AN ANNOTATED BIBLIOGRAPHY OF WESTERN CANADA BOREAL MIXEDWOOD FOREST AND RELATED LITERATURE

Prepared by

W.L Strong
I.D. SYSTEMS LTD.

Prepared for

FORESTRY CANADA
Northern Forestry Centre
5320 - 122 Street
Edmonton, Alberta
T6H 3S5

1992
Edmonton

INTRODUCTION

Pure and mixed forest stands of aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*) dominate the northern half of Alberta, the southwest portion of the Northwest Territories, northeastern British Columbia, central Saskatchewan, and part of southwestern Manitoba. These areas include both the Mixedwood (B18a and B18b) and Lower Foothills Forest Sections as recognized by Rowe (1972). The primary difference between these forest section in terms of their tree species composition is the occurrence of lodgepole pine (*Pinus contorta*) in the latter area. Another significant component of these forests is white spruce (*Picea glauca*), which increases in abundance as stands age. Historically, the primary commercial interest in mixedwood forests has been the harvesting of conifers component. However, during the past five to ten years, interest in the deciduous component has increased dramatically, but ecological research and planning to ensure sustainable development has lagged relative to the rate of resource development (e.g., several pulp mills, wafer board plants).

The primary objective of this study was to compile an annotated bibliography of boreal mixedwood forest and related literature as a basis for determining what type of data are available and where the studies were conducted. Related literature includes studies and documents such as soil surveys which could potentially be useful in promoting the sustained development of boreal mixedwood ecosystems.

DATA SOURCES

Materials for this bibliography were obtained from the searching of card catalogues, review of information on computerized data bases (AGRICOLA), and review of citation lists included in most research papers and technical reports. Most attention was focused on studies that were conducted in the 1960 to 1990 timeframe, although older and relevant citations were also included. The following libraries represent the principal sources where publications were reviewed -

- Cameron Library, University of Alberta, Edmonton;
- Bruce Peel Special Collections Library, University of Alberta, Edmonton;
- Canadian Circumpolar Library, University of Alberta, Edmonton;
- Northern Forestry Centre Library, Edmonton;
- Alberta Forestry/Energy, Lands and Wildlife Library, Edmonton;
- Alberta Environment Library, Edmonton;
- University of Calgary Library, Calgary;
- Saskatchewan Renewable Resources and Parks Library, Prince Albert;
- University of Saskatchewan Library, Saskatoon; and
- Canadian Wildlife Service Library, Edmonton.

Some sources were also obtained through contact with individuals who are actively conducting research in boreal mixedwood forests.

In addition to the compilation of citations, an attempt was made to briefly summarize the purpose of each study and/or the type of information included within each document. The type of included information was also summarized by assigning one or more key word codes to each study. The following list identifies the categories used for key words.

CODE	CATEGORIES
X1	Ecological land classification
X2	Physical land classification
	<u>Silviculture</u>
X3	Tree crop production
X4	Even age stand management
X5	Uneven age stand management
X6	Site preparation
X7	Vegetation control
X8	Species trials for planting
X9	Insects, disease, and damage
X10	Plant propagation
X11	Forest policy
X12	Harvesting methods
X13	Ecological effects and conditions of harvesting
X14	Juvenile stand tending
X15	Growth and yield
X16	Land based alienation due to road and resource development
X17	Remote sensing
X18	Genetics and cellular structure
	<u>Sustainable Benefits</u>
X19	Economics - fibre
X20	Economics - non fibre
X21	Unique resources

Environment (Physical and Biological Resources)

X22 Plant habitat and species diversity
X23 Water quality/volume
X24 Soil and site productivity
X25 Nutrient dynamics
X26 Wildlife distributions and diversity
X27 Wildlife habitat
X28 Wildlife migration
X29 Fisheries
X30 Micro-organisms
X31 Soil erosion
X32 Slope stability
X33 Vegetation surveys
X34 Soil surveys
X35 Ecology

Environment (Culture Aspects)

X36 Social
X37 Recreation
X38 Aesthetics
X39 Spiritual

Other Aspects

X40 Burning
X41 Site disturbance
X42 Climate
X43 Wood and product assessment
X44 Soil moisture
X45 Pollution
X46 Standing crop
X47 Hydrology
X48 Forest grazing
X49 Harvesting costs

The "X" preceding the category code was included to facilitate computer searching of the bibliography which is also available on 3.5" DOS floppy disc in Word Perfect 5.1 software. By placing an "X" prior to the code number, it allows the location of individual subject categories while avoiding interference with date and other numbers.

No attempt was made to evaluate or compare studies. This is a task best conducted by individual researchers within the context of their specific studies. Also included with each citation is a general geographical location where the study was conducted. These locations are based on National Topographic Series map sheets (e.g., 83 L, SW 63 C; S - south, N - North, E - East, W - West).

A total of approximately 745 citations are included in the following bibliography. Appendix I contains a guide to references by subject code.

ACKNOWLEDGEMENTS

This project was funded by Forestry Canada under the Green Plan Program (Phase I). Dr. Ian G.W. Corns (Forestry Canada) was the scientific authority and coordinated the project; Ms. Michelle Olson assisted with the library search, review, and compilation of the bibliography; and Ms. Janet Guretzki (I.D. Systems Ltd.) edited the final text.

Abouguendia, Z., L.A. Baschak, and R.C. Godwin. 1986. Effects of simulated acidic precipitation on Saskatchewan crop and forest species: results of the 1985/86 experiments. Saskatchewan Research Council, Saskatoon, Saskatchewan. SRC Technical Report Number 191.

The effects of simulated acid rain were assessed on several agricultural crops and forest tree species which included aspen. The results suggest that pH values higher than 3.6 had minimal effects on the studied species. Effects were only detected at levels of approximately 2.6. In some cases, aboveground growth was enhanced by low pH. At low pH, visible damage was evident in white spruce and aspen but neither growth nor physiological factors were effected. Increased acidity may increase the availability of nutrients.

Location: Not specific

Key words: X45

Addison, P.A. 1980. Ecological bench-marking and biomonitoring for detection of airborne pollutant effects on vegetation and soil. Alberta Soil Sands Environmental Research Program, Edmonton, Alberta. AOSERP Report 111.

Plant communities sampled in 1976/7 were re-sampled in 1979 to determine if air pollution from tar sands had affected the understory vegetation of forest communities. Soils were also collected and re-tested for sulphur, aluminum, iron, vanadium, and nickel. They found little difference in the vegetation during the two different sampling periods.

Location: 74 E

Key words: X45

Addison, P.A. 1982. Biomonitoring in the Athabasca Oil Sands area of Alberta: progress and pitfalls, pp. 332-367. In: Symposium workshop proceedings on acid forming emissions in Alberta, and their ecological effects, March 9-12. Alberta Environment, Canadian Petroleum Association, Oil Sands Environmental Study Group, Edmonton, Alberta.

A background review of bio- and atmospheric monitoring in the Alberta Oil Sands Environmental Research area with preliminary results. Much of the vegetation work focused on conifers and lichens.

Location: 74 E

Key words: X45

Addison, P.A. 1984. Biomonitoring of air pollution impacts in the Athabasca Oil Sands forests, pp. 4-5. *In* Toxic substances and the forest environment. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Forestry Report 30.

A general review of methods used for biomonitoring in the Alberta Oil Sands Environmental Research Project area.

Location: W 74 E

Key words: X45

Addison, P.A., and J. Baker. 1977. Ecological benchmarking and biomonitoring for detection of SO_2 effects on vegetation and soils, pp. 24-47. *In* Malhortra, S.S., editor. The effects of sulphur dioxide on forest vegetation and soils of Alberta Oil Sands, Annual Report (1976-77). Alberta Oil Sands Environmental Research Program, Vegetation Technical Research Program, Edmonton, Alberta.

Not available for review.

Location: 74 E

Addison, P.A., K.A. Kennedy, and D.G. Maynard. 1984. Effects of sour gas processing on a forest ecosystem in west-central Alberta. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-265.

This study investigated the impact of sour gas from two processing plants on forest plants and soils. Sulphur content in soils was found to have increased within the impingement zone. The greatest effects on vegetation were found nearest the source in the form of reduced herb cover and bryophyte diversity. Bryophytes were found to be the most sensitive to sulphur deposition. Trees did not show either a growth or reproduction response.

Location: 83 B

Key words: X33, X34, X35, X45

Addison, P.A., S.J. L'Hirondelle, D.G. Maynard, S.S. Malhotra, and A.A. Khan. 1986. Effects of oil sands processing emissions on the boreal forest. Environment Canada, Canadian Forestry Service, Northern

Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-284.

The results of a ten year study on the effects of emissions from oil sands processing plants in the Fort McKay area on boreal vegetation were presented. The effects were primarily limited to within ten kilometers of the source. Lichens and mosses were found to the most sensitive to sulphur deposition, while vascular plants showed minimal response. Most of this research was oriented towards jack pine stands.

Location: 74 E

Key words: X45

Addison, P.A., and S.S. Malhotra. 1979. Interim report on symptomology and threshold levels of pollutant injury to vegetation, 1978-79. Prepared for Alberta Oil Sand Environmental Research Program by Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Project LS3.1.

This study attempted to determine the visual and physiological threshold levels of air pollutant to cause injury to native plant species in the Athabasca oil sands region. Deciduous trees and shrubs were much more sensitive to sulphur dioxide than conifers.

Location: W 74 E

Key words: X45

Addison, P.A., S.S. Malhotra, and A.A. Khan. 1984. Effect of sulfur dioxide on woody boreal forest species grown on native soils and tailings. Journal Environmental Quality, 13:333-336.

This study experimentally found that net assimilation rates decreased more rapidly in deciduous relative to coniferous/evergreen plants when exposed to sulphur dioxide. Their response was influenced by both timing and duration of exposure.

Location: Not specific

Key words: X45

Addison, P.A., and K.J. Puckett. 1980. Deposition of atmospheric pollutants as measured by lichen element content in the Athabasca oil sands area. Canadian Journal of Botany, 58:2323-2334.

The metal content of lichens was related to proximity to gaseous and particulate emissions from oil sand plants. This study was one of the early attempts to use lichens in biomonitoring in the Alberta Oil Sands Environmental Research Project area. Contaminant concentrations were correlated with distance from source.

Location: 74 E

Key words: X25, X35, X45

Alemdag, I.S. 1969. Poplar volume by tree grade or quality classes: a feasibility study. Canada Department of Fisheries and Forestry, Forest Management Institute, Ottawa, Ontario. Internal Report FMR-13.

Not available for review.

Alexander, M.E., B. Janz, and D. Quintilio. 1983. Analysis of extreme wildfire behavior in east-central Alberta: a case study, pp. 38-46. *In* Proceedings of seventh conference on fire and forest meteorology, April 25-28, 1983. Fort Collins, Colorado, American Meteorological Society, Boston, Massachusetts.

A review of 1980 forest fires in the Winefred Lake area. Included was a summary of forest and meteorological conditions as they related to the fire.

Location: E 73 M

Key words: X40

Anderson, D.W., and J.G. Ellis. 1976. The soils of the provincial forest of Prince Albert Map area (73H). Saskatchewan Institute of Pedology, Saskatoon, Saskatchewan, Publication SF3.

A soil survey (1:126,720 scale) of the area located north and east of Prince Albert (5,700 km^2). Some profile descriptions and physical and chemical data were included as well as forestry and agricultural capability ratings.

Location: 73 H

Key words: X34

Anderson, H.G. 1976. The future forests of Saskatchewan. Ph.D. Dissertation, University of Saskatchewan, Saskatoon, Saskatchewan.

A biophysical analysis of 5,570 km^2 was conducted for the purpose of assessing the long-term implica-

tions of tree harvesting in southern Saskatchewan. The interpretation was stratified by land system (ecosection). Various pathways of stand development were presented to predict tree regeneration based on soil moisture conditions, conifer regeneration, and site productivity. A small amount of work was oriented towards mixedwood stands.

Location: 73 H

Key words: X1, X13

Anderson, H.G. 1981. Ecological land classification and evaluation: Cache Percotte area. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report Number 142.

This report involved the ecological land classification (1:15,000 scale) of the Cache Percotte school forest at Hinton, Alberta (65 km^2). This area occurs in the transition zone between the Lower and Upper boreal cordilleran forest zones. Descriptions were given for each ecosite (vegetation, soil, geomorphology, geology), along with Canada Land Inventory equivalent ratings for agriculture, forestry, ungulates, and waterfowl. Recreational use limitations were also provided for selected uses.

Location: 83 F

Key words: X1, X33, X34, X35, X37

Anderson, N. 1987. Aspen utilization concerns associated with oriented strand board plants, pp. 59-66. *In* Aspen quality workshop. Proceedings of workshop sponsored by Canadian Forestry Service and Alberta Forestry Service, Edmonton, Alberta.

The author described the problems with existing aspen age class which complicate harvesting, given that a two-pass harvesting method is infeasible. He further explains the complications associated with decay and hauling costs. Decay also creates problems in processing oriented strand board and is very difficult to screen out.

Location: 83 N

Key words: X9, X12, X19, X43

Annas, R.M. 1977. Boreal ecosystems of the Fort Nelson area of northeastern British Columbia. Ph.D. Dissertation, University of British Columbia, Vancouver, British Columbia.

Not available for review.

Annas, R.M., S.L. Robertson, J.A. Bentz, and Z.J. Nemeth. 1983. An ecosystem classification of the Boreal Cordilleran Ecozone: Sundre area. Alberta Energy and Natural Resources, Alberta Forest Service and Resource Evaluation and Planning Division, Edmonton, Alberta.

The purpose of this study was to develop an ecological zonation of forested lands between Sundre and Banff National Park. Most of the work involved the sampling of vegetation and analysis of site conditions. The eastern portion of the study area included the Lower Boreal-Cordilleran Ecoregion. Estimates of tree volume, site index, and mean annual increment were provided for forest community.

Location: 82 O

Key words: X1, X33, X34, X35

Anonymous. n.d. Permanent sample plot data. Alberta Forestry, Lands and Wildlife, Alberta Forest Service, Edmonton, Alberta.

A file of approximately 600 permanent plots has been developed with approximately 80 percent having vegetation and soils information. Mixedwood stands represent approximately ten percent of this data.

Location: ALTA

Key words: X25, X33, X34

Anonymous. 1938. Summary of stand and increment, mixedwood section of the boreal forest region, Manitoba and Saskatchewan. Canada Department of Mines and Resources, Forest Service, Research Note 52.

Not available for review.

Anonymous. 1971. Present and potential poplar utilization in the province of Alberta. Alberta Lands and Forests, Alberta Forest Service, Timber Management Branch, Edmonton, Alberta.

This report summarizes the amount of aspen and poplar available for immediate cutting in Alberta as of 1971 and where it was located. It also explained the terms and conditions under which poplar timber was sold. In 1971, less than one percent of the province's annual allowable cut for poplar was being utilized. At that time, a conservative estimate of 290 million m^3 existed.

Location: ALTA

Key words: X19

Anonymous. 1973. The habitat of Syncrude Tar Sands Lease #17 - an initial evaluation. Prepared by Syncrude Canada Limited, Environmental Monograph 1973-1.

This a general overview of biophysical resources on Lease 17 including selected wildlife resources. A 1:50,000 scale vegetation map was included with types according to dominant overstory species only. Most of this report is based on quotes and observations.

Location: W 74 E

Key words: X33, X35

Anonymous. 1973. The environmental effects of timber harvesting in the Edson and Grande Prairie forests of Alberta. Prepared for Alberta Department of Lands and Forests by C.D. Schultz and Company Limited., Vancouver, British Columbia.

An overview of the natural resources in the Grande Prairie, Edson, and Whitecourt forests. A summary of the provincial forest management system and forestry operations was also presented. The analysis was primarily oriented towards conifers.

Location: 83 F, K

Key words: X12, X19, X26, X27, X29, X37

Anonymous. 1975. An impact assessment of forest vegetation and soils within a seven mile radius from the Great Canadian Oil Sands Ltd. complex. Prepared for Great Canadian Oil Sands Ltd. by Intera Environmental Consultants Ltd., Calgary, Alberta.

The vegetation and soils within the vicinity of a tar sands oil plant were analyzed to determine if any measurable changes had occurred after seven years of plant operation. Elevated sulphur content occurred in forty percent of soil samples but could not be correlated to emissions.

Location: W 74 E

Key words: X33, X34, X45

Anonymous. 1976. The distribution of vanadium in foliage of four indicator tree species and in two types of litter within a seven mile radius from the Great Canadian Oil Sands Ltd. complex. Prepared for Great Canadian Oil Sands Ltd. by Loman and Associates.

Not available for review.

Anonymous. 1977a. Proposed Nipawin hydro-electric project - environmental assessment. Prepared by Saskatchewan Power Corporation, Regina, Saskatchewan.

An overview of the natural resources was presented for an area along the Nipawin River upstream of Nipawin. Vegetation, wildlife, recreation, and forestry resources were reviewed.

Location: 63 E

Key words: X22, X26, X27, X33, X35, X37

Anonymous. 1977b. McLennan area: Biophysical analysis and evaluation of capability. Prepared for Alberta Energy and Natural Resources by Synergy West Ltd., Calgary, Alberta.

A biophysical analysis and land classification (1:126,720) was prepared for the McLennan area. A description was provided for each ecosection. Capability ratings were developed for agriculture, forestry, recreation, ungulates, and waterfowl.

Location: NW 83 O

Key words: X1

Anonymous. 1978. Liquid fuels from renewable resources: feasibility study - summary and conclusions. Prepared for Environment Management Canada by InterGroup Consulting Economists Ltd., Winnipeg, Manitoba.

This report summarizes the potential of using wood as a source for producing methanol. At the time of analysis, a price of $25 to $30 per barrel would be needed to be competitive with oil. The long-term availability of the wood supply and environmental impact were considered unknown variables in the viability of this process.

Location: Not specific

Key words: X19

Anonymous. 1979a. Integrated resource survey: Wood Buffalo National Park, Alberta and Northwest

Territories. Prepared for Parks Canada by Airphoto Analysis Associates Consulting, Toronto, Ontario.

A broad overview of the biophysical resources of Wood Buffalo National Park with a 1:100,000 scale land classification. Most of the report focuses on the physical resources of the area. The vegetation was classified on the basis of physiognomy, although some floristics lists were presented.

Location: 84 I, P, W 74 L,M

Key words: X1

Anonymous. 1979b. Energy and chemicals from wood. Prepared for Alberta Energy and Natural Resources by SNC Tottrup Services Ltd., CV Engineering and Project Development Associates Ltd. Report Number 90.

A summary of potential uses of wood fibre. The analysis includes raw wood as well as residual materials for energy and chemical products. Costs for materials, labor, etc. are summarized and in some cases compared with existing systems (e.g., oil and gas).

Location: Not specific

Key words: X19

Anonymous. 1979c. Cold Lake Project, final environmental assessment. Prepared for Esso Resources Ltd. by Hardy Associates (1978) Ltd., Calgary, Alberta.

A biophysical analysis of the area west of Cold Lake. It included an ecological land classification (1:25,000) and assessment of potential impacts of oil development and emissions on the ecology of the area.

Location: 73 E, L

Key words: X1, X22, X23, X26, X27, X29, X30, X35, X41, X45, X47

Anonymous. 1980a. Soil survey, materials suitability and availability for reclamation and land use capabilities in the ALSANDS Project Area. Prepared for the ALSANDS Project Group by Hardy Associates (1978) Ltd., Calgary, Alberta.

A detailed soil survey was conducted within the vicinity of the proposed ALSANDS plant. This analysis included 1:20,000 scale maps, profile descriptions, and laboratory analyses of selected soil series. A general description of associated over- and understory vegetation is also given. Each soil series is rated for forest capability according to the Canada Land Inventory System.

Location: 74 E

Key words: X34

Anonymous. 1980b. Environmental impact assessment of Foothills project. Final report - vegetation section. Gulf Resources Inc., Calgary, Alberta.

Not available for review.

Anonymous. 1981a. A study of the impact on wildlife of short-rotation management of boreal aspen stands - interim report. Prepared by D.A. Westworth and Associates Ltd. for Canadian Forestry Service, Edmonton, Alberta. ENFOR Project Number P-164.

This project assessed the potential effects of short-rotation harvesting of aspen on wildlife. Although this is a preliminary report, the results showed that snags were important to certain bird species, particular in young stands of fire origin. It was noted that remnant snags would not occur if forest stands were subjected to short rotational management.

Location: 83 B

Key words: X27

Anonymous. 1981b. Forest depletion by energy development in the green area of Alberta. Prepared for Alberta Energy and Natural Resources by Hardy Associates (1978) Ltd., Calgary, Alberta. Report Number T/24.

At the end of 1979, it was estimated that 3,200 km^2 (approximately one percent) of Alberta's forested lands were disturbed by energy exploration and development.

Location: ALTA

Key words: X16

Anonymous. 1981c. Costs of harvesting aspen stands for energy production. Prepared for Environment Canada, Canadian Forestry Service, Northern Forestry Centre by the Coban Institute of Resource

Management Consultants, Edmonton, Alberta. ENFOR Project P-163.

The cost of harvesting aspen was estimated based on two sites using chain saw felling and a Dika side cutter. Overall costs including skidding, loading, trucking, unloading, and chipping ranged from $47 to $71 per tonne. The size of the trees being harvested was considered a significant variable in cost determination.

Location: 83 B

Key words: X49

Anonymous. 1981d. The impact of industrial activity on the population ecology of grizzly and black bears in the boreal forest of northwestern Alberta. Alberta Environment Centre, Vegreville, Alberta.

Not available for review.

Anonymous. 1981e. Aspen for high quality chemimechanical pulps: overview for Alberta. Prepared for Alberta Research Council by Woodbridge, Reed and Associates Ltd., Vancouver, British Columbia.

This study analyzes the suitability of producing chemi-thermo-mechanical pulp from Alberta grown poplars from an economic perspective.

Location: ALTA

Key words: X19

Anonymous. 1982a. Evaluation of the hardwood resources of the O'Chiese Block in the Rocky-Clearwater Forest. Alberta Energy and Natural Resources, Alberta Forest Service by Pedology Consultants, D.A. Westworth and Associates Ltd., Forinteck Canada Corporation, and Econotech Services Ltd.

The quantity and abundance of hardwood resources was assessed for an area northwest of Rocky Mountain House. Estimates suggest that nineteen percent of aspen had staining, six percent incipient decay, and three percent advanced decay. Approximately 500,000 m^3 of hardwood were estimated to occur in the area.

Location: 83 B

Key words: X9, X19

Anonymous. 1982b. Annotated bibliography of the relevant literature on the utilization and properties of Western Canadian poplar. Prepared for Alberta Economic Development by Forintek Canada Corporation.

Not available for review.

Anonymous. 1983a. Aspen cull study and the Prince Albert and Big River area. Prince Albert Pulp Company, Prince Albert, Saskatchewan.

Not available for review.

Anonymous. 1983b. Bleached CTMP for decayed and stained aspen logs. Woodbridge, Reed and Associates Ltd., Vancouver, British Columbia.

The intent of this study was to determine the extent and effect of stained and decayed aspen on the economic viability of a bleached chemo-thermo-mechanical pulp mill. The viability and application of the study depends on forest management, wood cost, base economics, and type of wood defects.

Location: ALTA

Key words: X9, X12, X19

Anonymous. 1984a. A policy for resource management of the Eastern Slopes. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Number T/38.

This report presents a revision of the Eastern Slope zonation and management policy.

Location: ALTA

Key words: X11

Anonymous. 1984b. Saskatchewan tourism development strategy. Prepared for Saskatchewan Tourism and Small Business by Marshall Macklin Monaghan Western Limited, Thorne Stevenson & Kellogg, and Derek Murray Consulting and Associates.

Not available for review.

Anonymous. 1984. Final report on the wildlife habitat/subregion evaluation legend for the provincial overview of wildlife resource status. Prepared for Alberta Energy and Natural Resources, Fish and

Wildlife Division by IEC Beak Consultants Ltd., Calgary, Alberta.

Not available for review.

Anonymous. 1984c. Status of the fish and wildlife resource in Alberta. Alberta Energy and Natural Resources, Fish and Wildlife Division, Edmonton, Alberta. ENR Report Number 1/87.

An overview of Alberta's fish and wildlife resources including economic value, management concerns, population size, and distributional information.

Location: ALTA

Key words: X22, X26, X27

Anonymous. 1984d. Final report on the distribution and abundance legend for the provincial overview assessment of wildlife resource status. Prepared for Alberta Energy and Natural Resources by IEC Beak Consultants Ltd., Calgary, Alberta.

The abundance and distribution of eighteen wildlife species was assessed with respect to a 1:1,000,000 habitat district map developed by Knapik and Westworth (1984). Much of this assessment was based on a summation of historical field surveys.

Location: ALTA

Key words: X22

Anonymous. 1985a. Saskatchewan game management 1984-1985. Saskatchewan Parks and Renewable Resources, Wildlife Branch, Regina, Saskatchewan.

Hunting licenses and kill statistics are presented for various wildlife management zones in Saskatchewan. The species evaluated ranged from birds to large mammals.

Location: SASK

Key words: X37

Anonymous. 1985b. Utilization of hardwoods in northern Alberta. Main report. Prepared for Northern Alberta Development Council by Woodbridge, Reed and Associates Ltd., Vancouver, British Columbia.

This report describes Alberta's hardwood resources and research activities by both government and industry. The potential opportunities, benefits, and constraint to the future developments of the resource are summarized.

Location: ALTA

Key words: X19

Anonymous. 1985c. Delaronde Lake: Shoreline management strategy. Prepared by Saskatchewan Parks and Renewable Resources, Resource Land Planning.

A general biophysical and recreation capability assessment was prepared for Delaronde Lake area, west of Prince Albert National Park. Operational guidelines were presented for each management unit.

Location: SW 83 J

Key words: X1, X37

Anonymous. 1985d. Candle Lake: shoreline management statement. Saskatchewan Parks and Renewable Resources.

A general biophysical and recreation capability assessment was prepared for the Candle Lake area, east of Prince Albert National Park. Operational guidelines were presented for each management unit.

Location: NW 73 H

Key words: X1, X37

Anonymous. 1985e. Prototype assessment of wildlife resource status of the Rocky Mountain House sheet (83B). Prepared for Alberta Energy and Natural Resources, Fish and Wildlife Division by IEC Beak Consultants Ltd., Calgary, Alberta.

Habitat-wildlife species models were developed for moose, white-tailed deer, mule deer, elk, bighorn sheep, American marten, and dabbler ducks in the Rocky Mountain House area. These models were developed to predict current habitat suitability. Known and predicted population densities were compared to assess the reliability of the models.

Location: 83 B

Key words: X27

Anonymous. 1986a. A prototype wildlife resource status assessment of the Wapiti (83L) NTS map sheet. Prepared for Alberta Forestry, Lands and Wildlife, Fish and Wildlife Division by Beak Associates Consulting Ltd., Calgary, Alberta.

Habitat models were developed for various wildlife species (moose, sheep, deer, woodland caribou) as a basis for rating habitat quality. Habitat suitability was calculated by assigning weights to various variables such as snow depth, food availability, etc.

Location: 83 L

Key words: X26, X27

Anonymous. 1986b. Feasibility study for the production of aspen finishing materials. Prepared for Alberta Municipal Affairs by HLA Consultants for Snow Goose Industries.

The potential of producing and selling aspen mouldings, trim, and baseboards were evaluated. It was concluded that such products could be viable. This study also included capital costs for establishing a plant.

Location: 83 G

Key words: X19

Anonymous. 1987a. A technical and economic evaluation of using the WESTIWOOD PROCESS to manufacture aspen billiard cues in Alberta. Cuecorp Ltd., Vermilion, Alberta. Canada - Alberta Forest Development Agreement.

The billiard cues produced were considered exceptionally good. As a result of this study, Cuecorp established a billiard cue plant in Vermilion (1989) that employs between six and twelve employees.

Location: SE 83 E

Key words: X19, X20, X43

Anonymous. 1987b. Demand for disposable aspen chopsticks (waribahi), Tonan Commerce Ltd. Prepared for Forestry Canada and Alberta Forest Service, Canada-Alberta Forest Resource Development Agreement. Project Number T 1B64-58.

In 1987, fifty-one percent of Japan's disposable chopsticks were made from aspen. They speculate that there is a market for aspen chopsticks in Japan as long as the sticks are produced from wood that is clear, smooth, and straight, and the sticks are easily separated.

Location: ALTA

Key words: X19

Anonymous. 1987c. Shingles and shakes from Alberta. Prepared for Forestry Canada and Alberta Forestry, Lands and Wildlife, Canada - Alberta Forest Resource Development Agreement by Foal Enterprises, Surrey, British Columbia.

The physical feasibility of making shingles and shakes from aspen wood was tested and found possible. Various steps in the manufacturing process were outlined.

Location: NW 73 L

Key words: X19

Anonymous. 1988a. Foreign markets. Prepared for Alberta Research Council by R.G. Ferguson Associates. Canada-Alberta Forest Resource Development Agreement.

As a result of this study, the Alberta Research Council should proceed with an application to the Japanese Ministry of Agriculture, Forestry, and Fisheries to become a "Designated Foreign Testing Body". This would increase Alberta's ability to market waferboard in Japan.

Location: Not specific

Key words: X19, X43

Anonymous. 1988b. The Chinese pulp-paper industry and its potential for Alberta business. Prepared for Canadian Forestry Service and Alberta Forest Service by Arbokem Inc., Montreal, Quebec. Canada-Alberta Forest Resource Development Agreement.

This study examined the current Chinese pulp and paper industry and attempted to identify opportunities for Alberta exports. There appears to be a market for coated and laminated paper and paperboard products.

Location: Not specific

Key words: X19

Anonymous. 1988c. Integrated resource inventory of Fox Creek-Knight study area. Alberta Forestry, and Wildlife, Edmonton, Alberta. Publication Number T/185.

An ecological land classification (1:100,000) was carried out in the Fox Creek-Knight area. This report presents the ecological, vegetational, and physical attributes of the area.

Location: S 83 K

Key words: X1, X24, X27, X29, X42, X33, X34

Anonymous. 1988d. Development of an integrated operation for aspen wood products and energy from aspen biomass, pp. 172-174. *In* Granger, C., editor. Sixth Canadian bioenergy R & D Seminar. Elsevier Applied Science, London.

Not available for review.

Anonymous. 1988e. Selection, modification and testing of an insect and disease model for forest yield prediction in the boreal forests of Alberta. Prepared for Canadian Forestry Service by Monenco Consultants Limited, Calgary, Alberta.

Not available for review.

Anonymous. 1988f. Shingles and shakes from Alberta jack pine and aspen: a feasibility study. Prepared for Forestry Canada and Alberta Forestry, Lands and Wildlife, Canada - Alberta Forest Resource Development Agreement by Silvacom Ltd., Edmonton, Alberta. Catalogue Number FO42-91/21-1988E.

This report outlines a preliminary business plan for establishing an aspen shake and shingle manufacturing facility in the Lac La Biche area.

Location: NW 73 L

Key words: X19, X43

Anonymous. 1988g. Development opportunities for an Alberta plywood plant. Prepared for Canadian Forestry Service and Alberta Forest Service by Woodbridge, Reed, and Associates, Vancouver, British Columbia. Canada-Alberta Forest Resource Development Agreement. Catalogue Number FO 42-91/52-1988E.

Market considerations were reviewed with respect to the manufacturing of plywood. The report suggests that the most promising option was to manufacture hardwood plywood with a softwood core.

Location: Not specific

Key words: X19

Anonymous. 1989. Ecoclimatic regions of Canada. Environment Canada, Canadian Wildlife Service, Canada Committee on Ecological Land Classification, Ecoregions Working Group, Ottawa, Ontario. Ecological Land Classification Series, Number 23.

A ecologically-based climatic zonation is presented for Canada. The criteria for zone recognition was based on vegetation growing on normal sites (i.e., moderately well drained loam soils with neither an excess nor lack of nutrients, and neither exposed nor protected from local climatic extremes). Moist of Rowe's (1972) B18a and B18b forest sections occur in the Subhumid Low (LBs) and Mid Boreal (MBs) ecoclimatic regions.

Location: CANADA

Key words: X35, X42

Anonymous. 1990a. Integrated management of timber and wildlife resources on the Weldwood Hinton Forest Management Area. Prepared by Weldwood of Canada, Hinton, Alberta.

This report contains information on wildlife (mammals and birds) - habitat relationships. The habitat types are broadly defined according to physiognomic types. The implications of various cutting methods were interpreted with respect to wildlife.

Location: 83 F

Key words: X22, X27, X35

Anonymous. 1990b. Significant natural features of the eastern boreal forest region of Alberta. Prepared for Alberta Forestry, Lands and Wildlife by D.A. Westworth and Associates, Alberta.

The purpose of this study was to identify significant natural features in the area that occurred primarily within the Athabasca River drainage basin. Of the 234 significant features identified, three sites were classified as nationally significant, forty-four as provincially significant, and 187 as regionally significant.

Location: EASTERN ALBERTA

Key words: X21

Anonymous. 1991a. Integrated resource inventory and evaluation of Berland study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number T/231.

An ecological land classification was prepared (1:100,000) and ratings were developed for winter habitat suitability for moose, elk, and caribou; forest capability; and improved grazing. The eastern portion of the Lower Boreal-Cordilleran and Mixedwood forests.

Location: 83 K

Key words: X1

Anonymous. 1992. Alberta soils name file - Version II. Alberta Soil Survey Working Group sponsored by Alberta Research Council and Agriculture Canada, Edmonton, Alberta.

Not available for review.

Location: ALTA

Key words: X34

Archibald, J.H. 1981. Forage inventory of the Rocky-North Saskatchewan study area. Alberta Energy and Natural Resources, Edmonton, Alberta. T/19 Number 3.

A forage inventory (1:50,000) for the Rocky-North Saskatchewan study area (6,950 km^2). The study identified thirty-one forage types in the study area. Species composition and biomass data were presented.

Location: W 83 C, 83 B, S 83 F, G, H

Key words: X48

Archibald, J.H. 1982. Forage inventory: Ram-Clearwater study area. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Technical Report T/19 Number 5.

This report presents a forage inventory and analysis (1:50,000) for the Ram-Clearwater study area (3,640 km^2). The objectives were to identify species composition and determine the amount of biomass available for foraging and browsing. Sixteen forage types were recognized in the area.

Location: SE 83 C, SW 83 B, NW 82 O

Key words: X48

Archibald, J.H. 1986. Ecological zonation of northwestern Alberta. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Report No. T/136.

The zones and subzones of northwestern Alberta were mapped at a scale of 1:500,000 and described in terms of plant associations, soils, and regional climate. Keys to plant associations and descriptions of forest productivity are included.

Location: 83 M, N, O, 84 B-G, J-O

Key words: X1, X2, X24, X33, X34, X35

Archibald, J.H., N.B. Ferguson, R.W. Haag, W.K. Hay, and D.J. O'Leary. 1984. Integrated resource inventory of the Deep Basin area (NTS 83L). Alberta Energy and Natural Resources, Edmonton, Alberta. Technical Report Number T/78.

Three natural resource inventories were prepared in the area south of Grande Prairie: a physical land classification (1:50,000), an ecological land classification (1:100,000), and forage inventory.

Location: 83 L

Key words: X1, X2, X48

Archibold, O.W. 1979. Buried viable propagules as a factor in post-fire regeneration in northern Saskatchewan. Canadian Journal of Botany, 57:54-58.

The objective of this study was to determine the amount of buried seed in an even-aged mixedwood stand that survived a fire in 1977 and to evaluate the role in the regeneration of the area. The rate of emergence represented 426 plants per square meter; eighty-seven percent originated from seed and thirteen percent developed from roots or rhizomes. It was determined there were 456 propagules per meter square with trees accounting for forty-three percent of the total seed input which originated from the surrounding undisturbed forest.

Location: SE 73 I

Key words: X13, X24, X33, X40

Archibold, O.W. 1980. Seed input into a postfire forest site in northern Saskatchewan. Canadian Journal of Forest Research, 10:129-134.

The quantity of seed transported into a burned, even-aged aspen-white spruce stand was monitored during the early regrowth stage to evaluate the recovery of the forest cover. The equivalent of approximately nine million seeds per hectare were collected in seed traps. The most abundant species were fireweed (65 percent), paper birch (28 percent), and white spruce (6 percent). The subsequent seed counts indicated a dramatic decline in trapped seeds (i.e., 3.4 million per hectare). Much of the early growth originated from vegetative reproduction.

Location: SE 73 I

Key words: X13, X33, X40

Ash, G.R., and L.R. Norton. 1980. A fisheries and water quality survey of ten lakes in the Richardson Tower area, northeastern Alberta. Vol. 1: Methodology, summary, and discussion. Alberta Oil Sands Environmental Research Program, Project WS 1.4.1, AOSERP Report 94.

This study analyzes the morphometric and water quality characteristics in relation to habitat requirements for indigenous and possible introduced fish species to determine potential fish yield and to determine the susceptibility of the lakes to acidification.

Location: NW 74 E

Key words: X23, X29

Atton, F.M., R.P. Johnson, and N.W. Smith. 1974. Bibliography of limnology and aquatic fauna and flora of Saskatchewan, 1974. Saskatchewan Tourism and Renewable Resources. Fisheries Report Number 10.

A bibliography of biological resources in lakes and stream within Saskatchewan.

Location: SASK

Key words: X22, X23, X27, X29, X30, X35, X45, X47

Ayres, K.W., D.W. Anderson, and J.G. Ellis. 1978. The soils of the northern provincial forest in the Pasquia Hills and Saskatchewan portion of the Pas Map Areas (63E and 63F). Saskatchewan Institute of Pedology, Saskatoon, Saskatchewan. Publication SF4.

A soils inventory was conducted in an area located east of Prince Albert (13,057 km^2) and 1:126,720 scale maps depicting soil associations were prepared. Ratings were developed for forestry and agriculture. Area estimates are provided for each soil association as well as detailed physical and chemical analysis data for selected associations.

Location: 63 E, F

Key words: X34

Bach, L., E.I.C. Wang, and M. Micko. 1983. Wood quality of Alberta aspen: mechanical strengths of clear, stained and decayed wood. University of Alberta Agriculture and Forestry Bulletin 6:7-9.

The effects of four grades of decay (clear, stained, intermediate, and advanced) on the mechanical strengths of aspen were studied. The tests performed were as follows: bending strengths, compression parallel to the grain, hardness, specific gravity, and moisture content. Results of these tests were tabulated. The results indicate that as decay progresses the specific gravity of wood decreases as do mechanical strengths.

Location: SW 83 J

Key words: X9, X19, X43

Bailey, G.R., and J. Dobie. 1977. Aspen poplars - tree and log quality. Canada Department of Fisheries and Environment, Canadian Forestry Service, Western Forest Products Laboratory, Vancouver, British Columbia. Information Report VP-X-155.

The quality of aspen logs was assessed in the Lesser Slave Lake area. The results indicated that six percent of the gross wood volume was decayed in trees less than sixty years, and twelve percent in trees greater than sixty years.

Location: 83 O

Key words: X9, X19

Baker, J. 1973. Nitrogen fractionation of two forest soils in Alberta. Canada Department of Environment,

Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-63.

The purpose of this study was to obtain information about the fractionation of nitrogen in each soil horizon and its distribution within two forest soils, Mercoal (Brunisolic Gray Luvisol) and Coalspur (Orthic Gray Luvisol). Generally, both soils responded similarly to fertilization but absolute values differed.

Location: SW 83 F

Key words: X25, X34

Baker, J., D. Hocking, and M. Nyborg. 1977. Acidity of open and intercepted precipitation in forests and effects on forest soils in Alberta, Canada. Water, Air and Soil Pollution, 7:449-460.

The effects of sulphur dioxide emissions via precipitation were examined with respect to soil properties. The results indicated increased extractable acid and aluminum levels, and decreased calcium and magnesium.

Location: 83 B, 74 D

Key words: X34, X45

Ball, W.J., and V.S. Kolabinski. 1979. An aerial reconnaissance of softwood regeneration on mixedwood sites in Saskatchewan. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-216.

This study assessed the practicality of large-scale (1:100 to 1:1,000) color photos to determine forest regeneration in softwood clear-cuts on mixedwood sites. The results strongly indicated that the use of remote sensing was favorable both economically and operationally.

Location: 63 E

Key words: X17

Bamsey, C. 1988. Directory of primary wood using industries in Alberta. Alberta Forest Service and Forestry Canada, Edmonton, Alberta. Canada - Alberta Forest Resource Development Agreement.

This is a comprehensive directory of all the primary wood-using industries in Alberta. For each industry the following information is provided: mill capacity, products manufactured, production in 1987, wood supply, harvesting systems, mill facilities, usage of wood residues, energy supply, and direct employment for 1987.

Location: ALTA

Key words: X12, X19, X20, X43

Barr, T. 1987. Aspen cull and its significance in bleached kraft production, pp. 55-58. *In* Aspen quality workshop, 12 February 1987. Proceedings of workshop by Canadian Forestry Service and Alberta Forestry Service, Edmonton, Alberta.

The author emphasizes the need for agreement on aspen management and inventory information. He also stresses the importance of low-rot content to achieve quality pulp to remain competitive in the market place.

Location: Not specific

Key words: X19

Barton, D.R., and R.R. Walbee. 1980. Ecological studies of aquatic invertebrates of the Alberta Oil Sands Environmental Research Program Study Area of northeastern Alberta. Alberta Oil Sands Environmental Research Program, Project AF 2.0.1, AOSERP Report 88.

The distribution and taxonomic composition of the macrobenthic fauna of the Athabasca, Muskeg, and Steepbank Rivers during 1976 and 1977 was described. The variety and density of vertebrates on oil sands were significantly less than on rubble substrates.

Location: W 74 H

Key words: X22, X26, X27, X29

Barton, G.M., and R.E. Wall. 1968. The occurrence of 3-hydroxyflavanoes in aspen branch stubs. Canada Department of Forestry and Rural Development, Forestry Branch, Bi-Monthly Research Notes, 24:49.

The occurrence of 3-hydroxyflavanoes was found to occur in dead aspen branches and knots. This chemical partially inhibits sulfite pulping and is associated with staining.

Location: Not specific

Key words: X9

Basham, J.T. 1987. Assessment and prediction of stem decay in aspen stands, pp. 110-126. In: Aspen quality workshop, 12 February 1987. Proceedings of workshop sponsored by Canadian Forestry Service and Alberta Forestry Service, Edmonton, Alberta.

This research suggests that age is a more reliable indicator of the extent of stem decay in aspen than diameter, growth rate, or site. In Manitoba and Ontario, superior clones were rare and faster growing clones usually have the most stem decay. Aspen clones have more influence on the amount of decay than site. *Phellinus tremulae* cause about seventy percent of stem decay in aspen and the presence of its conks on stems is the most reliable indicator of stem decay.

Location: ONT, MAN

Key words: X9

Bayrock, L.A. 1971. Surficial geology, Bitumount, NTS 74E. Alberta Research Council, Edmonton, Alberta. Map 34.

A 1:250,000 scale map of surficial deposits in an area immediately north of Fort McMurray.

Location: 74E

Key words: X2

Bayrock, L.A. 1972a. Surficial geology, Fort Chipewyan, NTS 74L. Alberta Research Council, Edmonton, Alberta.

A 1:250,000 scale map of surficial deposits at the southern end of Wood Buffalo National Park.

Location: 74 L

Key words: X2

Bayrock, L.A. 1972b. Surficial geology, Peace Point and Fitzgerald west of 111° 20', NTS 84 P and 74M. Alberta Research Council, Edmonton, Alberta.

A 1:250,000 scale map of surficial deposits in east central portion of Wood Buffalo National Park.

Location: 84 P, W 74 M

Key words: X2

Bayrock, L.A. 1972c. Surficial geology, Lake Claire, NTS 84I. Alberta Research Council, Edmonton, Alberta.

A 1:250,000 scale map of surficial deposits at the southern end of Wood Buffalo National Park.

Location: 84 I

Key words: X2

Bayrock, L.A., and T.H.F. Reimchen. 1974. Surficial geology, Waterways, NTS 74D. Alberta Research Council, Edmonton, Alberta.

A 1:250,000 scale map of surficial deposits in the vicinity of Fort McMurray.

Location: 74 D

Key words: X2

Bayrock, L.A., and T.H.F. Reimchen. 1976. Regional quaternary geology and landform analyses, Syncrude Leases 17 and 22, Alberta. Prepared for Syncrude Canada Ltd., Edmonton, Alberta.

Not available for review.

Beck, J.A., Jr., R.G. Anderson, G.W. Armstrong, and G.H. Farrow. 1988. Alberta economic timber supply analysis. Canada - Alberta Forest Resource Development Agreement. Catalogue No. FO 42-91/62-1989E.

An economic timber supply model suitable for Alberta was developed which contains the following components: a delivered wood cost model, a geo-referenced forest inventory (using quarter section summary data and ARC/INFO geographic information system), and the harvest scheduling model using TIMBER RAM.

Location: ALTA

Key words: X19

Beck, J.A., L. Constantino, W. Phillips, and M. Messmer. 1989. Supply, demand and policy issues for use of aspen. Forestry Chronicle, 65:31-35.

This paper reviews the wood supply and demand prospects for aspen and it analyzes forest manage-

ment policy in terms of recent and prospective supply.

Location: ALTA, SASK, MAN

Key words: X19

Beke, G.J. 1969. Soils of three experimental watersheds in Alberta and their hydrologic significances. Ph.D. Dissertation, University of Alberta, Edmonton, Alberta.

This study described, classified, and mapped soils for the purpose of determining their importance in the hydrologic cycle for watershed management purposes.

Location: NW 82 O

Key words: X23, X34

Bella, I.E. 1968. Estimating aerial component weights of young aspen trees. Canada Department of Forestry and Rural Development, Forestry Branch. Information Report MS-X-12.

Above-ground biomass of young aspen stands was determined in relation to stand density, site, and clonal variation in pure, even-aged stands growing on fresh sites. The report presents regression equations and tables for estimating the amount of above-ground biomass in young aspen trees.

Location: 62 K, O, 63 E

Key words: X33

Bella, I.E. 1969. Competitive influence-zone overlap: a competition model for individual trees. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Bi-Monthly Research Notes, 25(3):24-25.

Regression equations for aspen were developed to evaluate competition among individual trees based on parameters such as crown radius and diameter.

Location: Not specific

Key words: X4, X13

Bella, I.E. 1970. Simulation of growth, yield and management of aspen. Ph.D. Dissertation, University of British Columbia, Vancouver, British Columbia.

Regression models for predicting aspen growth and yield were developed for above average quality stands. Diameter at breast height and stem age were found to be the most useful variables used in equations to estimate basal area, volume, and weights per acre. The mathematical relationship among tree components (e.g., leaves, branches, stems) was also assessed.

Location: SASK, MAN

Key words: X15

Bella, I.E. 1972a. Logging practices and the development of new aspen stands. Canadian Forestry Service, Forestry Report, 2(2):5-6.

Various logging techniques were compared in the Hudson Bay area of Saskatchewan. The study found that aspen sucker densities were twice as great after summer logging than winter, more suckers developed where slash was less, high densities of suckers resulted in a greater proportion of mortality, and the season of logging did not affect stand species composition.

Location: 63 E

Key words: X12, X13

Bella, I.E. 1972b. Simulation of growth: a new approach to yield forecasting, pp. 103-108. *In* Aspen symposium proceedings. U.S. Department of Agriculture, Forest Service, General Technical Report NC-1.

Not available for review.

Bella, I.E. 1975. Growth-density relations in young aspen sucker stands. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-124.

This study examined the effect of density on tree growth in juvenile stands. The aim of the study was to improve growth and yield prediction techniques. The results suggest that stand density has a significant affect on growth, and diameter increment may be halved by crowding. To improve diameter increment, thinning is recommended.

Location: 63 E

Key words: X14, X15

Bella, I.E. 1986. Logging practices and subsequent development of aspen stands in east-central Saskatchewan. Forest Chronicle, 62:81-83.

This study began in 1965 to determine the effects of various logging practices on aspen sucker densities and subsequent stand development. It describes the growth and stand development trends at seventeen years after logging. The study showed that following both summer and winter logging there was excellent stocking and density. Logging slash on the ground resulted in stands with densities comparable to the fire-origin regeneration.

Location: 63 E

Key words: X12, X15

Bella, I.E. 1986. Tree growth response along seismic lines in Alberta. Forestry Chronicle, 62:29-34.

The results of this study showed that aspen growth was not stimulated along seismic cut lines which indicate a complete loss of production due to the lines. Following clearing the radial increment for aspen decreased from forty-six percent (before clearing) to ten percent (after clearing).

Location: 83 B, F, G, K, L

Key words: X15

Bella, I.E., and J.P. De Franceschi. 1972. The effect of logging practices on the development of new aspen stands, Hudson Bay, Saskatchewan. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-33.

The effects of aspen harvesting are assessed with respect to the quantity of suckers produced after summer and winter harvesting. Results indicate that more suckers are produced after summer harvesting. Stem densities ranged from 6,600 to 92,900 per hectare.

Location: 63 E

Key words: X6, X7, X12, X14

Bella, I.E., and J.P. De Franceschi. 1980a. Biomass productivity of young aspen stands in western Canada. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-219.

The purpose of this study was to determine the biomass represented by various components of the aspen tree from the time establishment to forty years old on a range of sites at various densities. Equations and tables are presented for estimating above-ground dry weights tree components for fully stocked stands in Alberta Saskatchewan. From ten to forty years the proportion of stem wood increases from sixty to seventy percent with a corresponding drop in the proportion of bark, branches, and leaves. This study suggests a rotational age of approximately thirty years for fully stocked normal stands.

Location: 83 O, P

Key words: X15

Bella, I.E., and J.P. De Franceschi. 1980b. Site index curves for aspen in the prairie provinces. Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Forest Management Note No. 1.

An aspen site index regression model was developed for mixedwood forests of western Canada.

Location: ALTA, SASK, MAN

Key words: X15

Bella, I.E., and K. Hunt. 1973. Kraft pulping of young trembling aspen from Manitoba. Canadian Journal of Forest Research, 3:359-366.

This study was conducted to determine how the yield and quantity of kraft pulp are affected by tree age at harvest in immature stands. The results suggest that aspen trees that are seven, thirteen, and twenty-two years old can produce market pulp with good yields and comparable strengths. However, costs of harvesting, bark removal, and chipping will vary among the three age groups.

Location: 62 K, O

Key words: X19

Bella, I.E., and J.M. Jarvis. 1967. High total productivity of a young aspen stand in Manitoba. Pulp Paper Magazine of Canada, 43:432-437.

The study suggests that short-rotation management of aspen can provide a quick return on investment and fill future demands for fibre. The results also suggest that young stands contain considerable

volume, assuming that vegetation competition is controlled and fertilizers applied.

Location: E 62 H

Key words: X7, X15

Bentz, J., D. Brierley, W. Hay, S. Nelson, S. Robertson, and R. Wehnrhahn. 1985a. Integrated resource inventory of Coal Branch study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. T/83-2.

An integrated resource inventory was conducted in the Coal Branch planning area (8,100 km^2) to provide a common basis for land use evaluation. An ecological (1:100,000) and physical (1:50,000) land classification, and a vegetation classification were developed. The report summarizes the interrelationship between the basic environmental components.

Location: S 83 F, N 83 C

Key words: X1, X2, X33

Bentz, J., M. Johnson, and D. Brierley. 1985b. Ecosystem classification and forest classification and capability of the McLeod River coal lease. Alberta Energy and Natural Resources, Edmonton, Alberta.

This report describes the ecosystem classification of the McLeod River coal lease area (1,830 ha). The ecosystem units were mapped at a scale of 1:15,000. The study includes an inventory of vegetation, soils, and mensurational data. Forest capability of the area was determined through a variety of methods.

Location: SW 83 F

Key words: X33, X34

Berlyn, R.W. 1990. Trial of a double-drum flail delimber/debarker processing small-diameter frozen timber: Phase II. Size distribution and composition of process flows, chemical pulping trials. Forest Engineering Research Institute of Canada, Vancouver, British Columbia. Special Report Number SR-68.

Aspen wood chips produced from large-diameter logs had a bark content of 4.2 percent. This suggests that the use of a flail does not affect pulp quality.

Location: 83 F

Key words: X15

Bessie, K., L.J. Knapik, and A.M. McCann. 1986. Physical land classification of the management unit W4 for Alberta Energy and Natural Resources by Pedocan Land Evaluation Ltd., Edmonton, Alberta. Technical Report No. T/111.

A physical land classification (1:15,000) was developed for the W4 forest management unit (1,305 km^2). Each physical classification unit was described in terms of its physiography, geomorphology, surface characteristics, and soils.

Location: 83 J, K

Key words: X2

Bichlmaier, M. 1985. Response of understory vegetation of some boreal mixedwood forest communities to native ungulate foraging. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The response of various plant communities was examined in relation to high and low in levels of native ungulate use. Preferred browse/grazing species included *Viburnum edule*, *Prunus virginiana*, *Amelanchier alnifolia*, *Aralia nudicaulis*, *Epilobium angustifolium*, and *Disporum trachycarpum*, but they were usually less abundant due to grazing. Bristly and spiny shrubs and introduced weeds increased due to their less preferred status.

Location: 83 H

Key words: X26

Biggs, W., S. Leigh-Spencer, and D. Smith. 1973. An ecological survey of Crimson Lake Provincial Park. Alberta Lands and Forests, Edmonton, Alberta.

Not available for review.

Bishoff, K.W. 1981a. Yield, use and chemical composition of forage in Elk Island National Park. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

This study assessed the habitat and forage resources within an enclosed 723 ha area that was heavily stocked with moose and elk. The objective of the study was to classify and describe the vegetation, to determine forage yield and chemical composition, and to describe resource utilization. In

general, annual herbaceous forage and current annual growth of browse provided adequate nutrients, but two to three year old wood is probably nutrient deficient.

Location: 83 H

Key words: X26, X27

Bishoff, K.W. 1981b. Forage inventory: Jean D'Or Prairie. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report Number T/19-1.

This report presents the results of a forage inventory (1:50,000) which was conducted in the Fort Vermilion area (1,495 km^2). Fourteen forage types were recognized. For each type, species composition and herbaceous biomass data were summarized.

Location: SW 84 J

Key words: X48

Bishoff, K.W. 1984. Forage inventory of the Frost Hills study area. Revised by D.J. Downing. Alberta Energy and Natural Resources, Edmonton, Alberta. Technical Report Number T/19-6.

A forage inventory was conducted in an area located along the south side of Lesser Slave Lake (1,212 km^2). Sixteen forage types were recognized, described, and mapped (1:50,000).

Location: S 83 O

Key words: X48

Black, R.L., and P.J. Kristopovich. 1954. Decay of trembling aspen in Manitoba and eastern Saskatchewan. Canada Department of Agriculture, Forest Biology Division, Saskatoon, Saskatchewan.

Not available for review.

Blyth, A.W. 1954. Regeneration of conifers and hardwood following fire and logging in the mixedwood stands of northern Alberta - internal report. Canada Department of Northern Affairs and Natural Resources, Forestry Branch, Project A30.

Not available for review.

Bohning, R.A. 1990. Directory of wood-using industries in Alberta 1989. Forestry Canada, Edmonton, Alberta and Canada-Alberta Forest Resource Development Agreement, Edmonton, Alberta.

This directory provides a listing of Alberta's secondary wood-using industries. Information is provided for each industry: the name, address, number of employees, and products manufactured.

Location: ALTA

Key words: X19, X43

Bond, W.A. 1980. Fisheries resources of the Athabasca River downstream of Fort McMurray, Alberta. Alberta Oil Sands Environmental Research Program, Edmonton, Alberta. Project AF 4.3.2, AOSERP Report 89.

The study area, the Athabasca River and its tributaries provided important spawning, feeding, and rearing areas for twenty-seven fish species and is important to the maintenance of the fish populations in Lake Athabasca. This report provides a summary of the biology and life cycle of these species within the study area.

Location: NW 74 E

Key words: X29

Bond, W.H., and K. Machniak. 1977. Interim report on an intensive study of the fish fauna of the Muskeg River watershed of northeastern Alberta. Alberta Oil Sands Environmental Research Program, Edmonton, Alberta. AF4.5.1, AOSERP Report 26.

This is a summary of an intensive study on the life histories of the fisheries resources of the Muskeg River watershed in the summer of 1976 and a quantitative assessment of the significance of the watershed to the fisheries of the Athabasca River system.

Location: SW 74 E

Key words: X29

Bond, W.A., and K. Machniak. 1979. An intensive study of the fish fauna of the Muskeg River watershed of northeastern Alberta. Alberta Oil Sands Environmental Research Program, Edmonton, Alberta. Project AF4.5.1, AOSERP Report 76.

A comprehensive study of the life history of the fish species of the Muskeg River was conducted during the open water period of 1976 and 1977. White and longnose suckers were the most abundant fish accounting for ninety-two percent of the fish enumerated. Both of these species exhibited a homing tendency.

Location: NW 73 D

Key words: X29

Boone, D.R., and N. Cyr. 1981. Chemical composition and biodegradability of decayed aspen wood. Alberta Research Council, Forest Products Working Group, Edmonton, Alberta. Report 81-A.

Not available for review.

Bonnor, G.M. 1982. Canada's forest inventory - 1981. Canada Department of the Environment, Canadian Forestry Service, Chalk River, Ontario.

Various statistics on Canadian forests were presented. These included percent of land and water, area of forest land, area of productive forest land, wood volumes, ownership, proportion of stocked and productive forest by age class, and total area, and volume of softwood by province.

Location: Canada

Key words: X19

Boyacioglu, E. 1975. Biophysical analysis and evaluation of capability: Fort Assiniboine. Alberta Lands and Forests, Edmonton, Alberta.

The report represents a biophysical classification (1:126,720) of an area near Fort Assiniboine. This analysis is strongly oriented towards the physical resources. Each ecosection was rated for agriculture, forestry, ungulates, recreation, and waterfowl capability.

Location: 83 J, K

Key words: X1

Boyacioglu, E., and C. Van Waas. 1973. Biophysical analysis and evaluation of capability: Edson-Peers. Alberta Lands and Forests, Edmonton, Alberta.

This report presents a biophysical analysis of the Edson-Peers area. Each ecosection was described in terms of physiography, soil association, present use, natural cover, and agro-climate zones. Suitability ratings were given for agriculture, forestry, ungulates, recreation, and water. Also included are land capability maps (1:50,000).

Location: NE 83 F, SE 83 K

Key words: X1

Boyd, M. 1977. Analysis of fur production records by individual fur-bearing species for registered trapping areas in Alberta, 1970-75. Alberta Energy and Natural Resources, Alberta Fish and Wildlife Division, Alberta.

Not available for review.

Boyd, M.G. 1978. Management of marten, fisher, and lynx in Saskatchewan with special reference to the effects of forest harvesting in the mixedwood boreal forest. M.E.Des. Thesis, University of Calgary, Calgary, Alberta.

The primary objective of this thesis was to review furbearer management practices to improve management strategies for marten, fisher, and lynx. The author concludes that insufficient information exists to properly manage these species, that marten and lynx populations should not be trapped during years of low numbers, and that the fisher trapping season should be shortened. Forest harvesting displaces marten, lynx, and fisher with the two latter species re-occupying an area within one to twenty years after disturbance. Marten require much longer periods of time due to the lack of suitable vegetation.

Location: SASK

Key words: X26, X27, X35, X41

Boydell, A.N., L.A. Bayrock, and T.H.F. Reimchen. 1974. Surficial geology, Rocky Mountain House (NTS 83 B). Alberta Research Council, Edmonton, Alberta.

A 1:250,000 map of surficial materials in the Rocky Mountain House area of Alberta.

Location: 83 B

Key words: X2

Bradley, C. 1980. Lesser Slave Lake Provincial Park biophysical inventory and resource assessment.

Prepared for Alberta Recreation and Parks, Edmonton, Alberta.

Not available for review.

Breck, D. 1987. Aspen defects: their importance to pulp and paper, pp. 6-23. *In* Aspen quality workshop. Proceedings of workshop sponsored by Canadian Forestry Service and Alberta Forestry Service, Edmonton, Alberta. February 12, 1987.

The quality of aspen is considered an important factor in determining the profitability of the pulp industry. Defects in the bole and fungal infects are considered the primary problems.

Location: Not specific

Key words: X19

Brese, W.G. 1977. Aspen utilization study. Alberta Business Development and Tourism, Edmonton, Alberta.

Not available for review.

Brierley, D., D. Downing, and D. O'Leary. 1985. Integrated resource inventory of the Key River study area. Alberta Energy and Natural Resources, Edmonton, Alberta. Technical Report No. T/87.

Volume I presents a physical (1:50,000 scale) and ecological (1:100,000) land classification for the Key River area (1,350 km^2). A general description is provided for each major physiographic unit and each ecosection. Various capability ratings were developed for agriculture, forestry, and wildlife. Volume II summarizes a vegetation classification.

Location: 84 F

Key words: X1, X2, X33, X34, X35

Brocke, L.K. 1976. Biophysical analysis and evaluation of capability: Clear River area. Alberta Energy and Natural Resources, Edmonton, Alberta.

This report presents a biophysical analysis (1:126,720) for the Clear River area which is located north of Grande Prairie. The physical and general biological resources were summarized for each ecosection. Capability ratings were developed for agriculture, forestry, ungulates, recreation, and waterfowl.

Location: 84 D

Key words: X1

Brocke, L.J., and K. Bennett. 1982. Soil, forest, and understory vegetation inventory, ecological land classification for the Sandalta Project area. Prepared for Gulf Canada Resources. Sandalta Report Number Phase II-23.

Not available for review.

Brown, K.R. 1989. Effects of nitrogen availability and CO_2 enrichment on growth, water use, and nutrition of seedlings of boreal trees. Ph.D. Dissertation, University of Alberta, Edmonton, Alberta.

The objective of this study was to examine the effects of atmospheric carbon dioxide enrichment on aspen and white spruce seedling growth. The results indicate that exposure to increased carbon dioxide levels increases mass, height, and leaf area of aspen for a short period of time (sixty days). Nutrient availability was an important factor in increased growth. Also see Brown and Higginbotham (1986).

Location: ALTA

Key words: X13

Brown, K.R., and K.O. Higginbotham. 1986. Effects of carbon dioxide enrichment and nitrogen supply on growth of boreal tree seedlings. Tree Physiology, 2:223-232.

The objective of this study was to characterize the growth and biomass partitioning response of white spruce and aspen seedlings in response to controlled concentrations of atmospheric carbon dioxide and nitrogen supply. Nitrogen supply had pronounced effects on biomass accumulation, height, and leaf area of both species.

Location: Not specific

Key words: X13

Bulmer, C.E. 1987. Nutrient imbalances of aspen poplar in acid sulfate soils in northwestern Alberta M.Sc. Thesis, University of Alberta, Edmonton.

This study describes forest-soil interactions in a soil developed on extremely acidic parent materials in northwestern Alberta. Its results showed that des-

pite the acidic conditions that nutrient concentrations in leaves were similar to average values reported in the literature.

Location: SW 84 C

Key words: X13, X25, X34

Cairns, A.L. 1976. Distribution and food habits of moose, wapiti, deer, bison, and snowshoe hare in Elk Island National Park, Alberta. M.Sc. Thesis, University of Calgary, Calgary, Alberta.

The habitat preferences of moose, bison, elk, and deer were investigated in Elk Island National Park. The principal habitats of moose were shrublands and shrub meadows; bison preferred upland grasses but used sedge and shrub meadows; elk primarily used grasslands but also used willows and sedges in their winter and spring diets, respectively; and deer favored upland graminoids in spring and summer, and shrubs in winter.

Location: 83 H

Key words: X27

Cairns, A.L., and E.S. Telfer. 1980. Habitat use by four sympatric ungulates in boreal mixedwood forest. Journal of Wildlife Management, 44:849-857.

The objective of this study was to evaluate habitat selection by moose, white-tailed deer, elk, and bison. These species differed in their use of habitat types in terms of time spent and type of winter use. Bison and elk preferred uplands, moose preferred shrublands and sedge meadows.

Location: 83 H

Key words: X27

Cameron, T.F. 1977. Biophysical analysis and evaluation of capability: La Crete area. Alberta Energy and Natural Resources, Land Use Assignment Committee, Edmonton, Alberta.

A biophysical analysis was conducted in the La Crete area (3,300 km^2). The natural resources of the study area were summarized and land capability ratings were developed for agriculture, forestry, recreation, ungulates, and waterfowl.

Location: SE 84 K

Key words: X1

Campbell, G.A., and J.D. Dunfield. 1969. Report on the forest survey of the Peter Pond Indian Reserve No. 193. Canada Department of Fisheries and Forestry, Forest Management Institute, Ottawa, Ontario.

A mapping and inventory of forests in the Peter Pond Indian Reserve area. Aspen and poplar represented approximately fifty-five percent of the total tree volume.

Location: 73 N

Key words: X19, X46

Campbell, J.S., V.J. Lieffers, and E.C. Pielou. 1985. Regression equations for estimating single tree biomass of trembling aspen: assessing their applicability to more than one population. Forest Ecology and Management, 11:283-295.

The study recommends the use of existing equations to estimate biomass when models are lacking for a specific area. This could be accomplished by matching measured tree parameters to existing equations. The following five descriptors would be necessary in selecting the appropriate existing regression equation: (1) mean diameter at breast height, (2) the mean height, (3) mean diameter at breast height/height, (4) ratio/mean absolute form quotient, and (5) mean wood density.

Location: NW 74 D

Key words: X15

Campbell, L.M., R.J. Bilodeau, and R.F. Deboo. 1969. Research on the poplar bud-gall mite in the prairie province. Canada Department of Forestry, Canadian Forestry Service, Forest Research Laboratory, Winnipeg, Manitoba. Internal Report MS-96.

The life history, distribution, and possible control of poplar bud-gall mites was summarized. *Aceria parapopulis* occurs in the southern portion of the boreal forest.

Location: ALTA, SASK, MAN

Key words: X9

Carder, A.C. 1972. Climatic trends in the Beaverlodge area. Canadian Journal of Plant Science, 42:698-706.

Analysis of weather records from Beaverlodge from 1916 to 1960 suggest that spring and fall have become warmer. This warming trend results in a longer frost-free period. The annual precipitation increased 4.6 cm during the forty-five years.

Location: SE 83 M

Key words: X42

Carmean, W.H. 1985. Site quality for hardwoods in the boreal forest of Canada, pp. 51-65. *In* Hagglund, B., and G. Peterson, editors. Broadleaves in boreal silviculture - an obstacle or an asset? Swedish University of Agricultural Sciences, Department of Silviculture, Umea. Report Number 14.

Not available for review.

Case, J.W. 1977. Lichens on *Populus tremuloides* in western central Alberta, Canada. Bryologist, 80:48-70.

This study found seventy-four lichens on aspen in west-central Alberta. The geographical and vertical distribution and aspect preferences of each lichen species was described. The aspen epiphytic lichen flora of this region closely resembles that of Prince Albert National Park, Saskatchewan.

Location: 83 E, F, G, J-O, 84 B, C, D

Key words: X33, X35

Cayford, J.H. 1957. Influence of the aspen overstory on white spruce growth in Saskatchewan. Canada Department of Northern Affairs and National Resources, Forest Research Division, Technical Note 58.

The author suggests that white spruce up to one hundred years old are suppressed by aspen, which can reduce volumes by fifty percent. It is suggested that aspen be removed before the stand reaches forty to fifty years of age.

Location: W 73 H

Key words: X4, X7, X14, X15

Cayford, J.H., V. Hildahl, L.D. Nairn, and M.P.H. Wheaton. 1959. Injury to trees from winter drying and frost in Manitoba and Saskatchewan in 1958. Forestry Chronicle, 35:282-290.

The authors describe the injury to trees resulting from the unusual weather conditions in the winter and spring of 1958. The aspen trees experienced a high bud mortality and the initial foliage was late, in scattered clusters, and leaves were abnormally large. Stem analyses showed that the radial increment of aspen was reduced by ninety-five percent.

Location: 62 K, W 52 E, SW 52 L

Key words: X15, X42

Cerezke, H.F., and F.J. Emond. 1989. Forest insect and disease conditions in Alberta, Saskatchewan, Manitoba, and the Northwest Territories in 1987. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-300.

The amount of forest land defoliated in 1987 by such insects as forest tent caterpillars and large aspen tortrix was estimated for the three prairie provinces. Estimates suggest that approximately 7.9 million hectares were defoliated, which represented a sixty percent increase over 1986.

Location: 83 B, E, L, D, 72 M, 82 A, B, H

Key words: X9

Cessna, A.J., J. Waddington, and S. Bittman. 1989. Residues of 2,4-D and Picloram in aspen poplar and soil after application with a roller. Canadian Journal of Plant Science, 69:205-212.

Between eleven and sixteen percent of the Picloram applied to the trees reached the soil. The residues were not considered to be an environmental problem because of its slow release from poplar tissue by leaching and decay.

Location: 72 J

Key words: X7

Chaplin, R.K., and J.F. Mathews. 1975. Conversion of poplar into animal feed - final report. University of Saskatchewan, Saskatoon, Saskatchewan. DSS contract O5W4-0063.

The mechanics and an economic assessment of converting poplar into animal feed was evaluated. In 1975 dollars, this feed would have cost $39/ton. The feed had a forty percent digestibility rate which was less than hay. While the feed is readily con-

sumed, it may have adverse effects on livestock reproduction.

Location: SASK

Key words: X19

Cheliak, W.M. 1980a. Genetic variation of trembling aspen in Alberta. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The leaf morphology of aspen was investigated. Eight morphological and two derived ratio characteristics had significant within population differs. Discriminant analysis showed population groupings could be defined by latitude. Leaf blade length was found to be the best character for discriminating among populations.

Location: ALTA

Key words: X13

Cheliak, W.H. 1980b. Genetic variation in natural populations of *Populus tremuloides*, pp. 117-118. *In* Dancik, B.P, and K.O. Higginbotham, editors. Proceedings of sixth North American forest biology workshop, 11-13 August. University of Alberta, Edmonton, Alberta.

A brief overview of the reproductive and genetic characteristics of aspen.

Location: ALTA

Key words: X18

Cheliak, W.M., and B.P. Dancik. 1982. Genetic diversity of natural populations of a clone-forming tree *Populus tremuloides*. Canadian Journal of Genetics and Cytology. 24:611-616.

The purpose of this study was to investigate the effects of asexual reproduction on population structure and genetic variation in trembling aspen. These characteristics were investigated electrophoretically. Levels of genetic diversity were found greater than those reported for comparable sexually reproducing plants and animals.

Location: ALTA

Key words: X18

Chow, S. 1987. CANFOR research on aspen wood quality, pp. 126-127. *In* Proceedings of workshop sponsored by Canadian Forestry Service and Alberta Forestry Service, Edmonton, Alberta. February 12 1987.

The results of an ongoing research project in northern Alberta and British Columbia are presented with topics including on-site wood quality determination, methods used to determine chemical properties, wood quality, and on-site detection instruments.

Location: NORTHERN ALBERTA

Key words: X9

Cieszewki. C.J., and I.E. Bella. 1991. Polymorphic height and site index curves for the major tree species in Alberta. Forestry Canada, Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Forest Management Note Number 51.

Using the VASI model (variable-age-site index), this paper presents height-growth curves for four tree species including aspen. Data was derived for Alberta Forestry Service, Weldwood of Canada, and Forestry Canada.

Location: ALTA

Key words: X15

Connell, A.B. 19--. Forest types of eastern Saskatchewan. Thesis, University of Toronto, Toronto, Ontario.

Not available for review.

Cordes, L.D., S. Hartwell, and W.L Strong. 1975. Environmental assessment of the Pine Lake area, Wood Buffalo National Park. National and Historic Parks Branch, Department of Indian and Northern Development, Research Contract 585-74-19.

An environmental analysis was conducted in a twenty-nine km^2 recreation area in Wood Buffalo National Park. The surficial deposits, soils, topography, and vegetation were mapped at a scale of 1:6,000. Fifteen forest and wetland communities were recognized and sampled. In addition, trampling experiments were conducted to determine the sensitivity of the ground cover vegetation.

Location: 84 P

Key words: X33, X34, X35, X37

Cormack, R.G.H. 1965. The effect of calcium ions and pH on the development of callus tissue on stem cuttings of balsam poplar. Canadian Journal of Botany, 43:75-83.

This paper is an anatomical comparison of callus tissue produced on stem cuttings of balsam poplar grown in distilled water and in saturated solutions of $CaSO_4$ from 6.0 to 11.0 pH. Differences in callus morphology, hardness, and cellular structure were observed. The emergence and subsequent growth of adventitious roots decreased with increasing alkalinity.

Location: Not specific

Key words: X10

Cormack, R.G.H., and P.L. Lemay. 1966. A further study of callus tissue development on stem cuttings of balsam poplar. Canadian Journal Botany, 44:47-50.

When balsam poplar cuttings are grown in a saturated solution of $CaSO_4$ (pH 11) for ten days and then transferred to distilled water for another ten days, the resulting callas mass shows two distinctive types of tissue. Reversal of the process results in a reversal of the location of the two tissue types.

Location: Not specific

Key words: X10

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.

See Corns and La Roi (1976).

Corns, I.G.W. 1978. Tree growth prediction and plant community distribution in relation to environmental factors in lodgepole pine, white spruce, black spruce, and aspen forests of western Alberta foothills. Ph.D. Dissertation, University of Alberta, Edmonton, Alberta.

The objective of this research project was to establish the relationship between forest growth, plant community distribution, and environmental factors within the boreal and subalpine forests of the Wapiti map area. One of the fifteen recognized vegetation types was dominated by aspen. Multiple regression equations were developed for growth - environmental factors. The predictive capability of the equations was significantly reduced when vegetation variables were deleted from the equations.

Location: 83 L

Key words: X24, X33, X34, X35

Corns, I.G.W. 1983. Forest community-types of west-central Alberta in relation to selected environmental factors. Canadian Journal of Forest Research, 13:995-1010.

Sixteen forest plant communities are described in terms of their composition and associated site conditions. Some information is presented on forest productivity. Information primarily derived from Corns (1978).

Location: 83 L

Key words: X24, X33, X35

Corns, I.G.W. 1988. Site classification and productivity in the boreal mixedwood, pp. 61-69. *In* Samoil, J.K., editor. Management and utilization of northern hardwoods. Proceedings of symposium, April 11-14, 1988, Edmonton, Alberta. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-296.

This paper focuses on the basic principles of forest site classification and its potential use in forest management. It discusses some representative site types in boreal mixedwood forests. It outlines the problems and opportunities with respect to the use of site classification information.

Location: Not specific

Key words: X15, X24, X33, X34, X35

Corns, I.G.W. 1989. Ecosystems with potential for aspen management. Forestry Chronicle, 65:16-22.

The utility of ecosystem classifications as a sound basis for intensive forest management was discussed.

Location: ALTA, SASK

Key words: X1

Corns, I.G.W., and R.M. Annas. 1986. Forest guide to forest ecosystems of west-central Alberta. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta.

This is a field guide to forest ecosystems of west-central Alberta. It describes 30 plant community associations including typical site conditions, productivity data, and provides management interpretations.

Location: 83 E, L, K, P

Key words: X6, X11, X33, X34, X35

Corns, I.G.W., and G.H. La Roi. 1976. A comparison of mature with recently clear-cut and scarified lodgepole pine forest in the Lower Foothills of Alberta. Canadian Journal of Forest Research, 6:20-32.

The composition of clear-cut and scarified blocks are compared with adjacent native lodgepole pine and mixed pine and aspen stands. The study found that tree densities stabilized within six years after cutting, and clear-cut stands were richer in vascular species and had a more even distribution of cover among species and mature stands.

Location: 83 F

Key words: X13, X33, X35, X41

Corns, W.G., and T.-S. Dai. 1967. Effects of added surfactant on toxicity of picloram, 2,4-D and 2,4,5-T to *Populus tremuloides* Michx. and *Populus balsamifera* L. saplings. Canadian Journal of Plant Science, 47:711-712.

This study determined the efficacy of various herbicides to control poplar species. The results indicated that a picloram-2,4-D mixture was enhanced by the addition of surfactant, but was not as effective as the picloram alone on aspen in most cases.

Location: Not specific

Key words: X7

Cote, W. 1984. Alberta aspen - tomorrow's resource today. Prepared for Alberta Energy and Natural Resources, Alberta Economic Development, and Alberta Research Council in cooperation with The Forest Products and Forest Industrial Development Research Program.

This report examines aspen in terms of wood quality with a specific focus on the cellular structure of aspen wood.

Location: ALTA

Key words: X18

Crampton, C.B. 1973. Studies of vegetation, landform, and permafrost in the Mackenzie Valley: land survey in the upper and central Mackenzie Valley. Northern Pipelines Task Force on Northern Oil Development, Environmental Social Committee. Report Number 73-8.

This is a landscape survey (1:250,000) of the upper and central Mackenzie Valley (44,800 km^2). Maps of vegetation, landforms, and permafrost in the area were developed. The landscape units have also been rated according to sensitivity to vehicular disturbance.

Location: NWT

Key words: X2

Crosson, L.S., J.G. Ellis, and J.S. Shields. 1970. The soils of the northern provincial forest reserves in the Shellbrook Map Sheet (73G), Saskatchewan. Saskatchewan Institute of Pedology, Saskatoon, Saskatchewan. Publication SF.1.

A soils inventory was conducted in an area located northwest of Prince Albert (284,400 km^2) and a 1:126,720 scale map was prepared. Forest and agriculture capability ratings were developed for each soil association. Area are provided for agriculture capability and soil associations. Physical and chemical data are also provided for selected soil associations.

Location: 73 G

Key words: X33

Cyr, N., and J.K. Laidler. 1987. Comparison of balsam and aspen poplar trees in Alberta. Canadian Forestry Service and Alberta Forest Service, Canada-Alberta Forest Resource Development Agreement. Catalogue Number FO 42-91/35-1988E.

The chemical characteristics of aspen and poplar were compared in an attempt to determine why balsam poplar was difficult to use in waferboard milling. The results suggest that poplar contain a higher proportion of soluble lignin.

Location: Not specific

Key words: X19

Cyr, N., and K.F. Schulz. 1982. Chemical composition and accessibility of carbohydrates in decayed aspen wood. Alberta Research Council, Edmonton, Alberta. Open File Report 1982-5.

Not available for review.

Cyr, N., K.F. Schulz, and M.M. Micko. 1983. Degradation and the relative accessibility of carbohydrates in decayed aspen wood. Cellulose Chemistry and Technology, 17:495-505.

Not available for review.

Dai, T.-S. 1966. Comparative effects of certain herbicides on aspen and balsam poplar. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

Tordon 22K was found the most toxic to aspen and balsam poplar cuttings, foliage, and roots of the herbicides tested. Ester formulations of 2,4-D and 2,4,5-T were found more effective than other formulations of 2,4-D for killing foliage.

Location: Not specific

Key words: X7

Dancik, B., L. Brace, J. Stelfox, and B. Udell. 1990. Forest management in Alberta: report of the expert review panel. Alberta Forestry, Lands and Wildlife, Expert Panel on Forest Management in Alberta, Edmonton, Alberta. Publication Number I/340.

The panel reviewed public concerns over the disposition of forest lands to new forest industries in Alberta. The topic included regulatory agencies, the planning process, technical aspects of management, environmental impacts of harvesting, integrated forest management, and reforestation. Concern was expressed over declining forest research.

Location: ALTA

Key words: X12, X13, X41

Dancik, B.P., J.D. Heidt, K.O. Higginbotham, and S.J. Titus. 1980. Development of a stand growth model for trembling aspen in the prairie provinces of Canada. Prepared for Environment Canada by University of Alberta, Edmonton, Alberta. ENFOR Project Number P-102.

The purpose of this study was to review and develop preliminary regression models for predicting aspen stand growth. These models were based on parameters such as site index, age, and stand density.

Location: ALTA, SASK, MAN

Key words: X15

De Franceschi, J. 1969. A co-operative pulping study of young aspen; data collection and summaries. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forest Research Laboratory, Winnipeg, Manitoba. Internal Report MS-103.

The proportion of wood, leaves, and branch biomass was determined for young (7, 13, 22 year old) aspen stands.

Location: 62 K

Key words: X15

De Franceschi, J.P., and F.W. Bell. 1990. Labour productivity and costs of motor-manual release of spruce from hardwoods in Manitoba. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-312.

The relative cost to cut aspen as a release technique was assessed. Two techniques were compared: brush saw and chain saw. Total costs in a young (25 year old) stand were $690/ha and $428/ha for each system, respectively. In an older stands (55 year old), it cost $350/ha.

Location: 62 N

Key words: X5, X7

Delisle, G.P., and R.J. Hall. 1987. Forest fire history maps of Alberta, 1931 to 1983. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta.

From 1953 to 1983, Class E fires (i.e., fires greater than 200 ha) accounted for eighty-five percent of the total area burned in Alberta. This report presents maps of the location of fires at a scale of 1:500,000 and listed them chronologically.

Location: ALTA

Key words: X40

Denney, N. 1987. Significance of aspen cull in oriented strand board plants, pp. 77-81. *In* Aspen quality workshop, 12 February 1987. Proceedings of workshop sponsored by Canadian Forestry Service and Alberta Forest Service, Edmonton, Alberta.

The acceptability of cull in the oriented strand board process is reviewed. Cull is much more significant in the harvesting process because logging and harvesting are paid for on a firm-wood basis; therefore, cull is an expense to the logger rather than the purchaser. The author suggests that species differentiation on hardwood maps must be improved as well as accurate aging to determine harvesting schedules, and prediction of stand deterioration to improve stand management.

Location: ALTA

Key words: X3, X15, X19

Denney, N. 1988. Problems of mixedwood management, pp. 48-49. *In* Samoil, J.K., editor. Management and utilization of northern mixedwoods. Proceedings of Symposium. April 11-14, 1988, Edmonton, Alberta. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-296.

Problems associated with the current tenure system in Alberta were identified. The author suggests that a duel tenure system in the mixedwood (i.e., softwood and hardwood) and the orientation of regeneration towards conifers are significant management problems.

Location: Not specific

Key words: X11

Dix, R.L., and J.M.A. Swan. 1971. The roles of disturbance and succession in upland forest at Candle Lake, Saskatchewan. Canadian Journal of Botany, 49:657-676.

This study attempts to determine the relative importance of disturbance and forest succession in landscape pattern and to relate succession to habitat. Conclusions are drawn regarding the species most likely to dominate different sites following severe fire and the kinds of vegetational changes likely to occur on them between disturbances.

Location: 73 H

Key words: X26, X33, X35, X41

Doerr, P.D., L.B. Keith, D.H. Rusch, and C.A. Fisher. 1974. Characteristics of winter feeding aggregations of ruffed grouse in Alberta. Journal of Wildlife Management, 38:601-615.

The annual onset of budding by grouse commenced with the first snow fall. Aggregate size increased until mid-January and steadily decreased until early April to half the maximum size. It was found that grouse feed in aspen and willows in the early morning but leave by sunrise. A nutrient analysis of aspen buds found a high protein and potassium content, although it was greater in willow buds.

Location: SW 83 I

Key words: X26, X27

Doucet, R. 1989. Regeneration silviculture of aspen. Forestry Chronicle, 65:23-27.

Factors that affect aspen regeneration are reviewed.

Location: Not specific

Key words: X3

Downing, D.J., and K.J. Bennett. 1984. Ecological land classification of the Bear River-Wapiti area. Alberta Energy and Natural Resources, Edmonton, Alberta.

An ecological land classification (1:15,000) was developed for an area (105 km^2) located southeast of Grande Prairie. A description of the natural resources was presented for each ecosite.

Location: SE 73 M

Key words: X1

Downing, D., and E. Karpuk. 199-. Aspen vegetation types of the Lower Boreal Mixedwood Ecoregion of east-central Alberta, first approximation. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta.

Key words: X48

Downing, D., and D. O'Leary. 1986. Integrated resource inventory of the Grande Prairie county west

study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Technical Report T/130.

Volume I of this integrated resource inventory (1:100,000) of the Grande Prairie County (930 km^2) describes the physical and biophysical characteristics of the landscape as well as evaluations for agriculture, forestry, and wildlife. Volume II describes plant associations and site productivity.

Location: SW 83 L

Key words: X2, X24, X33

Downing, D., D. O'Leary, and R. Schultz. 1987a. Integrated resource inventory of the Smoky-Peace Point study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Technical Report T/121.

An integrated resource inventory (1:100,000) was prepared for the Smoky-Peace Point study area (650 km^2). Volume I of this report presents land and fluvial classifications, a summary of ecosections and vegetation types, and evaluations for agriculture and wildlife for the area. Volume II describes the vegetation types and site productivity.

Location: SW 84 C, NW 84 N

Key words: X1, X2, X24, X27, X34, X35

Downing, D., D. O'Leary, and R. Schultz. 1987b. Integrated resource inventory of the East Peace study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number T/154.

An ecological land classification (1:100,000) was developed for a 14,200 km^2 area, located north of Peace River townsite. Land capability assessments were made for a variety of wildlife species, forestry, and agriculture.

Location: W 84 F, 84 C

Key words: X1

Downing, D.J., and A. Legris. 1988. Whitemud Falls ecological reserve biophysical inventory. Alberta Energy and Natural Resources, Edmonton, Alberta. T/174.

A biophysical inventory was conducted in the Whitemud Ecological Reserve (900 ha). Vegetation, soils, site conditions, and surficial materials were examined and organized into an ecological land classification (1:15,000 scale). Wildlife resources were also summarized. Three aspen and/or balsam poplar community-types were recognized and the report contains the associated releve information.

Location: 74 D

Key words: X1, X27, X33, X34, X35

Dronzek, J.F. 1969. Preliminary observations on *Populus tremuloides* (Michx.) clones at the Riding Mountain National Park. Canada Department Fisheries and Forestry, Forest Research Laboratory, Winnipeg, Manitoba. Internal Report MS-85.

Not available for review.

Drouin, J.A. 1976. Poplar bud gall mite. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Pest Leaflet 13-76.

Not available for review.

Drouin, J.A. 1989. Herbicide efficacy trials in Alberta and Manitoba, 1980-1985. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-306.

From vegetation control trials, data was obtained on conifer growth and tolerance of the herbicides, weed control, optimal timing of application, techniques, and equipment performance.

Location: SW 83 O, E 83 F, SW 83 P, SE 62 I, SW 52 E

Key words: X9

Drouin, J.A., and D.S. Kusch. 1975. Pesticide field trails on shade and shelterbelt trees in Alberta and Saskatchewan, 1974. Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Information Report NOR-X-131.

The purpose of trials was to obtain information on chemical efficacy, equipment, timing, and effects on non-target species to provide data for Canadian registration of successful candidate chemicals for twenty-two insecticides and two fungicides. Among the insect pests and fungi, there were forest tent caterpillar, poplar borer, blotch leaf minor, poplar leaf spot. As a result of these tests, six of the pesticides were registered for use against a specific insect pest, and one insecticide was regis-

tered for restricted use against two insect species.

Location: SASK

Key words: X9

Drouin, J.A., and D.S. Kusch. 1976. Pesticide field trails on shade and shelterbelt trees in Alberta, 1975. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-150.

This study tested thirty-seven chemical to determine their ability to control fourteen organisms. The results indicated seventeen chemicals were suitable for controlling eight insects.

Location: ALTA

Key words: X9

Drouin, J.A., and D.S. Kusch. 1977. Pesticide field trials on shade and shelterbelt trees in Alberta, 1976. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta, Information Report NOR-X-184.

This study tests the efficiency of twenty-eight insecticides, two microbials, and a adjuvant. Two of the ten target organisms were the forest tent caterpillar and the mold mite, which both feed on aspen. Using the various chemicals they had a successful control rate of between eighty to one hundred percent. Little to no phytotoxicity appeared in the trial plots.

Location: CENTRAL ALTA

Key words: X9

Drouin, J.A., and D.S. Kusch. 1979. Pesticide field trials on shade and shelterbelt trees in Alberta, 1978. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-213.

The purpose of this study was to determine the efficacy of twenty-two insecticides, optimum timing of application, equipment performance, and adverse effects on host plants on thirteen insect pests. Of these thirteen, three insects were hosts on commercial hardwoods: birch leaf mining sawflies, forest tent caterpillars and large aspen tortrix. Overall, the insecticides were effective.

Location: ALTA

Key words: X9

Drouin, J.A., and D.S. Kusch. 1980. Pesticide field trials on shade and shelterbelt trees in Alberta, 1979. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-227

Nineteen insecticides were tested for their ability to control fifteen insects. The study found fourteen of these chemicals controlled nine species.

Location: ALTA

Key words: X9

Drouin, J.A., and H.R. Wong. 1975. Biology, damage, and chemical control of the poplar borer (*Saperda calcarata*) in the junction of the root and stem of balsam poplar in western Canada. Canadian Journal of Forest Research, 5:433-439.

This study describes the biology, damage, and the chemical control of poplar borer on regeneration of balsam poplar growing on poor or disturbed sites in western Canada. Its life history and effects are similar to those described of Peterson (1947). Of ten systemic insecticides tested against the insect, the best results were obtained with dimethoate applied as a soil drench.

Location: NW 73 B, NE 83 G

Key words: X9

Duffy, P.J.B. 1963. Plantations of white spruce under aspen on different soils, Foothills Section, Alberta. Canada Department of Forestry, Establishment Report A-83.

This report describes the efforts undertaken to establish white spruce seedling plantations beneath overmature aspen and balsam poplar stands.

Location: SE 83 O

Key words: X8

Duffy, P.J.B. 1964. A forest land classification for the Mixedwood Section of Alberta. Canada Department of Forestry, Forest Research Branch, Calgary, Alberta, Publication No. 1128.

This study provides a description and classification of soils and forest productivity in the Mixedwood

forest area. The results focus primarily on site index for white spruce in relation to the moisture status of parent materials.

Location: 83 O, P

Key words: X13, X14, X24

Duffy, P.J.B. 1968. Differences in productivity between land types near Hinton, Alberta. Canada Department of Forestry and Rural Development, Canadian Forestry Service, Project A82.

Not available for review.

Duffy, P.J.B., and H. Knight. 1967. A forest land capability classification for Marsh Head demonstration area, Whitecourt Forest, Alberta. Canada Department of Forestry and Rural Development, Forestry Branch, Forest Research Laboratory, Calgary, Alberta, Information Report A-X-10.

A 75 km^2 area was classified and assessed according to the Canada Land Inventory method for Forestry as a demonstration study. The authors suggest more research was needed to identify site factors that limited tree growth in the area.

Location: 83 K

Key words: X13, X33, X34

Duffy, P.J.B., and Z. Nemeth. 1965. Plantations of white spruce under aspen on different soils, Foothills Section, Alberta: the Rocky Mountain plantations. Canada Department of Forestry and Rural Development, Forest Research Laboratory, Calgary, Alberta. Establishment Report, Project A-83. Internal Report A-7.

The location (maps and photos) and design of experimental plots in the Smith and Lawrence Lake were described. White spruce were differentially planted beneath aspen, while other sites were strip scarified and planted to white spruce.

Location: E 83 O, SW 83 P

Key words: X8

Duffy, P.J.B., and Z. Nemeth. 1967. Plantations of white spruce under aspen on different soils, Mixedwood Section, Alberta: the Athabasca plantations - establishment report, 1966. Canada Department of Forestry and Rural Development, Forest Research Laboratory, Calgary, Alberta. Internal Report A-7.

This report describes efforts to establish white spruce plantations under over-mature/mature aspen stands and on scarified strips. There are no conclusions or recommendations made; this is an ongoing study.

Location: E 83 O, SW 83 P

Key words: X6, X42

Dumanski, J., T.M. Macyk, and C.F. Veauvy, and J.D. Lindsay. 1972. Soil survey and land evaluation of the Hinton-Edson area, Alberta. Research Council of Alberta, Edmonton, Alberta. Report No. 93.

A reconnaissance soil survey (1:126,720) of the Hinton-Edson area was prepared for 1,458 km^2 area. The characteristics, distribution, and abundance of each soil series was described and assessed for forest capability.

Location: 83 F

Key words: X34

Dutchak, K.L. 1979. Ecological land classification and evaluation: Carcajou study area. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report Number 117.

This study organized the natural resources in the study area (2,243 km^2) into an ecological land classification (1:100,000 scale). A description was provided of each ecosection as well as Canada Land Inventory equivalent ratings for agriculture, forestry, recreation, ungulates, and waterfowl capability. In general, the area was dominated by deciduous forest intermixed with wetlands.

Location: 84 F

Key words: X1, X35

Dutchak, K.L. 1980. Ecological land classification and evaluation: Brazeau-Pembina study area. Alberta Energy and Natural Resources, Edmonton, Alberta.

A relatively detailed ecological land classification (1:100,000) was prepared for the Brazeau-Pembina study area (2,911 km^2). The natural resources were summarized for each ecosection. The eastern portion of the study area occurred with the Lower Boreal Cordilleran Ecoregion.

Location: 82 B, C, F, G

Key words: X1

Dutchak, K.L. 1984. Ecological land classification and evaluation: Rocky-North Saskatchewan. Alberta Energy and Natural Resources, Edmonton, Alberta. T/11-8.

An ecological land classification (1:100,000 scale) for a 6,676 km^2 area along the eastern slopes of the Rocky Mountains between Rocky Mountain House and the Brazeau Reservoir. Approximately three-quarters of the area occurs within the B19a forest section. The soil, vegetation, and topographic characteristics were described for each ecosection.

Location: 83 B

Key words: X1

Eager, R.L. J.M. Pepper, J.C. Roy, and J.F. Mathews. 1983. Chemical studies on oils derived from aspen poplar wood, cellulose, and an isolated aspen poplar lignin. Canadian Journal of Chemistry, 61:2010-2015.

A study of the effects of various parameters on the production and elemental composition of the oil-like products that can be produced from aspen.

Location: Not specific

Key words: X19

Ealey, D. 1979. The distribution, foraging behavior, and allied activities of the white pelicans in the area of the Athabasca Oils Sands. Alberta Oil Sands Environmental Research Program, Project LS 22.2, Report 83.

This describes their distribution and movements, non-breeding activities, habitat characteristics, diet of fish, and the effects of disturbance on white pelicans.

Location: NW 74 D

Key words: X26, X27, X28

Eberhart, K.E. 1986. Distribution and composition of residual vegetation associated with large fires in Alberta. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

This study examines the distribution and composition of residual vegetation following large fires. The results indicate that the distribution of residual vegetation varies by fire size rather than preburn vegetation type, and the composition of the residual vegetation differed according to preburn vegetation types but not by fire size class.

Location: ALTA

Key words: X40, X41

Eberhart, K.E., and P.M. Woodard. 1987. Distribution of residual vegetation associated with large fires in Alberta. Canadian Journal of Forest Research, 17:1207-1212.

This study describes the residual vegetation islands within sixty-nine fires (2 to 17,770 ha) that burned in Alberta from 1970 to 1983. Distribution of the residual vegetation from the burn was compared among five fire size classes. Results indicate decreased potential for natural reforestation and increased benefits to some wildlife habitats as fire size increased.

Location: ALTA

Key words: X22, X26, X27, X40

Edgar, L., G. Mikalchuk, D. O'Leary, and R. Schultz. 1986. Ecological inventory and evaluation of the Haig Lake study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Report Number Department 95.

A large-scale (1:15,000) ecological land classification was prepared for the area surrounding Haig Lake, which is located at the southwest corner of Buffalo Head Hills. The characteristics of each ecological unit were summarized in a table. Assessments were made for various recreational and related land uses.

Location: NE 84 C

Key words: X1, X37

Ehrentraut, G., and K. Branter. 1990. Vegetation management by manual and mechanical means in Alberta boreal forests. Forestry Chronicle, 66:366-368.

There are three successful nonchemical means of site preparation for conifer seedlings: double-discing

controls grasses and deciduous species on moist sites; martini plowing controls deciduous species on moist to wet sites; and ripper plow controls deciduous species on wet sites.

Location: ALTA

Key words: X7

Elliott, K.R., and H.R. Wong. 1966. An important predator of the aspen leaf beetle, *Chrysomela crotchi* Brown, in Manitoba and Saskatchewan. Canada Department of Forestry, Bi-Monthly Research Notes, 22(5):4.

Not available for review.

Ellis, J.G., and H.S. Clayton. 1970. The physiographic divisions of the northern provincial forest in Saskatchewan. Saskatchewan Institute of Pedology, Saskatoon, Saskatchewan. Publication SP3.

This study included both a 1:760,320 scale map and descriptive report on physiographic units found in the northern portion of Saskatchewan. The dominant soils were also related to these units. The boreal mixedwood zone occurred south of the Canadian Shield.

Location: SASK

Key words: X1, X34

Ellis, R.A. 1986. Understory development in aspen-white spruce forests in northern Alberta. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

This study investigates the effects of shifting tree canopy dominance from broadleaf deciduous to needle leaf evergreen on the understory structure and composition of aspen-white spruce mixedwood forests in northern Alberta. Canopy cover and the development of a moss carpet were the two factors found to be most important in influencing understory structure and composition. Species richness, species diversity, and total vascular plant cover decreased with increasing evergreen canopy cover.

Location: ALTA

Key words: X35

Emond, F.J., and H.F. Cerezke. 1990. Forest insect and disease conditions in Alberta, Saskatchewan and Manitoba, and the Northwest Territories in 1989 and predictions for 1990. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-313.

The pest conditions in 1989 within the prairie provinces were summarized. Damage was reported by area as well as by species. Tent caterpillars were the most significant defoliators of aspen.

Location: ALTA, SASK, MAN

Key words: X9

Erskine, A.J. 1977. Birds in boreal Canada: communities, densities, and adaptations. Supply and Services Canada, Canadian Wildlife Service. Report Series 41.

A broad overview of habitats used by birds. A portion of the report includes a section on birds found in deciduous and mixedwood stands.

Location: ALTA, SASK, MAN

Key words: X22, X26, X27

Etheridge, D.E., and J. Laut. 1958. Fungi associated with living and dead branches of pole-sized aspen. Canada Department of Agriculture, Science Service, Forest Biololgy Division, Bi-Monthly Progress Report, 14(4):2-3.

Not available for review.

Eulert, G.K., and J. Hernandez. 1980. Synecology and autecology of boreal forest vegetation in the Alberta Oil Sands Environmental Research Program study area. Prepared for Alberta Oil Sands Environmental Research Program by Interdisciplinary Systems Ltd. AOSERP Report 99.

A general overview of the ecology and vegetation of the AOSERP area is presented. It also includes a review of the autecology of selected tree and understory species such as alders, pin cherry, saskatoon, bearberry, bog cranberry, and wintergreens. Distributional maps are provided for some species.

Location: 74 E

Key words: X35

Fairbarn, M., and D.G. Maynard. 199-. Boreal ecosystem dynamics of ARNEWS plots: 1. Baseline

studies. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta. NOR-X-(In preparation).

Not available for review.

Fautley, R. 1988. Economic returns to private woodlots in Saskatchewan: utilizing aspen for pulping, pp. 46-49. *In* Forestry or agriculture: a case for diversification. Information Seminar sponsored by Canadian Forestry Service, Victoria, British Columbia. Canada-British Columbia Forest Resource Development Agreement, Report Number 42.

The potential economic benefits of private aspen woodlots is discussed. The author suggests that farmers would receive a greater return if they planted marginal lands to aspen rather than barley.

Location: SASK

Key words: X19

Feng, J.C., C.C. Feng, and S.S. Sidhu. 1989. Determination of hexazinone residue and its release from a granular formulation under forest conditions. Canadian Journal of Forest Research, 19:378-381.

The results of this study indicate that the percent release of hexazinone based on rainfall and length of exposure. This analysis was performed on a three year old aspen cut-over south of Grande Prairie. Tables for determining the period of exposure needed to achieve different levels of release after 0.25 to 25 mm of rainfall.

Location: SE 83 M

Key words: X7

Feng, J.C., and S. Navratil. 1990. Sampling for zero-time hexazinone residues in forest soil dissipation study. Canadian Journal of Forest Research. 20:1549-1552.

A method for measuring herbicide residue was tested in the Calling Lake area. The results suggest that the proposed technique in combination with traditional soil coring was the best method.

Location: SW 84 P

Key words: X7, X45

Ferguson, N.B. 1980a. Physical land classification of the Berland Current Regional Plan study area (1:250,000). Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report Number T/12-5.

A physical land classification was developed for a 9,200 km^2 area in the west-central portion of Alberta. The area was divided into physiographic regions and subregions (1:250,000), and a description of the physical and terrain conditions were described for each map unit.

Location: 83 E, F, K, L

Key words: X2

Ferguson, N.B. 1980b. Physical land classification of the Willmore-Kakwa regional recreation plan study area. Alberta Energy and Natural Resources, Edmonton, Alberta. Report T/12-Number 5.

A physical land classification was developed for a 10,200 km^2 area in Willmore Wilderness and Kakwa area (1:25,000). The area was divided into physiographic regions and subregions, and the physical and terrain conditions were described for each map unit.

Location: 83 E, F, L

Key words: X2

Ferguson, T.A. 1980c. Productivity and predictability of resource yield: Aboriginal controlled burning in the boreal forest. M.A. Thesis, University of Alberta, Edmonton, Alberta.

Not available for review.

Fenton, M.M., and L.D. Andriaskek. 1983. Surficial geology of the Sand River area, NST 73L. Alberta Research Council, Edmonton, Alberta.

A 1:250,000 scale map of surficial deposits in the Cold Lake and area west.

Location: 73 L

Key words: X2

Filion, F.L., S.W. James, J.L. Ducharme, W. Pepper, R. Reid, P. Boxall, and D. Teillet. 1983. The importance of wildlife to Canadians. Environment Canada, Canadian Wildlife Service, Ottawa, Ontario.

The socio-economic benefits of wildlife were summarized for both consumptive and nonconsumptive

uses. The analysis includes expenditures within provinces.

Location: CANADA

Key words: X36, X37

Fisher, G.L. 1985. Resource road planning guidelines for the Green Area of Alberta. Alberta Energy and Natural Resources, Alberta Forest Service, Edmonton, Alberta. ENR Report T/25.

The objective of these guidelines is to minimize environmental impact due to road construction by the timber and petroleum industries.

Location: ALTA

Key words: X16

Flanagan, L.B. 1985. Some aspects of the population biology and physiological ecology of *Aralia nudicaulis* L. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

See Flanagan and Moser (1985).

Flanagan, L.B., and W. Moser. 1985. Patterns of 14C assimilate distribution in a clonal herb, *Aralia nudicaulis*. Canadian Journal of Botany, 63:2111-2114.

The pattern of carbon 14 assimilate is examined in *Aralia nudicaulis* to determine the extent of physiological integration among individual shoots in a clone. The results suggest that most of the carbon assimilated by an individual shoot remains within that shoot at twenty-four hours. There was increased amounts of carbohydrate translocated from an unshaded shoot to the root and rhizome to shaded shoots.

Location: SE 83 O

Key words: X13

Flannigan, M.D., and C.E. Van Wagner. 1991. Climatic change and wildfire in Canada. Canadian Journal of Forest Research, 21:66-72.

The objective of this study was to interpret the potential impact of climatic warming on the severity of the forest fires. Their was a forty-six percent increase in seasonal severity rating as a result of a doubled carbon dioxide atmospheric content.

Location: 63 E

Key words: X40

Forrester, P.D. 1989. Sour felling in Alberta. Alberta Forestry, Lands and Wildlife, Forest Industry Development Division, Edmonton, Alberta. Forest Engineering Research Institute of Canada, Wood Harvesting Technical Note TN-141.

The purpose of this study was to assess the potential of using tree leaf transpiration as a technique to reduce wood weight. The results suggested minimal effect.

Location: 73 L

Key words: X12

Francis, J., and K. Lumbis. 1979. Habitat relationships and management of terrestrial birds in northeastern Alberta. Alberta Environment, Alberta Oil Sands Environmental Research Program, Edmonton, Alberta. Project LS 2.2.1.1. AOSERP Report 78.

The relative values of twenty-one habitat types were quantified for the breeding grounds of avifauna of the AOSERP study area. Also included was an annotated checklist of all bird species known to occur in the oil sands area.

Location: 74 E

Key words: X27

Fregren, D.H. 1980. The hardwood future in Alberta, pp. 145-147. *In* McIntosh, J.A., and M.N.Carroll, editors. Utilization of western Canadian hardwoods, proceedings of symposium, Prince George, British Columbia, November 21-22, 1979. Forintek Canada Corporation, Vancouver, British Columbia. Special Publication SP-2.

This paper provides a history of aspen utilization in Alberta since the early 1950s. It was apparent that utilization of aspen has risen and fallen on several occasions and many companies have returned to using white spruce. The author outlines reasons for discontinuation of poplar utilization.

Location: ALTA

Key words: X19

Froning, K. 1980. Logging hardwoods to reduce damage to white spruce understory. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta, Information Report NOR-X-229.

The purpose of this study was to assess the loss and damage to spruce understory at various densities during conventional aspen harvesting and to develop an economically feasible logging method for minimizing damage to the spruce in the understory. Results suggest that damage and destruction do not appear to be related to understory density. Careless skidding caused considerable damage and destruction. The recommendations of the study include special harvesting plans, crew training, and equipment.

Location: 63 E

Key words: X5, X12, X19

Fuller, T.K., and L.B. Keith. 1980a. Wolf population dynamics and prey relationships in northeastern Alberta. Alberta Oil Sands Environmental Research Program, Project LS21.1.4, AOSERP Report 102.

This study summarizes wolf population dynamics with respect to available food resources, mortality prey habits on moose, impact of disturbance, and other habits.

Location: NW 73 D, S 74 E

Key words: X26, X27, X28

Fuller, T.K., and L.B. Keith. 1980b. Woodland caribou population dynamics in northeastern Alberta. Alberta Oil Sands Environmental Research Program, Project LS 21.1.3, AOSERP Report 101.

The dynamics of the caribou population in the Birch Mountain area are described in terms of population density and distribution, age composition, sex ratios, reproduction, movement, and habitat use.

Location: W 74 E

Key words: X26, X27, X28

Fuller, T.K., and L.B. Keith. 1981. Woodland caribou population dynamics in northeastern Alberta. Journal of Wildlife Management, 45:197-213.

This report describes population dynamics of the woodland caribou in the Birch Mountains during the January 1976 to June 1978 period. This study was done because of Athabasca Oil Sands activities.

Location: W 74 E, E 84 H, SW 74 L, SE 84 I

Key words: X26, X27, X28

Garden, A., and R.W. Davies. 1988. The effects of a simulated acid precipitation on leaf litter quality and the growth of a detritivore in a buffered lotic system. Environmental Pollution Series A, Ecol-Biol. 52:303-313.

The effects of acid rain were experimentally tested on balsam poplar. The study showed that nitrogen content was reduced as was decomposition rates and the growth of *Tipula commiscibilis*.

Location: Not specific

Key words: X35

Gibbard, D.A., and B.J. Sutherland. 1986. 1986 site preparation equipment trials in Alberta, Donaren 180D powered disk trencher Sinkkila HMF scarifier. Forestry Canada and Alberta Forestry, Lands and Wildlife. Canada - Alberta Forest Resource Development Agreement. Project Number 1434-17.

The Donaren 180D effectively penetrated duff layers and consistently left clear furrows; however, stocking of planting spots was less than optimal. No conclusive results were obtained because the hydraulic system frequently malfunctioned.

Location: SW 84 F, SW 83 L, NE 83 M

Key words: X6

Giberson, W.G. 1988. Aluminum tolerance of *Betula papyrifera* Marsh., on naturally acidic soils. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The effect and tolerance of *Betula* to aluminum was investigated in the Buffalo Head Prairie area. Experiments showed decreased root elongation with increased aluminum concentration, but plants adapted to growing on soils with high aluminum contents had greater root elongation than did specimens from low concentrations.

Location: NW 84 G

Key words: X35

Giesbrecht, L., and A. Todd. 1979. A study on the winter food habits of Alberta marten. Alberta Energy and Natural Resources, Fish and Wildlife Division, Edmonton, Alberta.

Not available for review.

Gilbert, F.F., and E.G. Nancekirell. 1982. Food habits of mink and otter in northeastern Alberta. Canadian Journal of Zoology, 60:1282-1288.

The fecal materials of both mink and otter, opportunistic feeder, provided an indication of the smaller vertebrate species which occur in an area. This study was designed to determine the food habits of the mink and otter in two contrasting natural habitats, i.e., lakes and stream, which may be disrupted by oil sands exploitation. The results show that scats of these two species could be indicators of population size and distributional ranges of prey species.

Location: SW 74 E

Key words: X26

Gill, D. 1974. Snow damage to boreal mixedwood stands in northern Alberta. Forestry Chronicle, 50:70-73.

The impact of one brief weather event on forest stands in the boreal mixedwood was summarized. The summary emphasizes the intensity and extent of snow damage that occurred during near freezing temperatures. Deciduous trees were more damaged than conifers. Stem breakage was not associated with trunk rot or other similar defects. Stems over eight centimeters in diameter were the most susceptible.

Location: W 74 D, SE 84 A, NE 73 P

Key words: X42

Gorman, J.R. Compiler. 1985. Proceedings of the 1984 mechanized silviculture workshop. Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. NOR-X-272.

The use of various mechanized silvicultural equipment, site preparation, and site factors that must be considered prior to site preparation are discussed.

Location: Not specific

Key words: X1, X6

Gower, D. 1989. Fate of labelled nitrogen fertilizer in limed, elemental sulphur-laden forest soils. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

Nitrogen fertilizer was investigated with respect to its potential role in the reclamation of acidified soils. The results suggest that nitrogen was most effective if ammonium is used rather than nitrate, multiple light applications, and greater qualities are used on more severely affected soils.

Location: 83 B

Key words: X41, X45

Grabowski, T.I.J., J. Heidt, and S.J. Titus. 1981. An improved stand growth model for trembling aspen in the prairie provinces of Canada - Final report. Prepared for Environment Canada by University of Alberta, Edmonton, Alberta. ENFOR Project Number P-102.

A series of regression models were developed to predict various characteristics of aspen growth: mortality, diameter growth, height-age, volume, and biomass. The authors concluded the model worked fairly well (error ca. ten percent).

Location: ALTA, SASK, MAN

Key words: X15

Green, J.E. 1980. Small mammal populations of northeastern Alberta. II. Populations in reclamation areas. Alberta Oil Sands Environmental Research Program, Project LS 7.1.3, AOSERP Report 108.

This study examines small rodent demography, and compares the populations on natural and disturbed habitats, and looks at small rodent use of and damage to woody plants on reclaimed sites.

Location: NW 74 D

Key words: X26, X27

Greggs, A. 1976. An ecological assessment and development capability of Gregoire Lake. Alberta Recreation, Parks, and Wildlife, Edmonton, Alberta.

Not available for review.

Grewal, H.S. 1988. Biomass productivity in two-year-old aspen cutovers near Calling Lake and Slave Lake, Alberta, pp. 124-128. *In* Granger, C., editor.

Sixth Canadian Bioenergy R & D Seminar. Elsevier Applied Science, London.

Not available for review.

Gullion, G.W. 1986. Managing northern forests for wildlife. University of Alberta, Edmonton, Alberta.

This paper focuses on the management of aspen woodlands for grouse to enhance and maintain their habitat.

Location: Not specific

Key words: X12, X14, X27

Hall, R.J., P.H. Crown, and S.J. Titus. 1984. Change detection methodology for aspen defoliation with LANDSAT MSS digital data. Canadian Journal of Remote Sensing, 10:135-142.

The objective of this study was to develop a method of detecting and mapping forest tent caterpillar defoliation of aspen by using digital techniques. A three-spectral-band combination was found to be the most effective. The proposed method was considered reliable when field data were not available.

Location: ALTA

Key words: X9, X17

Halliday, W.E.D. 1929. Forest types: Pasquia Forest Reserve. Canada Department of Interior, Forest Service, Ottawa, Ontario.

Not available for review.

Halliday, W.E.D. 1935. Report on vegetation and site studies, Clear Lake, Riding Mountain National Park, Manitoba, 1932. Canada Department of Interior, Forest Service, Ottawa, Ontario. Research Note Number 42.

An early study of the soils and vegetation in the Riding Mountain area. The soils information is descriptive while the vegetation analysis includes understory and overstory releve data. Individual species were organized according to soil moisture regime. An interesting study from a historical perspective.

Location: 62 K

Key words: X33, X34, X35

Hanley, P.T. 1973. Biophysical analysis and evaluation of capability: Fort McMurray-Gregoire Lake area. Alberta Lands and Forests, Edmonton, Alberta.

A biophysical analysis (1:126,720) was present for the Gregoire Lake area, south of Fort McMurray. The classification was strongly oriented towards physical resources. Each ecosection was rated for agriculture, forestry, ungulates, recreation, and waterfowl capability.

Location: NW 74 D

Key words: X1

Harris, W.C. 1980. Guide to forest understory vegetation in Saskatchewan. Saskatchewan Tourism and Renewable Resources, Prince Albert, Saskatchewan. Technical Bulletin No. 9.

This report is a guide to assist in the identification of forest understory vegetation in Saskatchewan which are indicators of forest site.

Location: SASK

Key words: X35

Harris, W.C., A. Kabzems, A.L. Kosowan, G.A. Padbury, and J.S. Rowe. 1983. Ecological regions of Saskatchewan. Saskatchewan Parks and Renewable Resources, Forestry Division. Technical Bulletin 10.

Six ecoregions and thirteen ecodistricts in Saskatchewan were mapped and described. Each description included climate, terrain features, vegetation, wildlife, resources, and land use.

Location: SASK

Key words: X1

Hauge, T.M., and L.B. Keith. 1981. Dynamics of moose populations in northeastern Alberta. Journal of Wildlife Management, 45:573-597.

From January 1976 to June 1978, an intensive study of moose was conducted in northeastern Alberta (25,000 km^2). The results showed that the population was either static or declining and should not be subjected to hunting pressures.

Location: NW 74 D

Key words: X26

Hay, W.K., and D. O'Leary. 1988. Integrated resource inventory of the Wandering River study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Report T/178.

Physiography and surficial materials are the primary focus of this study (ca. 10,000 km^2). An "ecosection map" at 1:100,000 scale is presented. Forest and agriculture capability were assessed on the basis of physical site characteristics. Rating were also developed for various wildlife species.

Location: 83 P

Key words: X2

Head, W.K., D.W. Anderson, and J.G. Ellis. 1981. The soils of the Wapawekka map area (73I), Saskatchewan. Saskatchewan Institute of Pedology, Saskatoon, Saskatchewan. Publication SF5.

A soils inventory was conducted in an area north of Prince Albert (14,244 km^2) and a 1:126,720 scale map depicting soil associations was prepared. Ratings were developed for forest and agricultural capability. Area estimates were provided for each soil association as well as physical and chemical analysis data for selected associations. Forest cover types area stratified by height class.

Location: 73 I

Key words: X34

Heidt, J. 1983. Clonal variation in height growth of trembling aspen in central Alberta. Agriculture and Forestry Bulletin, 6:20-23.

This study examines the effect of clonal variation on height growth of an aspen stand. The results revealed that clones had significantly different heights at defined ages as well as height growth patterns.

Location: SW 83 J

Key words: X15

Heidt, J., J. Titus, and K.O. Higginbotham. 1980. Development of a stand growth model for trembling aspen in the prairie provinces of Canada, pp. 115-119. *In* ENFOR P-102, second bioenergy R and D seminar. 26-27 March 1980. National Research Council of Canada, Ottawa, Ontario.

A parallel project to work conducted by Dancik, Heidt, Higginbotham, and Titus (1980). However, this work developed models based on individual trees. The results of the model predict stand characteristics by diameter class at selected ages.

Location: ALTA

Key words: X15

Heit, M.J., and R.A. Bohning. 1988. Secondary forest products industry in Alberta, 1986. Forestry Chronicle, 64:461-463.

This article summarizes Alberta's secondary forest products industry in terms of firm characteristics, employment created, and value of sales. These statistics were compared with previous studies.

Location: ALTA

Key words: X19, X20

Henderson, C. 1987. Aspen management practices in Alberta, pp. 71-76. *In* Aspen quality workshop. Proceedings of workshop sponsored by Canadian Forestry Service and Alberta Forest Service, Edmonton, Alberta. February 12, 1987.

A general review of the problems associated with hardwood harvesting of the boreal forest. Problems include a high proportion of cull in over-mature stands, the presence of softwood trees in the over- and understory.

Location: ALTA

Key words: X3, X12, X13, X19, X35

Hennan, E., and B. Munson. 1979. Species distribution and habitat relationships of waterfowl in northeastern Alberta. Alberta Oil Sands Environmental Research Program, Project LS22.1.2, AOSERP Report 81.

This waterfowl study determined waterfowl species abundance and diversity and habitat associations. Even though the significance of individual wetlands in terms of duck numbers and densities varied throughout the season, Little McClelland Lake, Wet Muskeg Lake, Wood Slough, Gordon Lake, Saline Lake, and Algar Lake appeared consistently important.

Location: NW 73 D, SW 73 E

Key words: X27

Hildahl, V. 1977. Forest tent caterpillar. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Pest Leaflet 17-77.

This paper discusses the biology, life history, damage caused by, and control of the forest tent caterpillar.

Location: ALTA, SASK, MAN

Key words: X9

Hildahl, V., and A.E. Campbell. 1975. Forest tent caterpillar in the prairie provinces. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-135.

The distribution and location of forest tent caterpillar infestations were summarized for three different time periods between 1950 and 1971. The life history, effects, and possible natural and chemical controls of the caterpillar are discussed.

Location: ALTA, SASK, MAN

Key words: X9

Hildahl, V., and W.A. Reeks, W.A. 1960. Outbreaks of the forest tent caterpillar, *Malacosoma disstria* Hbn., and their effects on stands of trembling aspen in Manitoba and Saskatchewan. Canadian Entomologist, 92:199-209.

Both Saskatchewan and Manitoba experienced forest tent caterpillar infestations almost every year between 1923 and 1953. Although defoliation was not sufficiently severe to cause mortality, it did cause increment loss of approximately eight percent of the basal area.

Location: SASK, MAN

Key words: X9

Hiratsuka, Y. 1987. Forest tree diseases of the prairie provinces. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-286.

This report includes summaries on various diseases that affect trees in the prairie provinces. Each summary includes information on each disease's effect, distribution, hosts, symptoms, disease cycle, damage, possible control, and photographs of the disease's effect.

Location: Not specific

Key words: X9

Hiratsuka, Y., D.A. Gibbard, O. Bakowsky, and G.B. Maier. 1990. Classification and measurement of aspen decay and stain in Alberta. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-314.

Various diseases were briefly described and related to the use of aspen. The volume of aspen wood available from various forests of Alberta were tabulated. The use of an H-Gun for sampling wood hardness was described.

Location: Not specific

Key words: X9

Hiratsuka, Y. and A.A. Loman. 1984. Decay of aspen and balsam poplar in Alberta. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-262.

The major decay-causing agents for aspen and balsam poplar in Alberta were reviewed. Percent occurrences of various diseases are summarized for aspen and balsam poplar. Some of the summaries were on the basis of age classes.

Location: ALTA

Key words: X9

Hilton, J.E., and A.W. Bailey. 1974. Forage production and utilization in a sprayed aspen forest in Alberta. Journal of Range Management, 27:375-380.

This study investigated the efficacy of spraying 2,4-D on aspen forests for purposes of increasing forage for cattle. Two years after spraying an aspen forest with as little as 3.6 kg/ha of herbicide resulted in an annual production of 1,024 kg/ha; the control produced 219 kg/ha.

Location: SW 83 H

Key words: 7

Hocking, D. 1970. Pre-storage dip in fungicide semesan controls canker diseases of poplar cuttings in Alberta. U.S. Department of Agriculture, Forest Service. Tree Plantation Notes 21(3):18-20.

The problem of disease in nursery stock is identified and the effectiveness of fungicidal treatment is discussed.

Location: Not specific

Key words: X10

Hogg, E.H., and V.J. Lieffers. 1991a. The relationship between seasonal changes in rhizome carbohydrate reserves and recovery following disturbance in *Calamagrostis canadensis*. Canadian Journal of Botany, 69:641-646.

The seasonal growth pattern and food reserves of *Calamagrostis canadensis* were investigated to determine if the plant might be more easily controlled if mowed at a particular time in the summer. However, the results found that carbohydrate reserves were a poor predictor of regrowth potential.

Location: 83 P

Key words: X6, X7, X35

Hogg, E.H., and V.J. Lieffers. 1991b. The impact of *Calamagrostis canadensis* on soil thermal regime after logging in northern Alberta. Canadian Journal Forest Research, 21:387-394.

The effects of mowing of *Calamagrostis canadensis* on forest soil temperature was evaluated. The data suggested that mowed areas had warmer soil due to less insolation by a litter layer. Cooler soil temperatures could imped tree seedling growth.

Location: 83 P

Key words: X6, X7, X35

Hogg, E.H., and V.J. Lieffers. 1991c. Seasonal changes in shoot regrowth potential in *Calamagrostis canadensis*. Oecologia, 85:596-602.

This study examined the seasonal change in shoot regrowth of *Calamagrostis canadensis* following disturbance. The first objective was to determine the relationship between seasonal change in growth and nitrogen content. A second objective was to determine if seasonal change in regrowth was influenced by light.

Location: Not specific

Key words: X13

Holland, W.D., and Z.J. Nemeth. 1974. Description of soil site characteristics and forest growth in selected areas of northwestern Alberta. Environment Canada, Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. File Report NOR-015.

The general physical and site characteristics are described for soils in the High Level, Manning, Clear River, and Whitecourt areas. Regression models were developed for bulk density and root abundance relationships.

Location: 84 E, K, N, 83 D, K

Key words: X34

Holmes, J.R.B. 1962. Strip clearcutting in an 85 year old spruce-lodgepole pine-aspen stand losegun River, Whitecourt, Alberta. Canada Department of Forestry, Forest Research Branch, Calgary, Alberta.

The purpose of this study was to evaluate strip clearcutting with respect stocking and regeneration success. This particular report outlines the study design.

Location: SE 83 K

Key words: X6

Holmsen, S.D. 1988. Stand cleaning with Husqvarna 165RX clearing saws in northern Alberta. Forest Engineering Research Institute of Canada. Technical Note TN-116.

The cost of thinning aspen dominated stands with a 165RX Husqvarna saw was calculated. The cost per hectare was estimated at $400 based on a wage of $15/hr.

Location: SE 83 M

Key words: X7

Holowaychuk, N., and R.J. Fessenden. 1987. Soil sensitivity to acid deposition and the potential of soils and geology in Alberta to reduce the acidity of acidic input. Alberta Research Council, Terrain Sciences

Department, Edmonton, Alberta. Earth Sciences Report 87-1.

A map (1:2,000,000 scale) was prepared that depicts the sensitivity of soils in Alberta to acidification from pollution, while a second map summarizes the potential of soils and geology to mitigate the effects of increased acidity. Extensive legends and appendices provide the background attribute data for each map polygon.

Location: ALTA

Key words: X45

Horton, K.W. 1962. Studies of aspen root suckering. Canada Department of Forestry, Canadian Forestry Service, Forest Research Branch, Ontario. Mimeo Report 62-14.

Not available for review.

Horton, K.W., and Hopkins. 1965. Influence of fire on aspen suckering. Canada Department of Forestry, Canadian Forestry Service, Forest Research Branch, Ontario. Publication No. 1095.

This study examines prescribed burning to optimize aspen reproduction and to prevent suckering. The results show that intensive burning is ineffective for sucker control; moderate burning maximizes suckering, and light burning is ecologically undesirable.

Location: Not specific

Key words: X4, X6, X40

Howitt, R.W. 1981. Dynamics of a gray luvisol. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

A detailed chemical and physical analysis as well as site temperature and moisture monitoring were done on a Gray Luvisolic soil under a mixed aspen-white spruce stand in the Breton area. The author found that the LFH horizon inhibited water movement into the solum; ice promoted the development of platy structure in the Ae horizon; and the translocation of iron, aluminum, and organic constituents was related to water movement through the profile.

Location: SW 83 H

Key words: X34

Howlett, M. 1989. The forest industry on the prairies: opportunities and constraints to future development. Prairie Forum, 14:233-258.

This paper discusses the development and current situation of the forest industry in each of the prairie provinces as well as the constraints and opportunities to future development. It also presents a historical perspective on the two major periods of economic expansion: the lumbering period prior to the mid-1940s and the current cycle of pulp and paper development, which is most prevalent in Alberta.

Location: ALTA, SASK, MAN

Key words: X19

Hudson, R.J. 1975. A computer simulation study of the potential productivity of wildlife in the boreal mixed-wood zone of Alberta. Feeder's Day Report, 54:72-75.

The results of this study indicate that native grazing systems in mixedwood forests were only moderately productive. The author recommends improving wildlife habitat through logging and prescribed burning.

Location: ALTA

Key words: X27

Hunt, H.M. 1976. Big game utilization of hardwood cuts in Saskatchewan, pp. 91-126. *In* Proceedings of 12th North American moose conference and workshop, March 1976, St. John's, Newfoundland.

This study compares moose and elk use of cut-over blocks during two winters - one more severe than the other. During cold winters ungulates ventured further from cover. Older cuts were used more often than younger cuts, and patterns of cutting strongly influenced utilization patterns.

Location: 63 H

Key words: X26, X27, X41

Hunt, H.M. 1978. Foods of elk in the boreal forest of Saskatchewan. Saskatchewan Department of Tourism and Renewable Resources, Wildlife Technical Report 78-9.

Not available for review.

Hunt, H.M. 1979. The ecology and status of elk in Saskatchewan. Saskatchewan Department of Tourism and Renewable Resources, Wildlife Research Division, Saskatoon, Saskatchewan. (Unpublished).

Not available for review.

Huston, M., D. DeAngelis, and W. Post. 1988. New computer models unify ecological theory. Bioscience, 38:682-691.

This article discusses the merits of the individual-based models for modelling complex ecological systems.

Location: Not specific

Key words: X35

Ives, W.G.H. 1973. Heat units and outbreaks of the forest tent caterpillar, *Malacosoma disstria* (Lepidoptera: Lasiocampidae). Canadian Entomologist, 105:529-543.

The purpose of this study was to determine the relationship between heat units (accumulated degree-days) during a fixed overwintering period and a shifting early larval feeding period for the forest tent caterpillar based on known infestations. The results suggest that years with increasing populations had cooler overwintering periods and warmer and earlier feeding periods than did those with decreasing populations.

Location: ALTA, SASK, MAN

Key words: X9, X42

Ives, W.G.H. 1981. Environmental factors affecting 21 forest insect defoliators in Manitoba and Saskatchewan, 1945-69. Environment Canada, Canadian Forestry Service, Edmonton, Alberta. Information Report NOR-X-233.

This study summarizes the available outbreak histories of twenty-one species of forest insect defoliators common to Manitoba and Saskatchewan. The abundance of these insects was related to weather data over the same time period. The results revealed that weather appears to be a major determiner of abundance of all insect species. From limited data, it also appears that birds, small mammals, parasites, invertebrate predators, and disease may also play important roles in particular circumstances.

Location: SASK, MAN

Key words: X9

Ives, W.G.H., and J.A. Muldrew. 1978. Preliminary evaluation of the effectiveness of nucleopolyhedrosis virus sprays to control the forest tent caterpillar in Alberta. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-204.

Preliminary results are presented with respect to tests conducted in Alberta in 1976/77 to determine if virus sprays might be valid alternative to chemical insecticides for controlling tent caterpillar populations. The results reveal that mortality was quite high. There is evidence that the virus was carried over from earlier treatment and the infection spread as far as 4.6 km from the source area.

Location: 83 O

Key words: X9

Ives, W.G.H., and J.A. Muldrew, and R.M. Smith. 1982. Experimental aerial application of forest tent caterpillar baculovirus. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-240.

This report presents the results of the initial aerial spraying experiments of forest tent caterpillars with nuclear polyhedrosis virus and assesses the amount of virus carry-over in the areas sprayed in previous years. The applications were made from 1976 to 1980 and from the egg to the larval stage. High dosages resulted in increased mortality. It appears the virus carried over to subsequent generations in an area that was previous treated with a hydraulic sprayer but not in areas treated by aerial spraying.

Location: 83 J

Key words: X9

Ives, W.G.H., and H.R. Wong. 1988. Tree and shrub insects of the prairie provinces. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-292.

A comprehensive review of forest insects and 657 related citations.

Location: ALTA, SASK, MAN

Key words: X9

Jablonski, P.D. 1978. The Tri-Creeks watershed: a study into the effects of logging on the physical, chemical, and biotic conditions of three Alberta eastslope streams. Alberta Energy and Natural Resources, Forest Land Use Branch and Alberta Recreation, Parks and Wildlife, Edmonton, Alberta. Report No. 1.

The impact of clearcutting on streamside timber removal and road construction on hydrology, water quality, and fish and aquatic invertebrate populations is investigated. The report describes the Tri-Creek physical setting, climate, biology, instrumentation, and timber harvest practices.

Location: SW 83 F

Key words: X2, X12, X23, X29, X31, X32, X34, X42

Jackson, C. 1967. Preliminary report on the poplar timber resource of Alberta and the proposed deciduous timber quota system. Alberta Lands and Forests, Alberta Forest Service, Forest Management Branch, Edmonton, Alberta.

The purpose of this report was to review and determine the present (1967) commercial poplar situation and secondly to investigate ways to improve future disposition of poplar timber. It refers to existing company deciduous timber allocations.

Location: ALTA

Key words: X19

Jackson, C. 1974a. The deciduous timber resource and forest management policies of Alberta. Alberta Lands and Forest, Forest Service, Timber Management Branch, Edmonton, Alberta.

Not available for review.

Jackson, C. 1974b. The deciduous timber resource and forest management policies of Alberta, pp. 6-15. *In* Neilson, R.W., and C.F. McBride, editors. Poplar utilization symposium proceedings. Canada Department of the Environment, Canadian Forestry Service, Vancouver, British Canada. Information Report VP-X-127.

The deciduous forest resources of Alberta were described. The author estimates a supply of 540 million m^3 of aspen. Legislation and policies regarding deciduous tree utilization as of 1974 are also summarized.

Location: ALTA

Key words: X11

Jaquish, B.C. 1981. Natural variation in the leaf epicuticular wax alkanes and leaf wax morphology of trembling aspen (*Populus tremuloides* Michx.). M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The epicuticular was of aspen leaves was described with respect to inter- and intraclonal, temporal, sexual, and geographical variation.

Location: SW 83 H

Key words: X35

Jameson, J.S. 1963. Comparison of tree growth on two sites in the Riding Mountain forest experimental area. Canada Department of Forestry, Forestry Research Branch, Ottawa, Ontario. Publication 1019.

This report compares the growth of uneven-aged white spruce and aspen on two different sites. The results indicate a significant growth difference between the two sites in terms of number of merchantable trees, the rate of height growth, height of dominant trees at index age and index diameters, and the merchantable and total volume. The differences were attributed to more favorable soil texture, structure, and moisture conditions.

Location: 62 K

Key words: X13

Jaques, D., and P. van Eck. 1980. Analysis and mapping of terrestrial ecosystems on the AMOCO Lease area, Gregoire Lake, Alberta. Prepared for AMOCO Canada Petroleum Company Ltd. by University of Calgary, Kananaskis Center for Environmental Research, Calgary, Alberta.

A review was done of the biophysical resources within the vicinity of the AMOCO lease near Fort McMurray. Included in the report were the typing and sampling of plant communities, assessment of habitat suitability for wildlife and tree growth potential, and a survey of surficial parent materials and soils.

Location: NW 74 D

Key words: X27, X33, X34

Jarvis, J.M. 1968. Silviculture and management of native poplar stands. Canada Department of Forestry and Rural Development, Forestry Branch, Publication 1205:70-87.

This paper describes the then current species, range, volume, growth and yield, decay, silviculture and management, silvicultural research, and the future prospects of poplar.

Location: ALTA, SASK, MAN

Key words: X3, X9, X15

Jarvis, J.M., G.A. Steneker, R.M. Waldron, and J.C. Lees. 1966. Review of silvicultural research: white spruce and trembling aspen cover types, mixedwood forest section, boreal forest region, Alberta-Saskatchewan-Manitoba. Canada Department of Forestry and Rural Development, Forestry Branch. Publication 1156.

A review of forty years of research by the Canadian Forestry Service in boreal mixedwood stands. Among the summarized topics were site preparation, site classification, cutting methods, and thinning of aspen. A good review of a variety of miscellaneous projects which were often not published.

Location: ALTA, SASK, MAN

Key words: X3, X4, X5, X6, X7, X12, X13, X14, X15

Jarvis, J.M., and R.E. Tucker. 1968a. Prescribed burning after barrel scarifying on a white spruce-trembling aspen cutover. Pulp and Paper Magazine of Canada, 69(11):70-72.

The purpose of this experiment was to determine if fire would enhance white spruce colonization on aspen-white spruce sites after logging. The author suggests that this particular experiment was not very successful.

Location: 62 K

Key words: X6, X40

Jarvis, J.M., and R.E. Tucker. 1968b. Drought index as a predictor of moisture content in L and F horizons on an upland white spruce-trembling aspen cut-over area. Canada Department of Forestry and Rural Development, Forestry Branch. Publication 1237.

This study attempted to determine if prescribed burning is a feasible technique for reducing the organic mantle on upland mixedwood cutover areas in the boreal forest. The authors found that moisture content in L and F horizons was correlated with the Drought Index. Prescribed burning alone was not considered sufficient site preparation for planting or seedling to conifers because the F horizon dries slowly and retains much moisture after prolonged periods of drought.

Location: 62 K

Key words: X6, X13, X34, X40, X44

Jeffery, W.W. 1964. Forest types along Lower Laird River, Northwest Territories. Canada Department of Forestry, Forestry Research Branch, Ottawa, Ontario. Publication Number 1035.

Mixedwood forest communities along the Laird River from the British Columbia border to Nahanni Butte were described. These descriptions included general floristics, soils, ecological conditions and geomorphic data/interpretations. Some height-age data were presented.

Location: NWT

Key words: X33, X34, X35

Jesberger, J.A., and J.W. Sheard. 1973. A quantitative study and multivariate analysis of corticolous lichen communities in the southern boreal forest of Saskatchewan. Canadian Journal of Botany, 51:185-201.

This study investigated the structure and composition of corticulous lichen communities in southern boreal forest of Saskatchewan to identify environmental factors which affected their distribution. Lichen distributions were found to be related to moisture levels and tree age.

Location: SASK

Key words: X35

Johnson, H.J. 1957. Empirical yield tables for aspen on the Riding, Duck, and Porcupine Mountains,

Manitoba. Canada Department of Northern Affairs and National Resources, Forestry Branch, Forest Research Division, Ottawa, Ontario. Project MS-192.

This study developed height-age (50 year), stem density by age, age-diameter, age-basal area, and volume curves for aspen. It also included statistics on tree dimensions and volume data based on 162 sample plots.

Location: 62 K, N, O

Key words: X15

Johnson, H.J. 1985. A review of forest research studies conducted by the Canadian Forestry Service in Manitoba and Saskatchewan to 1970. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. 3 Vols. MS-1 to MS-89.

Not available for review.

Location: SASK, MAN

Johnson, H.J. 1986. The release of white spruce from trembling aspen overstories: a review of available information and silvicultural guidelines. Prepared for Manitoba Forestry Branch by Johnson Forestry Services, Winnipeg, Manitoba.

As the title indicates this report is a synthesis of available literature on the release of white spruce by removal of the aspen overstory in the Duck Mountain area. The author concluded that approximately one-third of the area might be suitable for treatment. There were several limitations which should be considered before processing.

Location: 62 N

Key words: X7, X15

Johnson, H.J., H.F. Cerezke, F. Endean, G.R. Hillman, A.D. Kiil, J.C. Lees, A.A. Loman, and J.M. Powell. 1971. Some implications of large-scale clearcutting in Alberta - a literature review. Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-6.

This literature review focuses on the following implications of large-scale clearcutting in Alberta: environmental factors, silvicultural implications, probable hydrological effects, fire hazards, insect problems, and infection and development of disease in regeneration.

Location: ALTA

Key words: X3, X9, X12, X40

Johnston, M.H. 1981. The effects of fire disturbance level on plant re-establishment in Elk Island National Park, Alberta. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The effects of prescribed burning on understory plants were examined to determine the importances of fire intensity on plant re-establishment and to identify regeneration mechanisms. The results suggest that one-third of species regenerate from seeds, one-third resprout, and one-third regenerate by both methods. The importance of different fire intensities on *Corylus cornuta* and *Rubus idaeus* were tested. *Corylus* was found to be less susceptible to intense fires than *Rubus* because of its deeper and longer underground stem.

Location: SE 83 H

Key words: X35, X40

Johnston, M., and P. Woodard. 1985. The effect of fire severity level on postfire recovery of hazel and raspberry in east-central Alberta. Canadian Journal of Botany, 63:672-677.

This study examined the relationship between fire severity levels and postfire plant establishment, and the feasibility of using small fuel beds to subject individual plant to controlled burns. The results showed that fire killed shrub stems at all levels of severity. Variation in fire severity had little effect on regrowth except lower levels tended to favor higher numbers of hazel sprouts and increased raspberry height growth.

Location: NE 83 H

Key words: X33, X40

Johnstone, W.D., and E.B. Peterson. 1980. Aboveground component weights in Alberta Populus stands. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-226.

The purpose of the study was to collect information from mature and immature stands over a range of sites and a broad geographical area of Alberta, and to use the resulting data to predict the component weights of poplar trees and stands from readily measured tree and stand characteristics. From this

study, equations for estimating the component weights and leaf area of aspen and balsam poplar were developed. Stand density and total standing group show a strong inverse relationship.

Location: 82 G, NW 83 K, NE 83 K, SW 83 O

Key words: X15

Jones, G.R. 1978. The influence of clearcutting on small mammal populations in the southern boreal forest of Saskatchewan. M.Sc. Thesis, University of Saskatchewan, Saskatoon, Saskatchewan.

The small mammal populations of cutover and adjacent forest area were compared. *Clethrionomys gapperi* was the most common species in cutovers and was only slightly affected by cutting. *Microtus pennsyvanicus* and *Peromyscus maniculatus* were only found in cutovers, while shrews generally preferred forest understories.

Location: NW 73 H

Key words: X13, X22, X26, X41

Jones, M.L., G.J. Mann, and P.J. McCart. 1978. Investigations in the Athabasca and Clearwater Rivers upstream of Fort McMurray. Alberta Oil Sands Environmental Research Program, Project AF 4.8.1, Report 36.

These fisheries investigations were undertaken to delineate actual and potential spawning areas for lake whitefish. The Athabasca River upstream of Fort McMurray provides critical spawning habitat for whitefish.

Location: NW 74 D

Key words: X26, X27, X28

Jozsa, L.A., M.L. Parker, P.A. Bramhall, and S.G. Johnson. 1984. How climate affects tree growth in the boreal forest. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-255.

An analysis of white spruce tree rings from across Canada to determine if climate has an effect on tree growth. The results suggest temperature is more important than precipitation.

Location: CANADA

Key words: X42

Kabzems, A. 1952. Stand dynamics and development in the mixed forest. Forestry Chronicle, 28:7-22.

This is a general discussion of stand dynamics and development in the mixedwood forests. The examples and conclusions refer primarily to Saskatchewan.

Location: SASK

Key words: X15, X33, X34

Kabzems, A., A.L. Kosowan, and W.C. Harris. 1986. Mixedwood section in an ecological perspective, Saskatchewan, second edition. Saskatchewan Parks and Renewable Resource, Technical Bulletin No. 8.

This report describes twenty-three common forest types in the boreal mixedwood forest and their associated site conditions, and identifies the implications to forest management.

Location: SASK

Key words: X24, X33, X34

Kabzems, A., and J.P. Senyk. 1967. A comparison of actual and potential forest land production in Saskatchewan. Forestry Chronicle, 43: 257-264.

In 1967, thirty-four percent of the Prince Albert forest area was vegetated by mixedwood and deciduous cover types with aspen representing approximately 71 million cubic meters or twenty-seven percent of the total volume in the area.

Location: 73 H

Key words: X19, X46

Kagis, I. 1952. Some problems of mixedwood stands. Forestry Chronicle, 28:6-18.

This paper focuses on the problems associated with stand composition, growth, and yield of both white spruce and aspen in mixedwood stands. No recommendations are offered.

Location: SASK

Key words: X15

Kansas, J.L., and W.K. Brown. 1991. Preliminary lichen habitat suitability assessment for the Little Smoky primary caribou winter range. Prepared for Alberta Newsprint Company Ltd., B.P. Resources Canada Ltd., Petro-Canada Ltd., and Esso Resources Canada Ltd. by Beak Associates Consultants Ltd. and Terrestrial and Aquatic Environmental Management Ltd.

Not available for review.

Kelsall, J.P., E.S. Telfer, and T.D. Wright. 1977. The effects of fire on the ecology of the boreal forest, with particular reference to the Canadian north: a review and selected bibliography. Canadian Wildlife Service, Occasional Paper No. 32.

Fire is the most important factor influencing the ecology of the northern boreal forest and can be characterized as a fire-dependent ecosystem. This review emphasizes the impact fire has had on fish, birds, and mammals especially game and furbearers, as well the specific characteristics of northern forests such as permafrost, soils, and unique vegetation.

Location: Not specific

Key words: X40

Kemp, G.A. 1970. Black bear population dynamics at Cold Lake, Alberta, 1968-70, pp. 26-31. *In* Herrero, S., editor. Bears - their biology and management, second edition. International conference of bear research and management, 6-9 November 1970, Calgary, Alberta.

This paper reports on the black bear population, dynamics, and ecology during a three year period in the Cold Lake area.

Location: 73 L

Key words: X27

Kemp, G.A., and L.B. Keith. 1970. Dynamics and regulation of red squirrel (*Tamiasciurus hudsonicus*) populations. Ecology, 51:763-779.

This paper describes the population dynamics of red squirrels in mixedwood forests near Rochester, Alberta. The results show that deciduous areas are important to overwinter juveniles.

Location: N 83 H

Key words: X26, X27

Kiil, A.D. 1970. Effects of spring burning on vegetation in old partially cut spruce-aspen stands in east-central Alberta. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forestry Research Laboratory, Edmonton, Alberta. Information Report A-X-33.

This study assessed the value of prescribed burning as a tool for regeneration of seedlings in partially cut spruce-aspen stands. The analysis focuses on the composition of post-fire vegetation. Prescribed fire does not appear to be an effective tool for creating site conditions suitable for survival of conifer seedlings in old, partially cut spruce-aspen stands, but it showed potential for hazard reduction, vegetative manipulation, and improvement of wildlife habitat.

Location: 83 I

Key words: X6, X40

Kimmins, J.P. 1975. Review of the ecological effects of herbicide usage in forestry. Environment Canada, Canadian Forestry Service, Pacific Forest Research Centre, Victoria, British Columbia. Information Report BC-X-139.

A synthesis of the biological and ecological effects of herbicides. Based on a bibliography compiled by Kimmins and Fraker (1973). Several areas of potential research are also identified.

Location: CANADA, USA

Key words: X6, X13, X45

Kimmins, J.P., and P.N. Fraker. 1973. Bibliography of herbicides in forest ecosystems. Environment Canada, Canadian Forestry Service, Pacific Forest Research Centre, Victoria, British Columbia. Information Report BC-X-81.

A compilation of 1614 citation on herbicides used in forested ecosystems in North America up to 1973.

Location: CANADA, USA

Key words: X6, X13, X45

Kirby, C.L. 1962. Growth and yield of white spruce-aspen stands in Saskatchewan. Saskatchewan

Department of Natural Resources, Forestry Branch. Technical Bulletin No. 4.

The growth and yield of white spruce and aspen in mixedwood stands is the primary focus of this bulletin. It has information pertaining to decay, cull, utilization, and silvicultural aspects.

Location: 73 H

Key words: X6, X12, X14, X15, X19

Kirby, C.L., W.S. Bailey, and J.G. Gilmour. 1957. The growth and yield of aspen in Saskatchewan. Saskatchewan Department of Natural Resources, Forestry Branch. Technical Bulletin No. 3.

This report provides a summary of the studies pertaining to the growth and yield, and cull and utilization of aspen in Saskatchewan by Saskatchewan Forestry Branch. Several tables and graphs on growth, yield, and cull were included.

Location: SASK

Key words: X3, X15, X19

Kirkwood, J. 1989. Billions of chopsticks for Asia's tables. British Columbia Business, 17(2):33,35,38.

Not available for review.

Kjearsgaard, A.A. 1972. Reconnaissance soils survey of the Tawatinaw map sheet (83I). Alberta Institute of Pedology, Edmonton, Alberta. Report Number S-72-29.

A soil survey (14,640 km^2) at the series level was conducted in the Westlock to Lac La Biche area (1:126,720 scale). Profile descriptions were given for each series, and for selected profiles physical and chemical characteristics were summarized. Some vegetation - soil relationships were identified.

Location: 83 I

Key words: X34

Knapik, L.J., and J.D. Lindsay. 1983. Reconnaissance soil survey of the losegun Lake area, Alberta. Alberta Research Council, Edmonton, Alberta. Bulletin 43.

This reconnaissance soil survey (1:126,720) of the Fox Creek area (14,410 km^2) describes the characteristics, distribution, and use limitations of the soils in the area.

Location: 83 K

Key words: X34

Knapik, L.J., W.B. Russell, K. Bessie, and M. Eng. 1985. Wildlife habitat mapping inventory prototype of the Wapita map sheet (83L). Prepared for Alberta Energy and Natural Resources, Fish and Wildlife Division by Pedocan Land Evaluation Ltd., Edmonton, Alberta.

Not available for review.

Knapik, L.J., W.B. Russell, K.M. Riddell, and N. Stevens. 1988. Forest ecosystem classification and land system mapping pilot project, Duck Mountain, Manitoba. Prepared for Forestry Canada, Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta.

Plant communities in the Duck Mountain area were sampled for floristic composition, percent cover, and site conditions. These data were organized into community-types. Each community summary included composition (percent cover), soil subgroup, productivity, and successional relationships.

Location: 62 N

Key words: X33, X34

Knapik, L.J., and D.A. Westworth. 1982. Ecological resources of the Calumet Lease, Alberta. Prepared for Canstar Oil Sands Ltd. by Pedocan Land Evaluation Ltd., Edmonton, Alberta.

Not available for review.

Knapik, L.J., and D.A. Westworth. 1984. Preliminary wildlife habitat regions/subregions of Alberta. Prepared for Alberta Energy and Natural Resources by Pedocan Land Evaluation, Edmonton, Alberta.

The province of Alberta was subdivided into areas with similar wildlife habitats on the basis of ecoregions and physiographic subdivisions.

Location: ALTA

Key words: X27

Knight, H. 1967. Some limiting factors of tree growth in Alberta - a review. Canada Department of Forestry and Rural Development, Forestry Branch. Internal Report A-8.

This review summarizes the available information on the limiting factors of tree growth in Alberta as they applied in the classification of forest lands. The main focus is to differentiate the limiting factors between Class 2 and 3, and between Class 3 and 4 of the Canada Land Inventory system. Results suggest that climate, soil moisture, and soil fertility and soil toxicity are the main limiting factors of growth. Soil temperature is suspected as being the most important limiting factor in Alberta, but the existing literature is insufficient to draw conclusions on limiting factors of tree growth.

Location: ALTA

Key words: X13, X24, X44

Kocaoglu, S.S. 1975. Reconnaissance soil survey of the Sand River area. Alberta Soil Survey, Edmonton, Alberta. Report Number 34.

A 1:126,720 scale soil survey was conducted in the area southeast of Lac La Biche (12,000 km^2). Profile descriptions were provided for all soil series and chemical and physical data were available for selected profiles. This soil survey was also broadly stratified by landform.

Location: 73 L

Key words: X34

Kocaoglu, S.S. 1983. Physical land classification of the Rocky-North Saskatchewan area. Alberta Energy and Natural Resources, Edmonton, Alberta. T/12-3.

This report presents a physical land classification (1:250,000) that was prepared for the Rocky-North Saskatchewan study area (6,950 km^2). It describes the area's geology, geomorphology, landforms, and soils, and includes their extent and distribution.

Location: 83 B, S 83 G, NE 83 C

Key words: X2

Kocaoglu, S.S., and K.E. Bennett. 1983. An integrated resource inventory of the Special Lakeland area, physical land and forage classifications. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report Number T/48.

A biophysical inventory was prepared for the Special Lakeland area based on physical land classification information. The focus of the inventory was on soils, landforms, and vegetation. Included is a general description of the area, physical land classification, and forage classification. The purpose of the report was to provide a framework for environmental resource management.

Location: NW 73 E

Key words: X2, X33, X34

Kocaoglu, S.S., and D.J. Sauchyn. 1980. Physical land classification of the Brazeau-Pembina study area. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report 147.

A physical land classification (1:50,000) was prepared for the Brazeau-Pembina area near Lodgepole, Alberta (3,350 km^2). The area was divided into physiographic regions, subregions, and geomorphic systems. A general description is given for each map unit with respect to its physical attributes.

Location: 83 B, 83 C, 83 F, 83 G

Key words: X2

Kojima, S. 1980. Biogeoclimatic zones of southwestern Alberta. Prepared for Alberta Energy and Natural Resources by Western Ecological Services Ltd. Edmonton, Alberta.

The purpose of this investigation was to identify and delineate biogeoclimatic zones in the southwestern part of Alberta which includes the mixedwood forest vegetation.

Location: SW ALTA

Key words: X1, X33, X35

Kolabinski, V.S. 1965. Clear-cutting alternate strips and scarifying in white spruce-aspen stands to induce white spruce regeneration. Manitoba and Saskatchewan Department of Forestry, Forest Research Laboratory, Winnipeg, Manitoba. Internal Report MS-5.

The purpose of this study was to determine whether clear-cutting in strips and mechanical

seedbed preparation in white spruce-aspen will result in merchantable white spruce stands. This report does not have any results but instead describes the logging procedure.

Location: 63 E, K, 73 H

Key words: X3, X12

Kolabinski, V.S. 1968. Location of research plots established by the Department of Fisheries and Forestry in central region, Saskatchewan. Canada Department of Fisheries and Forestry, Winnipeg, Manitoba. MS-97.

Not available for review.

Location: MAN

Kolabinski, V.S. 1969a. Location of research plots established by Department of Fisheries and Forestry in the Hudson Bay Region, Saskatchewan. Canada Department of Fisheries and Forestry, Winnipeg, Manitoba. MS-98.

Not available for review.

Location: SASK

Kolabinski, V.S. 1969b. Location of research plots established by the Department of Fisheries and Forestry, Western Region, Manitoba. Canada Department of Fisheries and Forestry, Winnipeg, Manitoba. MS-100.

Not available for review.

Location: MAN

Kramer, A. 1972. A review of the ecological relationships between mule and white-tailed deer. Alberta Lands and Forests, Alberta Fish and Wildlife Division, Edmonton, Alberta.

The interactions of mule deer and white-tailed deer were reviewed.

Location: ALTA, SASK, MAN

Key words: X27

Krause, H.H., G.F. Weetman, E. Koller, and J.M. Veilleuz. 1982. Interprovincial forest fertilization program - five year growth remeasurements. Environment Canada, Canadian Forestry Service. Information Report DPC-X-12.

Sample forest plots across Canada were fertilized to determine the effects on growth. Only one plot of boreal mixedwood aspen was included in the analysis. Fertilization with nitrogen plus phosphorus resulted in no response, but a large growth response was obtained with nitrogen plus potassium and nitrogen plus phosphorus plus potassium.

Location: SASK

Key words: X13, X15

Krumlik, G.J., and J.D. Johnson. 1979. Biogeoclimatic ecosystem classification of Alberta, forest types of northwestern Alberta - 1st Approximation. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. ENR Technical Report T/47.

Not available for review.

Krumlik, G.J., R. Slaco, and J.S. Nichols. 1982. A classification and interpretation of forest ecosystems of the eastern half of the Berland forest management area, Alberta - A first approximation. Prepared for British Columbia Forestry Products Ltd.

This study classifies and interprets forest ecosystems within the eastern half of the Berland Forest Management Area. The study included vegetation sampling and site interpretations. The biogeoclimatic approach was used for the classification.

Location: NW 83 F

Key words: X1, X33, X34

Kumar, P. 1973a. Biophysical analysis and evaluation of capabilities: Rochester area. Alberta Lands and Forests, Land Use Assignment Section, Edmonton, Alberta.

A biophysical analysis (1:126,720) of the Rochester area. Each ecosection was described in terms of physiography, soil associations, present use, and natural cover. Suitability ratings were prepared for agriculture, forestry, ungulates, recreation, and waterfowl.

Location: 83 I

Key words: X1

Kumar, P. 1973b. Biophysical analysis and evaluation of capability: Fawcett-Moose Portage area. Alberta Lands and Forests, Edmonton, Alberta.

A biophysical land classification based primarily on soils and surficial materials. Canada Land Inventory equivalent ratings were developed for agriculture, forestry, recreation, ungulate, and waterfowl.

Location: SE 83 O, SW 83 P

Key words: X1

Kumar, P. 1975. Biophysical analysis and evaluation of capability: Snipe Lake area. Alberta Lands and Forests, Edmonton, Alberta.

A biophysical analysis (1:126.720) of the Snipe Lake area. Each ecosection was described in terms of physiography, soil associations, present use, and natural cover. Suitability ratings were given for agriculture, forestry, ungulates, recreation, and waterfowl.

Location: 83 N

Key words: X1

Kumar, P. 1977. Biophysical analysis and evaluation of capability: High Level. Alberta Energy and Natural Resources, Edmonton, Alberta.

A biophysical land classification (1:126,720) was developed for the High Level area (3,200 km^2). The resources, mostly physical attributes, of each mapped ecosection are described. The capability of each ecosection was rated for agriculture, forestry, recreation, ungulates, and waterfowl.

Location: NE 84 K, N 84 J

Key words: X1

Kusch, D.S. 1977. Large aspen tortrix. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Pest Leaflet 21-77.

The life cycle, significance, and control of the large tortrix is briefly described.

Location: Not specific

Key words: X9

Leblanc, J-D., and B.J. Sutherland. 1987. Comparative evaluation of seven site preparation tools in a residual poplar mixedwood stand in Saskatchewan. Canadian Forestry Service, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario. Information Report O-X-381.

This paper reports on a comparative test of mechanized scarification tools in residual poplar mixedwood stands in Saskatchewan. The objective of the scarification was to create plantable microsites for conifers. It was recommended that light skidder-drawn equipment should be used in low density residual poplar stands. In high density residual stands, front tractor mounted v-blades or plows were recommended.

Location: SASK

Key words: X6

Lacate, D.S., K.W. Horton, and A.W. Blyth. 1965. Forest conditions on the lower Peace River. Canada Department of Forestry, Publication Number 1094.

A reconnaissance survey was conducted along the Peace River in Wood Buffalo National Park to evaluate forest productivity and ecological conditions.

Location: NW 84 I, SE 84 P

Key words: X15, X33, X34

Laidlaw, T.F. 1974. The potential of trembling aspen for reclamation planting in Alberta: some techniques of propagation, pp. 88-92. *In* Hocking, D., and W.R. MacDonald, editors. Proceedings of a workshop on reclamation of disturbed lands in Alberta. Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-116.

The author argues for and identifies techniques for using trembling aspen for reclamation planting in Alberta.

Location: ALTA

Key words: X8, X22, X31, X32, X35, X41

Laird, M.L. 1987. Forest management and herbicides. Alberta Environment, Pesticide Management Branch, Edmonton, Alberta.

Not available for review.

Lakusta, T. 1988. Regeneration performance zones of Alberta: climate analysis component. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Project C1-26-88.

Not available for review.

La Roi, G.H., and R.A. Ellis. 1984. The flora and vegetation around fire lookout towers and their access roads in western Alberta. Prepared by University of Alberta for Alberta Forest Research Trust, Edmonton, Alberta.

Disturbed and native plant communities around fire towers were described. These descriptions included cover estimates by species and species height data. Some of the study sites occurred in mixedwood vegetation.

Location: WESTERN ALTA

Key words: X33, X35

La Roi, G.H., and M. Ostafichuk. 1982. Structural dynamics of boreal forest ecosystems of three habitat types in the Hondo-Lesser Slave Lake area of north central Alberta in 1981. Prepared for Alberta Environment and Alberta Recreation and Wildlife, Edmonton. RMD-80/35A.

Composition and structure of eight forest plant communities were described as background information for a long-term study of boreal forest plant community development near Hondo, Alberta. Two of the communities were mixedwood stands. Data were given on plant phenology.

Location: SE 83 O

Key words: X33, X35

Larson, J.A. 1971. Vegetational relationships with air mass frequencies: boreal forest and tundra. Arctic, 24: 177-194.

The distribution and frequency of selected boreal forest understory species were related to macroclimatic conditions through the use of principal components analysis.

Location: CANADA

Key words: X35, X42

Lavkulich, L.M. 1982. Soils, vegetation, and landforms of the Fort Simpson area, N.W.T. Department of Indian and Northern Development. ALUV 71-72-51.

A general overview of the physical environment along the Mackenzie River as well as some information on plant species abundance by soil drainage class. The area is mapped and classified at a scale of approximately 1:50,000.

Location: NWT

Key words: X33, X34, X35

Lees, J.C. 1960. The application of silvicultural systems to the B.19 Foothills region of Alberta. M.F. Thesis, University of British Columbia, Vancouver, British Columbia.

Not available for review.

Lees, J.C. 1962a. Alberta foothills silviculture. Forestry Chronicle, 38:173-181.

Various harvesting and site treatment systems (clearcutting, shelterwood, and selective cutting) were evaluated in the Lower Boreal-Cordilleran ecoregion. These activities were stratified according to moisture regime.

Location: Not specific

Key words: X6, X12

Lees, J.C. 1962b. A discussion on white spruce natural regeneration in Alberta's spruce/aspen stands. Empire Forestry Review, 41:214-219.

The merits of a two-cut uniform shelterwood system were presented. These included protection of site from atmospheric elements, a local seed source, increased insolation, sheltering of seedlings, a maintenance of mineral seed bed for approximately five years, minimization of competition from some understory species, and better growth.

Location: ALTA

Key words: X7

Lees, J.C. 1963. Partial cutting with scarification in Alberta spruce-aspen stands. Canada Department of

Forestry, Rural Development, Forest Branch. Publication No. 1001.

This study was conducted in 110-year-old aspen-spruce stands in the B-18a section to investigate scarification for white spruce regeneration before and after partial cutting at different levels of intensity. The results indicated that only the scarified seedbed permitted satisfactory establishment of spruce. It was noted that aspen growth was poor as many trees were over mature and decadent.

Location: SE 83 O

Key words: X3, X6, X13

Lees, J.C. 1964a. A test of harvest cutting methods in Alberta's spruce-aspen forest. Canada Department of Forestry, Forest Research Branch, Ottawa, Ontario. Publication Number 1042.

Eight harvesting methods were investigated to determine which promoted maximum yield and satisfactory regeneration in spruce-aspen stands. The method that promoted the highest stand growth rate, lowest mortality, and best regeneration was the selective cutting method or a two-cut shelterwood system.

Location: NW 83 N, P

Key words: X3, X5, X12, X15

Lees, J.C. 1964b. Vegetation competition following scarification. Canada Department of Forestry, Forest Research Branch. Project A62.

Not available for review.

Lees, J.C. 1965. Assessment of operational scarification in the spruce-aspen forests of Alberta. Canada Department of Forestry, Forestry Research Laboratory, Calgary, Alberta. Internal Report A-2.

The relative effectiveness of various equipment for scarification in spruce-aspen stands were discussed based on seven different sites. The results indicate that scarification equipment did expose adequate mineral soil providing a good seedbed for seedling survival. The main problem encountered was excessive accumulation of leaf litter fall and vegetation encroachment.

Location: 83 L, SE 83 O, S 83 P

Key words: X3, X6

Lees, J.C. 1966. Release of white spruce form aspen competition in Alberta's spruce aspen forest. Canada Department of Forestry, Publication Number 1163.

Aspen removal in mixedwood stands resulted in increased height growth rates and a twenty to forty percent increase in merchantable volume. Twenty-five stands were included in the test on a variety of site types. Treatment of aspen with ammonium sulphamite minimized sucker regrowth for several years.

Location: ALTA

Key words: X5, X7, X15

Lees, J.C. 1970a. A test of silvicultural practices designated to secure reproduction in partially-cut mixedwood stands in the B19a section of Alberta. Canada Department of fisheries and Forestry, Forest Research Branch, Project A-58. Internal report A-31.

The purpose of this project was to obtain adequate white spruce regeneration by the combined use of shelterwood cutting, scarification, aspen control, and broadcast seeding on three major sites: dry upland, moist transition, and wet bottomland.

Location: 83 O

Key words: X3, X6, X13

Lees, J.C. 1970b. Natural regeneration of white spruce under spruce-aspen shelterwood, B-18a forest section, Alberta. Canada Department of Fisheries and Forestry, Canadian Forestry Service. Publication 1274.

This report covers the observations made of the early regeneration period 1959-1964 of white spruce seedlings after scarification under a spruce-aspen shelterwood in the Slave Lake forest. Three site groups were sampled: dry upland, moist transition, and a wet bottomland. Results from the study suggest that shelterwood cutting and scarification provided the necessary regime for successful natural regeneration of white spruce. Vegetative competition affected seedling height growth on all sites. Mineral soil was the most productive seedbed on scarified areas and rotten wood on undisturbed areas.

Location: S 83 O

Key words: X3, X6, X13, X24

Leggat, K.R., B.L. Magill, N. Van Waas, and H.S. Sandhu. 1981. The impacts of climate change and variability on Alberta's resources and environment, pp. 12-45. *In* Climate change seminar proceedings, Regina, Saskatchewan. 17-19 March 1981. Environment Canada, Atmospheric Environment Service, Downsview, Ontario.

The impact of climatic change in Alberta on the economic well-being of various sectors including forestry was discussed.

Location: ALTA

Key words: X42

Lehn, G.A. 1979. Natural variation in merchantable stem biomass among clones of trembling aspen. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The stocking, clone size variation, and inter- and intraclonal variation of aspen stands were examined. Clonal size varied up to ten fold which was thought to be a function of stand history rather than environmental conditions. Good aspen sites were found to be 6.5 times more productive than poor sites. A large amount of variation was observed among clones.

Location: SW 83 B, SE 83 J

Key words: X35

Lehn, G. 1980. Aspen biomass productivity-genotype versus phenotype, p. 131. *In* Dancik, B.P., and K.O. Higginbotham, editors. Proceedings of sixth North American forest biology workshop. University of Alberta, Edmonton, Alberta.

The relative effects of site and genetic control over biomass production were examined. Inter- and intra-clonal variation in biomass of the sound merchantable portion of the bole were used to gauge heritability.

Location: SW 83 C, SW 83J

Key words: X18, X35

Lehn, G.A., and K.O. Higginbotham. 1982. Natural variation in merchantable stem biomass and volume among clones of *Populus tremuloides* Michx. Canadian Journal of Forest Research, 12:83-89.

Various traits of aspen were examined and related to potentially merchantable biomass and volume production, and probable management strategies. Also the relative effects of site and genetic control on production were examined. The results show there was a large amount of clonal variability in biomass production. If the best clones were selected, biomass at eighty-five years could be increased by sixteen percent. The results suggest that approximately one-third of the variation in biomass and volume was genetically based.

Location: SE 83 J

Key words: X15, X35

Leskiw, L., J. Dowgray, D. Ealey, and K. McCourt. 1984. Wildlife habitat districts and land surface disturbance, Rocky Mountain House - 83B. Prepared for Alberta Energy and Natural Resources, Fish and Wildlife Division by Pedology Consultants and McCourt Management Ltd., Edmonton, Alberta.

A wildlife habitat district map based on ecological land classification and soils survey information, and a land surface disturbance map were developed at a scale of 1:250,000 for the Rocky Mountain House area.

Location: 83 B

Key words: X1, X27, X34, X41

Lesko, G.L., and J.D. Lindsay. 1973. Forest/soil relationships and management considerations in a portion of the Chip Lake map area, Alberta. Alberta Research Council, Edmonton, Alberta. Report 73-1.

The purpose of this study was to determine the forest/soil relationship for the Chip Lake study area. The results indicate that site index was more useful than basal area for predicting forest productivity. Soil drainage was identified as the most important soil property influencing tree growth in the study area.

Location: SW 83 G

Key words: X24

Lewis, H.T. 1977. Maskuta: The ecology of indians first in northern Alberta. Western Canada Journal of Anthropology, 7:15-52.

Based on interviews with more than fifty older Native people from across Alberta's boreal forest

region, information was obtained on the types of microenvironments once burned, the reasons for burning, and the considerations in controlling man-made fires. From these interviews, it appears that Natives of northern Alberta used very sophisticated approaches to and had an understanding of the dynamics of fire for management of plant and animal resources.

Location: ALTA

Key words: X40

L'Hirondelle, S.J., P.A. Addison, and D.B. Huebert. 1986. Growth and physiological responses of aspen and jack pine to intermittent SO_2 fumigation episodes. Canadian Journal of Botany, 64:2421-2427.

This study suggests that low frequencies of high sulphur dioxide exposure decrease aspen biomass production. Laboratory experiments found that physiological processes recovered fully within twenty-one hours after exposure.

Location: NW 74 D

Key words: X13, X33

Lieffers, V.J., and J.S. Campbell. 1984. Biomass and growth of *Populus tremuloides* in northeastern Alberta: estimates using hierarchy in tree size. Canadian Journal of Forest Research, 14:610-616.

This study determined the total biomass and growth of aspen in a number of aspen stands in the Fort McMurray area of northeastern Alberta. The main objectives were to relate biomass and growth to tree density, age, and air pollution from the oil sands mining and refining operations. Stands ranged from twenty-three to fifty-seven years old, aboveground biomass from 37 to 156 tonnes per hectare, and current rates of production from 1.5 to 5.2 tonnes per hectare per year. There was not detectable reduction in growth near the sulphur dioxide source.

Location: NW 74 D, SW 74 E

Key words: X15, X45

Lindsay, J.D., P,K. Heringa, S. Pawluk, and W. Odynsky. 1957. Exploratory soils survey of the Alberta map sheets 84-C (East half), 84-B, 84-A, and 74-D. Research Council of Alberta, Edmonton, Alberta. Preliminary Soil Survey Report 58-1.

A very general survey of soils and parent materials was conducted over a relatively large area. Sampling intensity was very low. Very general soil profile descriptions were given along with several sets of chemical and physical analyses.

Location: E 84 C, 84 A, B, 74 D

Key words: X34

Lindsay, J.D., W. Odynsky, T.W. Peters, and W.E. Bowser. 1968. Soil survey of the Buck Lake and Wabamun Lake areas. Alberta Soil Survey Report Number 24.

Soils were classified to the series level and mapped at a scale of 1:126,720 (4,222 km^2). General profile descriptions were provided for each series, and chemical and physical attributes were included for selected profiles. Subgroup classification needs updating.

Location: NE 83 B, E 83 G

Key words: X34

Lindsay, J.D., S. Pawluk, and W. Odynsky. 1958. Exploratory soil survey of Alberta map sheets 84-D (North half), 84-E, 84-F, and 84-G. Research Council of Alberta, Edmonton, Alberta. Preliminary Soil Survey Report 59-1.

A very general survey of soils and parent materials was conducted over a relatively large area. Sampling intensity was very low. Very general soil profile descriptions were given along with several sets of chemical and physical analyses.

Location: N 84 D, 84 E, F, G

Key words: X34

Lindsay, J.D., S. Pawluk, and W. Odynsky. 1959. Exploratory soil survey of Alberta map sheets 84-J, 84-K, and 84-L. Research Council of Alberta, Edmonton, Alberta. Preliminary Soil Survey Report 60-1.

A very general survey of soils and parent materials was conducted over a relatively large area. Sampling intensity was very low. Very general soil profile descriptions were given along with several sets of chemical and physical analyses.

Location: 84 J, K, L

Key words: X34

Lindsay, J.D., S. Pawluk, and W. Odynsky. 1960. Exploratory soil survey of Alberta map sheets 84-M, 84-N, and 84-O. Research Council of Alberta, Edmonton, Alberta. Preliminary Soil Survey Report 61-1.

A very general survey of soils and parent materials was conducted over a relatively large area. Sampling intensity was very low. Very general soil profile descriptions were given along with several sets of chemical and physical analyses.

Location: 84 M, N, O

Key words: X34

Lindsay, J.D., S. Pawluk, and W. Odynsky. 1961. Exploratory soil survey of Alberta map sheet 84-P, 84-I, and 84-H. Research Council of Alberta, Edmonton, Alberta. Preliminary Soil Survey Report 62-1.

A very general survey of soils and parent materials was conducted over a relatively large area. Sampling intensity was very low. Very general soil profile descriptions were given along with several sets of chemical and physical analyses.

Location: 84 H, I, P

Key words: X34

Loman, A.A., R.A. Blauel, and D. Hocking. 1972. Sulphur dioxide and forest vegetation. Canada Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-49.

This study attempts to distinguish between controllable and uncontrollable factors that cause sulphur dioxide damage in forest vegetation. In general, there exists an inverse relationship between the rate of plant metabolism and sulphur dioxide tolerance levels. The results of this study indicate that one part per million of sulphur dioxide for less than one hour will injure forest species. At lower levels of exposure, only sensitive plants such as lichens and bryophytes will be damaged.

Location: ALTA

Key words: X13, X25, X45

Loseth, P., D. Dye, and B. Sutton. 1990. Site index estimation form environmental factors in Saskatchewan. Prepared under Canada - Saskatchewan Forestry Development Agreement.

An attempt was made to predict site index from site parameters based on regression analysis techniques. Most of the analysis was oriented towards conifers but also included aspen.

Location: SASK

Key words: X15

Luck, S. 1982. Bear-Wapiti sand dunes: Level I. Resource inventory and assessment 1981. Alberta Recreation and Parks, Edmonton, Alberta.

The report presents a resource inventory and assessment of an area located southeast of Grande Prairie. Recommendations to protect the area included the establishment of a low-intensity/preservation park.

Location: SE 83 M

Key words: X20, X27

MacCallum, B., and G.R.A. Ebel. 1984. Ecological considerations for the wildlife of the Champion Forest Management Area, Alberta. Prepared by G.R.A. Ebel Consultants for Alberta Forestry, Lands and Wildlife, Edmonton, Alberta.

Not available for review.

Machniak, K., and W.A. Bond. 1979. An intensive study of the fish fauna of the Steepbank River watershed of northeastern Alberta. Alberta Oil Sands Environmental Research Program, Project AF 4.5.2, Report 61.

A comprehensive study of the fish species in the Steepbank River was conducted during the open water period of 1977. It primarily focused on spawning and migration patterns of species.

Location: NE 74 D

Key words: X28, X29

Machniak, K., W.A. Bond, M.R. Orr, D. Rudy, and D. Miller. 1980. Fisheries and aquatic habitat investigations in the MacKay River Watershed of northeastern

Alberta. Alberta Oil Sands Environmental Research Program, WS 1.3.1, AOSERP Report 93.

This study investigates the fish fauna of the MacKay River during open water period of 1978. It completes a habitat analysis of each reach within the watershed in terms of various physical parameters.

Location: NW 74 D

Key words: X29

MacIsaac, D.A. 1986. Crow Lake study area, northeastern Alberta. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. ENR Technical Report Number T/117.

A biophysical resource analysis was conducted in the Crow Lake area. The vegetation was sampled and classified into sixteen upland and twelve wetland community-types. Soils were described and lists were compiled of plant and animal species.

Location: NE 83 P

Key words: X1

MacIver, D. 1981. The bioclimates of central and northern Alberta. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta.

Not available for review.

MacIver, D.C., W.D. Holland, and J.M. Powell. 1972. Delineation of similar summer climatic regimes in central Alberta. Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Information Report NOR-X-30.

A multivariate statistical approach was used to group meteorological stations with similar climatic regimes. The area included in the study was from Edmonton north to Wabasca. A tabular summary of climatic data was provided for each recognized grouping.

Location: 83 E-P, 73 E, L, M

Key words: X42

MacLeod, W.K. 1950. Growth, development, and yield of spruce-poplar stands in northern Alberta. Canada Department of Resources and Development, Forestry Branch.

Not available for review.

MacLeod, W.K. 1952a. Normal yield table for even aged aspen stands in central and northern Alberta. Canadian Forestry Branch, Research Division, Project A-9.

Not available for review.

MacLeod, W.K. 1952b. Yield and volume tables for aspen in central and northern Alberta. M.F. Thesis, University of British Columbia, Vancouver, British Columbia.

Not available for review.

MacLeod, W.K., and A.W. Blyth. 1955. Yield of even-aged fully stocked spruce-poplar stands in northern Alberta. Canada Department of Northern Affairs and National Resources, Forest Research Division. Technical Note Number 18.

Yield tables for fully-stocked spruce-poplar stands were developed based on data from central Alberta. Information was provide on site index, basal area, percent composition, and volume to basal area factors for aspen.

Location: N 83 J, N 83 I, 83 O, 83 P

Key words: X15

Maher, R.V., G.W. Argus, V.L. Harms, and J.H. Hudson. 1979. The rare vascular plants of Saskatchewan. National Museum of Canada, Ottawa, Ontario. Syllogeus Number 20.

Vascular plants considered rare in Saskatchewan are identified and known locations are plotted.

Location: SASK

Key words: X22

Maser, G.B., and D. Darrah. 1989. Decay levels in mature aspen stands, Whitecourt, Alberta. Prepared by Alberta Forest Service, Forest Research Branch. Canada - Alberta Forestry Development Agreement, Catalogue Number FO 42-91/73-1989E.

An inventory of aspen stem decay was conducted in the Whitecourt forest. Estimates found thirty-

nine percent of total gross tree volume showed evidence of decay and staining. Tree diameter at breast height was found the best predictor of decay.

Location: SW 83 J, SE 83 K

Key words: X9, X19

Maini, J.S. 1968. Silvics and ecology of *Populus* in Canada, pp. 20-69. *In* Maini, J.S., and J.H. Cayford, editors. Growth and utilization of poplars in Canada. Canada Department of Forestry and Rural Development, Forestry Branch, Ottawa, Ontario. Publication Number 1205.

The available literature was reviewed on silvical characteristics and ecological behavior of *Populus* species in Canada.

Location: Not specific

Key words: X35

Maini, J.S., and J.H. Cayford, editors. 1968. Growth and utilization of poplars in Canada. Canada Department of Forestry and Rural Development, Forest Branch, Publication Number 1205.

The purpose of this symposium was to set the ground work to establish poplar as a major contributor to the national forest economy of Canada. The paper included information on silvics, silviculture, genetics, insects, disease, decay, and utilization.

Location: Not specific

Key words: X3, X9, X15, X19, X43

Maini, J.S., and B.W. Dance. 1965. Temperature relationships of a blight attributed to *Fusarium solani* (Mart.) Sacc. on trembling aspen suckers. Canada Department of Forestry, Bi-Monthly Progress Report, 21(2):2-3.

Not available for review.

Maini, J.S., and K.W. Horton. 1963. Reproduction response to *Populus* and associated *Pteridium* to cutting, burning and scarification. Canada Department of Forestry, Forest Research Branch. Report 63-O-19

Not available for review.

Maini, J.S., and K.W. Horton. 1966. Reproductive response of *Populus* and associated *Pteridium* to cutting, burning, and scarification. Canadian Department of Forestry. Publication Number 1155.

Not available for review.

Malhotra, S.S., and R.A. Blauel. 1980. Diagnosis of air pollutant and natural stress symptoms of forest vegetation in western Canada. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-228.

The morphological effects of pollution on forest plants is reviewed. Numerous photographs illustrate the effects of sulphur dioxide, hydrocarbon, salt, and other forms of damage to foliage.

Location: ALTA, SASK, MAN

Key words: X45

Malik, N., and W.H. Vanden Born. 1986. Use of herbicides in forest management. Environment Canada, Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-282.

This report discusses the use of and need for judicious herbicides in forest and silvicultural management practices in Canada. It provides information on herbicides currently being used in different regions of Canada, and their impact on the environment. Recommendations for future herbicide usage and areas of study are provided.

Location: ALTA, SASK, MAN

Key words: X7

Mallett, K.I. 1990. Host range and geographic distribution of *Armillaria* root rot pathogens in the Canadian prairie provinces. Canadian Journal of Forest Research, 20:1859-1863.

The following species of Armillaria root rot were found in the prairie provinces: *A. ostayae*, *A. sinapina*, and *A. calvescens*. For each species the approximate geographic location is provided and their host was identified.

Location: ALTA, SASK, MAN

Key words: X9

Manning, G.H., and H.R. Grinnell. 1971. Forest resources and utilization in Canada to the year 2000. Environment Canada, Canadian Forestry Service, Ottawa, Ontario. Publication Number 1304.

This report presents estimates of the demand for Canadian forest products and the available wood supply to meet the demand.

Location: CANADA

Key words: X19

Mathison, G.W., L.P. Milligan, and R.D. Weisenburger, 1986. Ruminant feed evaluation unit: evaluation of aspen as a feed stuff for cattle. Agriculture and Forestry Bulletin, 9(Special Issue): 53-55.

This study investigated the nutritive value of ground whole aspen trees fed with hay or in an aspen-barley grain silage mixture to cattle and sheep. The results indicated that unprocessed ground aspen has limited potential as a feedstuff, particularly for sheep. Recommendations suggest that the material would have to be upgraded and milled to at least 5.5 mm in size before being useful as feed.

Location: ALTA

Key words: X43

McDonald, C.S. 1979. Status of the hardwood resource in Alberta, pp. 23-30. *In* McIntosh, J.A., and M.N. Carroll, editors. Utilization of western Canadian hardwoods, Proceedings of symposium, Prince George, British Columbia, November 21-22, 1979. Forintek Canada Corporation, Vancouver, British Columbia. Special Publication Number SP-2.

An overview of species in Alberta is presented: species distribution and quality; volume of the resource; utilization; stumpage policies; and export policies for logs and chips.

Location: ALTA

Key words: X15, X19

Micko, M.M. 1987. Alberta aspen vs black poplar wood quality differences. Canada-Alberta Forest Resource Development Agreement. Catalogue Number FO 42-91/28 - 1988E.

This study analyzes the differences between the following physical properties of aspen and black poplar: segmental variation of specific gravity; moisture content; fibre length; vessel length; and vessel segments. The objective of the study was to gain a greater understanding of physical and mechanical properties of forest products manufactured from poplars. The results show that black poplar has a significantly lower specific gravity than aspen. Balsam poplar has a significantly higher moisture content especially in the mid-tree section and is more variable than aspen. Compared to aspen, balsam has wider vessel width throughout all segments. These important features in part explain why the aspen wafer board surface is more uniform than black poplar wafer board.

Location: NE 83 I

Key words: X19, X43

Micko, M.M., E. Wang, B. Bains, A. Yanchuk, and D. Bakos. 1983. Wood quality of clear stained and decayed aspen growing in Alberta. University of Alberta, Department of Agricultural Engineering, Edmonton, Alberta.

The results of this study showed that the extractive contents and chemical composition of clear wood differ significantly from decayed wood. Hellocellulose contents remain unchanged, but acid hydrolyzable cellulose, lignin and ash contents increased with progression of decay. Metallic ions, particularly calcium, tend to aggregate in the decayed wood.

Location: ALTA

Key words: X9

Miller, M.C. 1974. Poplar management in Saskatchewan, pp. 43-50. *In* Neilson, R.W., and C.F. McBride, editors. Poplar utilization symposium. Canadian Forestry Service, Western Forest Products Laboratory, Vancouver, British Columbia. Information Report VP-X-127.

The distribution, location, and volume of aspen and balsam poplar were described for the mixedwood zone. In addition, the present and potential utilization of aspen, the limiting factor of defects and cull, and current management and utilization practices were summarized.

Location: SASK

Key words: X46

Miller, M. 1978. Vegetation types of the Lakeland area. Alberta Recreation, Parks and Wildlife, Edmonton, Alberta.

Not available for review.

Miller, W.S., and A.N. Auclair. 1974. Factor analytic models of bioclimate for Canadian forest regions. Canadian Journal of Forest Research, 4:536-548.

The purpose of this study was to determine the relationship between climate and the distribution of forest types using principal component analysis. The results reveal that classification of forest regions by cluster analysis of climatic data has potential for forestry applications.

Location: CANADA

Key words: X22, X33, X42

Milligan, J.D. 1974. The use of aspen poplar in livestock diets, pp. 196-205. *In* Neilson, R.W., and C.F. McBride, editors. Poplar Utilization Symposium. Environment Canada, Canadian Forestry Service, Western Forest Products Laboratory, Vancouver, British Columbia. Information Report VP-X-127.

The use of steam processed aspen poplar products in the fatting diet of steers and diets of pregnant ewes was investigated. For steers, a diet consisting of five percent aspen resulted in similar feed/weight conversions as a diet consisting of five percent hay. At higher level of aspen fibre, there was a decrease in daily feed intake and feed/weight conversion decreased significantly. In feeding pregnant ewes, there was a tendency for lambing percentages to decline and the number of dead lambs to increase as energy from aspen fibre consumption increased. Digestibility of aspen fibre was comparable to alfalfa pellets for cattle.

Location: Not specific

Key words: X19

Moen, A.B. 1990. Demystifying forestry law: an Alberta analysis. Environmental Law Centre, Edmonton, Alberta.

Moen examines Alberta current forest management, reviews laws relating to disposition of timber, and describes current administrative practices.

Location: ALTA

Key words: X11

Molik, N., and W.H. Vander Born. 1986. Use of herbicides in forest management. Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-282.

The focus of this report was on the role of herbicides in Canadian forestry. The various topics included research, registration of herbicides, the impact of herbicides, factors limiting herbicide use, and recommendations.

Location: CANADA

Key words: X7

More, G. 1978. Ecological aspects of food selection in pine marten (*Martes americana*). M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

In a food selection study conducted in the southern Northwest Territories, it was found that boreal red-backed voles and meadow voles were the principal prey of pine marten. Red squirrel and showshoe hare were infrequent prey and deer mice were rarely selected. Marten have a bimodal activity period, early morning and evening in summer, which modified in fall and winter. This change in behavior may be attributed to day length.

Location: 85 C

Key words: X26

Morrall, R.A.A. 1964. An ecological study of soil microfungi of upland boreal forests at Candle Lake, Saskatchewan. M.A. Thesis, University of Saskatchewan, Saskatoon, Saskatchewan.

The microfungal character of boreal forest soils were examined in jack pine-black spruce, aspen, white spruce-birch stands. While many species (ca. 180) were found, only a few were common: *Mortierella vinacea*; *M. ramanniana*; *M. isabelliana*; and *Pullularia pullulans*. Seasonal fluctuations in species frequency were found only for a few species.

Location: NW 73 H

Key words: X30

Morrall, R.A.A. 1974. Soil microfungi associated with aspen in Saskatchewan: synecology and quanti-

tative analysis. Canadian Journal of Botany, 52:1803-1817.

A soil survey of microfungi associated with aspen was conducted over a wide geographical area and ecological range. The microfungal communities of aspen stands in the boreal forests of Saskatchewan appeared to be a distinctive character, i.e., characterized by an abundance of *Mortierella* spp. The remaining communities from all other parts of the province were distinct but did not form discrete groups.

Location: SASK

Key words: X22, X30, X35

Morrall, R.A.A., and T.C. Vanterpool. 1968. The soil microfungi of upland boreal forests of Candle Lake, Saskatchewan. Mycologia, 60:642-654.

The purpose of this study was to investigate soil microfungi in upland boreal forests at Candle Lake, Saskatchewan. A total of 113 taxa were isolated and identified. The microfungi showed a pattern of continuous variation among the sampled forest communities, but were not clearly correlated with the dominant vegetation.

Location: NW 73 H

Key words: X30

Moss, E.H. 1938. Longevity of seed and establishment of seedlings in species of *Populus*. Botanical Gazette, 99:529-542.

The objective of this paper was to investigate how aspen reproduce by seed. Results indicate that poplar seedlings require moisture continuously in the surface layers of the soil for at least the first week of growth. This is due to the slow growth of the primary root.

Location: NW 83 O

Key words: X35

Moss, E.H. 1953. Forest communities in northwestern Alberta. Canadian Journal of Botany, 31: 212-252.

An early description of the floristic composition and ecological relationships of the chief forest types are in the northwestern portion of Alberta. The white spruce is recognized as the climax species for the area. Fire was considered an impediment to the natural succession of poplar and pine to white spruce.

Location: NW ALBERTA

Key words: X22, X26, X33, X35

Moss, E.H. 1955. The vegetation of Alberta. Botanical Review, 21:493-567.

This paper provides an overview of the vegetation of Alberta with a specific section on the boreal forest.

Location: ALTA

Key words: X1, X33, X34

Moyles, D.L.J. 1981. Seasonal and daily use of plant communities by sharp-tailed grouse (*Pediocetes phasianellus*) in the parklands of Alberta. Canadian Field-Naturalist, 95:287-291.

Sharp-tailed grouse showed a preference for different plant communities at different times of the year. The results suggest that encroachment of the aspen community into the grassland and the grassland - shrub communities would deteriorate the optimum grouse habitat.

Location: SE 73 L

Key words: X26, X27

Mueller, U., L. Bradley, and R. Brown. 1976. Proposed Notekewin Park ecological survey and analysis for park development. Prepared for Alberta Recreation and Parks.

Not available for review.

Murphy, P.J. 1988. Policy development needs for successful mixedwood management, pp. 138-144. *In* Samoil, J.K., editor. Management and utilization of northern mixedwoods. Proceedings of symposium, 11-14 April 1988, Edmonton, Alberta. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-296.

The author discusses the need for modification of current forest management policy to ensure successful mixedwood forest management.

Location: Not specific

Key words: X11

Murray, W.A. 1981. The 1981 snowpack survey in the AOSERP study area. Alberta Oil Sands Environmental Research Program, Edmonton, Alberta. AOSERP Report 125.

The objective of this study was to discover whether winter pollutant deposition rates and the resultant snowpack load had increased proportionately. Results indicate that the amounts of sulphate and nitrate deposited in the snow within twenty-five km of the oil sands plants had increased by eighty-eight and twenty-seven percent, respectively. The amount of insoluble particulates decreased markedly.

Location: NW 74 D

Key words: X45

Murray, W. 1989. Evaluation of balsam poplar as a suitable species for log homes. Alberta Forestry, Lands and Wildlife, Forest Industrial Development Division, Edmonton, Alberta.

Balsam poplar was considered suitable for the machined log industry. Prior to taking a final position, an economic study should be completed to determine problems associated with kiln drying and cost effectiveness. Further studies were recommended.

Location: Not specific

Key words: X19, X43

Mytton, W.R., and L.B. Keith. 1981. Dynamics of moose populations near Rochester, Alberta, 1975-1978. Canadian Field Naturalist, 95:39-49.

This paper is primarily concerned with the population demography, movement, distribution, and habitat of radio collared moose near Rochester. Moose were located on aspen islands with muskegs during summer months. They moved to tall, high density upland aspen and coniferous stands in December through March.

Location: SE 83 J

Key words: X26, X27, X28

Nagy, J.A., and R.H. Russell. 1978. Ecological studies of the boreal forest grizzly bear (*Ursus arctos* L.). Canadian Wildlife Service Report.

The objective of this grizzly bear study in the boreal forest was to investigate their population dynamics, causes for mortality, habitat, and the impact of human activity in their range. Results of the study indicate the Swan Hills grizzly bear population is extremely young as a result of development and consequently the grizzly bear population appears to be in a state of decline.

Location: N 83 J, S 83 O

Key words: X27

Navratil, S., and I.E. Bella. 1988. Regeneration, development and density management in aspen stands, pp. 19-38. *In* Gambles, R.L., compiler. Management and utilization of Alberta's poplar, proceedings of Poplar Council of Canada tenth annual meeting, 26-28 October 1988, Edmonton, Alberta. Poplar Council of Canada, Toronto, Ontario.

This paper reviews regeneration silviculture and early development of aspen, and provides preliminary guidelines for density management of aspen stands.

Location: Not specific

Key words: X3, X6, X12, X14

Navratil, S., I.E. Bella, and E.B. Peterson. 1989. Silviculture and management of aspen in Canada: the western Canada scene, pp. 39-60. *In* Adams, R.D., editor. Aspen symposium '89, proceedings, July 25-27, 1989, Duluth, Minnesota. United States Department of Agriculture, Forest Service, North Centre Forest Experiment Station, St. Paul, Minnesota. General Technical Report NC-140.

This paper briefly reviews the aspen resource in British Columbia and the prairie provinces. Its primary focus was on aspen regeneration and silviculture, density management, growth and yield prediction, and the problems of aspen management.

Location: ALTA, SASK, MAN

Key words: X3, X15

Navratil, S., and P.B. Chapman, editors. 1991. Aspen management for the 21st century. Proceed-

ings of symposium, 20-21 November 1990. Poplar Council of Canada, Alberta Forestry, Lands and Wildlife, and Forestry Canada.

This symposium included papers from a variety of sources (e.g., foresters, wildlife biologists, public) with an orientation towards their views of aspen forest management and related topics.

Location: Not specific

Key words: X11, X20

Navratil, S., and J. Lane. 1987. Control of aspen development in areas designated for softwood production: summary of satellite trails A, B, and C. Canada - Alberta Forest Resource Development Agreement Report. Alberta Forest Research Branch, Spruce Grove, Alberta.

Site preparation and pre-harvesting chemical treatment of parent trees were tested as means of aspen suppression for the development of pure softwood stands and superior aspen stands. Methodologies and preliminary findings of three trails in the Calling Lake area, Weberville Demonstration area, and Hines Creek area are provided.

Location: 83 P, S 84 D

Key words: X6, X7

Navratil, S., P. Phillips, and R. Morton. 1989. Aspen competition and lodgepole pine growth in mixed regeneration in western Alberta, pp. 43-44. *In* Hamilton, E., compiler. Vegetation management: an integrated approach. Proceedings of fourth annual vegetation management workshop. Forestry Canada and British Columbia Ministry of Forestry, Victoria, British Columbia. Canada-British Columbia Forest Resource Development Agreement, FRDA Report Number 109.

The objectives of this study were to estimate the effects of aspen on growth of four to twelve year old pine in mixedwood stands. Using a modified growth model (Chapman Richards function) suggested that a ten to twenty percent of aspen cover was beneficial to lodgepole seedlings growth. Higher levels of aspen cover was detrimental to lodgepole pine growth.

Location: WESTERN ALBERTA

Key words: X3, X13, X15

Neilson, R.W., and C.F. McBride. 1974. Poplar utilization symposium. Canada Department of Environment, Canadian Forestry Service, Information Report VP-X-127.

This is the symposium proceedings for poplar utilization held in May 1974. The papers discuss the current (1974) resource status and forest management policies for the four western provinces, and the properties of poplar that affect utilization.

Location: ALTA, SASK, MAN

Key words: X43

Nelson, S.J. 1983. Ecological land classification and evaluation: Sturgeon Lake - Puskwaskau East. Alberta Energy and Natural Resources, Edmonton, Alberta. Technical Report T/11-9.

An ecological land classification (1:100,000) was conducted in the Sturgeon Lake area of west-central Alberta (5,760 km^2). Land resource evaluations given for till crops, improved grazing, moose habitat, tree growth, and potential hazards.

Location: SW 83 N

Key words: X1, X15, X24, X27, X33, X34, X42

Nelson, S.J., D. Downing, and D. O'Leary. 1989. Holmes Crossing proposed Natural Area biophysical inventory. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Report T/200.

A biophysical inventory (1:20,000) was conducted in the proposed Holmes Crossing Natural Area (49 km^2). This report summarizes environmental, historical, and land use information; and identifies, describes, and maps soils and landform features, plant communities, and special features.

Location: SW 83 J

Key words: X1, X20, X33, X34

Nelson, S.J., W. Hay, and G. Mikalchuk. 1988. Ecological land classification: Yellowhead North. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Report T/167.

An ecological land classification (1:100,000) was conducted in the Yellowhead North planning area (5,438 km^2). This report provides baseline data on each ecoregion and ecosection in the area in terms

of soils, drainage, vegetation physiognomy, and plant associations.

Location: E 83 E, N 83 F, NW 83 G

Key words: X1, X33, X34

Nemeth, Z.J., S. Kish, and J.R. Hendry. 1981. Biogeoclimatic ecosystem classification of Alberta. Alberta Energy and Natural Resources, Edmonton, Alberta. Report T/5.

This report presents a biogeoclimatic ecosystem classification for an area located southeast of Grande Prairie. It defines forest ecosystems and the variability that exists within the subzones and analyzes forest-environment relationships.

Location: E 83 L

Key words: X1, X33, X34

Nielson, P.L. 1975. The past and present status of the plains and boreal forest grizzly bear in Alberta. Canadian Wildlife Service Report, Edmonton, Alberta.

A historical review of grizzly bear distributions and abundance. A map is also presented of the presently known range of the species in western Alberta.

Location: ALTA

Key words: X26, X27

Nietfeld, M.T. 1983. Foraging behaviour of wapiti in the boreal mixed-wood forest, central Alberta. M.S. Thesis, University of Alberta, Edmonton, Alberta.

The feeding habits of elk were compared different habitats: poplar forest, willow, upland grassland, and sedge meadow. Use differences were found amongst the types by season.

Location: SE 83 H

Key words: X27

Nietfeld, M., and R.J. Hudson. 1984. Foraging ecology of wapiti in the boreal mixed-wood forest, central Alberta, pp. 131-139. *In* Proceedings of 1984 western states and provinces elk workshop, April 17-19, 1984, Edmonton, Alberta. Alberta Fish and Wildlife, Edmonton, Alberta.

This paper discusses the forage selection of elk in five habitat types in boreal mixedwood forests of central Alberta. Dietary crude protein was considered sufficient to meet the requirements of elk throughout the year, except in sedge meadows during the winter.

Location: ALTA

Key words: X27

Nietfeld, M., J. Wilk, K. Woolnough, and B. Hoskin. 1985. Wildlife habitat requirement summaries for selected wildlife species in Alberta. Prepared by Alberta Energy and Natural Resources, Wildlife Resource Inventory Unit, Edmonton, Alberta. ENR T/73.

This manual summarizes and defines the relationship between Alberta's wildlife species and their respective habitats. Habitat distribution maps and a comparative wildlife habitat region maps have also been included.

Location: ALTA

Key words: X26, X27, X28

Novakowski, N.S. 1967. The winter bioenergetics of a beaver population in northern latitudes. Canadian Journal of Zoology, 45:1107-1118.

The results of this study indicate that beaver in these latitudes are confined to subnivean existence for approximately 150 days each year. Given this long period of confinement, their deciduous food cache is insufficient to meet energy requirements; therefore to conserve energy, adult beavers reduce activity, have longer periods of dormancy, huddle, and increase their fur insulation and fat reserves.

Location: SW 74 L

Key words: X26, X27

Nowlin, R.A. 1978a. Habitat selection and food habits of moose in northeastern Alberta. Colorado State University, Wildlife Research Unit, Fort Collins, Colorado.

Not available for review.

Nowlin, R.A. 1978b. Relationship between habitats, forage, and carrying capacity of moose range in northern Alberta. Part 1: Moose preferences for

habitat strata and forages. Alberta Oil Sands Environmental Research Program, Project TF 1.2, AOSERP Report 33.

Moose appear to prefer the upland over the lowland habitats during the fall and winter except for non-feeding and bedding. In both seasons the aspen and aspen-white spruce stands were preferred, while black spruce and black spruce-larch habitats were avoided or seldomly used.

Location: SW 74 E

Key words: X26, X27, X28

Ojamaa, P.M. 1977a. Ecological land classification: Manning Grazing Reserve study. Alberta Energy and Natural Resources, Edmonton, Alberta.

An ecological land classification was completed for the Manning Grazing Reserve. The physiography, soils, and ecological conditions were provided for each ecosection. Establishment ratings for forage were given.

Location: NW 84 C

Key words: X1, X34

Ojamaa, P.M. 1977b. Ecological land classification: Fort Vermilion Grazing Reserve study area. Alberta Energy and Natural Resources, Edmonton, Alberta.

An ecological land classification was completed for the Fort Vermilion Grazing Reserve. The physiography, soils, and ecological conditions were provided for each ecosection. Establishment ratings for forage were given.

Location: E 84 K

Key words: X1, X34

Ojamaa, P.M. 1978a. Biophysical analysis and evaluation of capability: Cold Lake. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report 59.

A biophysical land classification (1:126,720) was developed for an area located west of Cold Lake (3,830 km^2). The report summarizes the natural resources of the area on an ecosection basis but is primarily oriented towards the physical resources. Capability ratings were developed for agriculture, forestry, recreation, ungulates, and waterfowl.

Location: 73 L

Key words: X1

Ojamaa, P.M. 1978b. Biophysical analysis and evaluation of capability: Little Smoky. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report 60.

A biophysical land classification (1:126,720) was completed for Little Smoky study area (6,900 km^2). The report summarizes the natural resources of the area on an ecosection basis but is primarily oriented towards the physical resources. Capability ratings were developed for agriculture, forestry, recreation, ungulates, and waterfowl.

Location: NW 83 K

Key words: X1

Ojamaa, P.M. 1978c. Ecological (biophysical) land classification: Three Creeks Grazing Reserve study area. Alberta Energy and Natural Resources, Edmonton, Alberta.

A biophysical classification was prepared for the Three Creeks area (200 km^2) location northeast of Peace River. Soils and topography were the typical characteristics given for each ecosection. Ratings were given for the establishment of forage crops.

Location: 84 C

Key words: X1, X48

Ojamaa, P.M. 1979. Ecological land classification: Pembina Grazing Reserve study area. Alberta Energy and Natural Resources, Edmonton, Alberta.

An ecological land classification was completed for the Pembina Grazing Reserve study area (512 km^2). The potential for grazing was described in terms of its growth and yield, and its dependence on climate (precipitation), soils, drainage, and slope.

Location: SW 83 H

Key words: X1, X34, X33

O'Leary, D., D. Downing, D. Schindeler, and L. Boyd. 1986. Integrated resource inventory of the Kimiwan-Winagami study area. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. T/119.

This study is an integrated resource inventory (1:100 000) of the Kimiwan-Winigami study area (550 km^2) which was completed in 1985. Volume I provides the area's physical and biological characteristics of the landscape and land evaluations for agriculture, forestry, and wildlife. Volume II describes the floristic and environmental factors of the plant associations.

Location: SE 84 C, NE 83 N

Key words: X2, X24, X33

Ondro, W.J. 1984. Harvesting aspen for energy may be economic, p. 8. *In* Growth, yield, and ENFOR. Environment Canada, Canadian Forest Service, Northern Forest Research Centre, Edmonton, Alberta. Forestry Report 29.

The utilization and market potential of poplar in Alberta for 1987-88 is discussed. It covers poplar inventory, present and potential utilization, and markets for various poplar wood products. It also provides a directory of commercial forest industry products.

Location: ALTA

Key words: X19, X43

Ondro, W.J. 1989. Utilization and market potential of poplar in Alberta. Forestry Canada, Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-305.

The market potential for aspen 1987-88 was assessed. Aspen represented one-third of Alberta's wood supply but only seventeen percent of the harvest volume. Since 1980 the use of aspen has increased ten fold.

Location: ALTA

Key words: X19

Ondro, W.J. 1991. Economics of 15 options for industrial utilization of poplar. Forestry Canada, Northern Forestry Centre, Canadian Forestry Service, Edmonton, Alberta. Information Report NOR-X-320.

Various possible uses for aspen were reviewed with respect to parameters such as wood density, green weight, percent veneer yield, quality of dimensional lumber produced per tree, wood grades, etc. Consideration was also made of economic factors associated with milling of aspen relative to white spruce, pine, and fir.

Location: Not specific

Key words: X43

Ondro, W.J., and I.E. Bella. 1984. Integrated utilization makes aspen an economic resource, p. 5. *In* Growth, yield, and ENFOR. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Forestry Report 29.

This article presents an aspen utilization study at Lesser Slave Lake which analyzed the manufacturing of veneer, lumber and studs, wafer board, and the production of waste residue. Recommendations suggest that an integrated complex for manufacturing all these wood products with an on-site energy conversion plant would be a good compromise and near complete aspen utilization would be accomplished.

Location: 83 O

Key words: X19, X43

Ondro, W.J., and I.E. Bella. 1988. Market potential for Alberta's poplar products, pp. 51-60. *In* Barkley, B., and G. McVey, editors. Poplar culture to the year 2000. Proceedings of Poplar Council of the United States and Canada, joint meeting, 22-24 June 1987.

Not available for review.

Ondro, W.J., and T.B. Williamson. 1982. The forest industry in the economy of Alberta, 1978-79. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-246.

This report summarizes the 1979 survey of Alberta forest industries. The highlights of the report cover the industrial base, the resource base, products, and economic impact.

Location: ALTA

Key words: X2, X19, X20

Ondro, W.J., and T.B. Williamson. 1985. The forest industry in the economy of Saskatchewan, 1979-80. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. NOR-X-270.

This report presents the results of a survey of the forest industry in Saskatchewan in 1980. The highlights of the report include the industrial base, forest products, and economic and social impacts.

Location: SASK

Key words: X19, X20

Padbury, G. 1978. Biophysical resource inventory of Prince Albert National Park, Saskatchewan. Agriculture Canada, Saskatchewan Institute of Pedology. Publication S185.

The soils, landforms, and vegetation were inventoried and mapped for Prince Albert National Park. The vegetation was organized into vegetation types; most of these were aspen or aspen-spruce communities. The abundance of species were summarized by cover classes. Plant communities were also assessed for their sensitivity to recreational use. Some chemical and physical attribute data were provided for selected soil associations.

Location: E 73 G, J

Key words: X33, X34, X35, X37

Padbury, G. 1986. Potential of soils and bedrock to neutralize acid, Saskatchewan, 1:2,000,000 scale map. Agriculture Canada and Saskatchewan Department of Environment, Regina, Saskatchewan.

Not available for review.

Park, J., and K.J. Bennett. 1983. Integrated resource inventory of the Wapiti Sands Dunes study area. Alberta Energy and Natural Resources, Edmonton, Alberta.

A physical and ecological land classification and descriptive report were prepared for an area located southeast of Grande Prairie.

Location: SE 73 M

Key words: X1, X2

Parker, R.W. 1978. The influence of atmospheric sulfur emissions on nutrient return via throughfall and stemflow in three boreal ecosystems. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

During the summers of 1976 and 1977 field plots were established to determine the distribution of rainfall under stands of aspen, jack pine, and black spruce. The relative amounts of sodium, potassium, calcium, magnesium, and sulphur returned to the soil and recycled from trees to soil in throughfall, stemflow, and litterfall was also determined. The effect of sulphur emissions from oil sands plant on nutrient return was investigated.

Location: NW 74 D

Key words: X13, X25

Paul, G., and D.E. Etheridge. 1958. Decay of aspen (*Populus tremuloides* Michx.) and balsam poplar (*Populus balsamifera* L.) in the Lesser Slave Lake region of Alberta. Alberta Department of Lands and Forests and Canada Department of Agriculture.

This interim report provides the preliminary data on decay relationships in aspen and balsam poplar in the Lesser Slave Lake area. The results suggest that one-hundred percent of balsam poplar have evidence of decay by the age of forty years and aspen by sixty years. Slower growing trees also had a greater proportion of decay than aspen. The average percent cull on a board foot basis was seventy-two and thirty-nine percent for balsam poplar and aspen, respectively.

Location: SW 83 O

Key words: X9

Pearson, A.M. 1976. The boreal forest grizzly bear. Annual report, Canadian Wildlife Service.

A survey of grizzly bears in the Swan Hills area was conducted in 1974-5. In addition to capturing bears and determining basic physical characteristics, their movements were also monitored by radio tracking.

Location: NW 83 J

Key words: X26, X27

Pease, J.L., R.H. Vowles, and L.B. Keith. 1979. Interaction of snowshoe hares and woody vegetation. Journal of Wildlife Management, 43:43-60.

The study attempted to but did not find a correlation between food supply and the cyclic hare population. It did discover that the daily food requirements of hares in winter feeding was 300 grams of woody browse with a maximum diameter of three to four millimeters.

Location: NW 83 H

Key words: X26

Penner, D.F., K.H. McCourt, and K.E. Smyth. 1980. A review and assessment of the baseline data relevant to the impacts of oil sands development on black bears in the AOSERP study area. Alberta Oil Sands Environmental Research Program, Project LS21.6.2, Report 65.

This report provides information on population dispersion, the potential impacts of large development projects, and population dynamics of black bear in the Alberta Oil Sands Environmental Research Project study area.

Location: 84 A, H; 74 D, E; S and NE 74 L

Key words: X26, X27, X28

Peters, T.W. 1981. Reconnaissance soil survey of the Brazeau Dam area. Alberta Soil Survey, Edmonton, Alberta. Report Number 40.

A soil survey (1:126,720) was conducted in the Brazeau Dam area (5,650 km^2). Soil suitability ratings were developed for forestry, wildlife, agriculture, recreation and selected engineering uses.

Location: NW 83 B, SW 83 G

Key words: X34

Peters, T.W., and W.E. Bowser. 1956. Soil survey of the Rocky Mountain House Sheet. Alberta Soil Survey Report, Edmonton, Alberta. Number 19.

Soils were classified to the series level and mapped at a scale of 1:126,720 (6,640 km^2). General profile descriptions were provided for each series, and chemical and physical attributes were included for selected profiles. Subgroup classification needs updating.

Location: SE 83 B

Key words: X34

Peterson, E.B. 1970. Methods for estimating standing crop in *Populus* forests in Alberta. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forestry Research Laboratory, Calgary, Alberta. Internal Report A-29.

The methods used in a 1968 and 1969 field study of above-ground standing crop in the tree component of poplar-dominated ecosystems in Alberta are outlined.

Location: Not specific

Key words: X15, X33

Peterson, E.B., and M.J. Apps. 1989. Do ecosystem models such as FORCYTE-11 have a role to play in boreal mixedwood management?, pp. 181-186. *In* E.N. Hogan, editor. Proceeding seventh Canadian bioenergy R&D seminar, 24-26 April 1989, Ottawa, Ontario. Energy, Mines and Resources Canada, Ottawa, Ontario.

Not available for review.

Peterson, E.B., and Y.-H. Chan. 1989. A nominal dataset for the FORCYTE-11 modelling framework for aspen ecosystems in Alberta, Canada. Prepared by Western Ecological Services Ltd., Victoria, British Columbia for Forestry Canada, Northern Forestry Centre, Edmonton, Alberta.

Not available for review.

Peterson, E.B., Y.-H. Chan, and N.M. Peterson. 1988a. Biomass and nutrient content of aspen ecosystems in Alberta, Canada, pp. 119-123. *In* Granger, C., editor. Sixth Canadian bioenergy R & D seminar. Elsevier Applied Science, London.

Not available for review.

Peterson, E.B., Y.-H. Chan, N.M. Peterson, and R.D. Kabzems. 1988b. Calibration of FORCYTE-11 growth simulation model for aspen ecosystems in Alberta, Canada, pp. 151-154. *In* Granger, C., editor. Sixth Canadian bioenergy R & D seminar. Elsevier Applied Science, London.

This report relates identified mixedwood management problems to a stand level ecosystem modelling framework, Forcyte-11. The applicability of the model was judged based on both present and future applications. In this study, 16 concerns were tested.

Location: Not specific

Key words: X25

Peterson, E.B., A. Kabzems, R.D. Kabzems, and N.M. Peterson. 1989. Boreal mixedwood forest management challenges: a synopsis of opinions from 1988 interviews - final report. Forestry Canada, Canada Forestry Service, Northern Forestry Centre, Edmonton, Alberta. ENFOR Project P-353.

Not available for review.

Peterson, E.B., and A.G. Levinsohn. 1977. Vegetation types and forest productivity, west part of Syncrude's Lease 17, Alberta. Prepared for Syncrude Canada Ltd. by Western Ecological Services Ltd. Environmental Research Monograph 1977-6.

The purpose of this study was to obtain baseline information concerning present vegetation of the western half of Syncrude's floristic composition of eight mapped vegetation units. Forest productivity was quantified for each vegetation unit. Aspen was a component of three of the eight communities types. Fire history and surface accumulation of water as a result of beaver dams were the major influences on floristic composition and vegetation patterns.

Location: SW 74 E

Key words: X33, X35, X46

Peterson, E.B., V.M. Levson, and R.D. Kabzems. 1982. Upper limits of standing crop density for woody species in the prairie provinces. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-243.

Forest and nonforest stands were sampled in the boreal mixedwood and foothills zones to determine the maximum amount of biomass that was present in young stands (<10 years old). The results suggest that young aspen stands (<5 years old) can have up to thirty tonnes per hectare of biomass. A variety of regression equations were developed for estimating dry weight by component.

Location: ALTA, SASK, MAN

Key words: X33, X35, X46

Peterson, E.B., N.M. Peterson, and R.D. Kabzems. 1983. Impact of climatic variation on biomass accumulation in the Boreal Forest Zone: selected references. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-254.

This bibliography provides a list of literature up to 1981 on the relationship between climatic variables and growth rates of boreal tree species.

Location: CANADA

Key words: X13, X42

Petro, F.J. 1987. Some considerations in utilizing Alberta aspen for solid wood products, pp. 24-33. *In* Aspen quality workshop, 12 February 1987. Proceedings of workshop sponsored by Canadian Forestry Service and Alberta Forestry Service, Edmonton, Alberta.

The author presents a list of clear wood and sound wood aspen products made in Canada. A goal is to develop whole tree utilization. Modifications to the Hardwood Lumber Association's grading system are suggested to improve utilization. Decay patterns associated with *Fomes igniarius* is discussed and recommendations and guidelines for producing optimum sawlogs is given to take into consideration decay and rot.

Location: Not specific

Key words: X9, X12, X43

Phillips, W.E., G.W. Armstrong, J.A. Jr. Beck, and K. Banskota. 1988. The opportunity cost of forested land losses to agricultural uses: an Alberta case study. Forestry Chronicle, 64:35-39.

This paper presents an economic model that can be used in determining the opportunity cost of displacing forested land from timber production under sustained yield policies. The values of non-timber resources produced in a forest are not taken into consideration.

Location: NW ALTA

Key words: X19

Phillips, W.E., J.A. Beck, and G.W. Lamble. 1986. Forest economics research needs for west-central Canada. Environment Canada, Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-281.

Based on a questionnaire, twenty-six areas that need economic research were identified. The top five were economics of (i) integrated forest land use, (ii) regional and economic forest industry impact, (iii) forest protection, (iv) allowable cut

determinations, and (v) timber supply analysis modelling.

Location: ALTA, SASK, MAN

Key words: X19, X20

Pielou, E.C., J.S. Campbell., and V.J. Lieffers. 1986. Comparison of the structures of even-aged stands in three geographic regions. Canadian Journal of Botany, 64:122-129.

This study provides information on the growth rates of individual stems and the rates at which they self-thin in even-aged stands in northern Alberta. It also describes a dynamic model devised to simulate the demographic behavior of aspen stands.

Location: NW 74 D, SW 74 E

Key words: X15, X24

Pierpoint, G. 1981. Site types in the boreal mixedwood forest, pp. 10-16. In: Proceedings, Boreal Mixedwood symposium. Canada-Ontario Joint Forest Research Committee.

Not available for review.

Pike, R.T. 1953. Thinning aspen, Duck Mountain Forest Reserve, Manitoba. Canada Department of Research and Development, Forestry Branch, Ottawa, Ontario. Silviculture Leaflet Number 89.

The preliminary results of a 1926 removal of aspen from mixedwood stands to evaluate its effect on white spruce growth are reported. The results suggested diameter increased, and mortality of white spruce decreased.

Location: 62 N

Key words: X5, X7

Pluth, D.J. 1973. A survey of soils and natural environments at the Fort Enterprise area. University of Alberta, Boreal Institute of Northern Studies, Edmonton, Alberta. Occasional Publication 9:65-72.

Not available for review.

Pluth, D.J. 1986. Amelioration of subsurface horizons of Luvisolic soils through mechanical disruption. Prepared for Environment Canada, Canadian Forestry Service by University of Alberta, Edmonton, Alberta.

Not available for review.

Plylpec, B., and R.E. Redmann. 1984. Acid-buffering capacity of foliage from boreal forest species. Canadian Journal of Botany, 62:2650-2653.

The results of this study indicate that broadleaf species including aspen are better buffered against acidic pollution than evergreens, especially jack pine.

Location: NE 73 B

Key words: X13, X45

Polster, D.F., and L.E. Watson. 1979. Vegetation classification and evaluation - Elk Island National Park. Prepared for Parks Canada by Techman Ltd., Calgary, Alberta.

This report presents a vegetation classification and describes the associated ecological conditions in Elk Island National Park. The vegetation classification relies strongly on floristics with minimal attention to the physiognomy of communities or the abundance of species.

Location: 83 H

Key words: X33

Ponto, R.L. 1990. Bulldozer production rates and guidelines for constructing fireguards in boreal forest cover types. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Canada-Alberta Forest Resource Development Agreement, Project 1457-69.

This report summarizes the productivity rate for bulldozers to create fire guard in the boreal forest by forest cover type based on approximately 200 km of construction and 600 hours of work. It also provides guidelines for constructing fire guards by forest cover type.

Location: ALTA

Key words: X40

Powell, J.M., and D.C. MacIver. 1977. A summer climate classification for the forested area of the prairie provinces using factor analysis. Fisheries and Environment Canada, Canadian Forestry Service,

Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-177.

Factoral analysis was used to develop a classification of summer climates in the forested and adjacent areas of the prairie provinces.

Location: ALTA, SASK, MAN

Key words: X42

Powell, J.M., and D.C. MacIver. 1978. Maps of selected climatic parameters for the prairie provinces, May to September, 1961-1970. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-206.

This report presents maps of mean daily temperature, precipitation, number of days with a minimum temperature of -2.2°C and below, and water deficiency assuming a soil moisture storage level of 100 mm for the individual summer months of May to September and for the summer season for the year 1961 to 1970. The majority of the data were acquired for weather stations in the forested areas in the prairie provinces.

Location: ALTA, SASK, MAN

Key words: X42

Powell, J.M. 1981. Impact of climatic variation on boreal forest biomass production, pp. 189-194. *In* Harington, C.R., Editor. Climatic change in Canada 2. National Museum of Canada, Ottawa, Ontario. Syllegeus 33.

A dendrochronological study is outlined for the purpose of assessing short- and long-term climatic variation. If changes are found the intent was to evaluate the changes with respect to biomass growth and production.

Location: ALTA

Key words: X42

Pratt, R.H.M. 1965. Aerial spraying with 2,4-D to eliminate aspen. Pulp and Paper Magazine of Canada, 67(9):WR460-462.

Results indicate that the aerial application of 2,4-D was effective in reducing hardwood crown cover. Approximately seventy-five percent of the hardwoods were severely damaged (i.e., top killed). Aspen was the most severely effected followed by white birch, and balsam poplar. The aspen suckers were also killed but 2,4-D had little affect on balsam poplar suckers.

Location: 62 K

Key words: X7

Pringle, W.L., C.R. Elliott, and J.L. Dobb. 1973. Aspen regrowth in pastures of the Peace River region. Journal of Range Management, 26:260-262.

Methods to circumvent the cost (e.g., breaking soil, removing roots, and seed bed preparation) of converting forest land to pasture were investigated. Various tillage equipment was compared to assess their relative ability to minimize aspen sucker development.

Location: NW ALTA

Key words: X48

Prokopchuk, J.R., and J.H. Archibald. 1976. Land capability classification for forestry in Alberta. Alberta Energy and Natural Resources, Alberta Forest Service, Edmonton, Alberta. ENR Report Number 6.

A systematic land inventory was conducted from 1965 to 1973 to classify the land capability for forestry Alberta. This report provides a summary of the methodology used in the classification.

Location: ALTA

Key words: X1, X2, X33, X34, X35

Quaite, J. 1953. Poisoning with "ammate" to eliminate aspen. Canada Department of Northern Resources, Forestry Branch. Silviculture Leaflet Number 94.

The purpose of this study was to determine the effects of aspen removal on white spruce growth via the use of ammate. When applied to the stumps of 2.5 cm trees, the ammate prevented root and stump sprouting and it also killed numerous adjacent aspen. The poison killed large aspen 10 to 15 m away from the treated stump. When ammate was applied to larger trees, the effect was less dramatic.

Location: 83 O

Key words: X7

Ramananskis, H. 1987. Aspen solid wood products, pp. 82-85. *In* Anonymous. Proceedings of Aspen quality workshop. Sponsored by Canadian Forestry Service and Alberta Forestry Service, Edmonton, Alberta. February 12, 1987.

The author explains that Sunchild Forest Products has had success in making pallets from black poplar. They also describe the prospects of manufacturing aspen as furniture lumber giving wood grade and markets special consideration.

Location: ALTA

Key words: X19, X43

Rannard, C.D. 1974. Poplar management in Manitoba, pp. 25-41. *In* Neilson, R.W., and C.F. McBride, editors. Poplar utilization symposium. Canadian Forestry Service, Western Forest Products Laboratory, Vancouver, British Columbia. Information Report VP-X-127.

This is a general overview of management poplar species in Manitoba. It does not specify specific practices for mixedwood forests.

Location: MAN

Key words: X11

Raske, A.G. 1974. Hatching rates of forest tent caterpillar in the laboratory. Environment Canada, Canadian Forestry Service. Bi-Monthly Research Notes 30:24-25.

This study determined the incubation period, larval hatching rate, and the number of larvae obtainable from egg bands from forest tent caterpillars. These variables were measured and tabulated for the 1966-67 period.

Location: SE 83 G

Key words: X9

Rayner, M.R. 1984. Ecological land classification and evaluation: Ram-Clearwater. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report Number T/11.

An ecological land classification (1:100,000) and a descriptive report was developed for the Ram-Clearwater study area (3,500 km^2). Only the eastern most portion of the area contained mixedwood forests.

Location: SW 83 B, NW 82 O

Key words: X1

Reeder, S.W., and Wm. Odynsky. 1965. Soil survey of the Cherry Point and Hines Creek area. Research Council of Alberta, Edmonton, Alberta. Report Number 85.

A soils inventory and classification (1:190,080 scale) in an area south of High Level. Profile descriptions are given for each soil series, and chemical and physical attributes were summarized for selected profiles. Soil subgroup classification needs to be updated.

Location: W 84 F

Key words: X34

Reeder, S.W., and W. Odynsky. 1969. Reconnaissance soil survey of the Hotchkiss and Keg River area. Research Council of Alberta, Edmonton, Alberta. Report Number 89.

A soil survey (1:190,080) was conducted northwestern Alberta (7,955 km^2). This report describes the soils, their distribution, and chemical and physical characteristics.

Location: W 84 C

Key words: X34

Regier, H. 1985. Effects of municipal waste water irrigation on an aspen poplar forest. Alberta Environment, Environmental Protection Services, Edmonton, Alberta.

A five year study was conducted to determine the effects of waste water irrigation on soil, groundwater, and aspen growth. Results indicate that irrigation had a marginal measurable effect, but overall was not detrimental to the ecosystems.

Location: SW 83 H

Key words: X13, X45

Reid, D.E. 1974. Vegetation of the Mackenzie Valley - Part one. Arctic Gas Biological Report Series. Vol. 3. Prepared for Canadian Arctic Gas Study Ltd. by Northern Engineering Services Company Ltd., Calgary, Alberta.

This study provides baseline information on the vegetation ecology of the Mackenzie Valley: physiography, landforms, and terrain types. Fifty-five terrain types characterized by twelve vegetation types were described and mapped at a scale of 1:24,000. Forest productivity was considered low compared to southern Canada.

Location: NWT

Key words: X33

Reid, D.E., Editor. 1977. Vegetation survey and disturbance studies along the proposed Arctic Gas Route. Prepared for Canadian Arctic Gas Study Limited by Northern Engineering Services Company Ltd. Biological Report Number 37.

A reconnaissance survey of vegetation and disturbance was completed along selected portions of the proposed Arctic Gas pipeline right-of-way. This report described nineteen plant communities in seventeen physiographic areas. Plant communities are related to landforms.

Location: ALTA

Key words: X33, X35

Reid, D.E. 1983. River otter ecology in northeastern Alberta, annual report 1982-1983. University of Calgary, Calgary, Alberta.

Not available for review.

Reid, D.E. 1986. Ecological land classification of Elk Island National Park. Prepared for Parks Canada by Hardy Associates, Calgary, Alberta.

A biophysical inventory of Elk Island National Park with a strong emphasis on plant communities. Soil, site, and terrain conditions are also summarized.

Location: 83 H

Key words: X1, X33, X34

Renecker, L.A. 1986. Bioenergetics and behaviour of moose (*Alces alces*) in the aspen boreal forest. Ph.D. Dissertation, University of Alberta, Edmonton, Alberta.

The main purpose of this study was to define seasonal changes in plant-animal interactions to determine how moose respond to extreme seasonal and boreal environmental changes in terms of energy expenditure, digestive function, and resource use behavior.

Location: SW 83 L

Key words: X26

Renecker, L.A. 1988. Overview of game farming in Canada, pp. 47-62. *In* Valdez, R. editor. Proceedings of first international wildlife ranching symposium, 16-21 May 1988, New Mexico State University, Las Cruces, New Mexico.

Not available for review.

Renecker, L.A., and R.J. Hudson. 1985. Estimation of dry matter intake of free-ranging moose. Journal of Wildlife Management, 49:785-792.

The purpose of this study was to evaluate seasonal changes in the amount of feed consumed by moose. The consumption of two moose was monitored for six to eight weeks on a twenty-four hour basis. During summer intake ranged from 38 to 128 grams per kilogram of body weight.

Location: 83 H

Key words: X27

Renecker, L.A., and R.J. Hudson. 1986. Seasonal foraging rates of free-ranging moose. Journal of Wildlife Management, 50:143-147.

Foraging rates of free-ranging moose in aspen habitats were evaluated. Consumption rates increased with the increased availability of biomass but maximum consumption rates varied seasonally.

Location: S 83 H

Key words: X26

Rennie, D.A., W.A. Klassen, G.A. Fuller, and E.H. Kennett, E.H. 1985. Report of the task force on use of herbicides in forest management. Saskatchewan Department of Parks Renewable Resources, Saskatoon, Saskatchewan.

This study represents the conclusions of a task force that reviewed the use of herbicides in the forest industry. They concluded that 2,4-D or 2,4,5 T degraded within a few days after application, but Roundup had a half-life of sixty days. Cool moist soils can prolong degradation of these chemical.

Location: Not specific

Key words: X7, X45

Rintoul, J., and S. Myers. 1983. Avifauna of Crow Lake Candidate Ecological Reserve - observed and expected. Alberta Energy and Natural Resources, Natural Areas Program, Edmonton, Alberta. Technical Report Number 10.

An annotated list of birds and their associated habitats were summarized for Crow Lake.

Location: NE 83 P

Key words: X27

Rivard, P.G., P.M. Woodard, and R.L. Rothwell. 1990. The effects of water table depth on white spruce (*Picea glauca*) seedling growth in association with marsh reed grass (*Calamagrostis canadensis*) on wet mineral soil. Canadian Journal of Forest Research, 20:1553-1558.

This study examined whether the survival, growth, and nutrient content of white spruce seedlings are significantly affected by competition with marsh reed grass under simulated water table conditions on wet mineral soil substrates. The presence of reed grass did significantly affect growth of seedlings. The nutrient concentration of the white spruce foliage was significantly affected by water table depths and the presence of grass.

Location: N 83 H

Key words: X6, X7, X8, X13

Roed, M.A. 1970. Surficial geology, Edson, NTS 83 F. Alberta Research Council, Edmonton, Alberta. Map 33.

Surficial depositions were mapped in the 83 F map sheet at a scale of 1:250,000.

Location: 83 F

Key words: X1

Roller, K.J. 1967. Improvement of aspen stands in Manitoba, pp. 27-35. *In* Trembling aspen in Manitoba, 1965 annual meeting, Manitoba Section, Canadian Institute of Forestry. Canada Department of Forestry and Rural Development, Ottawa, Ontario.

Not available for review.

Rolley, R., and L. Keith. 1979. A review of moose habitat requirements. Prepared for Alberta Oil Sands Environmental Research Program by Alberta Recreation, Parks and Wildlife, Edmonton, Alberta. AOSERP Project TF.1.1.

This paper reviews moose habitat selection by season, and discusses the environmental factors which affect selection.

Location: Not specific

Key words: X26, X27, X28

Rolley, R.E., and L.B. Keith. 1980. Moose population dynamics and winter habitat use at Rochester, Alberta, 1965-79. Canadian Field Naturalist, 94:9-18.

Moose population growth and habitat use are reviewed for a thirteen year period. Moose selected treed muskegs and upland aspen stands less than ten meters in height and avoided agricultural clearings, roads, and dwellings.

Location: N 83 H

Key words: X26, X27, X28

Ross, M.S., L.B. Flanagan, and G.H. La Roi. 1986. Seasonal and successional changes in light quality

and quantity in the understory of boreal forest ecosystems. Canadian Journal of Botany, 64:2792-2799.

The purpose of this study was to describe and interpret the patterns of temporal and spatial variation in light quality and understory vegetation in eight forest types. In the mixedwood forests, red:infrared light ratios and percent photosynthetically active radiation values declined rapidly in May and June during the time of leaf expansion and increased with leaf senescence in September. The differences in light regime in early and late successional forests may have important implications for phytochrome-controlled development and succession in understory plant species.

Location: SW 83 P

Key words: X35

Ross, M.S., and G.H. La Roi. 1984. Structural dynamics of boreal forest ecosystems on three habitat types in the Hondo-Lesser Slave Lake area of north central Alberta in 1983. Prepared for Alberta Environment, Research Management by University of Alberta, Edmonton, Alberta. RMD-80/35A.

The phenological and successional changes on eight study sites in the Hondo-Lesser Slave Lake area based on three years of data were summarized. One of the studied habitat types was dominated by aspen-white spruce vegetation. Some information was also provided on meteorological conditions, light quality, and seasonal variation in avifauna.

Location: SE 83 O

Key words: X22, X33, X35

Rostad, H.W.P., and J.G. Ellis. 1972. The soils of the provincial forest in the St. Walburg map area (73F). University of Saskatchewan, Saskatoon, Saskatchewan.

A soil survey (1:126,720 scale) was developed for a 4,000 km^2 area south of Meadow Lake. Profile descriptions by each series and physical and chemical data were provided for selected soil series. Soil capability ratings were included for agriculture and forestry.

Location: 73 F

Key words: X34

Rothwell, R.L. 1978. Watershed management guidelines for logging and road construction in Alberta. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-208.

This report summarizes guidelines for harvesting operations and road construction to ensure protection of water resources. The guidelines intent was to reduce erosion, sedimentation, and deterioration of water quality.

Location: ALTA

Key words: X12, X16, X23, X31, X32, X41

Round, R.C. 1975. Selected ecological aspects of the Wapiti and Moose of Riding Mountain National Park, Manitoba. Thesis, Brandon University, Brandon, Manitoba.

Not available for review.

Rowan, W., and L.B. Keith. 1956. Reproductive potential and sex ratio of snowshoe hare in northern Alberta. Canadian Journal of Zoology, 34:273-281.

This study found that the average litter size of snowshoe hare was 3.8 with a modal size of 4, and a range of 1 to 7. The average number of litters per year was 2.75. Thus the annual reproductive potential was 10.5 young per female.

Location: NW 74 D

Key words: X26

Rowe, J.S. 1956a. Vegetation of the southern boreal forest in Saskatchewan and Manitoba. Ph.D. Dissertation, University of Manitoba, Winnipeg, Manitoba.

This study represents an early investigation of the plant communities and their associated site conditions in the boreal mixedwood zone of central Saskatchewan and Manitoba. The floristic composition and average percent cover was described for several mixedwood plant associations as well as successional trends.

Location: SASK, MAN

Key words: X33, X34, X35, X44

Rowe, J.S. 1956b. Use of undergrowth plant species in forestry. Ecology, 37:461-473.

Rowe outlines a method of using the undergrowth plant species as indicators of forest site types in the southern boreal forest. A vegetation table presents the relationship of vegetation strata to forest moisture class. Another diagram illustrates the cover-abundance of undergrowth strata in mature stands of poplar, poplar-spruce, and spruce.

Location: ALTA, SASK, MAN

Key words: X33, X35

Rowe, J.S. 1972. Forest regions of Canada. Canadian Forestry Service, Publication Number 1300.

Eight forest regions and various forest sections in Canada were mapped and described in terms of location, dominant trees, and associated terrain conditions.

Location: CANADA

Key words: X1, X33

Rowe, J.S. 1979. Concepts of fire effects on plant individuals and species. Paper presented at symposium: fire in northern circumpolar ecosystems. Fredericton, New Brunswick, October 22-24, 1979.

Not available for review.

Rusch, D.H., and L.B. Keith. 1971. Ruffed grouse-vegetation relationships in central Alberta. Journal of Wildlife Management, 35:417-429.

This study showed that eighty-five percent of all observed ruffed grouse were recorded in aspen woods. Male ruffed grouse selected drumming sites that were surrounded by suitable vegetation; however, no correlations were found between the length of time a male occupied a drumming site and any characteristics of the surrounding vegetation.

Location: SW 83 I

Key words: X26, X27

Rusch, D.A., and W.G. Reeder. 1978. Population ecology of Alberta red squirrels. Ecology, 59:400-420.

The authors describe temporal changes and spatial differences in the population structure and densities of red squirrels in black spruce, jack pine, and aspen stands. Red squirrels are less abundant in aspen stands (0-99/100 ha). After fall dispersal, virtually all squirrels occupying aspen habitats were juveniles. Annual survival was highest in spruce and lowest in aspen.

Location: N 83 H

Key words: X22, X27, X28

Russell, W.B. 1986. Classification of cover types for wildlife habitat inventory in Alberta. Prepared for Alberta Forestry, Lands and Wildlife, Fish and Wildlife Division by Russell Ecological Consultants, Edmonton, Alberta.

A cover type classification was designed specifically for Alberta's wildlife habitat inventory and mapping at intermediate scales (1:100,000 to 1:250,000). A total of 131 cover type units were recognized.

Location: ALTA

Key words: X1, X27

Russell, W., R. Annas, and L. Knapik. 1984. Potential natural vegetation data base for Alberta habitat subregions. Prepared for Alberta Energy and Natural Resource, Fish and Wildlife Division by Pedocan Land Evaluation Ltd., Edmonton, Alberta.

The potential natural vegetation types were predicted for the twelve wildlife habitat regions of Alberta. For each vegetation type the following information was provided: physiognomic type, associated species, moisture regime, soils, landforms, comments, and sources.

Location: ALTA

Key words: X26, X27, X33, X34, X35

Sachs, I.B., J.C. Ward, and R.E. Kinney. 1974. Scanning electron microscopy of bacterial wetwood, sapwood, and normal heartwood in poplar trees, pp. 453-460. *In* Proceedings of seventh annual scanning electron microscope symposium IIT Research Institute, Chicago, Illinois. Part 2.

Not available for review.

Santo, M. 1984. Pedogenesis of Luvisolic soils in east-central Saskatchewan. Ph.D. Dissertation, University of Saskatchewan, Saskatoon, Saskatchewan.

Soil profiles from three different mixedwood sites in the boreal forest were compared with respect to

their development. Although similar processes affected soil profile development, site conditions (e.g., moisture regime) affected the nature of the development

Location: 73 H

Key words: X34

Sauder, E.A., and A.W.J. Sinclair. 1989. Trial of a double-drum flail delimber/debarker processing small-diameter frozen timber: phase I. Prepared by Forest Engineering Research Institute of Canada, Vancouver, British Columbia for Forestry Canada and Alberta Forest Service, Edmonton, Alberta. Canada-Alberta Forest Resource Development Agreement. FERIC Special Report Number SR-59.

In trails of the double-drum flail delimber/debarker processing of small-diameter frozen aspen logs, it was found that bark content was 3.8 percent compared to a goal of one percent. The authors considered the process to have several benefits such as reduced logging costs and the increased feasibility of harvesting stagnant, low-volume, and small diameter stands.

Location: SW 83 F

Key words: X12

Scheelar, M.D., and T.M. Macyk. 1972. Reconnaissance soil survey of the Mount Watt and Fort Vermilion area. Research Council of Alberta, Edmonton, Alberta. Report Number 92.

A soil survey (19,100 km^2) at the series level was conducted in the High Level to Fort Vermilion area (1:126,720 scale). Profile descriptions were given for each series, and for selected profiles physical and chemical characteristics were summarized. Agricultural capability was reviewed and soil suitability for timber production was summarized.

Location: 84 K, W 84 J

Key words: X34

Scheelar, M.D., and Wm. Odynsky. 1968. Soil survey of the Grimshaw and Notikewan area. Research Council of Alberta, Edmonton, Alberta Report No. 88.

A soils inventory and classification (1:190,080 scale) in an area near Peace River, Alberta. Profile descriptions are given for each soil series, and chemical and physical attributes were summarized for selected profiles. Soil subgroup classification needs to be updated.

Location: W 84 C

Key words: X34

Schewe, A.M., and J.M. Stewart. 1986. Twig weight-diameter relationships for selected browse species in the Duck Mountain Forest Reserve. Canadian Journal of Forest Research, 16:675-680.

This study is part of a larger study which is examining moose, elk, and deer browse consumption in clear-cutting located in the Duck Mountain area of Manitoba. In addition, the study attempted to determine the best time of year to collect twigs. The results revealed that seasonal variation in twig weight-diameter relationships was great. It was recommended that twigs should be collected during dormancy in winter or during their period of growth cessation in late summer.

Location: 62 N

Key words: X15, X27, X33

Schneider, B.B. 1988. Harvesting northern mixedwood forests in Alberta, pp. 110-113. *In* Samoil, J.K., editor. Management and utilization of northern mixedwoods. Proceedings of symposium, 11-14 April 1988, Edmonton, Alberta. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-296.

This paper provides a general summary of the concerns and issues associated with mixedwood harvesting.

Location: 83 L

Key words: X12

Schultz, R., D. O'Leary, and D. Downing. 1986. Peace River corridor recreation study. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta.

The area along the Peace River from the British Columbia border to the town of Peace River was surveyed for potential recreational sites. Site suitability ratings were developed for various uses such as campgrounds, picnic areas, building sites, sources of sands and gravel, etc.

Location: N 83 M, S 83 D

Key words: X37

Schwartz, F.W. 1980. Hydrological investigation of Muskeg River basin, Alberta. Alberta Oil Sands Environmental Research Program, Project WS.2.2, AOSERP Report 87.

The focus of the study was to determine the role that shallow groundwater and muskeg systems play in the quantity and quality of surface water in the Muskeg River basin.

Location: SW 74 E

Key words: X23, X47

Searing, G.F. 1979. Distribution, abundance, and habitat associations of beavers, muskrat, mink, and river otters in the AOSERP study area, northeastern Alberta. Alberta Oil Sands Environmental Research Program, Project LS23.2, AOSERP Report 73.

This study reports on a 1.5 year long study of moose population dynamics and behavior in northeastern Alberta. It was determined that uplands were used from June through September and lowland use increased during November and December (mostly by bulls). There is a correlation between lowland usage and snow depth. If snow was shallow, usage of open lowlands increased during winter months. Open lowlands were critical spring habitat because they provided the first high quality food. Predictions state that exploitation of moose cannot be raised without creating a major population decline.

Location: SW 74 E

Key words: X26, X27, X28

Shoup, J.M. 1967. Effect of slash on aspen regeneration (winter cut) Hudson Bay, Saskatchewan. Canada Department of Forestry and Rural Development, Forestry Research Laboratory, Winnipeg, Manitoba. Internal Report MS-50.

Not available for review.

Shoup, J.M. 1968. Effect of slash on aspen regeneration (winter and summer cuts) Hudson Bay, Saskatchewan. Canada Department of Forestry and Rural Development, Forestry Research Laboratory, Winnipeg, Manitoba. Internal Report MS-73.

Not available for review.

Shoup, J.M. 1968. Effect of slash on aspen regeneration (winter and summer cuts) Hudson Bay, Saskatchewan. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forestry Research Laboratory, Winnipeg, Manitoba. Internal Report MS-79.

Not available for review.

Shoup, J.M. 1970. Effect of slash on aspen regeneration (winter and summer cuts), Hudson Bay, Saskatchewan. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forestry Research Laboratory, Winnipeg, Manitoba. Internal Report MS-114.

The purpose of this study was to determine the effects of unmerchantable residual overstory and the accumulation of logging slash on the restocking of cut over aspen stands. The results suggest that aspen regeneration was abundant on both winter and summer cut areas, and under all slash conditions. Slash may somewhat reduce suckering but does not seem to affect the level of stocking. After four growing seasons, there was not apparent reduction in numbers of density classes.

Location: 63 E

Key words: X6, X12

Shoup, J.M., L.D. Nairn, and R.H.M. Pratt. 1968. Trembling aspen bibliography. Canadian Forestry Service, Canada Forestry Research Laboratory, Winnipeg, Manitoba. Liaison Service Note MS-L-3.

A bibliography on aspen literature including disease, insects, wildlife aspects, management, silviculture, and environment prior to 1968 for Canada and the United States.

Location: CANADA

Key words: X3, X4, X5, X6, X7, X8, X9, X12, X13, X14, X15, X19, X27, X40

Sidhu, S.S. 1965. Response of plant species to grazing in the forest regions of Saskatchewan. M.Sc. Thesis, University of Saskatchewan, Saskatoon, Saskatchewan.

The study compares forested, cleared and seeded areas. The results suggest that the percentage of decreaser plants is maximum in seeded and least in forested habitats, and increasers are most abundant

in forested and least in seeded areas. Most forest forbs, except *Lathyrus*, increased as a result of grazing, but decreased in cleared and seeded habitats.

Location: SASK

Key words: X48

Singh, B.K., and J.C. Nautiyal. 1984. Factors affecting Canadian pulp and paper prices. Canadian Journal of Forest Research, 14:683-691.

The purpose of this study was to assess the impact of varying factors such as price, economies of scale, and technological change on the price of Canadian pulp and paper products. Price equations for wood pulp, newsprint, other paper and paper board, and other products were estimated using data from 1951 to 1981. The results reveal that substantial economies of scale are experienced by newsprint and wood pulp sectors. It was also determined that in order to lower costs, it would be necessary to substitute existing capital with low energy and labor.

Location: CANADA

Key words: X19

Singh, T. 1982. Biomass equations for ten major tree species of the prairie provinces. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre. Information Report NOR-X-242.

In this study, regional biomass equations were developed for ten major tree species on the prairie provinces including aspen and balsam poplar that could eventually be used to convert conventional forest inventories to biomass inventories. Three models were derived using various density and height variables.

Location: ALTA, SASK, MAN

Key words: X15

Singh, T. 1982. Weight tables for important tree species in the prairie provinces. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Forest Management Note 14:1-4.

Equations and tables were developed for estimating the biomass of whole trees for balsam poplar and aspen for the prairie provinces.

Location: ALTA, SASK, MAN

Key words: X15

Singh, T. 1983. Weight tables for important tree species in the Northwest Territories. Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Forest Management Note 27.

Weight tables and prediction equations for six major tree species in the Northwest Territories including aspen and balsam poplar are provided. The tables provide oven dry weights for the above ground portion of the tree with and without foliage.

Location: NWT

Key words: X15

Singh, T. 1984. Biomass equations for six major tree species of the Northwest Territories. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-257.

The purpose of this study was to collect biomass data to develop a set of equations to model a broad range of tree sizes for six major tree species in the Northwest Territories. Two of the species were aspen and balsam poplar. The best estimates were provided by a multiple regression model using five predictor variables. Equations for predicting total oven dry biomass of living tree above-ground with and without foliage.

Location: SW NWT

Key words: X15, X33

Singh, T. 1984. Conversion of tree volume to biomass in the prairie provinces. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Forest Management Note 28:1-7.

Equations based on provincial merchantability limits were derived for the construction of oven dry weight biomass tables.

Location: ALTA, SASK, MAN

Key words: X15

Singh, T. 1986. Generalizing biomass equations for the boreal forest region of west-central Canada. Forest Ecology and Management, 17:97-107.

This paper describes the procedures used and the results obtained when generalized biomass equations were developed for broad application in the boreal forest. Two procedures (prediction error sum of squares and covariance analysis) were used to assess the reliability of the generalized equations.

Location: ALTA, SASK, MAN

Key words: X15

Singh, T. 1987. Prediction error in tree biomass regression functions for western Canada, pp. 199-208. *In* Estimating tree biomass regressions and their error. Proceedings of workshop on tree biomass regression functions and their contribution to the Error of forest inventory estimates. Inventory Estimates, Syracuse, N.Y. May 26-30, 1986. United States Department of Agriculture, Forest Service, Broomhall, Pennsylvania. General Technical Report. NE-117.

Regression models for predicting aspen and balsam fir were developed and compared with other existing models. The developed models were based on diameter and height variables, and had explained variances of approximately ninety-eight percent.

Location: ALTA, SASK, MAN

Key words: X15

Singh, T., compiler. 1988a. Current applied climatological research in Alberta. Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-294.

A summary of various climatological studies which were in progress in 1987. A few of the included studies were in the boreal forest.

Location: ALTA

Key words: X42

Singh, T. 1988b. Estimated downed dead roundwood fuel volumes in central Alberta. Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-289.

This study determined the volumes of downed dead roundwood fuels in central Alberta and developed regression equations to estimate these fuels from commonly measured forest stand variables. From the study, predictive equations were derived from stand measurements, basal area, stem density, crown density, height, and age.

Location: NE 83 I, NE 83 O, SW 83 O, NE 83 B

Key words: X15

Singh, T., and K.O. Higginbotham. 1988. An overview of the effects of climatic variability on forest vegetation in western Canada, pp. 255-274. *In* Magill, B.L., and F. Geddes, editors. The impact of climate variability and change on the Canadian Prairies. Alberta Environment, Edmonton, Alberta.

Not available for review.

Singh, T., and G.R. Hillman. 1972. Reconnaissance survey of infiltration and related hydrological problems in northern Alberta and adjacent Northwest Territories. Environment Canada, Canadian Forestry Service, Edmonton, Alberta. Information Report NOR-X-29.

The results of a 1970 reconnaissance hydrological survey in northern Alberta and in the Northwest Territories are presented. Existing and potential problems were assessed, especially those relating to infiltration, soil moisture, and water quality. The results suggested that soil freezing under saturated conditions affected infiltration capacity and overland flows which had management implications for snowmelt floods and could have adverse effects on land clearing, resource extraction, water quality, fish and wildlife habitat.

Location: 84 I, J, P, O

Key words: X2, X31, X32, X34

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* Publication 117 de l'association internationale des sciences hydrologiques symposium de Tokyo, Decembre 1975.

Not available for review.

Singh, T., and Y.P. Kalra. 1977. Impact of pulpwood clearcutting on stream water quality in west central Alberta, pp. 272-284. *In* Alberta watershed research program symposium proceedings, 1977.

Fisheries and Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Information Report NOR-X-176.

The objective of this study were to establish benchmark nutrient conditions in the streams of undisturbed catchments and to assess changes due to extensive clearcutting. The results showed that the water samples collected from logged catchments had increased concentrations and yields of inorganic constituents: Ca, Mg, Na, K, HCO_3, SO_4-S, Cl, NH_4-N, NO_3-N, NO_2,-N, PO_4-P.

Location: 83 F

Key words: X23, X25, X31

Singh, T., and M.M. Kostecky. 1986. Calorific value variations in components of 10 Canadian tree species. Canadian Journal of Forest Research, 16:1378-1381.

The calorific value of various tree species including aspen and balsam poplar were measured by tree component. Values for aspen and poplar ranged from 18.5 to 20.5 MJ/kg. Balsam poplar stem values were approximately 1 MJ/kg less than aspen.

Location: MAN

Key words: X19

Singh, T., and M.M. Kostecky. 1987. Energy potential from Manitoba forest biomass, pp. 101-105. *In* Granger, C., editor. Sixth Canadian bioenergy R & D seminar. Elsevier Applied Science, London and New York.

Not available for review.

Singh, T., and M.M. Micko. 1984. Energy potential of aspen and other hardwoods in the prairie provinces of Canada, pp. 215-218. *In* Curtis, F.A., editor. Energy developments: new forms, renewables, conservation. Proceedings of ENERGEX '84, the global energy forum, 14-19 May 1984. Regina, Saskatchewan. Pergamon Press, Oxford, England.

The authors identified and described the potential of using aspen, poplar, and white birch as fuel and as a source of methanol. Included in the summary were tables on total volume of biomass available for use in the prairie provinces. They estimated 950,000 barrels of oil per day could be replaced with wood and wood derivatives.

Location: ALTA, SASK, MAN

Key words: X19, X20

Singh, T., and J.M. Powell. 1986. Climatic variation and trends in the boreal forest region of western Canada. Climatic Change, 8:267-278.

This study analyzed historical meteorological reports from 1872 to 1981 for three broad boreal forest zones, one zone included the B18a and b and B19 forest sections. In that forest zone during the period of analysis, precipitation decreased (-0.428 mm yr-1) and temperatures increased (+0.019° C yr-1).

Location: SASK

Key words: X42

Sivak, B. 1987. Field guide to forest ecosystems of southwestern Alberta, first approximation. Alberta Forestry, Lands and Wildlife, Forestry Service, Edmonton, Alberta.

A compilation of plant communities and associated site conditions which includes the southern most portion of the boreal forest.

Location: 82 O

Key words: X33, X34, X35

Skinner, D.L. 1984. Selection of winter food by beavers at Elk Island National Park. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The feeding habits of beaver in Elk Island National Park were investigated. It was found that beaver preferences decrease in the following order: young aspen to young balsam poplar and birch. Selection preference increased with increasing distance from water. Aspen, poplar and alder were high in nutrients but birch was low.

Location: SE 83 H

Key words: X27

Smith, R.M. 1978. Bibliography of forest entomology research 1927-77, Canadian Forestry Service, Prairie Region. Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Information Report NOR-X-212.

A bibliography of entomology research published up to 1977. Includes approximately 950 citations for both hard and softwoods.

Location: ALTA, SASK, MAN

Key words: X9

Smith, S. 1989. What did you expect? Forestry Chronicle, 65:28-39.

The author describes Weyerhaeuser Canada's experience with mixedwood forest stands and their approach to mixedwood management in its lease area in Saskatchewan. He viewed hardwoods as having equal value to softwoods and in some cases greater value.

Location: SASK

Key words: X3, X12

Smithers, L.A. 1959. Some aspects of regeneration silviculture in spruce-aspen stands in Alberta. Canada Department of Forest and Rural Development, Canadian Forestry Service, Research Branch. Monograph 59-5.

This study discusses how scarification might improve spruce regeneration. Results indicate that the time of scarification did significantly effect regeneration. Aspen suckering was more of a problem on undisturbed than on scarified sites.

Location: SE 83 O

Key words: X6

Steele, T.M., D.M. Boylen, and A. Baungartner. 1988. Saskatchewan's forest industry, 1985. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-295.

A survey of Saskatchewan's forest industry was prepared with respect to benefits and impacts on the economy. In 1985, approximately fifty-seven percent of Saskatchewan's forest products were exported. Direct employment represented 2700 person-years.

Location: SASK

Key words: X19

Stelfox, H.A. 1972. Aerial beaver food cache surveys in the Fort Simpson region, N.W.T. Canadian Wildlife Service, Edmonton, Alberta. (Unpublished).

Not available for review.

Stelfox, H.A. 1981. Ecological land classification: Red Deer-James. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report No. T/11 - Number 4.

An ecological land classification was prepared for the upper portion of the Red Deer and James River basin. Vegetation, soils, landform, and climatic zonation were included in the analysis.

Location: 83 O

Key words: X1

Stelfox, H.A. 1984. Ecological land classification and land surface disturbance regimes suitable for wildlife habitat mapping and assessment at 1:250,000 map scale. Alberta Energy and Natural Resources, Fish and Wildlife Division, Edmonton, Alberta. (Unpublished).

Not available for review.

Stelfox, J.G. 1980. Nutritive value and preference ratings of common big game browse plants in Alberta. Canadian Wildlife Service, Edmonton, Alberta. (Unpublished).

Not available for review.

Stelfox, J.G. 1981. Effects on ungulates of clear-cutting in western Alberta: the first 25 years. Environment Canada, Canadian Wildlife Service, Edmonton, Alberta.

This study looked at three forest types (white spruce, lodgepole pine and aspen). All clearcut sites received only moderate use by big game animals during the first six years after logging. Winter use was nonexistent because of snow depth. Between six and twelve years both summer and winter use increased substantially due to increased abundance of browse. Big game used scarified sites more than they did unscarified site by year nine.

Location: SW 83 F

Key words: X6, X13, X27

Stelfox, J.G. 1983. Logging - wildlife interactions. Canadian Wildlife Service Report. Canadian Wildlife Service, Edmonton, Alberta.

Not available for review.

Stelfox, J.G. 1984. Effects of clear-cut logging and scarification on wildlife habitats in west-central Alberta. Environment Canada, Canadian Wildlife Service, Edmonton, Alberta.

The effects of clearcutting were reviewed twenty-seven years after logging. The degree of big game use was strongly influenced by the availability of hiding and thermal cover. The early stages of stand re-establishment resulted in increased use of by deer and elk during summer, but winter use was limited for the first twenty-five to thirty years in spruce and mixedwood stands. Unscarified mixedwood stands supported higher densities of big game, furbearers, and other species during the first twenty-seven years after logging than scarified.

Location: 83 F

Key words: X13, X22, X27

Stelfox, J.G. 1988. Forest succession and wildlife abundance following clear-cut logging in west-central Alberta. Canadian Wildlife Service, Edmonton, Alberta.

The effects of clearcutting and scarification were studied with respect to wildlife use. Habitat potential was rated for wildlife use on the basis of time after clearcutting. A variety of wildlife groups were considered.

Location: 83 F

Key words: X13, X22, X27

Stelfox, J.G., G.M. Lynch, and J.R. McGillis. 1976. Effects of clearcut logging on wild ungulates in the central Alberta foothills. Forestry Chronicle, 52:539-552.

The purpose of this study was to determine the impact of logging on white spruce stands on post-logging ungulate utilization, and the effects of scarification of logging areas on the carrying capacity of big game range. The results indicate that unscarified areas provide more browse and cover than do scarified areas. In logged areas, poplar species were twenty-four percent more abundant on scarified areas than in unscarified areas. Observed numbers of big game seventeen years after logging and scarification were much lower than expected from the carrying capacity estimates.

Location: SW 83 F

Key words: X26, X27

Stelfox, J.G., E.S. Telfer, and G.M. Lynch. 1973. Effects of logging on wildlife. Fish & Game Sports. Fall 1973:1-4.

The temporal impacts of logging on wildlife in the Alberta foothills are examined. The author claims that properly managed logging will enhance wildlife habitat by creating a diversity of forest age classes that would provide both food and shelter. No evidence exists to show that any species was being threatened.

Location: WESTERN ALTA

Key words: X12, X26, X27, X28

Stelter, D.E. 1985. Application of the JABOWA growth stimulator to white spruce - trembling aspen stands in Alberta. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

The JABOWA forest growth model was modified for application to Alberta's mixedwood boreal forests. The author concluded that revised model produced results (basal area, species frequency, diameter) that were similar to measured values.

Location: Not specific

Key words: X15

Steneker, G.A. 1962. Improvement cutting in 60 to 100-year old white spruce/aspen stands to increase white spruce volume production, Saskatchewan: area I - Dore Lake road, progress report. Canada Department of Forestry, Forest Research Branch, Project MS-224.

Thinning plots were established in mixedwood stands and portions of the aspen overstory were removed. No results were available.

Location: 73 J

Key words: X5, X7, X15

Steneker, G.A. 1963. Results of a 1936 release cutting to favour white spruce in a 50-year old white spruce-aspen stand in Manitoba. Canada Department of Forestry, Forest Research Branch, Ottawa, Ontario. Publication Number 1005.

A mixedwood stand which had been thinned thirty years earlier by removing aspen and jack pine were re-examined. The results found that white spruce volume doubled relative to the control.

Location: MAN

Key words: X5, X7, X15

Steneker, G.A. 1964. Ten-year results of thinning 14-, 19- and 23-year-old aspen to different spacings. Canada Department of Forestry, Forest Research Branch, Ottawa, Ontario. Publication Number 1038.

Three different ages of young aspen were thinned to three different densities. Twelve foot spacing were found best to maximize volumes, while 2.4 meter spacings were best for core wood.

Location: 62 K

Key words: X3, X4, X7, X14, X15

Steneker, G.A. 1965. An assessment of competition in an aspen stand. Canada Department of Forestry, Forest Research Laboratory, Winnipeg, Manitoba. Progress Report MS-240. 65-MS-7.

Not available for review.

Steneker, G.A. 1966. Thinning aspen, Turtle Mountain Forest Reserve. Canadian Department of Forestry, Forest Research Laboratory, Winnipeg, Manitoba. Internal Report MS-25.

The objective of this study was to determine the efficacy of thinning in an eleven year old aspen stand to increase individual tree increment so that larger trees could be harvested at rotational age. Eighteen years after the stand had been thinned it was determined that strip-thinning had been unsuccessful in increasing the per hectare production and growth of individual trees.

Location: S 62 G

Key words: X14

Steneker, G.A. 1967a. Management of aspen stands in Manitoba, pp. 36-41. *In* Trembling aspen in Manitoba. Papers presented at the 1965 annual meeting, Manitoba Section, Canada Department of Forestry and Rural Development, Canadian Institute of Forestry, Information and Technical Services Division.

Not available for review.

Steneker, G.A. 1967b. Growth of white spruce following release from trembling aspen. Canada Department of Rural Development, Forestry Branch, Ottawa, Ontario. Publication Number 1183.

The aspen overstory of eight mixedwood stands were removed as an experiment to determine the effects on white spruce. After ten years, diameter increased, height increment doubled, and volume increased sixty percent relative to the controls.

Location: SASK, MAN

Key words: X5, X7, X15

Steneker, G.A. 1969a. Multiple thinning in fourteen-year-old poplar, Porcupine Provincial Forest, Saskatchewan. Canada Department of Fisheries and Forestry, Forest Research Laboratory, Winnipeg, Manitoba. Information Report MS-X-17.

This study was conducted to determine what stand density by age promoted the best increment and volume production. The results indicated that the level of stocking required to give maximum volume production was higher than that required to produce maximum diameter increment on individual trees.

Location: 62 O

Key words: X4, X7, X14, X15

Steneker, G.A. 1969b. The effect of scarification upon the development of residual spruce trees in a partially cut white spruce trembling aspen stand. Canada Department of Fisheries and Forestry, Forestry Branch, Forest Research Laboratory, Winnipeg, Manitoba. Information Report MS-X-14.

The results of scarification on residual white spruce were examined twenty years after selective logging. The data suggested that scarification did not have a major affect and could be done as close as 1 to 1.3 meters from tree stem on one or two sides of the tree, but the other sides should not be disturbed within eight meters.

Location: Not specific

Key words: X6

Steneker, G.A. 1972a. Suckering and soluble sugars in trembling aspen root cuttings. Canadian Forestry Service. Bi-Monthly Research Note 28:34.

The results indicate that soluble sugar concentrations in aspen roots appear to decrease significantly from early spring to late summer, and may account for fifty percent of the variation in sucker growth.

Location: 62 K

Key words: X7

Steneker, G.A. 1972b. Size and suckering of trembling aspen (*Populus tremuloides* Michx.) clones in Manitoba. Ph.D. Dissertation, University of Michigan, Ann Arbor, Michigan.

This study investigated the size and extent of clonal intermixing, examined the effects of temperature and apical growth on suckering, and assessed the possibility of using leaf characteristics to identify the source clone of suckers. The author concluded that fire plays an important role in determining clone size.

Location: 62 K

Key words: X35

Steneker, G.A. 1973. The size of trembling aspen (*Populus tremuloides* Michx.) clones in Manitoba. Canadian Journal of Forestry Research, 3:472-478.

The purposes of this study were (i) to determine the size of aspen clones in two areas within Manitoba, and if possible, relate this to site conditions; and (ii) to point out the problems of getting accurate inventory data when aspen clones are relatively large. Differences in site factors did not seem to be related to clone size. The conclusions recommend that to obtain sufficient information on interclonal variation in growth, a large inventory of clones must be undertaken.

Location: 62 K

Key words: X13, X24, X35

Steneker, G.A. 1974a. Factors affecting the suckering of trembling aspen. Forestry Chronicle, 50:32-34.

The purpose of this study was to assess the importance of the apical dominance effect and temperature upon sucker formation on aspen roots. The results suggest that the apical dominance effect primarily controls suckering. Once this effect has been broken, increased soil temperature will promote suckering. Recommendations were made for management of aspen.

Location: SE 62 I, 62 K

Key words: X3, X13

Steneker, G.A. 1974b. Thinning of trembling aspen (*Populus tremuloides* Michaux) in Manitoba. Environment Canada, Canadian Forestry Service, Edmonton, Alberta. Information Report NOR-X-122.

Thinned aspen stands (21 to 23 years prior) were evaluated for growth. The results showed that thinning increased diameter at breast height but also resulted in an decrease in total volume. Thinning spacings were 3 x 3 m and 3.6 x 3.6 m.

Location: S 62 G

Key words: X3, X4, X7, X14, X15

Steneker, G.A. 1974c. Selective cutting to release white spruce in 75- to 100-year old white spruce-trembling aspen stands. Canada Department of Environment, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-121.

This study found that the reduction in stand density of +70 year old stands (mostly aspen) had little effect on the productivity of the larger white spruce.

Location: 73 J

Key words: X5, X7, X13, X15

Steneker, G.A. 1976. Guide to the silvicultural management of trembling aspen in the prairie provinces. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-164.

This paper discusses various aspects of aspen management such as regeneration, stand develop-

ment, harvesting, stand tending, stand improvement, control of aspen, and implication of aspen management for other land uses.

Location: ALTA, SASK, MAN

Key words: X3, X7, X12, X14, X15

Steneker, G.A., and J.M. Jarvis. 1963. A preliminary study to assess competition in a white spruce-trembling aspen stand. Forestry Chronicle, 39:334-336.

The authors correlated and developed regression equations for the relationship between tree density and distance to surrounding trees.

Location: 63 D

Key words: X15

Steneker, G.A., and J.M. Jarvis. 1966. Thinning trembling aspen stands, Manitoba and Saskatchewan. Canada Department of Forestry, Ottawa, Ontario. Publication Number 1140.

This report combines and compares eight aspen thinning experiments that were conducted between 1926 and 1951 in Manitoba and Saskatchewan. There was no consistency of methodology for the experiment or return period for remeasurement, however, the purpose was to determine stocking levels necessary for maximizing volume production and diameter growth. In spite of the incongruity of the data among experiments, some conclusions and recommendations were made for thinning practices.

Location: S 62 G, 62 K, O

Key words: X14, X15

Steneker, G.A., and R.A. Prasad. 1972. Suckering and soluble sugars in trembling aspen root cuttings. Environment Canada, Canadian Forestry Service. Bi-Monthly Notes 28:34.

The purpose of this study was to determine whether variation in aspen suckering is related to the amount of soluble sugars present in the parent roots. An analysis of variance indicated strong differences in sugar content of the clones between collection dates. There was a weak correlation between sugar and sucker growth.

Location: 62 K

Key words: X13, X33

Steneker, G.A., and R.E. Wall. 1970. Aspen clones, their significance and recognition. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forest Research Laboratory, Winnipeg, Manitoba. Information Report MS-L-8.

This is a general overview about aspen clones. It briefly describes the development of clones, their significances, and how to recognize them.

Location: Not specific

Key words: X15

Steneker, G.A., and R.E. Wall. 1972. Wound healing and fungal colonization in stems of young trembling aspen after thinning and pruning. Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Information Report NOR-X-37.

The purpose of this study was to analyze the initial healing process in pruning wounds and preliminary fungal colonization of trunk rot fungi in thinned and unthinned fifteen year old aspen. It appeared that pruning wounds healed more rapidly among thinned aspen. In unthinned plots, wound dressing resulted in slower wound healing and more extensive fungal colonization.

Location: 62 O

Key words: X3, X9, X14

Steneker, G.A., and M.A. Walters. 1971. The effect of root length upon the suckering of trembling aspen. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forestry Research Laboratory, Edmonton, Alberta. Information Report A-X-46.

Aspen roots cut to different lengths were evaluated for their ability to produce suckers. The results suggested that sucker production was independent of root length. It was found that suckers tended to form at the proximal end of the root, i.e., nearest the source of hormones.

Location: MAN

Key words: X6, X7, X13

Stewart, R.R., R.R. MacLennan, and J.D. Kinnear. 1977. The relationship of plant phenology to moose.

Saskatchewan Department of Tourism, Renewable Resources, Regina, Saskatchewan. Technical Bulletin Number 3.

Browse quality and its energy value were determined for shrubs used by moose in eastern Saskatchewan. Browse was also assessed on a seasonal basis to determine if its value changed. Data on crude fibre content and digestible nutrients were provided for various seasons.

Location: NE 63 F

Key words: X25, X27

Stringer, P.W. 1976. A preliminary vegetation survey of the Alberta Oil Sands Environmental Research Program study area. Prepared for Alberta Oil Sands Environmental Research Program by Intraverda Plant Systems Ltd., AOSERP Report 4.

Eighty-four vegetation stands in the Alberta Oil Sands Environmental Research Project area were sampled and classified into physiognomic types which ranged from wetlands to coniferous and deciduous forests. The discussion was about plant successional trends in the area. A key for identification of these types on aerial photography was also developed.

Location: 74 E

Key words: X33

Stonehouse, H.B., and J.G. Ellis. 1983. The soils of the Hudson Bay and Saskatchewan portion of the Swan Lake map area (63D and 63C), Saskatchewan. Saskatchewan Institute of Pedology, Saskatoon, Saskatchewan. Publication S5.

A soils inventory was conducted in an area southeast of Prince Albert (17,761 km^2) and a 1:126,720 scale map depicting soil associations was prepared. Ratings were developed for forest and agricultural capability. Area estimates were provided for each soil association as well as physical and chemical analysis data for selected associations. Forest cover types were stratified by height class.

Location: W 63 C

Key words: X34

Strong, W.L. 1978. Biophysical land classification and evaluation of capability: Lakeland. Alberta Energy and Natural Resources, Edmonton, Alberta. Publication Number 63.

A 1:100,000 scale ecological land classification was prepared for a 3,400 km^2 area in the lower portion of the B18a forest section. A brief description is given of each ecosection. Canada Land Inventory equivalent ratings were given for agriculture, forestry, recreation, ungulates, and waterfowl capability as well as assessments of soil limitations for selected recreational activities.

Location: 73 L

Key words: X1, X35, X37

Strong, W.L. 1981. Ecological land classification and evaluation: Jean D'Or Prairie. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Technical Report Number T/11-5.

A 1:100,000 scale ecological land classification was prepared for the Fort Vermilion - Jean D'Or area (1,455 km^2). Five plant communities were recognized, two were dominated by aspen and/or balsam poplar. The characteristics of each ecosection was summarized in a legend. Agricultural capability for arable crops and grazing, tree growth potential for white spruce, ungulate habitat, and potential environmental hazards are rated.

Location: SW 84 J

Key words: X1

Strong, W.L. 1982. Ecological land classification and evaluation: Frost Hills area. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Technical Report Number T/11-6.

An ecological land classification at the ecosection level (1:50,000 scale) was prepared for a 1,093 km^2 area along the southern side of Lesser Slave Lake. Included in the study were assessments of climate, soils, and vegetation. The common upland forest communities were dominated by a mixture of aspen and balsam poplar. Capability ratings were developed for agriculture, forestry, wildlife habitat capability, and potential environmental hazards.

Location: 83 O

Key words: X1, X24, X33, X34, X35, X37, X42

Strong, W.L. 1984. Below-ground ecology of boreal forests in the Hondo-Lesser Slave Lake area, Alberta.

Ph.D. Dissertation, University of Alberta, Edmonton, Alberta.

This research focuses on the below-ground ecology of 11 boreal forest stands which included jack pine, white spruce, aspen, and mixedwood communities. Root densities of individual stands, the morphology of trees on different site conditions, plant water relationships, and root density-nutrient relationships were investigated. See Strong and La Roi (1983a,b, 1985, 1986).

Location: 83 O

Key words: X33, X34, X35, X44

Strong, W.L. 1988. Water management unit mapping and land use analysis of the Athabasca River basin in Alberta. Prepared for Alberta Environment by Ecological Land Surveys Ltd., Edmonton, Alberta.

The Athabasca River drainage basin was subdivided into ecosections (1:1,500,000) and water management units. Each ecosection was rated for its agricultural suitability. The extent and location of cleared agricultural land was also plotted.

Location: 83 F, J, N, O, P, 73 M, 74 D, E, L

Key words: X1

Strong, W.L. 1990. Benchmark vegetation transects for monitoring grazing in the Peace River region. Prepared for Alberta Forestry, Lands and Wildlife, Public Lands Division by Ecological Land Surveys Ltd., Edmonton, Alberta.

Twelve permanent vegetation transects (50 m) were established in the Grande Prairie - Peace River region for the purpose of monitoring natural vegetation as part of a forest grazing program. Plant cover and composition, and biomass data were collected as part of the analysis.

Location: 83 M, N

Key words: X33, X48

Strong, W.L. 1992. Ecoregions and ecodistricts of Alberta. Prepared for Alberta Forestry, Lands and Wildlife by Ecological Land Surveys Ltd., Edmonton, Alberta.

This report is an updated version of the 1981 "Ecoregions of Alberta" classification by Strong and Leggat (1981). This update includes some name changes, re-organization of the boreal forest classification, and a quantitative analysis of several climatic parameters. In addition, a provincial ecodistrict classification was developed at a scale of 1:1,000,000.

Location: ALTA

Key words: X1, X42

Strong, W.L, and L.L. Kennedy. 1986. Sunchild Cree Reserve - land resource assessment and development guidelines. Prepared for Sunchild Band and Canadian Forestry Service by Ecological Land Surveys Ltd., Edmonton, Alberta.

The Sunchild reserve was ecological classified (1:21,120 scale) and assessed for tree growth capability, agriculture, and environmental hazards for integrated resource planning purposes.

Location: NW 83 B

Key words: X1, X33, X34

Strong, W.L, and L.L. Kennedy. 1986. O'Chiese Reserve - land resource assessment and development guidelines. Prepared for O'Chiese Band and Canadian Forestry Service by Ecological Land Surveys Ltd., Edmonton, Alberta.

The O'Chiese reserve was ecological classified (1:21,120 scale) and assessed for tree growth capability, agriculture, and environmental hazards for integrated resource planning purposes.

Location: NW 83 B

Key words: X1, X33, X34

Strong, W.L, and G.H. La Roi. 1983. Rooting depth and successional development of selected boreal forest communities. Canadian Journal of Forest Research, 13:577-588.

Root densities, depth, and stand age were compared to determine if rooting depth increased with stand age. The results were mixed, but rooting depth did increase on sandy soils. Most plant roots were located near the forest floor.

Location: SE 83 O

Key words: X35

Strong, W.L, and G.H. La Roi. 1983. Root-system morphology of common boreal forest trees. Canadian Journal of Forest Research, 13:1164-1173.

The root system morphology of common boreal trees including aspen was described. On sandy sites deeply penetrating roots on aspen were common, but on fine-textured soils roots tended to more horizontally oriented.

Location: SE 83 O

Key words: X35

Strong, W.L, and G.H. La Roi. 1985. Root density-soil relationships in selected boreal forest communities of central Alberta. Forest Ecology and Management, 12:233-251.

The root densities relative to depth, extractable nutrients, and abiotic factors were compared in aspen, mixedwood, jack pine, and black spruce. The results suggested that a positive association with water-holding capacity and extractable phosphorus, and negative relationship to depth, clay content, and soil bulk density.

Location: SE 83 O

Key words: X35

Strong, W.L, and G.H. La Roi. 199-. Belowground niche partitioning among boreal forest plant species. American Naturalist, (Submitted).

Data were presented that suggest that niche partitioning occurs among boreal plant species. This interpretation was based on a comparison of rooting depth and plant water potentials.

Location: SE 83 O

Key words: X35

Strong, W.L, and K.R. Leggat. 1981. Ecoregions of Alberta. Alberta Energy and Natural Resources, Edmonton, Alberta. Technical Report Number T/4.

The province of Alberta was subdivided into ecoregions on the basis of vegetation and other ecological information, and climatic data. This classification was primarily a synthesis and interpretation of information that was available at the time. The vegetation and climatic characteristics of each ecoregion were described.

Location: ALTA

Key words: X1

Strong, W.L, E.T. Oswald, and D.J. Downing, editors. 1990. The Canadian system of vegetation classification. Environment Canada, Canadian Wildlife Service, Ottawa, Ontario. Ecological Land Classification Series, Number 25.

A national vegetation classification system was developed for Canada. The upper levels of the classification were based on physiognomic characteristics, while the most detailed levels of classification (i.e., community-type) was based on stand structure, species composition, and abundance.

Location: Not specific

Key words: X33

Swan, E.P., and R.M. Kellogg. 1986. Chemical properties of black cottonwood and balsam poplar. Canadian Journal of Forest Research, 16:497-501.

Black and balsam poplar were compared for their relative lignin content. The two species were similar although the heartwood contained more lignin than did the sapwood. The balsam poplar samples were from Alberta.

Location: SW 83 G, SE 83 O, 83 P, 73 M

Key words: X43

Swan, J.M.A. 1964. A phytosociological study of upland boreal forest at Candle Lake, Saskatchewan. M.A. Thesis, University of Saskatchewan, Saskatoon, Saskatchewan.

A phytosociological comparison of coniferous, deciduous and mixedwood forest stands. A small portion of the results were devoid to aspen and mixedwood stands.

Location: NW 73 H

Key words: X22, X23, X35

Swan, J.M.A., and R.L. Dix. 1966. The phytosociological structure of upland forest at Candle Lake, Saskatchewan. Journal of Ecology, 54:13-40.

The structure and composition of upland forests in the Candle Lake region are analyzed. From the

data, the authors suggest a relationship exists between canopy structure and subcanopy, and between canopy structure and soil texture and disturbance.

Location: 63 D

Key words: X24, X33, X34, X42

Swanson, R.H., and G.R. Hillman. 1977. Effect of large-scale clear-cutting on water yield in western Alberta, pp. 256-271. *In* Swanson, R.H., and P.A. Logan, compilers. Alberta watershed research program symposium proceedings, 1977. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-176.

A fifty-nine percent increase in streamflow from snow, a twenty-seven percent increase in annual flow, and an increase in storm peaks of one to times were measured on clearcut lands relative to native conditions. The authors anticipated that these increased flows would continue for approximately thirty years, or until the stands becomes fully established.

Location: 83 F

Key words: X13, X23

Swanson, R.H., and G.R. Hillman. 1977. Predicted increased water yield after clear-cutting verified in west-central Alberta. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-198.

The objective of this study was to verify predicted water yield increases of twenty to thirty percent following clearcut harvesting. The results showed there was twenty-seven percent increase in water yield.

Location: 83 F

Key words: X13, X35

Swanson, R.H., and D.R. Stevenson. 1971. Managing snow accumulation and melt under leafless aspen to enhance watershed value, pp. 63-69. *In* Proceeds of western snow conference, Billings, Montana. April 20-22, 1971.

This paper identifies the influence of leafless trees and shrubs in distributing snow, and how it might be manipulated to achieve management goals. Leafless aspen and willow stands are important in localizing snow and altering the ablation rate. Small openings in a leafless canopy are effective snow traps. Openings physically oriented and of a size designed to maximize accumulation and minimize ablation would improve groundwater recharge opportunities if created on recharge areas.

Location: Not specific

Key words: X23, X47

Telfer, E.S. 1969. Potential for game ranching in boreal aspen forests of western Canada. Journal of Range Management, 28:172-180.

This paper discusses the potential of using mixedwood forests for game ranching. Among the variables considered were snow cover, soil productivity, understory vegetation, and competition with native populations.

Location: 83 H

Key words: X26, X27

Telfer, E.S. 1974. Logging as a factor in wildlife ecology in the boreal forest. Forestry Chroncile, 50:186-190.

The potential effects of clearcutting were reviewed with respect to wildlife habitat needs. The primary problems with clearcutting is that it reduces stand and species diversity. These problems could be minimized by leaving strips of mature vegetation, lengthing the interval between removal of adjacent strips, and partial cuts.

Location: Not specific

Key words: X12, X13, X22, X27

Telfer, E.S. 1978. Cervid distribution, browse and snow cover in Alberta. Journal of Wildlife Management, 42:352-361.

The purpose of this study was to identify factors that control winter distribution of ungulates by examining the relationship between browse availability, snow depth, and cervid distributions in three areas of Alberta. It appears from the information gathered that elk and deer winter utilization was not strongly related to browse availability, but instead to traditional wintering areas and human disturbance.

Moose distributions could be altered and populations increased by manipulating browse supply.

Location: NW 83 H

Key words: X22, X26, X27, X28

Telfer, E.S. 1984. Circumpolar distribution and habitat requirements of moose (*Alces alces*), pp. 145-182. *In* Olson, R., R. Hastings, and F. Geddes, editors. Northern Ecology and Resource Management. University Alberta Press, Edmonton, Alberta.

The author provides a general overview of the distribution and habitat requirements for moose in northern latitudes. Factors limiting distribution and habitat use by season are discussed.

Location: CANADA

Key words: X26, X27

Telfer, E.S., and A. Cairns. 1978. Stem breakage by moose. Journal of Wildlife Management, 42:639-642.

This paper presents estimates of the extra winter food that moose could obtain by breaking stems taller than their usual limit of 2.44 m, and assesses the impact of stem breakage on the vegetation structure. The authors suggest that breakage of aspen saplings combined with heavy browsing on low shrubs and saplings has slowed vegetation succession in Elk Island National Park.

Location: 83 H

Key words: X26, X27

Telfer, E.S., and G.W. Scotter. 1975. Potential for game ranching in boreal aspen forests of western Canada. Journal of Range Management, 28:172-180.

Elk Island National Park was used as an example of the potential for game ranching in the mixedwood portion boreal forest. Biological (habitat) factors and social concerns were discussed.

Location: ALTA, SASK

Key words: X20

Thomas, G.P. 1967. Decay as a limiting factor on poplar utilization, pp. 49-51. *In* Industry, The future for poplar utilization in Alberta, Canada. Industrial wood products seminar, 8-9 November 1966, Edmonton, Alberta. Canada Department of Industry, Wood Products Branch, Ottawa, Ontario.

The results of this study indicate that the incidence of fungi and disease infection in aspen increases from mesic to dry sites; for balsam poplar it increases from mesic to wet sites. Both species had decay in over sixty percent of the trees sampled. Additional trees were infected with stain producing fungi.

Location: 83 J, K, L, N, O

Key words: X9

Thomas, G.P. 1968. Decay as a limiting factor on poplar utilization, pp. 145-148. *In* Maini, J.S., and J.H. Cayford, editors. Growth and utilization of poplars in Canada. Canada Department of Forestry and Rural Development, Ottawa, Ontario. Publication 1205.

Thomas emphasizes the idea that aspen decay should not stop industry from utilizing the resource. It is suggested that change be made to the utilization standards of aspen and high grading be avoided. He recommends increasing the size and capacity of the aspen-utilizing industries in Alberta as well as the tree improvement of aspen.

Location: ALTA

Key words: X9, X12, X19

Thomas, G.P., D.E. Etheridge, and G. Paul. 1960. Fungi and decay in aspen and balsam poplar in the Boreal Forest Region, Alberta. Canadian Journal of Botany, 38:459-466.

The results of this decay survey of aspen and balsam poplar in Alberta showed that seventy-three percent of the aspen and sixty-one percent of the balsam poplar were decayed. For aspen, infection decreased from mesic to dry sites; however for balsam poplar there was little difference in infection according to moisture conditions. The loss of volume due to decay for aspen and balsam poplar was twenty-five and one hundred percent, respectively. Frequency and effects of various fungi were described.

Location: 83 J, K, L, N, O

Key words: X9

Thompson, D.C., D.M. Ealey, and K.H. McCourt. 1980. A review and assessment of the baseline data relevant to the impacts of oil sands developments on large mammals in the AOSERP study area. Alberta Oil Sands Environmental Research Program, Edmonton, Alberta, Project LS 21.6-1, AOSERP Report 64.

This is a comprehensive literature review that presents the available data on the impact of the oil sands development on the moose, woodland caribou, and wolf populations parameters. Major gaps in the baseline knowledge for these large mammals were identified.

Location: W 74 E

Key words: X26, X27, X28

Thompson, M.D., M.C. Wride, and M.E. Kirby. 1978. Ecological habitat mapping of the AOSERP study area. Phase I. Alberta Oil Sands Environmental Research Program, Project VE 2.3, Report 31.

The purpose of this study was to prepare preliminary ecological habitat maps at a scale of 1:50,000 scale from false color infrared photographs.

Location: 74 A, D, H, S and NE 74 L

Key words: X1, X27

Thorpe, J.P. 1978. Effects of cattle grazing on understory shrubs in Saskatchewan aspen forests. M.Sc. Thesis, University of Saskatchewan, Saskatoon, Saskatchewan.

This study found that cattle and wild ungulates browsed similar species. With grazing, *Viburnum edule* and *Amelanchier alnifolia* decreased, while *Rubus idaea*, *Corylus cornuta*, *Rosa acicularis*, *Symophoricarpos alba*, and *Lonicera involucrata* increased. Grazing tended to reduce browse production, and the more intensive the less productive the plants.

Location: 73 F

Key words: X48

Tietje, W.D., and R.L. Ruff. 1980. Denning behaviour of black bears in boreal forest of Alberta. Journal of Wildlife Management, 44:858-870.

Denning chronology and behavior of black bears were investigated in east-central Alberta. Bears selected mixed stands of aspen and white spruce or mature spruce for denning sites.

Location: 73 L

Key words: X27

Timmermann, H.R., and J.G. McNicol. 1988. Moose habitat needs. Forestry Chronicle, 64:238-245.

A comprehensive review of the moose habitat needs of North America indicates that their optimum habitats contain an interspersion of food and cover within traditionally used seasonal home range. Aspen is important both as browse and shelter.

Location: NORTH AMERICA

Key words: X26, X27, X28

Tomm, H.O. 1978. Response of wild ungulates to logging practices in Alberta. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

An assessment of the effects of logging practices on wild ungulates (moose, deer, and elk) was conducted in the west-central forests of Alberta. Analysis of variance indicated that distance from cover was a significant factor affecting the utilization of clearcut blocks by ungulates. There was a significant difference by species in distance. Moose utilization was consistently more uniform over cutblocks compared to deer or elk use. Deer and elk showed a preference for cutblock edges.

Location: 83 B, C, F, G, K, L

Key words: X26, X27

Tomm, H.O., J.A. Beck, Jr., and R.J. Hudson. 1981. Responses of wild ungulates to logging practices in Alberta. Canadian Journal of Forest Research, 11:606-614.

The use of cutblocks by moose, mule deer, and elk were compared to post logging treatment. It was found that these species were effected by the design and treatment. Recommendations were included to maximize ungulate utilization.

Location: 83 B, F, G, K, L

Key words: X12, X13, X27

Tripp, D.B., and P.J. McCart. 1979. Investigation of the spring spawning fish populations in the Athabasca and Clearwater Rivers upstream from Fort McMurray. Alberta Oil Sands Environmental Research Program, Project WS 1.6.1, AOSERP Report 84.

The primary objective of this study was to identify the spring spawners of the Athabasca and Clearwater Rivers; describe their spawning grounds; and describe the timing of spawning, hatching, and emergence in relation to environmental factors such as water temperature, turbidity, dissolved oxygen concentrations, and stream flow. Both these rivers provide valuable habitat for a number of minor species and provide feeding grounds for juvenile goldeye.

Location: NW 74 D

Key words: X29

Tripp, D.B., and P.T.P. Tsui. 1980. Fisheries and habitat investigations of tributary streams in the southern portion of the AOSERP study area: Summary and conclusions. Alberta Oil Sands Environmental Research Program, Project WS 1.6.2, AOSERP Report 92.

This is the summary and conclusions report concerning the fisheries and habitat investigations of tributary streams in the southern portion of the Alberta Oil Sands Environmental Research Project area. It provides a description of each individual stream, the benthos, and studies of seven fish species.

Location: E 74 A, N 74 D

Key words: X29

Tucker, R.E., and J.M. Jarvis. 1967. Prescribed burning in a white spruce-aspen stand in Manitoba. Pulp Paper Magazine of Canada, 68:333-355.

The use of prescribed burning as a silvicultural tool in spruce-aspen stands was investigated. Burning resulted in the removal of the aboveground vegetation cover, but due to the high moisture content of the FH horizon the roots were largely unaffected.

Location: 62 K

Key words: X40

Tucker, T.L. 1974. Economic consequences of recycling for the Canadian newsprint industry. Canadian Journal of Forest Research, 4:15-22.

The objective of this paper was to determine the probable future of Canada's newsprint market, the possible economic consequences of the increased consumption of recycled newsprint paper within the U.S., and the resulting adjustments to the major fibre producers. The results suggest that recycling will cause only marginal market shifts to the detriment of Canadian producers.

Location: CANADA

Key words: X19

Turchenek, L.W., and J.D. Lindsay. 1982. Soils inventory of the Alberta Oil Sands Environmental Research Program study area. Prepared for the Alberta Oil Sands Environmental Research Program by Alberta Research Council, Edmonton, Alberta. AOSERP Report 122.

A soil survey (1:126,720) was conducted in the AOSERP area (28,440 km^2). This report provides soils maps and information on the type, characteristics, and aerial distribution of soils in the study area. Capability classifications were provided for forestry, agriculture, engineering, wildlife, and recreational use, and soil sensitivity to acid deposition. Volume 2 contains profile descriptions and chemical/physical attributes.

Location: N 74 D, 74 E, S 74 L

Key words: X34

Turchenek, L.W., and M.E. Pigot. 1988. Peatland distribution in Alberta. Alberta Research Council, Edmonton, Alberta. Map 212.

The proportion of wetlands stratified by physiographic unit were mapped at a scale of 1:2,000,000.

Location: ALTA

Key words: X33

Twardy, A.G. 1978. Soil survey of a portion of the Syncrude Lease 17 area, Alberta. Prepared for Syncrude Canada Ltd. by Pedology Consultants, Edmonton, Alberta.

A 1:24,000 scale soils map was prepared for Lease 17 of the Syncrude oil sands area (93 km^2).

Location: SW 74 E

Key words: X34

Twardy, A.G., and I.G.W. Corns. 1980. Soil survey and interpretations of the Wapita map area. Alberta Institute of Pedology, Edmonton, Alberta. Report 39.

Soils were inventoried and mapped at a scale of 1:126,720 within a 14,000 km^2 area south of Grande Prairie, Alberta. The northeast half of the study area occurred within the B18a and B19a forest section. Each soil series was described, while chemical and physical data were provided for selected series. Soil series were also evaluated for their agricultural capability and various forest practices.

Location: 83 L

Key words: X34, X33 - see Corns 1978, 1983

Twardy, A.G., and J.D. Lindsay. 1971. Reconnaissance soil survey of the Chip Lake area. Research Council of Alberta, Edmonton, Alberta. Report Number 91.

A soils inventory and classification (1:126,720 scale) to the series level was conducted in the Chip Lake area (5,560 km^2), west of Edmonton. Profile descriptions were given for each series and for selected profiles physical and chemical properties were summarized. Twelve series were interpreted for forest management limitations with respect to soil characteristics.

Location: 83 I

Key words: X34

Usher, R.G. 1978. The response of moose and woody browse to clearing in the boreal mixed-wood zone of Alberta. M.Sc. Thesis, University of Calgary, Calgary, Alberta.

The effects of forest cover clearing were investigated on browse production and moose utilization. It was found that shrubs/tree saplings and grass species increased in abundance relative to comparable mature stands. Variation in browse production was thought to be controlled by soil moisture availability. *Cornus stolonifera*, *Prunus pensylvanica*, *Prunus virginiana*, and *Betula* spp. were the preferred species on the cleared areas; *Salix*, *Populus tremuloides*, and *Viburnum edule* were most commonly used in the mature stands.

Location: 73 L

Key words: X22, X27, X33, X41

Usher, R.G. 1981. Ungulate use and habitat capability of recently clear-cut forest blocks in the Sand River area of Alberta, and of different-aged stands in the Cold Lake region. Prepared by International Environmental Consultants Ltd. for Esso Resources Canada Ltd., Calgary, Alberta.

Not available for review.

Vaartaja, O. 1960. Ecotypic variation of photoperiodic response in trees especially in two *Populus* species. Forest Science, 6:200-206.

The purpose of this study was to investigate the effect of photo periodic differences between northern and southern seedlings of aspen. The results suggest that short days inhibit the growth of aspen in Saskatchewan relative to more southerly latitudes. In addition, the proportion of root was much greater in more northerly than southerly locations.

Location: 73 H

Key words: X13

Van Camp, J., and E.S. Telfer. 1975a. Browse yield and use by ungulates in Elk Island National Park, 1973-74. Environment Canada, Canadian Wildlife Service, Ottawa. Progress Report.

This study assessed browse utilization in Elk Island National Park based on permanent transects established in 1972. Browse utilization between 1971-2 and 1973-4 were compared. In general, it was considered relative high.

Location: 83 H

Key words: X27

Van Camp, J., and E.S. Telfer. 1975b. Hare habitat and cover relationships in Elk Island National Park. Canadian Wildlife Service, Edmonton, Alberta.

The habitats used by snowshoe hare were examined based on pellet counts, runways, and other sign. Hare were found in mixedwood stands, coniferous

swamps, and deciduous forests not used by ungulates. Sites preferred by hare were dominated by dense shrubs.

Location: 83 H

Key words: X27

Van Groenewoud, H. 1961. Variation in pH buffering capacity of the organic layer of grey wooded soils. Soil Science, 92:100-105.

Methodological concerns with respect to the measurement of pH in forest soils was evaluated, and buffering can be an important factor, and pH values were often not normally distributed. The author suggests using large rather than small samples for testing.

Location: SASK

Key words: X25

Van Kooten, G.C., and L.M. Arthur. 1988. Assessing economic benefits of climate change on Canada's boreal forest. Canadian Journal of Forest Research, 19:463-470.

This paper describes a simple approach to examining the benefits of climate change given that the productivity of Canada's boreal forests are expected to increase under climate change. The author suggests that it may be premature to predict the net benefits of climate change but it may result in an overall loss to Canada and increased benefits of Canada's trading partners.

Location: ALTA, SASK, MAN

Key words: X19, X20

Van Kooten, G.C., R.E. Van Kooten, and G. Brown. 1990. Modelling the effect of uncertainty on harvest age for the boreal forest of northwestern Alberta. Forest Economics and Policy Analysis Research Unit, University of British Columbia, Vancouver, British Columbia. Working Paper 139.

Not available for review.

Van Waas, C. 1977. Biophysical analysis and evaluation of capability: Dixonville. Alberta Energy and Natural Resources, Edmonton, Alberta.

A natural resources inventory, biophysical land classification (1:126,720), and capability (agriculture, forestry, recreation, ungulates, and waterfowl) assessment were prepared for the Dixonville area.

Location: SW 74 C

Key words: X1

Van Waas, C. 1977. Biophysical analysis and evaluation of capability: Whitemud Hills. Alberta Energy and Natural Resources, Edmonton, Alberta.

A natural resources inventory, biophysical land classification (1:126,720), and capability (agriculture, forestry, recreation, ungulates, and waterfowl) assessment were prepared for the Whitemud Hills which are located northwest of Peace River.

Location: W 84 C

Key words: X1

Van Waas, C. 1978. Biophysical analysis and evaluation of capability: Whitecourt area. Alberta Energy and Natural Resources, Edmonton, Alberta. ENR Report Number 61.

A biophysical land classification (1:126,720 scale) was prepared for 2,700 km^2 in the vicinity of Whitecourt, Alberta. The primary criteria used in the classification were topography and soils. The area includes both the B18a and B19a forest sections. Canada Land Inventory equivalent ratings were given for agriculture, forestry, ungulates, and waterfowl.

Location: NW 83 G

Key words: X1

Van Waas, C., and E. Boyacioglu. 1973. Biophysical analysis and evaluation of capability: Lake George. Alberta Lands and Forests, Edmonton, Alberta.

This report presents a biophysical analysis (1:63,360) of the Lake George area. Each ecosection was described in terms of physiography, soil associations, present use, natural cover, and agro-climate zone. Suitability ratings were given for agriculture, forestry, ungulates, recreation, and waterfowl.

Location: NE 83 M

Key words: X1

Vitt, D.H. 1973. Distributional studies on bryophytes of Alberta. Bryologist, 76:505-510.

The distribution of seventeen bryophytes that occur north of 54° latitude was described.

Location: ALTA

Key words: X33

Volney, W.J.A. 1988. Insects and diseases of the mixedwood forest: problems and opportunities?, pp. 99-109. *In* Samoil, J.K., editor. Management and utilization of northern mixedwoods. Proceedings of symposium, 11-14 April 1988, Edmonton, Alberta. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-296.

The benefits and impacts of the forest tent caterpillar on the annual stemwood and foliage production of aspen are described.

Location: Not specific

Key words: X9

Volney, W.J.A. 1989. The aspen leaf beetle, pp. 3-4. *In* Forest insect and disease notes, A-013. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta.

This forest insect disease note provides the following information on the aspen leaf beetle: description; feeding patterns; life cycle; reproductive biology; and population dynamics. To date, no controls have been developed for this defoliator.

Location: Not specific

Key words: X9

Waddington, J., and S. Bittman. 1987. Control of brush regrowth in northeastern Saskatchewan by several concentrations of herbicides applied with a roller. Canadian Journal of Plant Science, 67:467-475.

The efficacy of a roller application for brush control in pastures was tested with three sites in Saskatchewan. This method appears to be successful when the regrowth is between one and two meters tall, the brush regrowth was controlled for at least two years, and individual plants received adequate treatment.

Location: 72 J

Key words: X7, X48

Waldron, R.M. 1961a. Girdling, basal spraying and frilling of mature aspen. Timber Canada, 22(12):34-35.

Not available for review.

Waldron, R.M. 1961b. Seedbed preparation for white spruce regeneration in the white spruce-aspen stands in Manitoba. Canada Department of Forestry, Forest Research Branch, Mimeo. 61-19.

Not available for review.

Waldron, R.M. 1963. Observations on aspen-suckering in Manitoba and Saskatchewan. Department of Forestry, Forest Research Branch, Winnipeg, Manitoba. Unpublished report.

Not available for review.

Waldron, R.M. 1964. Converting aspen stands to white spruce by planting and seedling on scalped strips, Manitoba. Canada Department of Forestry, Forest Research Branch, Winnipeg, Manitoba. 64-MS-16.

The methods used in an attempt to convert mixedwood stands to spruce at several Manitoba sites were described. The primary method involved the planting of rows of white spruce on cleared strips in aspen dominated stands.

Location: MAN

Key words: X6

Wall, R.E. 1969. Distribution of *Fomes igniarius* in aspen stands as affected by clonal variation. Canada Department of Fisheries and Forestry, Canadian Forestry Service. Bi-Monthly Research Notes, 25:5.

The objective of this study was to relate trunk rot incidence to cloning, in even-aged aspen stands. The results suggest that decay resistant clones may exist in any aspen stand.

Location: MAN

Key words: X9

Wall, R.E. 1971. Variation in decay in aspen stands as affected by their clonal growth pattern. Canadian Journal of Forestry Research, 1:141-146.

This study was conducted to determine the interclonal variation in decay within even-aged aspen stands, while taking into account the effects of site. The results demonstrated that there were highly significant differences among clones, in percent decay, volume of decay, and gross volumes. It was apparent that each clone had unique patterns of rot within the stem.

Location: MAN

Key words: X3, X4, X9, X13, X15

Wall, R.E., G.P. Kalra, and R. Prasad. 1971. Concentrations of micronutrients in foliage of aspen (*Populus tremuloides* Michx.) in Manitoba. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Northern Forest Research Laboratory, Edmonton, Alberta. Information Report A-X-47.

This is a preliminary investigation to obtain information on micronutrient levels of aspen foliage in Manitoba. Levels of iron manganese, copper, and zinc were tabulated. Differences in micronutrient levels in groups of trees at the same location were not statistically different, except for manganese at the Bowsman location where chlorotic trees were present.

Location: 62 O

Key words: X24, X25

Wallace, W.L. 1966. Cull in balsam poplar on Lower Peace River, Wood Buffalo National Park, Alberta. Forest Management Institute, Ottawa, Ontario.

Not available for review.

Wallis, C. 1987. The rare vascular flora of Alberta: volume 2. A summary of the taxa occurring in the Canadian shield, boreal forest, aspen parkland, and grassland natural regions. Prepared for Alberta Forestry, Lands and Wildlife by Cottonwood Consultants Ltd., Calgary, Alberta. Publication Number T/164.

This report provides a listing of the rare vascular plants found in the boreal forest among other ecological zones.

Location: ALTA

Key words: X33

Watton, E. 1982. Pembina River Provincial Park resource assessment. Alberta Recreation and Parks, Edmonton, Alberta.

Not available for review.

Weatherill, R.G. and L.B. Keith. 1969. The effect of livestock grazing on an aspen forest community. Alberta Department of Lands and Forestry, Fish and Wildlife Division, Edmonton, Alberta. Technical Bulletin Number 1.

This study evaluates the effect of grazing by domestic livestock on an aspen forest community and on some common wildlife populations therein. Trees were little affected by grazing. Taller herbs tended to be replaced by shorter and often more exotic species. Grazing was found to be beneficial for ruffed grouse, but populations of snowshoe hare, white-footed mouse, red-backed vole, and white-throated sparrows were apparently negatively affected by grazing. Grazing did not seem to affect shrews, oven birds, least flycatcher and red-eye vireos.

Location: SW 83 I

Key words: X26, X48

Webb, F.E. 1967. The implications of insect attack on aspen, pp. 21-26. *In* Trembling aspen in Manitoba. Paper presented at the 1965 annual meeting, Manitoba Section, Canada Department of Forestry and Rural Development, Canada Institute of Forestry, Information and Technical Services Division.

Not available for review.

Wehrhahn, R.L. 1981. Forage inventory of Brazeau-Pembina study area. Alberta Energy and Natural Resources, Edmonton, Alberta. T/19-2.

A forage inventory (1:50,000) was done in the Brazeau-Pembina area (3,350 km^2) in 1980. Species composition and biomass were collected for each of the twenty-eight forage types identified.

Location: SW 83 G, NW 83 B, NE 83 C, SE 83 F

Key words: X22, X26

Wehrhahn, R.L. 1982. Forage inventory of the Chungo-Cline-Nordegg study area. Alberta Energy and Natural Resources, Edmonton, Alberta. T/19-4.

A forage inventory (1:50,000) of the Chungo-Cline-Nordegg study area (3,900 km^2) was completed in 1981. Species composition and biomass were collected for twenty-two of the twenty-four forage types recognized in the area.

Location: E 83 C

Key words: X22, X26

Weldwood, R.W. 1979. Complete tree utilization: an analysis of the literature (1970-1978). Environment Canada, Canadian Forestry Service, Hull Quebec. ENFOR Project P-15.

Various aspects of whole-tree utilization are reviewed. Among the topics reviewed were the availability of biomass, harvesting systems, chipping, transportation, storage, environmental affects, and economics.

Location: Not specific

Key words: X13

Wells, J. 1979. Past utilization of hardwoods in Alberta. pp. 41-42. *In* McIntosh, J.A., and M.N. Carroll, editors. Utilization of western Canadian hardwoods, Proceedings of Symposium, Prince George, British Columbia, 21-22 November 1979. Forintek Canada Corporation, Vancouver, British Columbia. Special Publication Number SP-2.

The paper describes Zeidler Forest Industries' move away from incorporating/utilizing poplar in plywood due to the products inferiority. He suggests an alternative production factory to process poplars.

Location: Not specific

Key words: X19

Wengert, E.M. 1988. Utilization and marketing opportunities for Alberta aspen soil wood products. Prepared for Forestry Canada and Alberta Forestry, Lands and Wildlife. Canada - Alberta Forest Resource Development Agreement.

Aspen utilization can be increased if non-conventional processsing techniques are used to produce a variety of wood products. Eight general use categories of aspen were examined for their technical merits and marketing potential. These products include veneer and plywood, construction lumber, utility lumber, furniture blanks or parts, pallet stock or parts, fuel, animal feed and roughage, and animal bedding.

Location: ALTA

Key words: X19, X43

Wheaton, E.E., T. Singh, R. Dempster, K.O. Higginbotham, J.P. Thorpe, G.C. Van Kooten, and J.S. Taylor. 1987. An exploration and assessment of the implications of climatic change for the boreal forest and forestry economics of the prairie provinces and Northwest Territories: phase one. Saskatchewan Research Council, Saskatoon, Saskatchewan. SRC Publication Number E-906-36-B-87.

The implications of CO_2-induced climatic change in the boreal forest of western Canada were assessed. The authors concluded that increased CO_2 could increase tree growth rates, but the forest-grassland interface might shift northward as a result of warmer temperatures. Such a shift could affect various forestry operations.

Location: ALTA, SASK, MAN

Key words: X9, X15, X19, X26, X35, X42

Wheeler, G.W. 1989. Campbell Creek aspen regeneration grazing trial. Alberta Forestry, Lands and Wildlife, Forest Land Use Branch, Edmonton, Alberta.

Not available for review.

White, J. 1981. The allometric interpretation of the self-thinning rule. Journal of Theoretical Biology, 89:475-500.

The self-thinning rule is reviewed and an attempt was made to refine the formula.

Location: Not specific

Key words: X15, X35

Whitney, H.S., and J.A. Baranyay. 1968. An undescribed gall midge leaf spot of balsam poplar. Phytopathology, 58:262-263.

The purpose of this study was to examine a leaf spot on balsam poplar associated with gall midge (Cecidomyiidae). Based on cultures, it was postu-

lated that the cecidomiid larvae injure the leaf tissue making it susceptible to colonization by fungi.

Location: ALTA and other

Key words: X9

Williams, G.D.V. 1985. Estimated bioresource sensitivity to climatic change in Alberta, Canada. Climate Change, 7:55-69.

Climatic warming would improve productivity in northern Alberta but would reduce productivity in southern area because of increased moisture stress based on a dry-matter productivity index. The warmer conditions would potentially result in a 18 percent net increase in productivity.

Location: ALTA

Key words: X42

Winkler, R.D. 1980. Watershed stratification for flow prediction. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

See Winkler and Rothwell (1983).

Winkler, R.D., and R.L. Rothwell. 1983. Biogeoclimatic classification system for hydrologic interpretations. Canadian Journal of Forest Research, 13:1043-1050.

The purpose of this study was to determine if biogeoclimatic land classification could be used for hydrologic interpretation. The hypothesis was that the hydrologic recharge and discharge areas could be identified in a watershed using ecological survey data. The precision of prediction was low with estimated values exceeding actual values by one to four times. In simple vegetation, the use of biogeoclimatic data did not appear to an advantage, but it may be of more use in complex landscapes.

Location: SE 83 F

Key words: X1, X47

Wong, H.R. 1979. Biological observations on overwintering larvae of the large aspen tortrix in Alberta. Environment Canada, Canadian Forestry Service, Bi-Monthly Research Notes 35:21.

This note reports on the site and parasites of overwintering larvae of the large aspen tortrix in Alberta.

Location: ALTA

Key words: X9

Wong, H.R., and J.C.E. Melvin. 1974. Insects of aspen-catkins in the Canadian prairies. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-76.

The insects associated with male and female aspen catkins were described. The life history of *Epinotia nisella*, *Anathix puta*, and *Dorytomus* spp. were also briefly described.

Location: ALTA, SASK, MAN

Key words: X9

Wong, H.R., and J.C.E. Melvin. 1976. Biological observations and larval descriptions of *Enargia decolor* (Lepidoptera:Noctuidae) on trembling aspen in northern Alberta. Canadian Entomologist, 108:1213-1220.

The life history of *Enargia decolor* is described. This insect feeds on aspen foliage.

Location: NORTHERN ALBERTA

Key words: X9

Wong, H.R., J.C.E. Melvin, and A.M. Harper. 1977. Common insect and mite galls of the Canadian Prairies. Fisheries and Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Information Report NOR-X-196.

This report pictorially illustrates the more common galls and abnormal growths of the Canadian prairies caused by insects and mites. Dichotomous keys and references are supplied.

Location: ALTA, SASK, MAN

Key words: X9

Wong, R.K.W., M. English, F.D. Barlow, L. Cheng, and K.R. Tremaine. 1989. Towards a strategy for adapting to climate change in Alberta. Prepared for Alberta Agriculture, Alberta Environment, Alberta Forestry, Lands and Wildlife, and Alberta Technology,

Research and Telecommunications by Alberta Research Council, Edmonton, Alberta.

This study was a response to the increasing concern over the anticipated "greenhouse effect". It provides an assessment of the results of the global climatic models in respect to Alberta's present and future climate, an analysis of climatic records, and possible strategies for adapting to climatic change.

Location: ALTA

Key words: X42

Woodard, P.M., and M.M. Micko. 1985. A compilation of wood quality data for tree species native to Alberta. Environment Canada, Canadian Forestry Service, Edmonton, Alberta.

This report summarizes available information on wood quality of aspen and balsam poplar in the Edson, Slave Lake, and Grande Prairie areas. Similar wood quality information was also provided for lodgepole pine and white spruce.

Location: ALTA

Key words: X43

Wooley, D.E. 1972. Beaver (*Castor canadensis*) studies in the Mackenzie Valley. Chapter II. *In* Ruttan, R.A., and D.R. Wooley, editors. Studies of furbearers with proposed pipeline routes in the Yukon and Northwest Territories. Arctic Gas Biological Report Series No. 9.

The habitat of beaver was reviewed in several areas in the Northwest Territories. Population densities were primarily based on aerial surveys with some field work.

Location: NWT

Key words: X26, X27

Wynnyk, A., J.D. Lindsay, and Wm. Odynsky. 1969. Soil survey of the Whitecourt and Barrhead areas. Research Council of Alberta, Edmonton, Alberta. Alberta Soil Survey Report Number 90.

Soils were classified to the series level and mapped at a scale of 1:126,720 (7,470 km^2). General profile descriptions were provided for each series, and chemical and physical attributes were included for selected profiles. Subgroup classification needs updating.

Location: 83 J

Key words: X34

Yanchuk, A.D. 1982. Clonal variation of wood density and fibre length of trembling aspen (*Populus tremuloides* Michx.) in north-central Alberta. M.Sc. Thesis, University of Alberta, Edmonton, Alberta.

This study examined patterns of intra- and interclonal variation of wood density and fibre length of aspen. The results showed that significant differences occurred among clones. Wood density was greatest at the tree base, decreased to a minimum at mid-height, then increased again near the top of the tree. Radial wood density was greatest near the pith at all heights, decreased substantially outward, then increased again in the mature wood zone.

Location: SW 83 J

Key words: X15, X18

Yanchuk, A.D., B.P. Dancik, and M.M. Micko. 1983. Intraclonal variation in wood density of trembling aspen in Alberta. Wood Fib. Science, 15:387-394.

This paper reports on patterns of wood density variation within aspen trees at one site near Blue Ridge, Alberta. There were significant differences found among clones. Wood density seems to be greatest at the bottom of the tree, decreases to a minimum at mid height, then increases again near the top of the tree. Radially, wood density is greatest near the pith at all heights, decreases then increases again in an outward direction.

Location: SW 83 J

Key words: X43

Yanchuk, A.D., B.P. Dancik, and M.M. Micko. 1984. Variation and heritability of wood density and fibre length of trembling aspen in Alberta, Canada. Silvae Genetics, 33:11-16.

The purpose of this study was to describe the variation and heritability of wood density and fibre length among naturally occurring aspen clones in north central Alberta. The results indicate significant differences for both variables. Wood density was generally greatest near the pith, decreased immediately outside the pith, then increased in the wood zone. Fibre lengths were shortest near the pith and increased across the radius. Correlations

indicated these relationships were under genetic control.

Location: SW 83 J

Key words: X18

Yanchuk, A.D., I. Spilda, and M.M. Micko. 1987. Natural variation of extractives in the wood of trembling aspen. Agriculture and Forestry Bulletin, 9:22-24.

This study investigated the variation of benzene-alcohol extractives among naturally occurring clones of aspen. Percent extractive content showed significant clonal differences in extractives. However, the clonal heritability indicated that these differences were caused primarily as the result of environment factors.

Location: Not specific

Key words: X18

Yanchuk, A.D., I. Spilda, and M.M. Micko. 1988. Genetic variation of extractives in the wood of trembling aspen. Wood. Sci. Technology, 22:67-71.

The results of this study indicate significant differences among clones in terms of their benzene-alcohol-water extractives; however, the heritability for extractive content was low. Extractive content was highest near the pith and decreased outwardly. Genetics and phenotypic correlations between rate of growth and extractive content indicated that faster growing trees tended to exhibit less extractive.

Location: SW 83 J

Key words: X18

Yang, R.C. 1989. Growth response of white spruce to release from trembling aspen. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-302.

The effect of aspen overstory removal on white spruce grow is reviewed. The results suggest overstory removal stimulates diameter growth (up to 177 percent), increases height (42 percent), basal area and health of the white spruce. Partially a follow-up of work by Steneker (1963 and 1967).

Location: SASK, MAN

Key words: X5, X7, X15

Young, G.B. 1979. The selection, falling, measurement, weighting and subsampling of the main commercial species within the prairies and Northwest Territories, phase I. Environment Canada, Canadian Forestry Service, Hull, Quebec. ENFOR Project P-92.

Four hundred twenty trees (*Abies lasiocarpa, Picea glauca, Pinus banksiana, Populus tremuloides, Pinus contorta,* and *Abies balsamea*) were cut and sampled. A total of 20 aspen were sampled in each province. The primary emphasis was on the bole (discs removed), but subsamples were made of cones, branches, and foliage.

Location: ALTA, SASK, MAN

Key words: X15

Young, G.B. 1980. The selection, falling, measurement, weighting and subsampling of the main commercial species with the prairies and NWT, Phase II. Environment Canada, Canadian Forestry Service, Hull, Quebec. ENFOR Project P-92.

One hundred eighty trees (*Larix laricina, Betula papyrifera*, and *Populus balsamea*) were cut and sampled. A total of 20 aspen were sampled in each province. The primary emphasis was on the bole (discs removed), but subsamples were made of cones, branches, and foliage.

Location: ALTA, SASK, MAN

Key words: X15

Young, P. 1984. Calculation of interspersion for habitat region/subregion map. Alberta Energy and Natural Resources, Fish and Wildlife, Edmonton.

Not available for review.

Zalasky, H. 1968. Penetration and initial establishment of *Nectria galligena* in aspen and peachleaf willow. Canadian Journal of Botany, 46:57-60.

This study investigated the initial penetration of the periderm and leaf traces by *N. galliena* and the early disease symptoms. Results revealed that *Nectria* penetrated the periderm directly, however, the infection establishes itself in the petiole based and leaf trace more rapidly than in the periderm.

Location: MAN

Key words: X9

Zalasky, H. 1970. Disease problems of poplar in the western interior of Canada. Canada Department of Fisheries and Forestry, Canadian Forestry Service, Forest Research Branch, Edmonton, Alberta. Information Report A-X-39.

This report focuses on disease and injuries to poplar in western Canada.

Location: Not specific

Key words: X9

Zalasky, H. 1971. Frost ring resulting in a destructive canker of poplar, p. 24. In Proceedings of the Canadian Phytopathological Society, 37th session, June 21-24, 1971. University of Alberta, Edmonton.

Not available for review.

Zalasky, H. 1972. Isolation and characteristics of sclereid-like cells in sapwood of Pinus and Popular. Environment Canada, Canadian Forestry Service, Northern Forest Research Centre, Edmonton, Alberta. Information Report NOR-X-48.

This study investigates sclereid-like cells in frost rings or traumatic tissues of injured sapwood of pine and poplar species in the prairie provinces which are correlated with similar cell structure in the injured bark because of their common origin. Sclereid-like cells of poplar originate from ray parenchyma. Low temperature damage was believed to be a factor in the formation of spiral grain of wood in both pine and poplars.

Location: ALTA, SASK MAN

Key words: X13

Zalasky, H. 1975. Cell deformities in bark and sapwood caused by *Rhytidiella moriformis* and *Keissleriella emergens* infections in poplar. Canadian Journal of Botany, 53:780-783.

The purpose of this study was to examine roughbark and woody galls on balsam poplar using a new histological method of induced infections to ascertain if the different symptoms were a reflection of different cell reactions. In conclusion, both pathogens, *R. moriformis* and *K. emergens*, caused changes in cell structure and tissues of the host. However, it appeared that the trees infected with *R. moriformis* resulted in larger affected surface areas of bark and sapwood than with *K. emergens*.

Location: MAN

Key words: X9

Zalasky, H. 1977. Frost damage of poplar. Environment Canada, Canadian Forestry Service, Northern Forestry Research Centre, Edmonton, Alberta. Pest Leaflet 15-77.

Frost damage to aspen and balsam poplar is common in the prairie provinces. The risk of frost damage is most prevalent during March-April and September-October when temperatures fluctuate above and below freezing. The freezing and thawing of tree tissue results in either outright killing or growth deformities.

Location: ALTA, SASK, MAN

Key words: X9

Zias, X-J. 1987. Sulphur and its relationship to carbon, nitrogen, and phosphorus in Luvisolic soils of Saskatchewan. M.Sc. Thesis, University of Saskatchewan, Saskatoon, Saskatchewan.

This study compares the distribution of sulphur with various soil properties of deciduous, mixedwood, and coniferous boreal forest stands. Cations were most abundant in deciduous stands and decreased with increasing conifer cover; nitrogen, phosphorus, and sulphur decreased similarly, although total organic matter was similar on all sites. Sulphur decreased with depth but significant amounts occurred in the upper C horizons. Aspen had the greatest abundance of sulphur. A relative extensive bibliography is provided.

Location: SASK

Key words: X25, X34

Zoltai, S.C. 1969. Geomorphology of the Waterhen River area, Saskatchewan. Canada Department of Fisheries and Forestry, Forestry Branch, Manitoba. Information Report MS-X-19.

The geomorphology of the Waterhen area was mapped and interpreted at a 1:250,000 scale and the major climatic zones were delineated.

Location: 73K

Key words: X2

Anonymous. 1985f. Lakeland sub-regional integrated resource plan. Alberta Energy and Natural Resources, Edmonton, Alberta. Publication Number T/1-No.17.

A land use plan was prepared for an area located southeast of Lac La Biche. The planning area was zoned according to broad categories.

Location: 73 L

Key words: X11

Anonymous. 1985g. Jean D'Or Prairie subregional integrated resource plan. Alberta Energy and Natural Resources, Edmonton, Alberta. Publication Number T/1-No. 16.

A land use plan was prepared for an area located along the near Fort Vermilion. The planning area was zoned according to broad categories.

Location: 84J

Key words: X11

Anonymous. 1985h. Frost Hills local integrated resource plan. Alberta Energy and Natural Resources, Edmonton, Alberta. Publication Number T/1-No. 13.

A land use plan was prepared for an area located along the south side of Lesser Slave Lake. The planning area was zoned according to broad categories.

Location: 83 O

Key words: X11

Anonymous. 1986c. Rocky-North Saskatchewan sub-regional integrated resource plan. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number T/1-No. 8.

A land use plan was prepared for a 7,000 km^2 area west of Rocky Mountain House. The planning area was zoned according to broad categories.

Location: 83 B

Key words: X11

Anonymous. 1986d. Brazeau-Pembina sub-regional integrated resource plan. Alberta Forestry, Edmonton, Alberta. Publication Number T/1-No. 9.

A land use plan was prepared for a 2,950 km^2 area west of Drayton Valley. The planning area was zoned according to broad categories.

Location: 82 B, C, F, G

Key words: X11

Anonymous. 1986e. Nordegg-Red Deer River sub-regional integrated resource plan. Alberta Forestry, Edmonton, Aberta. Publication Number T/1-No.10.

A land use plan was prepared for a 3,820 km^2 area southeast of Abraham Lake. The planning area was zoned according to broad catgories.

Location: 83 B, C

Key words: X11

Anonymous. 1987d. Key River sub-regional integrated resource management plan. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number T/159.

A land use plan was prepared for a 1,696 km^2 area in northwestern Alberta. The planning area was zoned according to broad categories.

Location: 84C

Key words: X11

Anonymous. 1987e. Sturgeon Lake-Puskwaskau East sub-regional integrated resource plan. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number T/1-No.14.

A land use plan was prepared for a 5,830 km^2 area in the vicinity of Valleyview. The planning area was zoned according to broad categories.

Location: 83 N

Key words: X11

Anonymous. 1987f. Bear River-Wapiti local integrated resource plan. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number T/145.

A land use plan was prepared for a small area located southeast of Grande Prairie.

Location: 73 M

Key words: X11

Anonymous. 1987g. Smoky-Peace Point sub-regional integrated resource plan. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number T/1-No. 142.

A land use plan was prepared for a 821 km^2 area south of Peace River townsite. The planning area was zoned according to broad categories.

Location: 84 C, 84 N

Key words: X11

Anonymous. 1991b. Grande Prairie County West local integrated resource plan. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. Publication Number I/368.

A land use plan was prepared for a 930 km^2 area west of Grande Prairie along the British Columbia border. The planning area was zoned according to broad categories.

Location: 83 L

Key words: X11

Johnson, H.J. 1987. A review of forest research studies conducted by the Canadian Forestry Service in Alberta to 1975. Prepared for Canadian Forestry Service by Johnson Forestry Services Winnipeg, Manitoba.

The types of information available for approximately 220 uncompleted research studies in Alberta and Northwest Territories were evaluated.

Location: ALTA

Key words: X3, X4, X5, X6, X12, X13, X15,

Johnson, H.J., and R.M. Waldron. 1992. A review and field evaluation of forest research and development projects established by Forestry Canada between 1920 and 1970, Riding Mountain National Park, Manitoba. Forestry Canada, Northwest Region, Manitoba District Office, Winnipeg, Manitoba. Canada-Manitoba Partnership Agreement, Forestry Report.

Not available for review.

Peterson, E.B., and N.M. Peterson. 1992. Ecology, management, and use of aspen and balsam poplar in the prairie provinces of Canada. Forestry Canada, Northern Forestry Centre, Edmonton, Alberta. Special Report 1.

Not available for review.

Peterson, N.M. 1990. Bibliography of recent North American literature on aspen and balsam poplar to 1989, companion dBaseIV data base to Peterson and Peterson (1992). Forestry Canada, Northern Forestry Centre, Northwest Region, Edmonton, Alberta

A digital listing of literature on aspen and balsam poplar.

Location: NORTH AMERICA

Key words: Highly varied

Sidhu, S.S. 1965. Response of plant species to grazing in the forest regions of Saskatchewan. M.Sc. Thesis, University of Saskatchewan, Saskatoon, Saskatchewan.

The study compares forested, cleared and seeded areas. The results suggest that the percentage of decreaser plants is maximum in seeded and least in forested habitats, and increasers are most abundant in forested and least in seeded areas. Most forest forbs, except *Lathyrus*, increased as a result of grazing, but decreased in cleared and seeded habitats.

Location: SASK

Key words: X48