

RESEARCH ON FMA LEASE OF WELDWOOD AT HINTON

**COMPILED BY
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The following is a summary compilation of research studies carried out by the Canadian Forestry Service since the late 1950's on the FMA lease area of Weldwood at Hinton. The summaries are arranged by program area:

- i) Resources (stand productivity, site productivity, silviculture);
- ii) Protection (insects, diseases);
- iii) Environment (fire, hydrology, climate); and
- iv) Economics.

Some studies have been arbitrarily placed in this arrangement as they overlap forestry disciplines. The following format is used for each study listing:

- (a) Study title, including study number(s);
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iv) Economics

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Study : Seed release from slash-borne lodgepole pine cones
(A 80)

Objectives: a) To determine rate of release, deterioration
in quality and loss to squirrels of
slash-borne seeds following clearcutting.

b) determine major factors affecting loss of
quality and rate of seed release from slash-
borne serotinous cones.

Status : Initiated in 1962 when three 5-acre lodgepole pine
stands were selected for study and clearcutting.
After logging, the amount and quality of
slash-borne seeds were determined by periodic
sampling during 1962, 1963, 1964 and 1966.

Reports : Ackerman, R.F. 1963. Seed release from slash-
borne lodgepole pine cones after clear-
cutting. Can. Dep. For., For.Res. Br.,
Calgary. Establishment Rep. 63-A-5.

Ackerman, R.F. 1966. Effect of storage in slash
on quantity and quality of lodgepole pine
seeds available for regeneration. Can. Dep.
For. Rural Dev., For. Br., For. Res. Lab.,
Calgary. Inf. Rep. A-X-3.

Contact : L.G. Brace

Current and
Long-term
plans : None

Study : Container planting in Alberta (A/T 105)

Objective: Experiments were designed to answer a series of questions related to container planting.

Status : Experiments were carried out between 1962 and 1966 with field plantings of various container stock. In 1965 NW Pulp & Power Ltd. initiated pilot trials of container plantings, based on the results of the experiments, with 1/4 million planted in 1965 and 1/2 million in 1966.

Reports : Ackerman, R.F. 1964. A field test of bullet planting in Alberta. Progress Report (Mimeo 64-A-7); 1965. Progress Report (Mimeo. 65-A-6)

Ackerman, R.F., D.I. Crossley, L.L. Kennedy and J. Chedzoy. 1965. Preliminary results of a field test of bullet planting in Alberta. Can. Dep. For., For. Res. Br., Publ. No. 1098.

Contact : L.G. Brace

Current and Long-term plans : None

Study : Evaluation of pilot scale container planting in the Alberta Foothills Section (A 268: NOR-002) and subsequent container studies including NOR-10-111.

Objective: Evaluate present system of container planting used by NWPP for white spruce and lodgepole pine on a variety of sites.

Status : Approximately 180 plots containing 100 marked seedlings were established in 1965, 1966 and 1967. First, third and fifth year tallies of survival and growth were carried out.

Reports : H.J. Johnson and F. Marsh. 1967. Preliminary evaluation of pilot-scale container planting in the foothills of Alberta. Can. Dep. For. Rural Dev., For. Br., For. Res. Lab., Calgary. Inf. Rep. A-X-11.

H.J. Johnson and G. Dixon. 1968. Preliminary evaluation of pilot-scale container planting in the foothills of Alberta-1966 planting. Can. Dep. For. Rural Devel., For. Br., For. Res. Lab., Calgary. Internal Rep. A-11.

G. Dixon and H.J. Johnson. 1969. Preliminary evaluation of pilot-scale container planting in the foothills of Alberta- 1967 planting. Can. Dep. Fish. For., For. Br., For. Res. Lab., Calgary. Internal Rep. A-19.

H.J. Johnson. 1972. Performance of container stock in Alberta. pp. 101-118. In. Proceedings of a workshop on container planting in Canada. Environ. Can., Can. For. Serv., DPC Ottawa Inf. Rep. DPC-X-2.

N.R. Walker and H.J. Johnson. 1974. Field performance of pine and spruce reared in the BC/CFS Styroblock-Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-84.

H.J. Johnson and N.R. Walker. 1976. Five-year field performance of pine and spruce styroplugs in Alberta. For. Chron. 52:197-198.

N.R. Walker. 1978. Field performance of Spencer-Lemaire container seedlings in west-central Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-207.

N.R. Walker and H.J. Johnson. 1980. Containerized conifer seedling performance in Alberta and the NWT. Environ. Can. Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-218.

N.R. Walker and W.J. Ball. 1987. Container seedling field performance after 10 years. Can. For. Serv., North. For. Cent., Edmonton. For. Manag. Note 44.

Contact : (H.J. Johnson) and N.R. Walker

Current and
Long-term
plans : None

Study : Stand modelling of the growth and development of important forest types in the Prairie Provinces (NOR-4-75, NOR-4-02)

Objective: To forecast growth and yield of forest stands growing under a range of site and density conditions using a stand growth model developed for this purpose.

Status : STEMS (Stand and Tree Evaluation and Modelling System) was tested on stands of jack pine, aspen, lodgepole pine and white spruce using PSP data, and has been calibrated for these species. Demonstations of model have been given.

Reports : Nil

Contacts : H. Grewal and I.E. Bella

Current and long term plans : Publish an information report on the testing and calibration work done on "STEMS" on jack pine and aspen in the Prairie Provinces. This model was developed and is being continuously updated at the NEFES of the USFS in St. Paul, Minn.

Study : Managed stand yield tables for lodgepole pine and white spruce in Alberta.

Objectives: To develop a growth and yield prediction system for second growth lodgepole pine and white spruce -- i.e., new stands that follow harvest and are being established through either natural regeneration or planting -- within an appropriate and available site classification framework. Yield estimates thus obtained should be suitable input for timber management system models (e.g., TIMPLAN) for AAC calculations.

Status : A new polymorphic height growth model has been developed for lodgepole pine in Alberta. The first version of a lodgepole pine growth model has been completed. Present efforts concentrate on report writing.

Reports : A paper by Tait, Cieszewski and Bella on lodgepole pine stands dynamics has been accepted for publication. A paper by Cieszewski on the new polymorphic height growth model is in review. A paper on the lodgepole pine stand growth model is in preparation.

Contact : C. Cieszewski

Current and Long term Plans : See Reports

Study : Juvenile height growth of white spruce and lodgepole pine following logging and scarification in west-central Alberta.

Objective: To obtain information on the juvenile growth rates of pine and spruce following logging.

Status : Results indicated that lodgepole pine regeneration exceeds the minimum 6-foot standards within 20-years but in many areas white spruce regeneration will not reach this minimum. Terminated.

Reports : W.D. Johnstone. 1976. Juvenile height growth of white spruce and lodgepole pine following logging and scarification in west-central Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-171.

Contact : (W.D. Johnstone, B.C. For. Serv., Vernon)

Current and Long term plans : None

Study : Growth and yield of five commercially important native species in Alberta, Saskatchewan, and Manitoba. (NOR-4-008, NOR-4-45, NOR-4-01)

- Objectives:
1. To construct yield tables for use in natural, unmanaged lodgepole pine, jack pine and aspen stands.
 2. To determine the effect of different types and intensities of thinning on subsequent growth and yield of lodgepole pine, jack pine and aspen.
 3. To determine growth and development of four indigenous conifer species, Picea glauca, Pinus banksiana, P. resinosa, and P. contorta var. latifolia at various spacings on major site types, so that optimum spacing can be selected for specific management objectives in future planting.
 4. Use all available growth and yield information on these species to derive and/or adapt a suitable stand growth model for evaluating stand management options in terms of growth and yield.

Status: Continuing. Some major findings are listed below:

- new equations derived to predict yield of lodgepole pine stands for age, stand density and site productivity
- spacing and thinning recommendations for lodgepole pine
- operational thinning guidelines
- yield losses relative to line clearings in stands
- incidence and impact assessment of major pests in second growth 1P and deriving strategies to reduce impact.

Reports : W.D. Johnstone. 1981. Effects of spacing 7 year-old lodgepole pine in west-central Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-236.

- W.D. Johnstone. 1976. Variable density yield tables for natural stands of lodgepole pine in Alberta. Can. Dep. Fish. Environ., Can. For. Serv., Ottawa. Forestry Tech. Rep. 20.
- I.E. Bella. 1974. Thinning young lodgepole pine is faster with a brush saw. For. Chron. 50:151-154.
- I.E. Bella. 1982. Effect of line clearing in forest stands on tree growth in western Canada. Can. For. Serv., North. For. Res. Cent., Edmonton. File Report.
- I.E. Bella. 1983. Natural lodgepole pine in west-central Alberta. Part I: Regeneration stocking. pp. 5-7. In. Lodgepole pine: Regeneration and Management. U.S.D.A., For. Serv., Pacific Northwest For. Ra. Exp. Stn., Portland, Ore., Gen. Tech. Rep. PNW-157.
- W.D. Johnstone. 1983. Natural lodgepole pine in west-central Alberta. Part II: Juvenile spacing. pp. 8-14. In. Lodgepole pine: Regeneration and Management. U.S.D.A. For. Serv., Pacific Northwest For. Ra. Exp. Stn., Portland, Ore., Gen. Tech. Rep. PNW-157.
- Bella, I.E. 1984. Growth models for yield forecasting in aspen and jack pine. Page 2 In Growth, yield, and ENFOR. Environ. Can., Can. For. Serv., North For. Res. Cent., Edmonton, Alberta. For. Rep. 29.
- Bella, I.E. 1984. Spacing is the key to improved yields in lodgepole pine. Page 4 In Growth, yield and ENFOR. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alberta. For. Rep. 29.
- Bella, I.E. 1985. Pest damage incidence in natural and thinned lodgepole pine in Alberta. For. Chron. 61(3):233-238.
- Bella, I.E. 1985. Western gall rust and insect leader damage in relation to tree size in young lodgepole pine in Alberta. Can. J. For. Res. 15:1008-1010.

Bella, I.E. and Navratil, S. 1987. Growth losses from winter drying (red belt damage) in lodgepole pine stands on the east slopes of the Rockies in Alberta. Can. J. For. Res. 17:1289-1292.

Bella, Imre E. and Stoszek, Karl J. 1988 Strategies for reducing impacts of terminal shoot insects. pp. 286-287. In Proc. "Future Forests of the Mountain West: A Stand Culture Symposium", Missoula, MT, Sep. 29 Oct. 3, 1986. USDA, Gen. Tech Rep. INT-243.

Navratil, S. And Bella, Imre E. 1988. Impact and reduction strategies for foliage and stem diseases and abiotic injuries of coniferous species. 310-321. In Proc. "Future Forests of the Mountain West: A Stand Culture Symposium". Missoula, MT, Sep. 29 - Oct. 3, 1986. USDA, Gen. Tech. Rep. INT-243.

Bella, I.E. and Navratil, S. 1988. Western gall rust dynamics and impact in young lodgepole pine stands in Alberta. Can. J. For. Res. (in press)

Tait, D.E., Cieszewski, C.J. and Bella, I.E. 1988. The stand dynamics of lodgepole pine. Can. J. For. Res. (in press)

Contact : I.E. Bella

Current and Long term plans :

- reanalyse the Gregg Burn 1P spacing data including current remeasurement and write up results.
- analyse leader damage (mainly from Pissodes spp.) impact on 1P height growth and prepare report.
- develop precommercial thinning prescriptions for young 1P that will consider western gall rust dynamics.
- develop yield prediction system for Alberta that will tie in with the provincial inventory and can be used for AAC calculation.

Study : Assessment of regeneration stocking standards used in Alberta.

Objective: To evaluate the suitability of the present stocking standards from the viewpoint of a desirable minimum standard that would ensure an acceptable wood fibre production.

Status : New minimum stocking standards were derived for the two most important commercial conifers, requiring 220 well dispersed lodgepole pine per acre or 300 well dispersed white spruce per acre. Also a larger 10 m² quadrat is suitable for spruce and 12 m² for pine. The corresponding minimum stocking percentages should be around 75% and 70% respectively.

Reports : I.E. Bella. 1976. Assessment of regeneration stocking standards use in Alberta. Environ. Can., Can. For. Serv. North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-167.

I.E. Bella and J.P. DeFranceschi. 1978. Assessment of regeneration stocking standards used in Alberta. A follow-up. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-211.

Contact : I.E. Bella

Current and Long term Plans : None

Study : Growth of fir and spruce advance growth and logging residuals following logging in west-central Alberta.

Objective: To obtain information on growth after clearcutting of white spruce, black spruce, and alpine fir advance growth and logging residuals.

Status : Spruce and fir logging residuals showed significant growth release after logging. The greatest release was in diameter growth; white spruce demonstrated the largest response of the species examined. Terminated.

Reports : W.D. Johnstone. 1978. Growth of fir and spruce advance growth and logging residuals following logging in west-central Alberta. Fish. Environ. Can., Can. for.Serv., North.For. Res. Cent., Edmonton. Inf. Rep. NOR-X-203.

Contact : (W.D. Johnstone, B.C. For. Serv., Vernon

Current and Long term plans : None

Study : Ingress of lodgepole pine and white spruce
regeneration following logging and scarification in
west-central Alberta.

Objective: To determine the rate of seedling ingress following
logging and scarification.

Status : Recommended that surveys be conducted after 8
growing seasons and consideration be given to
acceptance of all seedlings. Terminated.

Reports : W.D. Johnstone. 1976. Ingress of lodgepole pine
and white spruce regeneration following
logging and scarification in west-central
Alberta. Environ. Can., Can. For. Serv.,
North. For. Res. Cent., Edmonton, Inf. Rep.
NOR-X-170.

Contact : (W.D. Johnstone, B.C. For. Serv., Vernon).

Current and
Long term
Plans : None

Study : Planting chance and spacing trials in white spruce on different soils, in the Foothills Section, Alberta (A-83)

Objective: To determine the effects of site and initial spacing on planting chance, seedling mortality, and period growth in plantations of white spruce under aspen.

Status : Thirty-six acres of plantations were established in 1962 in 70-year old aspen with scattered white spruce. Four plantations were planted on crown land in the vicinity of Marlboro and Bickerdike. Terminated in 1969.

Report : Duffy, P.J.B. 1963. Plantations of white spruce under aspen on different soils, Foothills Section, Alberta. Can. Dept. For., For. Res. Br., Calgary. Establishment Rep. 63-A-11.

Contact : (P.J.B. Duffy, P.J.B. Duffy & Associates Ltd., West Vancouver)

Current and Long term plans : Potential to have plantations resurveyed in next few years.

Study : Development of regeneration silviculture for white spruce and lodgepole pine in the B.19 Forest Section of Alberta (A-54: A/T 54)

Objectives: 1. To test clearcutting and mechanical scarification as a regeneration method for lodgepole pine and white spruce on the major site types found within the Foothills Section.

2. To determine the major factors affecting success of scarification.

3. To establish demonstration areas.

Status : Initiated in 1958 on the lease area to determine optimum regeneration silvicultural practices for the major site conditions of the area. Regeneration response on eleven 5-acre scarified and un-scarified areas were measured during the first, second and fifth years following treatment. Terminated in 1969.

Reports : Ackerman, R.F. 1960. The development of regeneration silviculture for white spruce and lodgepole pine in the B. 19 Forest Section of Alberta. Progress Report - 1961.

Ackerman, R.F. 1962. Modifications in the environment of lodgepole pine germinants induced by scarification. Can. Dep. For., For. Res. Br., Mimeo. 62-13.

Contact : L.G. Brace

Current and Long-term plans : None

Study : Forest ecosystem classification and interpretations for forest management (NOR-27-169; NOR-10-193; NOR-10-04)

Objective: To classify forest ecosystems and make interpretations for forest management using available forest ecological and reconnaissance soil survey information.

Status : Field guide is published for west-central Alberta study area which includes NTS map sheets 83F (Edson), 83L (Wapiti) and 83K (Iosegun Lake). Eleven sample plots located during the Biogeoclimatic classification (1977-1980) are situated in the McLeod (6 plots), Embarras (3 plots) and Athabasca (2 plots) working circles.

Reports : Corns, I.G.W. and R.M. Annas. 1986. Field guide to forest ecosystems of west-central Alberta. Can. For. Serv. North. For. Cent., Edmonton, Alberta.

Corns, I.G.W. 1987. The study area-background supplement to Field Guide to forest ecosystems of west-central Alberta. File report. Can. For. Serv. North. For. Cent., Edmonton, Alberta.

Contact : I.G.W. Corns

Current and Long term plans : None

Study : Plant succession following clearcutting and scarification in lodgepole pine forests in the Lower Foothills of Alberta. (NOR-10-193)

Objective: To document plant succession and tree biomass accumulation following pulpwood clearcutting in west-central Alberta.

Status : Early plant succession and tree biomass accumulation was documented by Corns (1972) and Corns and LaRoi (1976) on 6 to 12 year old clearcuts sampled in 1970 and logged between 1958 and 1964. Twenty-five sample plots are located in the Marlboro working circle, compartment VII. In 1982, several (3) of the 25 year old plot areas were sampled for species composition and tree biomass. A report is in preparation.

Reports: Corns, I.G.W. 1972. Early plant succession after clearcutting of lodgepole pine in the Lower Foothills of Alberta. M.Sc. thesis, University of Alberta, Edmonton, Alberta.

Corns, I.G.W. and G.H. LaRoi. 1976. A comparison of mature with recently clear-cut and scarified lodgepole pine forests in the Lower Foothills of Alberta. Can. J. For. Res. 6:20-32.

Contact : I.G.W. Corns

Current and Long term plans : A manuscript "Succession and tree biomass accumulation after clear-cutting lodgepole pine in west-central Alberta - the first 24 years" was submitted to Can. J. For. Res. and is presently under revision.

Study : Compaction by forestry equipment and effects on coniferous seedling growth on four soils in the Alberta foothills.

Objective: To document the effects of summer logging and the use of site preparation equipment on soil bulk density in four soil associations encompassing a wide range of physical properties in west-central Alberta. White spruce and lodgepole pine seedling growth on soils compacted to field bulk densities was also studied in the greenhouse.

Status : Field work was done in 1983 and 1984 within the McLeod, Athabasca, Marlboro and Embarrass working circles of the Weldwood FMA.

Reports : Corns, I.G.W. 1988. Compaction by forestry equipment and effects on coniferous seedling growth on four soils in the Alberta foothills, Can. J. For. Res. 18:75-84.

Contact : I.G.W. Corns

Current and
Long term
plans : None

Study : Land classification for forest fertilization
(NOR-12-122)

Objectives: To develop and provide a land classification
system for the consideration and efficient
application of fertilizers for increasing forest
productivity.

Status : In 1970, three 40+ acre blocks were selected in 3
age classes of lodgepole pine on two soil types
south of Hinton. Plots were systematically laid
out in the blocks and the soils were sampled and
described, including some chemical analyses.
Funding was not continued.

Reports : Nil, except the base work was incorporated with the
10 year report of the fertilizer results.

Contacts : (W. Holland). R. Yang

Current and
long term
plans : None

Study : Fertilization of established lodgepole pine stands (NOR-04-04)

Objective: To assess the effects of fertilizing 70-year-old and 30-year-old lodgepole pine stands on stand growth and yield.

Status : Nitrogen (N) fertilizer improved total stand and merchantable volume production in 70-year-old pine stands on both Coalspur and Mercoal soils by as much as 34 m³ in total and 33 m³ in merchantable volume per hectare over the 10-year period, or a 50% improvement in wood production. In 30-year-old stands, fertilization improved tree diameter and volume increments but not stand volume. Fertilization effects were probably obscured by mortality. Fertilizer should be used in combination with thinning for effective fertilization of young dense lodgepole pine stands.

Fertilization had little effects on wood density tracheid length on 70-year-old lodgepole pine.

Reports : R.C. Yang. 1983a. Natural lodgepole pine in west-central Alberta. Part III. Fertilization. pp. 15-19. In. Lodgepole pine: Regeneration and Management. U.S.D.A. For. Serv., Pacific Northwest For. Range Exp. Stn., Portland, Ore., Gen. Tech. Rep. PNW-157.

R.C. Yang. 1983b. Composite design versus factorial experiments in forest fertilization trials. Can. J. For. Res. 13(3):438-444.

R.C. Yang. 1985a. Ten-year growth response of 70-year-old lodgepole pine to fertilization in Alberta. North. For. Res. Cent., Edmonton, Alberta. Inf. Rep. NOR-X-266.

R.C. Yang. 1985b. Effects of fertilization on growth of 30-year-old lodgepole pine in west-central Alberta. North. For. Res. Cent., Edmonton, Alberta. Inf. Rep. NOR-X-268.

G.F. Weetman, R.C. Yang and I.E. Bella. 1985. Nutrition and fertilization of lodgepole pine. Pages 225-232. In. Lodgepole pine: The species and its management. Symposium Proceedings (Ed.) D.M. Baumgartner, R.G. Krebill, J.T. Arnott and G.F. Weetman. Washington State Univ., Pullman, WA.

R.C. Yang and I.E. Bella. 1986. Fertilization improves stand productivity of preharvest lodgepole pine. North. For. Cent., Edmonton, Alberta. For. Management Note No. 36.

R.C. Yang, E.I.C. Wang and M.M. Micko. 1988. Effects of fertilization on wood density and tracheid length of 70-year-old lodgepole pine in west-central Alberta. Can. J. For. Res. In press.

Contact : R. Yang

Current and
Long term
plans : Study closed.

Study : Fertilization and thinning of semimature lodgepole pine stands (NOR-0405)

Objective: To assess the combined effects of fertilization and thinning on semimature lodgepole pine stand growth and to examine the interrelations of soil nutrient status, thinning, fertilization, foliar nutrient, foliar dimensional changes and tree/stand growth.

Status : Eighteen experimental blocks each consisting of four 9.5 m radius circular plots were established and half of these blocks were thinned in 1984. Four levels of N at 0, 180, 360, and 540 kg/ha were applied in the fall of 1985.

Foliar and soil samples have been taken annually since 1984 and nutrient status determined. Statistical analysis to determine effects of fertilization and thinning on foliar dimensional changes, foliar and soil nutrient status are in progress.

Reports : Nil

Contact : R. Yang

Current and Long term plan : Remeasurement to assess tree and stand responses to combined effects of fertilization and thinning is scheduled for the fall of 1990.

Study : Transformation and movement of applied fertilizer elements (N,P,S) in selected lodgepole pine stands (NOR-4-102, NOR-4-03)

Objective: To determine the influence of a soil series on the transformation of N, P and S fertilizers and the accumulation and distribution of these in the various inorganic and organic soil fractions. To also determine the association, if any, of a specific nutrient fraction with growth.

Status : The physical and chemical properties of two luvisols (Mercoal and Coalspur) influenced the distribution patterns of N, S and P observed.

Reports : J. Baker. 1973. Nitrogen fractionation of two forest soils in Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-63.

J. Baker. 1982. Five year residual effects of nitrogen, phosphorus and sulfur fertilization on the concentrations and distribution of these nutrients in the soil profiles of two luvisols. Can. For. Serv., North. For. Res. Cent., Edmonton. File Rep.

J. Baker. 1982. Five year residual effects of nitrogen, phosphorus, and sulfur fertilization on the foliar composition of lodgepole pine current growth. Can. For. Serv., North. For. Res. Cent., Edmonton. File Rep.

J. Baker. 1977. The reaction of two luvisolic forest soils to phosphate fertilization. Can. J. Soil Sci. 57:385-395.

J. Baker. 1987. Distribution of N in a simulated profile of a Podsollic Gray Luvisol following urea fertilization. Can. J. Soil Sci. 67:271-280.

J. Baker. 1987. Current information regarding fertilization of lodgepole pine and suggestions for future research. North. For. Cent., File Report.

J. Baker. 1987. The status of 3-N fractions in the profile of a Podsollic Gray Luvisol 6 and 12 weeks after fertilization with urea, NH_4NO_3 and $(\text{NH}_4)_2\text{SO}_4$. North. For. Cent., File Report.

J. Baker. 1988. An approach to balanced applications of N, P and S in the fertilization of lodgepole pine in the foothills. Rept. submitted to Can. J. For. Res.

Contact : (J. Baker)

Current and
Long term

Plans : None

Study : Differences in forest land productivity between five physiographic land conditions, Foothills Section, Alberta (A82)

Objective : To describe and explain a) the differences in productivity between five physiographic groups of land, b) the variation in productivity within each group, and c) the site factors which are useful in classifying denuded forest land or land supporting suitable stands for the sample of year. Terminated.

Status : Field work was completed in 1962 but no reporting was completed.

Reports : Nil

Contact : (P.J.B. Duffy, P.J.B. Duffy & Associates Ltd., West Vancouver)

Current and Long term plans : None

Study : Aspen ingress on cutovers designated for conifer production (NOR-10)

Objective: To quantify aspen ingress by suckering and seeding-in on pine cutovers and competition levels impacting growth, and to define the needs and efficacy of release treatments.

Status : Field surveys are in progress to relate aspen ingress to site, site preparation and composition of parent stands. Trials of alternative approaches to pine release are in a planning stage.

Reports : A progress report will be available in 1989.

Contact : S. Navratil

Current and Long term plans : See above - Reports

Study : Development and application of large-scale photography and image analysis techniques to forestry. (NOR-22-142)

Objectives: a. To utilize new techniques and apply appropriate sampling designs in the application of large-scale photography in acquiring resource inventory data; and,

b. To provide advisory and technology transfer services in the acquisition, uses, and analyses of remote sensing imagery, mapping, and in the operation of interpretation equipment.

Status : Some preliminary work for this on-going project was undertaken on the lease and used in the following report on assessment of regeneration by use of large-scale photography.

Report : C.L. Kirby. 1980. A camera and interpretation system for assessment of regeneration. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-221.

Contact : R.J. Hall

Current and Long term plans : None

Study : Estimation of logging residues using large-scale aerial photographs.

Objective: To investigate the application of large-scale aerial photographs to the estimation of logging residues using the line intersect technique.

Status : Measurement rates and precisions from photographs compared to ground survey were favorable and considerable potential for operational application was evident. A few problems were identified with solutions presented where applicable. Software programs are being developed for a fuelwood application in the Yukon Territories in conjunction with the Department of Indian Affairs and Northern Development in Whitehorse. Was updated and copy given but no Yukon activity at present.

Report : C.L. Kirby and R.J. Hall. 1979. The estimation of logging residues using large-scale aerial photographs. pp. 57-62. In D. Quintilio (Compiler) Proceedings of the International Fire Management Workshop. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-215.

Contact : R.J. Hall

Current and Long term plans : None

Study : Evaluation of mortality in stands of young trees in plantations and scarified areas (NOR-10-08).

Objective: To determine whether or not pine tree survival from establishment to age 35 years is related to site conditions, and if so, to prepare a set of survival curves for each site class.

Status : The locations of 69 sampling areas established in juvenile lodgepole pine stands near Hinton, Alberta, to monitor growth and survival are mapped. Brief descriptions of field and analytical methods are given. Annual and cumulative survival curves for low, medium, and high productivity areas are presented. Partial life tables were prepared for each of these areas and showed that the cumulative mortality after 25 years amounted to approximately 6, 34, and 22 % for low, medium and high productivity areas respectively. Armillaria root rot, Armillaria obscura (Pers.) Herink, and the Warren root collar weevil, Hylobius warreni Wood, caused most of the mortality on low productivity areas. Snowshoe hares, Lepus americanus Erxleben, were the most important mortality factor on medium productivity areas, while Armillaria root rot was the principal identified mortality agent on high productivity areas. Curves showing the infestation or damage rates of the major pests on an annual basis and in relation to stand age and density are given, followed by a discussion of the trends. Height increments of potential crop trees are influenced by tree age and area productivity, but not by stand density or Pissodes damage.

Reports : Ives, W.G.H. and C.L. Rentz. 1988. Life tables for juvenile lodgepole pine in the foothills of west-central Alberta: a progress report. Gov. Can., Can. For. Serv., North. For. Cent., Edmonton, Alberta. Unpubl. Rep.

Contact : W.G.H. Ives

Current and Long term plans : It is hoped that 1987-88 mortality and tree condition can still be assessed in the fall of 1988, but this is contingent upon help being available, and upon an open fall, especially if the work extends into October. Long-term plans are difficult to formulate. Ideally, the study should be continued another 5 years, with annual examinations, as this would take the study through one complete snowshoe hare cycle, but this is probably impractical.

If the 1987-88 data is obtained, it is planned to incorporate it into the progress report, which would then be upgraded to an information report, to be completed after the contact person retires. No future publications are planned, at least until the future of the study is more certain.

Study : Protecting white spruce understories (Project 1480)

Objective: To evaluate harvestable aspen stands with white spruce understories from the point of view of logging costs, understory damage and subsequent understory development for a range of harvesting options and understory densities, and to report results.

Status : Stand selection and logging option criteria have been determined . Stands selected on company limits and stand inventories completed. Logging plans have been prepared and harvesting is expected to proceed by mid-September 1988.

Reports : Brace, L.G. and Bella, I.E. 1988. Understanding the understory: dilemma and opportunity. In Proc. Management and utilization of northern mixedwoods. Edmonton, Alberta, Apr. 11-14, 1988. Can. For. Serv., North. For. Cent., Edmonton. NOR-X-296, pp. 69-86.

Contact : L. Brace or R. Waldron

Current and Long-term plans : See status

Study : Detection and appraisal of tree pests and vegetative disturbance (CP-2; CR-2; A/T 217; A/T 237; NOR-1-033; NOR-11-01)

Objectives: To investigate and monitor the occurrence, abundance and damage caused by forest insects and diseases and other tree damage agents and to report these pest conditions in annual reports.

Status : Annual surveys of pests and conspicuous forest damage have been conducted since 1941. Infestations of major insect and disease outbreaks have been monitored and their impact on the forest resource have been assessed and published.

Permanent plots of 2-6 years duration, were established in the 1960's in the leased area to study the impact of Armillaria root rot. Atropellis canker, western gall rust, root collar weevil, red belt, etc.

Reports : Anonymous. 1939-1983. Annual reports of the Forest Insect and Disease Survey, 1936 to 1983. Environ. Can., Can. For. Serv. Ottawa, Ont.

_____. 1946-70. Annual district reports, Forest Insect and Disease Survey, 1945-1969. Dep. Fish. For. Can. For. Serv. Calgary, Alberta.

_____. 1971-77. Annual district reports: Forest Insect and Disease Survey, Prairies Region, 1970-1977. Environ. Can., Can. For. Serv., Edmonton, Alberta.

_____. 1978-83. Forest insect and disease conditions in Alberta, Saskatchewan, Manitoba, and the Northwest Territories, 1977-82. Environ. Can., Can. For. Serv., Edmonton, Alberta.

_____. Several Annual File Reports.

Baranyay, J.A. and G.R. Stevenson. 1964. Mortality caused by Armillaria root rot, Peridermium rusts, and other destructive agents in lodgepole pine regeneration. For. Chron. 40:350-361.

Bourchier, R.J. 1954. Armillaria root rot of natural lodgepole pine regeneration in Alberta. Can. Dep. Agric., Sci. Serv., For. Biol. Div. Bi-mon. Prog. Rep. 10(1):4.

Bourchier, R.J. 1957. Red belt, Atropellis canker, and tree mortality of lodgepole pine in Alberta. Can. Dep. Agric., Sci. Serv., For. Biol. Div. Bi-mon. Prog. Rep. 13(2):2-3.

J.K. Robins and J.P. Susut. 1972. Weather damage to lodgepole pine in the Coal Branch area of Alberta in 1971. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. File Rep. NOR-Y-18.

J.K. Robins and J.P. Susut. 1974. Red belt in Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-99.

Additional Reports and Publications

Anon. Forest insect and disease conditions in Alberta, Saskatchewan, Manitoba, and the Northwest Territories in 1979 (Inf. Rep. NOR-X-225); in 1980 (Inf. Rep. NOR-X-231); in 1981 (Inf. Rep. NOR-X-239); in 1982 (Inf. Rep. NOR-X-248); in 1983 (Inf. Rep. NOR-X-261); in 1984 (Inf. Rep. NOR-X-269); in 1985 (Inf. Rep. NOR-X-276) and in 1987 (Inf. Rep. in Press)

See also the following for references specific to Hylobius warreni control trials on FMA lease of Weldwood:

Project NOR-132

Drouin, J.A. and D.S. Kusch. 1975. Pesticide field trials on shade and shelterbelt trees in Alberta and Saskatchewan, 1974. Environ. Can., Can. For. Serv., North. For. Res. Cent. Inf. Rep. NOR-X-131.

Drouin, J.A. and D.S. Kusch. 1978. Pesticide field trials on shade and ornamental trees in Alberta, 1977. Fisheries and Environ. Can., Can. For. Serv., North. For. Res. Cent., Inf. Rep. NOR-X-205.

Include also: Re ref. to pests in McLeod Working Circle:

Dempster, W.R. and N.A. Stevens. 1987. Risk management in forest planning. Joint publ. of Canadian For. Serv. (North. For. Cent.) and Alberta For. Serv. under the Canada-Alberta Forest Resource Devel. Agreement.

Contacts : H. Cerezke, and W.J.A. Volney

Current and Long term plans : Forest Insect and Disease Survey unit of CFS will continue to monitor for pests and tree damaging agents on an annual basis within FMA lease of Weldwood on a request basis, and will seek to include the FMA in plantation surveys for pests and pest damage impact

Study : Studies of the root-collar weevil, Hylobius warreni Wood and its ecological relationships in lodgepole pine stands. (CZ-9; A/T 244; NOR-024; NOR-11-03).

Objective : To investigate weevil abundance, its distribution, damage relationships and behavior in lodgepole pine stands in Alberta.

Status : Studies of the root-collar weevil commenced in 1961 and continued to 1967, with carry over of some aspects to 1975. Initially, most field plot studies were conducted in natural stands within St. Regis (Alberta) Lease Area, then later expanded to other locations along the Alberta foothills from west of Sundre to near Grande Prairie. Most of the data have been summarized in reports cited below. Some major findings are as follows:

Highest incidence of the weevil occurs within the Lower Foothills Section between 760 and 1220 m elevation and none were found above 1585 m. Within even-aged stands weevil numbers were proportional to stand density, tree size, and site quality. Population estimates varied mostly between 494 and 2965 per ha., and can be present in stands from about age 6 years to maturity. Tree mortality, resulting from girdling feeding activity of the larvae, rarely exceeded 10%, and was most common on trees less than 20 years old growing on high quality sites, and particularly when well spaced. Up to 100% of trees within infested stands, however, exhibit cumulative weevil feeding scars in the root-collar zone by age 60 years. Growth loss effects from degrees of partial girdling were evaluated radially on the stem and root, and vertically on the stem. The life cycle development of H. warreni, its survival, sex ratios, oviposition, host selection pattern and dispersal behaviour were described within and adjacent to commercial clearcut stands. Sampling methodology was developed for general survey and population census. A field experiment was conducted to evaluate thinning treatment on subsequent weevil abundance and tree damage, but some of the field results were negated by severe hail damage.

Reports : Cerezke, H.F. 1967. A method for rearing the root collar weevil, Hylobius warreni Wood (Coleoptera: Curculionidae). Can. Entom. 99:1087-1090.

- _____. 1968. A root collar weevil on lodgepole pine in Alberta. Can. Dep. For. Rural Develop., For. Br. Res. News 11 (3):11.
- _____. 1970. The distribution and abundance of the root weevil, Hylobius warreni Wood in relation to lodgepole pine stand conditions in Alberta. (Abstr.) Diss. Abstr. Int., B.Sci. Eng. 30(9):4187-7-B.
- _____. 1970. A method for estimating abundance of the weevil Hylobius warreni Wood, and its damage in lodgepole pine stands. For. Chron. 46:392-396.
- _____. 1970. Biology and control of Warren's collar weevil, Hylobius warreni Wood, in Alberta. Can. For. Serv., Edmonton. Internal Rep. A-27.
- _____. 1970. Survey report of the weevil, Hylobius warreni Wood, in the foothills of Alberta. Can. For. Serv., Edmonton, Internal Rep. A-38.
- _____. 1972. Effects of weevil feeding on resin duct density and radial increment in lodgepole pine. Can. J. For. Res. 2:11-15.
- _____. 1973. Bark thickness and bark resin cavities on young lodgepole pine in relation to Hylobius warreni Wood (Coleoptera: Curculionidae). Can. J. For. Res. 3:599-601.
- _____. 1973. Some parasites and predators of H. warreni in Alberta. Environ. Can., Can. For. Serv. Bi-Mon. Res. Notes 29:24-28.
- Cerezke, H.F. 1973. Survival of the weevil, Hylobius warreni Wood, in lodgepole pine stumps. Can. J. For. Res. 3:367-372.
- _____. 1974. Effects of partial girdling on growth in lodgepole pine with application to damage by the weevil Hylobius warreni Wood. Can. J. For. Res. 4:312-320.

Contact: H.F. Cerezke

Current and
Long term
plans :

Plantation surveys initiated in 1987 in all three Prairie Provinces indicated H. warreni to be one of the 3 to 5 top damaging agents in young lodgepole and jack pine stands. In June, 1988, visitation was made to the Grande Prairie area to view three plantations established in 1981 that represent part of a major genetic tree improvement program. The sites examined were progeny tests of 400 families of lodgepole pine; all were established in previously logged pine sites that supported rootcollar weevil populations. In each of the three plantations, H. warreni was now the main damage agent, accounting for 2-10% tree mortality, and its larvae and damage were present on an estimated 30% of trees in one of the plantations.

Based on provincial and industrial concerns of the above scenario, a new research proposal is being discussed to initiate studies on rootcollar weevils, specifically in relation to young high-value stands. Five short (2-4 yrs) and long-term (5-6 yrs) objectives identified include:

- 1) Identify sources and levels of rootcollar weevil populations in mature pine stands during pre- and post-harvest periods;
- 2) Identify rootcollar weevil distribution and attack patterns within young planted or naturally stocked pine stands;
- 3) Test and modify or adapt established methods for estimating populations of root collar weevils and their dispersal behavior in young stands;
- 4) Investigate control options (e.g. biological agents, cultural and insecticidal controls and pheromones) and undertake field test trials;
- 5) Prepare guidelines for an integrated pest management strategy of rootcollar weevils in young high-value stands.

It is anticipated that experimental locations would mostly include the Alberta foothills initially, with application of experimental trials in other locations of the Prairie Provinces.

Study : Armillaria mellea, stem rusts, and other destructive agents in young lodgepole pine stands (A/T-217, NOR-034).

Objectives: 1. Describe the long-term variation of disease occurrence in post-fir natural lodgepole pine stands.

2. Identify and assess the factors affecting the incidence and rate of damage caused by Armillaria mellea.

3. Record the presence and effect of other infectious and non-infectious agents in the development of lodgepole pine stands.

Status : An area of about 1,000 acres known as the Robb Burn was burned in May, 1941. Area surveyed at different times in the 1950's. In 1957 seven 1/20-acre sample plots were established and then re-surveyed every three years until 1976. Data has been analysed and has been used in some general reports to which it related, however, the results of the 1962 re-survey were published separately.

Reports : Baranyay, J.A. and G.R. Stevenson. 1964. Mortality caused by Armillaria root rot, Peridermium rusts and other destructive agents in lodgepole pine regeneration. For. Chron. 40:350-361.

Contact: Y. Hiratsuka

Current and Long-term plans : A survey of the present situation of the seven plots may be feasible and worthy of reporting.

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Study : Studies on the Armillaria mellea complex in the Northern and Western region. NOR-11-09

Objectives: 1. To determine what members of the Armillaria complex are found in northern and western region and their geographic and host distribution.

2. To determine the relative pathogenicity of the Armillaria complex to lodgepole pine.

3. To map the distribution of Armillaria in specific sites by use of the trap log technique.

4. To develop early detection and survey techniques for Armillaria root rot.

Status : Study is ongoing. Results to date have shown that two species of Armillaria are in Alberta, that both of these species are pathogenic to lodgepole pine, that the trap log technique can be used to detect and map the distribution of Armillaria in a site.

Reports : Mallett, K.I. and Y. Hiratsuka. 1984. The identity of the Armillaria mellea complex in Alberta. Am. Phytopath. & Can. Phytopath. Societies joint meeting. Phytopathology 74:824.

Mallett, K.I. and Y. Hiratsuka. 1985. The "traplog" method to survey the distribution of Armillaria mellea in forest soils. Can. J. For. Res. 15:1191-1193.

Mallett, K.I. and Y. Hiratsuka. 1988. Inoculation studies of lodgepole pine with Alberta isolates of the Armillaria mellea complex. Can. J. For. Res. 18:292-296.

Contact : Ken Mallett

Current and Long term plans : A study into the use of the traplog technique as a survey tool to detect Armillaria root rot is planned for the next 3 years. A report on the identity and distribution of the Armillaria species in the prairie provinces is in preparation. An information report on Armillaria root rot in the prairie provinces is in preparation.

Study : Western gall rust resistant/susceptibility study in relation to genetic improvement program of lodgepole pine; NOR-11-06

Objective: To investigate the relative resistant/susceptibility or phenological escape of lodgepole pine to western gall rust.

Status : A study plot 31 km south east of Hinton on the Forestry Trunk road was established in 1983. Scions from 10 tagged field resistant and 10 field susceptible trees were collected and grafted. Four graftlings for each tree (20 x 4 = 80) have been planted at NoFC site for further study.

Contact : Y. Hiratsuka and P.J. Maruyama

Current and Long term plans : Want to keep tagged trees (20) for future observation and possible seed collection.

Study : Impact of a fir needle rust, Pucciniastrum epilobii, on regeneration of alpine fir in Hinton, Alberta area (A/T-254; NOR-35-026; NOR-11-06)

Objectives: 1. To appraise the impact of needle rust on Abies spp. in potentially commercial stands.

2. To investigate, susceptibility and resistance taking into consideration such factors as morphological variations, site and age.

3. Investigate recurrence in a given area and on any given tree.

4. Correlate presence or absence of rusts on alternate hosts with rust on fir.

Status : Established in 1968 in the Camp 22 area southeast of Hinton. Analysis of preliminary data obtained in 1971 indicated the feasibility of continuing this project.

Reports : There are no reports to date, however, samples collected in 1965 from the same site were used for the publication.

Y. Hiratsuka, L.E. McArthur, and F.J. Emond. 1967. A distinction between Pucciniastrum goeppertianum and P. epilobii with classification of status of Peridermium holwayi and P. ornamentale. Can. J. Botany 45:1913-1915.

Contact : Y. Hiratsuka

Current and Long-term plans : In 1989 or 1990, intend to re-locate the site; find 10 tagged trees (4 heavily infected; 3 lightly infected; 3 not infected); and measure heights, diameters, etc. of the ten tagged trees to evaluate the impact of the needle rust in young stands.

Study : Aerobiology of Comandra blister rust, Cronartium comandrae (A 236; NOR-7-094)

Objective: Conduct surveys to ascertain the distribution of the rust in the region, and the incidence and role of the associated rodents, insects and microflora: (Other objectives not relevant to studies on lease area).

Status : Annual surveys carried out between 1964 and 1972 included monitoring of one plot in the Robb burn area. The odd other collection was also made on the lease area. The data on canker growth from this plot has not been published although some information on the associated agents has been published in the following publications.

Reports : J.M. Powell. 1970. Cronartium comandrae in Canada, its distribution and hosts. Can. Plant Dis. Surv. 50:130-135.

J.M. Powell. 1971. Occurrence of Tuberculina maxima on pine stem rusts in western Canada. Can. Plant Dis. Surv. 51:83-85.

J.M. Powell. 1982. Rodent and lagomorph damage to pine stem rusts, with special mention of studies in Alberta. Can. Field-Naturalist 96:287-294.

Contact : J.M. Powell

Current and Long-term plans : None

Study : Microbial populations associated with various forest sites (A 303)

Objective : To characterize the microbial population found under three forest types as to fluctuation in total population and the nutritional requirement of that population, and to correlate these fluctuations with differences in soil temperature, moisture and pH.

Status : Initiated in 1968 with selection of white spruce, lodgepole pine and aspen plots. Populations were sampled from various horizons and 400 organisms were picked. Technique used proved to be unsuitable for grouping the forested soil microflora.

Reports :

Contact : (J.A. Dangerfield, FORINTEK Canada Ltd.)

Study : Effects of atmospheric effluents on forest soils
(NOR-7-162)

Objective: To determine the influence of air pollutants such
as SO₂ on 1) amount, form and region of
accumulation of chemical constituents in the soil,
2) soil micro-flora, especially sulfur and nitrogen
organisms, 3) sulfur availability in the soil and
the effect of this on sulfur up-take in plants.

Status : Laboratory studies were undertaken with soil
samples from the L-F-H, AE, Bf and Bt horizons of
the Mercoal, Bisequa Luvisol Gray Wooded soil from
the Hinton area, to determine specific soil
properties likely to be influenced by SO₂
contamination. In 1974 an evaluation of airborne
sulfur and suspected sources of emission was
undertaken in the vicinity of Hinton. A build up
of sulfur in soil and vegetation was recorded in
the vicinity of Hinton but there were no
indications of damage.

Reports : J. Baker. 1975. Atmospheric sulfur compounds and
their effect on soil. North. For.Res. Cent.,
Edmonton., File Rep.

J. Baker, 1976. Atmospheric deposition of sulfur,
calcium and magnesium at sites surrounding the
North Western Pulp & Power Plant, Hinton,
Alberta. North. For.Res. Cent., Edmonton.
File Rep.

J. Baker. 1976. Accumulation and impact of
airborne sulfur compounds on soil and
vegetation in the vicinity of Hinton, Alberta.
Environ. Can., North. For. Res. Cent.,
Edmonton. File Rep. 162.

Contact : (J. Baker)

Current and
Long term
plans : None

Study : Effect of risk factors on annual allowable cut.

Objective: To develop improved modelling techniques for making realistic projections of future timber supplies under fire, and insect and disease risk factors. The implications of risk in relation to harvest schedules, investment decisions, and to boreal forest management in general were examined, and the importance of risk management in forest planning was emphasized.

Status : This study conducted by W.R. Dempster & Associates in the McLeod Working Circle of Hinton leasehold in 1987.

Reports : Dempster, W.R., and N.A. Stevens. 1987. Risk management in forest planning. Canada-Alberta Forest Resource Development Agreement.

Singh, T. 1987. Risk factor modelling for forest yield predictions in Alberta, Canada. Pages - In U.S. Forest Service, Proceedings of the Forest Growth Modelling and Prediction Conference, Department of Forest Resources, U. of Minnesota, St. Paul, Mn.

Singh, T. 1988. Modelling forest yield risk factors in Canada. National Woodlands 11(1):21-22.

Contact : T. Singh

Current and Long term plans : Climate change is likely to be a major risk factor in the future management of Hinton FMA. The following studies are required for providing the needed solutions for all the above-mentioned risk factors influencing annual allowable cut.

1. Develop climate related forest productivity models for adjusting forest productivity estimates under the changed climatic conditions.
2. Study the likely changes in commercial and nonmarket values of the boreal forest as its boundaries shift gradually northwards.

Study : Technical and advisory services program in fire
(NOR-087)

Objectives: a. 1. To determine the feasibility of using
prescribed fire to reduce or eliminate pine
saplings in a 14-year-old, overdense pine
stand of fire origin.

2. To determine the short-term effects of fire on
pine saplings, duff layer, and lesser
vegetation.

b. 1. To establish the correlation between seasonal
and yearly fire severity and fire business on
N.W.P.P. lease limits and adjacent areas.

Status : a. An area was selected for burning on the Gregg Burn,
a 1-acre plot and a one 20' x 20' test plot, both
plots supporting about 500,000 stems/acre. Plans
to burn in 1971 were not completed because of
unsuitable weather conditions.

b. Analysis was undertaken of 10 years of weather data
obtained from seven weather stations located on the
lease prior to 1970 to establish seasons and daily
fire weather severity. A file report was submitted
to NWPP and the information incorporated for future
fire control planning on the lease limits.

Report : (See above)

Contacts : A.D. Kiil (D. Quintilio)

Current and
Long term
plan : None

Study : A study of hazard and flammability of white spruce and lodgepole pine slash in Alberta (A-603; A/T 127)

Objectives: To assess the relative slash hazard and flammability of lopped and unlopped white spruce and lodgepole pine slash at various stages of decay.

To study fire behaviour under controlled burning conditions, to develop practical procedures for prescribed burning.

Status : Initiated in 1962 and carried out north of Chip Lake, before being terminated in 1969.

Reports : A.D. Kiil. 1964. A study of slash hazard and flammability on cutovers in Alberta. Can. Dep. For., For. Res. Br., Calgary. Mimeo. 64-A-4.

A.D. Kiil, 1966. Three prescribed burns in 1-year old white spruce slash. Can. Dep. For., For. Res. Lab., Calgary. Int. Rep. A-6.

Contact : A.D. Kiil

Current and Long-term plans : None

Study : Slash weight and size tables for white spruce and lodgepole pine in Alberta (A-601; A/T 125)

Objectives: 1. To determine the effect of stem and crown parameters on crown weight and size distribution.

2. To determine the weight of the unmerchantable portion of the stem of different tree sizes.

3. To prepare fuel weight and size tables.

Status : Initiated in 1962 and completed in 1967. Included analysis of 60 white spruce, 101 lodgepole pine, black spruce and alpine fir.

Reports : Kiil, A.D. 1965. Weight and size distribution of slash of white spruce and lodgepole pine. Can. Dep. For., For. Res. Br., Calgary. Mimeo 65-A-6.

Kiil, A.D. 1965. Weight and size distribution of slash of white spruce and lodgepole pine crowns in Alberta. For. Chron. 41:432-437.

Kiil, A.D. 1967. Fuel weight tables for white spruce and lodgepole pine crowns in Alberta. Can. Dep. For. Rural Develop., For.Br. Ottawa. Publ. No. 1196.

Kiil, A.D. 1969. Estimating fuel weights of black spruce and alpine fir crowns in Alberta. Can. Dep. Fish. For., For. Br., Ottawa. Bi-mon. Res. Notes 25:31-32.

Contact : A.D. Kiil

Current and Long-term plans : None

Study : A preliminary study of the physical characteristics and moisture content of clearcut lodgepole pine and white spruce slash in Alberta. (A-602; A/T 126).

Objective: To provide a basis for a practical assessment of slash hazard at various stages after logging for lodgepole pine and white spruce slash.

Status : Initiated in 1963 and terminated in 1969. Fuel moisture sampling immediately after clearfelling was carried out in the springs of 1963 to 1966. Most pronounced changes in slash moisture occur during the first two fire seasons after logging, with subsequent fluctuations being dependent on weather conditions.

Reports : A.D. Kiil. 1964. A preliminary study of the physical characteristics and moisture content of clearcut lodgepole pine and white spruce slash in Alberta. Can. Dep. For., For. Res. Br., Calgary. Progress Rep. 64-A-5.

A.D. Kiil. 1968. Changes in the physical characteristics and moisture content of pine and spruce-fir slash during the first five years after logging. Can. Dep. For. Rural Develop., For. Br., For. Res. Lab., Edmonton. Int. Rep. A-14.

Contact : A.D. Kiil

Current and Long-term plans : None

Study : The fuel complex in mature lodgepole pine stands of fire origin (A-605; A/T 129)

Objective: To develop a quantitative method of fuel classification whereby fuel weight and size can be predicted from measurement of stand parameters.

Status : Thirty 1/10 acre sample plots and 90 sub-plots were measured during 1965 and 1966.

Reports : A.D. Kiil. 1967. The fuel complex in 70-year-old lodgepole pine stands of different densities. Univ. Montana, Missoula. M.Sc. Thesis.

A.D. Kiil, 1968. Weight of the fuel complex in 70-year-old lodgepole pine stands of different densities. Can. Dep. For. Rural Devel., For. Br., Ottawa. Publ. No. 1228.

Contact : A.D. Kiil

Current and Long-term plans : None

Study : Prescribed fire following clearcutting of overmature spruce-fir in the Foothills Section of Alberta (A 304; NOR-5-092)

Objectives: a. Investigate the techniques and logistics of prescribed fire use in the overmature spruce-fir slash-fuel type.

b. Evaluate the effects of prescribed burning in terms of slash hazard, fuel moisture, burning indices and fire intensity.

c. Determine the relationship between the U.S. Buildup Index and the moisture content of the L,F and H layers in spruce-fir stands and in clearcut areas.

Status : Study begun in 1967 and completed in 1973. Involved blocks selected on each of two site conditions, shallow or deep organic. Inventories carried out prior to clearcutting and following clearcutting to establish weight-and-size distribution of slash prior to burning. Sampling points used to facilitate assessment of fuel consumption and depth of prescribed burn.

Reports : Kiil, A.D. 1969. Basic considerations in the planning and use of prescribed fire. Can. Dep. Fish. For., Can. For. Serv., For. Res. Lab., Calgary. Inf. Rep. A-X-21.

Kiil, A.D. 1969. Fuel consumption by a prescribed burn in spruce-fir logging slash in Alberta. For. Chron. 45:100-102.

Kiil, A.D. 1970. Distribution of moisture in spruce-fir duff and its relevance to fire danger rating. Can. Dep. Fish. For., Can. For. Serv., For. Res. Lab., Edmonton. Int. Rep. A-34.

Kiil, A.D. and Z. Chrosciewicz. 1970. Prescribed fire - its place in reforestation. For. Chron. 46:448-451.

Kiil, A.D. 1971. Prescribed burning in spruce-fir slash in Alberta. A 16-mm color movie with sound track.

Kiil, A.D. 1971. Prescribed fire effects in subalpine spruce-fir slash. Can. Dep. Environ. Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-3.

Kiil, A.D. 1971. fire hazard from large block clearcutting in Alberta. pp. 75-94. In. Some implications of large-scale clearcutting in Alberta-A literature review. Can. Dep. Environ., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-6.

Contact : A.D. Kiil

Current and Long-term plans : None, but consideration could be given to measure plantation performance on the burned blocks.

Study : Prescribed burning following cutting of spruce/fir in the foothills section of Alberta (A-270; NOR-003)

- Objectives:
1. To describe the effects of prescribed burning at a range of intensities on the following site factors which are regarded as of major importance to the establishment and growth of regeneration; nature of seed bed and root environment in terms of depth of moss, L, F and H layers; ground vegetation regarded as possible competitor with seedlings, soil temperature in the seedling rooting zone, soil moisture.
 2. To evaluate the effect and permanency of these changes in terms of growth and survival of artificially established seedlings of lodgepole pine and white spruce, reversal of site deterioration.
 3. From these facts, to decide whether prescribed burning has any silvicultural value on these and similar sites and to suggest necessary further investigation on techniques for general use.

Status : Commenced in 1968 with the selection of four 15-25 acre blocks on two different sites, one with shallow and one with deep duff. Burning treatments were applied in 1968 and 1969 and post burning assessments carried out. Soil temperatures were followed, and survival and growth measurements of planted and seeded stock were undertaken. Recolonising vegetation was enumerated.

- Reports :
- F. Endean. 1972. Soil temperature, seedling growth and white spruce regeneration. pp. 15-20 In. R.G. McMinn. White spruce: the ecology of a northern resource. Environ. Can., Can. For. Serv., North For. Res. Cent., Edmonton. Inf. Rep. NOR-X-40.
- F. Endean and W.D. Johnstone. 1974. Prescribed fire and regeneration on clearcut spruce-fir sites in the foothills of Alberta. Environ. Can., Can. For. Serv., North For. Res. Cent., Edmonton. Inf. Rep. NOR-X-126.

Contact : (F. Endean; W.D. Johnstone) L.G. Brace

Current and Long term plans : None

Study : Effects of prescribed fire on peaty humic gleysols and gray wooded soils under spruce-fir forests (A 295; NOR-10-004)

Objective : Evaluate the prescribed fire effects on various physical and chemical soil properties.

Status : Commenced in 1967 on the lease area, when series of soil moisture units were established on each of four blocks following prescribed burning. Measurements of soil moisture and temperature were obtained for five growing seasons, and soil samples were collected for chemical analyses for four consecutive years.

Reports : Lesko, G.L. 1971. Early effects of a prescribed fire in spruce-fir slash on some soil properties. Can. Dep. Fish. For., For. Res. Lab., Edmonton. Internal Rep. A-44.

Lesko, G.L. 1972. Immediate effects of a prescribed fire on soil properties. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Forestry Report 1(6):4.

Contact : (G.L. Lesko, syncrude Ltd.)

Current and Long term plans : None

Study : Infiltration and erosion as influenced by land use
(NOR-13-141)

Objective : To develop and test methodology for on-site
evaluation and assessment of infiltration capacity
ratings of vegetation-soil types for erosion hazard.

Status : Different forest types and soil associations were
selected on the lease area for infiltration capacity
ratings and assessment. Study completed and report
published.

Reports : T. Singh. 1983. Proposed method of preliminary
assessment of estimating erosion hazards in
west-central Alberta. Can. For. Serv.,
North. For. Res. Cent., Edmonton. Inf. Rep.
NOR-X-251.

T. Singh. 1984. Infiltration as an indicator of
erosion susceptibility. National Woodlands
7(2):23.

Contact : T. Singh

Current and
Long term
Plans : None

Study : Impact of clearcutting on forest environment:
Quantitative evaluation of the effects of pulpwood
harvesting in Western Alberta on water yield,
physical water quality, and streamflow regime.
(NOR-13-121)

Objectives: a. To quantitatively determine the impact of
present and past timber harvesting operations
on channelized streamflow and physical water
quality.

b. To identify sources of sediment.

Status : Composite streamflow hydrographs were developed for
9 uncut and 9 harvested catchments. The water yield
from the logged catchments was 42 mm more than the
unlogged controls, a difference of 27%. Most of the
increase occurred during the early spring snowmelt
period which is associated with frequent periods of
rain in this region. Suspended sediment
measurements confirmed that most sediment originates
from erosion at road stream crossings. A bush mulch
was found to be effective in controlling erosion and
sediment from these sources.

Reports : Swanson, R.H. and G.R. Hillman. 1977. Predicted
increased water yield after clearcutting
verified in west central Alberta. Fish. and
Environ. Can., Can. For. Serv., North. For.
Res. Cen., Inf. Rep. NOR-X-198.

Swanson, R.L. and G.R. Hillman. 1977. Effect of
large-scale-clearcutting on water yield in
western Alberta. pp. 256-271. In. R.H.
Swanson and P.A. Logan (Eds.) Alberta
Watershed Research Program Symposium
Proceedings, 1977. Fish. Environ. Can., Can.
For. Serv., North. For. Res. Cent., Edmonton.
Inf. Rep. NOR-X-176.

Rothwell, R.L. 1977. Suspended sediment and soil
disturbance in a small mountain watershed
after road construction and logging. pp.
285-300. In. R.H. Swanson and P.A. Logan
(Eds.). Alberta Watershed Research Program
Symposium Proceedings, 1977. Fish. Environ.
Can., Can. For. Serv., North. For. Res. Cent.
Edmonton. Inf. Rep. NOR-X-176.

Rothwell, R.L. 1983. Erosion and sediment control at road-stream crossings. Forestry Chronicle 59:62-66.

Hillman, G.R., J.M. Powell and R.L. Rothwell. 1978. Hydrometeorology of the Hinton-Edson area, Alberta, 1972-1975. Fish. and Environ. Can., Can. For. Serv., North. For. Res. Cent., Inf. Rep. NOR-X-202.

Contacts : R.H. Swanson, G.R. Hillman (NoFC); R.L. Rothwell (U of Alberta).

Current and
Long term
plans : None

Study : Water quality and road-side soil erosion and sedimentation at logging road-stream intersections (NOR-13-161).

Objective: To determine and demonstrate the effects of erosion-sedimentation controls at logging road-stream intersections in terms of suspended sediment concentrations and discharge determined upstream and downstream from road-stream crossings.

Status : The effectiveness of a "brush mulch" to control erosion and sediment at road-stream crossings was evaluated by measurement and comparison of upstream and downstream suspended sediment. The brush mulch consisted of logging debris, such as branches, tree tops and logs 2-15 cm in diameter, laid on the ground to intercept and to slow overland flow and to trap sediment. Two treatments were defined and tested. Treatment no. 1 was a brush mulch and grass-fertilizer mixture applied by hydroseeding to three bare soil road-stream crossings. Treatment no. 2 was a grass-fertilizer mixture applied by hydroseeding to another three road-stream crossings.

Total seasonal and storm sediment production for mulched and unmulched crossings averaged 31 and 37, and 566 and 2297 kg/day/ha, respectively. Tests showed significant differences between treatments for both seasonal and storm sediment production. The levels of significance were low because of high variability in sediment production among treatments and road crossings. Frequent onsite inspections during storm and nonstorm conditions, however, identified sources of variability and supported a final conclusion that the brush mulch was effective for erosion and sediment control at road-stream crossings.

Reports : Rothwell, R.L. 1973. How to design logging road drainage systems. Can. For. Ind. 93(3):39-43.

_____. 1974. Erosion control measures for logging and road construction. In Proc. of Practical Forest Watershed Management Course Fp2402. Cranbrook, B.C., April 23-24, 1974. Available from: Centre for Continuing Education, Univ. B.C., Vancouver.

_____. 1974. Erosion control of forest roads.
Paper presented at Environmental Considerations
of Road Construction, A short Course of
Instruction for Forest Road Builders and Field
Men. Forest Technology School, Hinton, Alberta.
Oct. 8-11, 1974.

_____. 1974. Progress Report: Road-bank
stabilization in the Hinton-Edson area,
Alberta. File Rep. NOR-017.

_____. 1976. Progress Report 1975-76. Erosion
sediment control at road-stream crossings in
the Hinton-Edson area, Alberta. Rpt. to
Steering Comm., Alta. Watershed Res. Prog. 3 p.

_____. 1978. Watershed management guidelines
for logging and road construction in Alberta.
Environ. Can., Can. For. Serv., North. For.
Res. Cent., Edmonton. Inf. Rep. NOR-X-208.

_____. 1983. Erosion and sediment control at
road-stream crossings. Forestry Chronicle
59:62-66.

Contact : (R.L. Rothwell, U. of Alberta)

Current and
Long-term
plans : None

- Study : Changes in chemical and physical water quality following forest harvesting and related land disturbances (NOR-13-104).
- Objective : To assess changes in the concentration and yields of nutrients as a result of clearcutting and to determine the water chemistry of natural waters in the Hinton lease area.
- Status : More change in the yield of some nutrients than in their concentration, as a result of progressive clearcutting in forest catchments.
- Reports : Singh, T., Y.P. Kalra, and G.R. Hillman. 1974. Effects of pulpwood harvesting on the quality of stream waters of forest catchments representing a large area in Western Alberta, Canada. pp. 421-427. In. Effects of man on the interface of the hydrological cycle with the physical environment--Symposium, IAHS Publication 113, Paris, France.
- Singh, T. and Y.P. Kalra. 1975. Changes in chemical composition of natural waters resulting from progressive clearcutting of forest catchments in west-central Alberta Canada, pp. 435-444. In. The hydrological characteristics of river basins and the effects on these characteristics of better water management--Symposium, IAHS Publication 117, Tokyo, Japan.
- Singh, T. and Y.P. Kalra. 1977. Impact of pulpwood clearcutting on stream water quality in west central Alberta. pp. 272-284. In R.H. Swanson and P.A. Logan (Eds.). Alberta Watershed Research Program Symposium Proceedings, 1977. Fish. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-176.
- Singh, T. and Y.P. Kalra. 1977. Estimation of natural pollution loads from streamflow measurements in remote catchments. Water, Air and Soil Pollution. 7:111-116.
- Singh, T. 1976. Yields of dissolved solids for aspen grassland and spruce-fir watersheds in southwestern Alberta. J. Range Manage. 29:401-405.

Singh, T. and Y.P. Kalra. 1975. Specific conductance method for in situ estimation of total dissolved solids. J. Waterworks Assoc. 67:99-100.

Contacts : T. Singh and Y.P. Kalra

Current and

Long term

Plans : None

Study : Climatic zonation for the forested areas of the Prairie Provinces (NOR-2-115)

Objective : To classify the climate of the main forested regions of the Prairie Provinces, such that areas having similar climatic regimes can be delineated on a map.

Status : Completed with several publications which included the lease area and with one restricted to area.

Report : Powell, J.M. and D.C. MacIver. 1976. Summer climate of Hinton-Edson area, west-central Alberta, 1961-1970. Fish. Environ. Can., Can. For. Serv., North For. Res. Cent., Edmonton. Inf. Rep. NOR-X-149.

Powell, J.M. 1977. Precipitation climatology of the Eastern Slopes area of Alberta. pp. 187-204. In R.H. Swanson and P.A. Logan (Eds.). Alberta Watershed Research Program Symposium Proceedings, 1977. Fish. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. NOR-X-176.

Contact: J.M. Powell

Current and
Long term
plans : None

Study : The climate of clearcut forested areas
(NOR-14-138; NOR-31-179; NOR-28-04/07)

Objectives: a. To determine the effect of clearcutting of
different sizes on the various climatic
parameters.

b. To identify the zones of stand border influence
for each climatic parameter and to relate this
to size and orientation of cut.

c. To assess the use of fixed ground based climatic
stations, with ground level mobile sensors and
airborne sensors, for obtaining climatic data
for forestry purposes.

Status : Climate stations were maintained on different areas
of the lease from 1971 to 1977 each summer. On
average 50 stations were run each year with in total
over 100 locations sampled. Most stations were
situated on clearcuts but some were in the uncut
forest. Sixteen to 20 stations were also run
throughout the winter of 1971-72 and snow surveys
were run in four winters. All regular or satellite
stations were equipped for measuring temperature,
humidity and precipitation. Base stations (7) and
some other stations were equipped for measuring
wind, radiation, soil temperature, (some soil
moisture) and some evaporation (1 or 2 years only).
Additional precipitation stations were also
employed. Transects of soil temperature profiles (6
to 26 stations) were established on 8 cut blocks.
In 1971 and 1972 a dozen mobile temperature
traverses were run between four study compartments.
Thermal infrared line scan images were taken in 1971
along two transects in McLeod Working Circle. Most
of the data has been analysed and tabulated and some
used in publications.

Reports : Powell, J.M. 1971. Environmental factors affected
by clearcutting. pp. 4-18. In: Johnson, H.J.,
H.F. Cerezke, F. Endean, G.R. Hillman, A.D.
Kiil, J.C. Lees, A.A. Loman and J.M. Powell.
Some implications of large-scale clearcutting in
Alberta, a literature review. Can. Dep.
Environ., Can. For. Serv., Edmonton. Inf. Rep.
NOR-X-6.

- Reports : MacIver, D.C. and Powell, J.M. 1973. thermal soil variations as a function of clearcut size: preliminary analysis. Paper presented at the 11th Conf. Agr. and For. Meteorology, Amer. Meteorol. Soc., Durham, N.C. January 9, 1973. (Also Environ. Can., North. For. Res. Cent., Edmonton, File Report NOR-Y-53. pp. 10).
- Lubitz, E.D. and J.M. Powell. 1974. Some computer techniques for presentation of thermal infrared line scan data. Environ. Can., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-79.
- Hillman, G.R., J.M. Powell and R.L. Rothwell. 1978. Hydrometeorology of the Hinton-Edson Area, Alberta, 1972-1975. Fish. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-202.
- Powell, J.M. 1977. Precipitation climatology of the Eastern Slopes area of Alberta. pp. 187-204. In: Watershed Research Program Symposium Proceedings, 1977. Fish. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-176.
- Singh, T. 1986. Microclimate of clearcuts in west-central Alberta. Pages 47-59 In: Proceeds. of the 10th Annual General Meeting, Alberta Climatological Assoc. Feb. 20, 1986. Envir. Can., Edmonton, Alberta.
- Contacts : J.M. Powell and T. Singh
- Current and Long-term Plans : Paper in preparation on soil temperature variations in clearcuts.

Study : The effect of the microclimate of clearcut areas on survival and growth of conifer regeneration (NOR-14-139)

Objective : To determine the significance of microclimatic regimes created by clearcutting in terms relevant to growth and survival of planted spruce and pine.

Status : Four areas were selected on the lease representative of two major soil types. Two transects of five sample plots were located outward from the stand edge up to 180 m. White spruce and lodgepole pine container stock were planted at 1-m spacing in 6 rows each of 50 trees. Growth was monitored through three growing seasons. Temperature, humidity, precipitation, wind and solar radiation were recorded on the cut areas. Temperature profiles (10,0,-7.5,-15 cm) were measured during 30 min intervals continuously at each plot. Analysis of the seedling growth data has been completed and a report published. Much of the climatological data has been extracted and analysed and a report is planned.

Report : W.D. Johnstone. 1984. Influence of stand edge on planted white spruce and lodgepole pine. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alberta. Inf. Rep. NOR-X-256.

Contact : (W.J. Johnstone, H.P. Sims) J.M. Powell, T. Singh

Current and Long term plans : Paper in preparation on soil temperature variations in clearcuts.

Study: Study of soil moisture and temperature in relation to topography, soil, vegetation and climate. (NOR-016).

- Objectives:
- a. To accumulate information on soil moisture and temperature conditions of some forest types in Alberta.
 - b. To relate soil moisture and temperature regimes to microclimate, edaphic conditions, and floristic composition.
 - c. To relate soil moisture and soil temperature to forest productivity.
 - d. To find a method for the estimation and expression of ecosystem moisture regime.

Status: Initiated in 1967 with the study of forest types and soils within lease area near Hinton. Vegetation, forest stand and soils were described on 35 one/tenth acre sample plots which were assigned to 10 forest types. Five commercial forest types were chosen out of these 10 and 10 permanent plots for study of soil temperature and moisture were established using a series of 6 Colman fiberglass soil moisture units with thermistors at depths to 100 cm. In 1968 microclimatic stations were established in conjunction with the five forest types. Measurements were taken during the summers of 1968-1972, with air temperature and relative humidity recorded continuously and soil moisture and temperature, and precipitation observed weekly. Soils were analysed for physical and chemical characteristics. Preliminary assessment suggested that soil temperatures in general were lower than the optimum and differences in soil temperatures between forest types are substantial during the growing season. Tree growth seemed to be more influenced by soil temperature than moisture deficiency. A potential internal moisture stress combining five factors was developed as a measure of forest type moisture regime.

Study was terminated with resignation of study leader, G.L. Lesko, in 1975, although some of the climate data is held by J.M. Powell.

Reports: Lesko, G.L. 1970. Considerations in the quantitative evaluation of ecosystem moisture regime. pp. 69-75
In Powell, J.M. Proceedings of the 3rd Forest Microclimate Symposium, Can. For. Serv., Alta./Territories Region, Calgary, Alta.

Contacts: (G.L. Lesko), J.M. Powell

Current and
Long term
plans : None

Study : Mined-land reclamation and environmental protection
(NOR-15-126)

Objectives: a) To develop, adapt and demonstrate effective and economical methods of reclamation and environmental projection associated with specific land-use and water-use objectives for the range of lands and associated water affected by mining in the Prairies Region.

b) To develop, adapt and demonstrate methods for use on mined-land and associated water courses that will reduce accelerated erosion and sedimentation, improve and protect fish and wildlife habitats, maintain water quality, and conserve the aesthetics and potential uses of mined areas.

Status : Some of this study was carried out on the Luscar Coal area adjacent to the lease commencing in the fall of 1970 and concluding in 1972. Major emphasis was on selection of suitable species, seeding time and surface preparation for revegetation trials. Two reports were published from the study which grew out of a background report (listed below) while a thesis by Dillon based on some of the work was done at the U of Calgary.

Reports : Peterson, E.B. and H.M. Etter. 1970. A background for disturbed land reclamation and research in the Rocky Mountain region of Alberta. Can. For. Serv., Inf. Rep. A-X-34.

Etter, H.M. 1971. Preliminary report of water quality measurements and revegetation trials on mined land at Luscar, Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Internal Rep. NOR-3.

Lesko, G.L., H.M. Etter and T.M. Dillon. 1975. Species selection, seedling establishment and early growth on coal mine spoils at Luscar, Alberta. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-117.

Contact : (G.L. Lesko, Syncrude Ltd.)

Current and Long term plans : None

Study : Forestry development and fire management economics (NOR-3-03).

Objectives & Status : Economics related research conducted by the CFS on the Weldwood (Hinton) lease area at Hinton has been limited to two interviews of company representatives conducted for the primary wood using industry surveys of 1972 and 1979. Both of these studies showed that Weldwood (Hinton) is a major component of not only the regional economy surrounding Hinton but also the forest economy of Alberta. The 1972 study showed that Weldwood (Hinton) (at that time Northwest Pulp and Power Ltd.) produced 100% of the Kraft pulp produced in Alberta and accounted for roughly 16% of total employment by primary wood using industries in the province. The construction of the company's stud mill in 1972 increased both total sales and the number of persons employed at the mill. This was reflected in the second survey conducted in 1979 which showed that employment had increased from a level of 788 person years in 1972 to 873 person years in 1979. (Note: A third survey was conducted by the Alberta Forest Service in 87/87).

Reports : Teskey, A.G. and J.H. Smyth. 1973. A directory of primary wood-using industries in Alberta, Saskatchewan and Manitoba, 1972. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-83.

Teskey, A.G. and J.H. Smyth. 1975. The economic importance of sawmilling and other primary wood-using industries in Alberta, 1972. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-145.

Ondro, W.J., B.W. Karaim, R.A. Bohning, and G.R. Stevenson. 1980. A directory of primary wood-using industries in Alberta, 1979. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton. Inf. Rep. NOR-X-220.

Ondro, W.J. and T.B. Williamson. 1982. The forest industry in the economy of Alberta, 1978-79. Environ. Can., Inf. Rep. NOR-X-246.

Contact : T.B. Williamson, R. Bohning

Current and Long term plans : To maintain continuity in the data base and to update industry information a fourth survey should be undertaken in 1992 or 1993. The study could be conducted by CFS or by the AFS or jointly.