Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Soil Physical Properties, Harvest Trafficking and Aspen Regeneration Along a Catena	A project to increase understanding of the relationship between soil texture/structure, soil moisture, and soil compaction and aspen regeneration/growth to identify sites with a high risk of regeneration failure.	**Deliverables:** • Method to predict harvesting impacts to aspen regeneration based on vegetation and soil type. • Harvesting practices will be adapted to minimize impact. **Recommendations:** Pending	1998–2002	Alberta Research Council; Daishowa-Marubeni; Weyerhaeuser; Slave Lake Pulp; Ainsworth; Millar Western **Al-Pac Contact**: G. Grover
Aerial Regeneration Surveys	A comparison between field regeneration surveys and 70 mm aerial photography. Interpretation of photographs is accurate enough to assess density and height of aspen suckers. Tool has been approved by the Department of Sustainable Resources as an acceptable regeneration survey method.	**Results**: • An aerial survey eliminates access problems, is more economical, faster, and provides records. **Recommendations:** • Implemented photographic regeneration survey.	Completed	Timberline Consultants **Al-Pac Contact**: G. Grover
Aspen Dynamics in Regenerating Stands in the Boreal Forest I	A project that examines: 1) The effect of cold soils (as under *Calamagrostis* litter) on growth of aspen suckers; 2) The effect of *Calamagrostis* competition under different nutrient regimes; 3) Root systems in declining and healthy aspen stands, as well as, regenerating aspen cutblocks of varying sucker densities; 4) Can a large depleted root system be a liability to the regenerating stand? 5) Light response of shade tolerant and intolerant tree species; 6) Effect of partial removal of an aspen clone on suckering.	**Results:** • Increased knowledge in mechanisms of aspen regeneration that can be valuable for difficult sites and partial harvests. **Recommendations:** • Decadent stands will sufficiently sucker. • *Calamagrostis* control important for aspen suckering.	1997–2001	University of Alberta; Daishowa-Marubeni; Weyerhaeuser; Millar Western; Ainsworth; Slave Lake Pulp **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Aspen Dynamics in Regenerating Stands in the Boreal Forest II	1) Root carbohydrates are essential for nourishing aspen suckers and the vigour of aspen suckers can be attributed to these carbohydrate stores. There is anecdotal evidence that aspen in northern climates store carbohydrates in the shoots during winter. This project examines carbohydrate dynamics between aspen root and shoot systems in summer and winter. 2) Site preparation for conifer seedlings may increase the density of aspen suckers. Alternatively, damage to the root system could also lead to disease or mortality of the aspen suckers. This project evaluates the density and health of aspen suckers after various methods of site preparation.	**Deliverables:** • Increased knowledge in mechanisms of aspen regeneration that can be valuable for difficult sites and partial harvests. **Recommendations:** Pending	2000–2004	University of Alberta; Daishowa-Marubeni; Weyerhaeuser; Millar Western; Ainsworth; Slave Lake Pulp **Al-Pac Contact**: G. Grover
Post-Harvest Burning to Enhance Aspen Regeneration	*Calamagrostis canadensis* (a type of grass) forms an insulating layer in some cutblocks that prevents the soil from warming and reduces aspen suckering. Burning grass and other litter while blackening the soil surface can greatly enhance soil warming and might accelerate aspen suckering over grass re-growth. This project explores use of a propane-powered flamer mounted on a tractor to burn litter under non-fire danger conditions.	**Deliverables:** • A silviculture tool to enhance aspen regeneration in areas with heavy grass competition (e.g., decadent aspen stands). **Recommendations**: Pending	2000–2002	Alberta Research Council; Weyerhaeuser **Al-Pac Contact**: G. Grover
Stand Condition and Site Factors Affecting the Regeneration of Healthy-Mature and Over-Mature Aspen	This project has 2 components: 1) Aspen decadence: identify causal factors in clone decline and potential site/clone limitations to achieve stocking and growth standards. 2) Harvesting impacts on suckering: assess the importance of season of harvest and direct root damage to the regeneration of aspen suckers.	**Results:** • Increased knowledge in mechanisms of aspen regeneration that can be affected by decadence, soil characteristics and harvesting. **Recommendations:** • Optimal harvesting strategies can be chosen.	1997–1999, monitoring phase	Alberta Research Council; Daishowa-Marubeni; Weyerhaeuser; Millar Western; Ainsworth; Slave Lake Pulp **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Suppression of Aspen Suckering under Logdecks	Suckering can only be suppressed (i.e., by log decks) for a certain length of time before the roots lose their ability to produce shoots. This project seeks to determine the length of time aspen roots tolerate suckering suppression.	**Results:** • Aspen roots rapidly die after harvesting regardless of suppression of suckering. After one year suckering ability was still sufficient to regenerate the stand. **Recommendations**: • Bush inventories should not be left for more than one growing season.	1998–2001	Alberta Research Council; Ainsworth **Al-Pac Contact**: G. Grover
The Influence of Snow and Duff Depth on Soil Freezing and Subsequent Compaction (Winter Catena)	This project will investigate soil freezing as influenced by moisture content and insulating layers. It will also suggest possible solutions such as disturbance of the insulating layer by feller-bunchers, which will aid in soil freezing.	**Deliverables:** • Methodology to assess possible compaction problems on winter ground due to insufficient freezing and possible mitigative strategies. **Recommendations**: Pending	2000-2005	Alberta Research Council; Daishowa-Marubeni; Weyerhaeuser; Slave Lake Pulp; Ainsworth; Millar Western **Al-Pac Contact**: G. Grover
Destruction of Aspen Regeneration	Repeated destruction of aspen suckers may result in the inability of the parent roots to provide more suckers. Knowledge of the time during which regeneration is vulnerable versus able to repeat suckering after destruction will decrease the impact of repeated entry into a cutblock. On the other hand, stand tending will explore the time during which aspen suckers are vulnerable to destruction.	**Results:** • Aspen suckers increased in density after destruction regardless of age. A second cutting resulted in slightly lower densities than the original. **Recommendations**: • The impact of repeated block entry on regeneration is negligible if aspen suckers are relative young (height concern). • Stand tending has to be done at least twice to reduce aspen density slightly. Explore better stand tending methods.	1998–2001	Alberta Research Council **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Cost/Benefit Analysis of Different Methods of Slash Dispersal	The costs and impact on aspen regeneration were evaluated for several methods of slash dispersal.	**Results:** • Slash accumulation, compaction and delayed hauling can severely affect suckering density and height. **Recommendations**: **Implemented** • Al-Pac has changed slash dispersal from spreading to piling in narrow windrows.	1997–2000	Alberta Research Council; Daishowa-Marubeni; Ainsworth; Forest Engineering Research Institute of Canada **Al-Pac Contact**: G. Grover
Development of Reclamation Guidelines	Surveys of several blocks logged in 1993/94, as well as, examination of other companies' slash disposal practices will lead to development of reclamation guidelines that will be cost-effective and allow for maximum regeneration. We are currently evaluating the effectiveness of reclaiming slash with the log loader by piling it into narrow windrows. Productivity studies and aspen regeneration surveys will be completed.	**Results:** • Amalgamated from literature review and field observations. **Recommendations**: **Implemented** • New, cost-effective reclamation guidelines.	2000	**Al-Pac Contact**: G. Grover
Decompaction of Roads	This project evaluates the effectiveness of ripping the road surface with a bulldozer to aid in the decompaction process measured by the performance of planted white spruce, jack pine and aspen seedlings, and black poplar cuttings.	**Deliverables:** • Assessment of the ability of various seedling types to grow in compacted vs. "ripped" soil. **Recommendations**: Pending	1999–2002	Forest Engineering Research Institute of Canada **Al-Pac Contact**: G. Grover
Soils Conservation Guidelines	Soils are one of the most important resources that provide future forest health and productivity. Rutting, compaction, erosion, nutrient loss, etc., can lead to site degradation that is difficult or impossible to reverse. To conserve forest soils proactively, soils conservation guidelines will be implemented.	**Deliverables:** • Guidelines that effectively conserve forest soils through adequate forest practices. **Recommendations**: Pending	2000–2002	Internal project **Al-Pac Contact**: D. Chromik
Aspen Juvenile Mortality Study	Different harvesting regimes, stands and sites produce different aspen sucker densities. Is the final stand density related to initial density or do stand densities merge at one point in time? What are the dynamics of sucker mortality and do they change with different sucker densities?	**Deliverables:** • Accurate modeling of aspen growth and Annual Allowable Cut (AAC) calculations. • Regeneration standards based on science. **Recommendations**: Pending	2000–2004	Alberta Research Council; Daishowa-Marubeni; Weyerhaeuser; Slave Lake Pulp; Ainsworth; Millar Western **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Mixedwood Characteristics and Understorey Inventory of the Forest Management Agreement (FMA) Area	Using leaf-off Alberta Vegetation Inventory (AVI) data, the FMA area will be characterized by the amount and distribution of pure aspen stands, pure spruce stands and mixed aspen/spruce stands. Age and frequency distribution of spruce understorey is important as the previously excluded understorey can replace white spruce volumes for future harvest. Growth and yield information in white spruce understorey may be gathered from the photography or by gathering field data. Landscape analysis of understorey distribution will also be of importance.	**Results:** • Natural distribution of mixed versus pure stands. • Understorey characterization (delay to spruce recruitment). **Recommendations**: • Data will be incorporated in growth and yield curves.	1997–2000	Timberline Consultants **Al-Pac Contact**: G. Grover
Natural Regeneration of White Spruce in Relation to Mast Year Occurrence	Burns of various ages are being studied to examine white spruce regeneration in relation to previous stand composition and location from residuals/burn edge. This project relates the age and density of white spruce seedlings to the absence/presence of a white spruce seed mast year within two years of stand initiation (wildfire). The data will be compared to the Regenerated Yield Standards Initiative (RYSI) study on white spruce regeneration in cutblocks (see below).	**Results:** • Natural white spruce regeneration is related to mast year occurrence. • Most white spruce ages are underestimated due to missing growth rings. **Recommendations:** • Add to coniferous stand structure guidelines for leaving residual material. • Include results in growth and yield curves for natural stand development.	1998–2002	University of Alberta; Network Centres of Excellence **Al-Pac Contact**: G. Grover
Analysis of Regenerated Yield Standards Initiative (RYSI) Data	The Alberta government initiated a province-wide survey of white spruce regeneration in 7- to 32-year-old cutblocks. Data on white spruce density, height, competition, aspen densities, ecosite, and site preparation method were collected. This project analyzed the data from FMA specific ecological sub-regions.	**Results:** • Information on artificial and natural white spruce regeneration after harvesting. **Recommendations**: **Implemented** • Data was incorporated in yield curve development.	1998	Timberline Consultants **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Light Model for Understorey Development	This project continues development of a model that predicts the amount of light transmitted through overstorey canopy and shrub layers to the ground.	**Results:** **Recommendations**: **Implemented** • A tool to predict development of white spruce understorey or aspen suckering in an existing stand or a stand modified through partial harvesting. • Model can be used to select suitable aspen stands for underplanting. • Light model will be incorporated into Mixedwood Growth and Yield Model (MGM) in 2003.	1997–1998	University of Alberta **Al-Pac Contact**: G. Grover
Growth Rates of Understorey White Spruce and Incorporation into Mixedwood Growth Model (MGM)	An accurate prediction understorey white spruce dynamics and growth rates is vital for mixedwood growth and yield curves, and implementation of mixedwood management. This project is collecting data on early stand development regarding white spruce recruitment and the data will be incorporated into MGM.	**Deliverables:** • Accurate modeling of white spruce recruitment and juvenile growth. • Accurate Timber Supply Analysis. **Recommendations:** Pending	2000–2002	University of Alberta; Vanderwell; Weyerhaeuser; Louisiana Pacific **Al-Pac Contact**: G. Grover
Develop Mixedwood Growth and Yield Curves	Currently used and approved yield curves do not model mixedwood growth with great accuracy and do not allow for innovative silviculture/harvesting interventions. New mixedwood growth and yield curves are developed using empirical data, MGM outputs and scientific data/expert opinion.	**Results:** • Mixedwood yield curves have been developed. **Recommendations:** • Approved for L1. • Verbal approval for FMA.	2000–2001	Forestry Corp; Vanderwell **Al-Pac Contact**: G. Grover
Current Knowledge of Productivity and Biodiversity of Mixedwood Stands	This project was a literature survey that gathered information on mixedwood aspen and white spruce interactions, especially as related to productivity and biodiversity.	**Results:** • Increased knowledge of the characteristics of mixedwood stands. • Identification of knowledge gaps for future research directions. **Recommendations**: Implemented • Project to address productivity of mixed versus pure stands has been initiated.	1998	University of Alberta **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Productivity of Mixedwood Stands	This project will quantify productivity of mixedwood stands compared to pure aspen or white spruce stands.	**Results:** • Mixed stands have greater overall productivity. • Mixedwood Management can improve yields. • Improved mixedwood growth and yield curves. **Recommendations**: **Implemented** • Mixedwood Association formed to address future research and management needs.	1998–2000	University of Alberta **Al-Pac Contact**: G. Grover
Growth Rates of Understorey Juvenile White Spruce	This project examines the effect of shading and water stress on growth rates of white spruce seedlings growing in an understorey of aspen.	**Deliverables:** • Assessment of white spruce survival and growth in understorey vs cutblock. **Recommendations:** Pending	1998–2001	Alberta Research Council **Al-Pac Contact**: G. Grover
Resource Utilization of Aspen and White Spruce	Aspen has been recognized as a nurse crop to white spruce seedling establishment, through decreasing incidence of insect attack and moderation of the micro-climate. There has also been speculation on nutrient cycling and myccorhizal interactions. This project examines the effect of aspen on white spruce seedling mortality and growth rates through interchange of nutrients and myccorhizae.	**Deliverables:** • Understanding of the facilitative/symbiotic relationship between aspen and white spruce. • Quantification of the effect aspen nurse crop has on white spruce mortality and growth rates. **Recommendations**: Pending • Goal: Decreased use of herbicide by quota holders and maintenance of aspen components in white spruce plantations, thus maintaining mixedwood characteristics of the boreal forest and ensuring future incidental aspen wood supply.	1998–2004	Alberta Research Council **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
White Spruce Understorey Protection	In order to maintain mixedwood characteristics of the boreal forest, methods have to be developed to harvest these stands in a way that fits into the natural disturbance model and will regenerate the stand as a mixedwood stand. This project examines operational constraints in protecting spruce understorey (cost/benefit analysis), as well as the effects of this harvesting protocol on aspen regeneration (soil compaction, soil warming, moisture, light, etc.) and white spruce release (enhanced growth increments).	**Deliverables:** • Increased aspen supply to Al-Pac on the FMA area (stands with dense spruce understorey are usually delayed until the spruce matures, thus the aspen are lost). • Increased white spruce supply to quota holders (released spruce will reach maturity faster). **Recommendations**: Pending	1997–2004	Alberta Research Council; Vanderwell **Al-Pac Contact**: G. Grover
White Spruce Understorey Enhancement	As part of a larger mixedwood management initiative, this project examines the effects of varying percentages of white spruce residuals on establishing a white spruce understorey in an aspen regenerating cutblock. Seedbed availability (partial scarification) and seedbed preference (artificially created microsites) are also studied.	**Deliverables:** • Knowledge of seedbeds that are receptive and can be created without major disturbances. • Knowledge about success of seed tree retention and natural white spruce regeneration. **Recommendations:** Pending	1998–2004	Alberta Research Council **Al-Pac Contact**: G. Grover
White Spruce Understorey Introduction to Young Aspen Stands	Mixedwood management may lead to decreased white spruce monoculture plantations, yet quota holders depend on a continuous wood supply. Increased coniferous volume may be created by underplanting pure young aspen stands that can later be harvested with understorey protection.	**Deliverables:** • Increased coniferous volumes for quota holders that might increase possibility of quota holder buy-in into Ecologically Sustainable Forest Management (ESFM). • Development of a tool that secures white spruce stocking without expensive scarification after logging. **Recommendations:** Pending	1998–2004	Alberta Research Council **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Underplanting Mature Aspen Stands With White Spruce	In nature, the majority of stands convert from spruce to aspen (after disturbance) and vice versa (maturing stands). Rather than planting white spruce in cutblocks with competition (*Calamagrostis*) etc., underplanting of mature aspen stands will leave the site stocked with established white spruce seedlings after aspen harvest.	**Results:** • Successful establishment of white spruce under aspen canopy. **Recommendations**: • A tool to be used in Mixedwood Management, especially on sites prone to *Calamagrostis.*	1995–1997, monitoring ongoing	University of Alberta **Al-Pac Contact**: G. Grover
Influence of Site Preparation and Seedling Stock on Performance of Underplanted White Spruce Seedlings	Different site preparation methods (blading, ripping, mixing) are evaluated for white spruce seedling performance (five different stock types) under an aspen canopy in five different stands. Seedlings were harvested four years after planting and growth rates and nutrient levels are analyzed.	**Results:** • Blading reduced nutrient flow to seedlings. • Site preparation did not significantly increase seedling survival. • Site preparation did lead to aspen die back. **Recommendations**: • Establish white spruce seedlings under an aspen canopy without site preparation.	1997–2001	Canadian Forest Service **Al-Pac Contact**: G. Grover
Re-Evaluation of Old Canadian Forest Service Research Sites	CFS research into underplanting of white spruce, white spruce release and partial harvesting had been initiated in the 1960s. These sites are being re-measured and will provide 40 years of data.	**Results:** • Growth rates of underplanted white spruce. • Magnitude of individual white spruce release. **Recommendations**: • Results to be incorporated into growth and yield curve development.	1999–2000	Canadian Forest Service; Vanderwell; Millar Western; Slave Lake Pulp; Zeidler; Weyerhaeuser **Al-Pac Contact**: G. Grover
Field Induction of Flowering in White and Black Spruce Trees by Treatment With Gibberellin GA4/7	Injection of plant hormone Gibberellin GA4/7 plus overlapping girdling has been shown to be successful in inducing flowering and seed production in Pinaceae species. Four different dosage regimes plus/minus girdling is being tested for best results.	**Results:** • Girdling and injection of GA4/7 did successfully induce flowering in white and black spruce trees. **Recommendations**: • Superior white and black spruce seed supply can be assured in poor seed years.	1997–2002	University of Calgary; Network Centres of Excellence **Al-Pac Contact**: G. Grover

Silviculture Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Socio-Economic Implications of Mixedwood Management	Economical advantages of coniferous and deciduous operators jointly managing the mixedwood system were explored.	**Results:** • Increased harvesting costs due to partial harvesting systems (understorey protection, seed tree selection, etc.) as well as possible delay in white spruce regeneration will be offset against decreased silvicultural costs (no scarification, planting and tending) and increased white spruce growth rates after removal of the aspen overstorey. **Recommendations**: • Knowledge of the economic benefits of mixedwood management will aid in changing government regulations and quota holder.	1998	Alberta Research Council **Al-Pac Contact**: G. Grover
The Effect of Glyphosate herbicide on Aspen Survival and Re-Growth	This project will explore the effect of glyphosate (sprayed on some white spruce cutblocks) on aspen survival, re-sprouting, and especially health, quality and future yield forecast of the deciduous component.	**Deliverables:** • Accurate assessment of aspen performance after glyphosate exposure. • Accurate growth and yield modelling for white spruce plantations. **Recommendations**: Pending	2001-2003	Alberta Research Council; Weyerhaeuser; Vanderwell; Millar Western **Al-Pac Contact**: G. Grover
Develop a Mixedwood Management Database	This project incorporates information on mixedwood management trials into a database.	**Results:** • Bibliography. **Recommendations**: • Incorporate into growth and yield curve development. • Gap analysis for future research.	1999	Alberta Research Council; Daishowa-Marubeni; Weyerhaeuser; Slave Lake Pulp; Millar Western; Ainsworth **Al-Pac Contact**: G. Grover

Fibre Enhancement Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Poplar Molecular Genetics Cooperative (PMGC)	Al-Pac is participating in a University of Washington-based Cooperative whose objectives are to increase the understanding of the molecular genetic mechanisms underlying adaptability in different environments.	**Results:** • Development of a genetic map identifying genes linked to adaptability in several hybrid families of poplars. • Development of microsatellites for genotyping of poplars and aspens. • Accessed hybrid material for tree improvement poplar program. **Recommendations:** • PMGC to continue a service of DNA fingerprinting where needed.	2002	University of Washington; Poplar Molecular Genetics Cooperative **Al-Pac Contact**: B. Thomas
Growth and Physiology of Aspen and Hybrid Poplars in Northeastern Alberta	A series of field and greenhouse trials were established in 2000 to better understand the growth and physiology of early establishment in aspens and poplars with regards to the poplar farming program. Different fertilizers and silviculture treatments were tested to favour growth and establishment. New trials will be established in 2001.	**Results: Preliminary** • Rooted hot-lifted stock entered dormancy at planting and did not regrow in spring 2000. • 25 cm-long unrooted cuttings outperformed rooted and 40 cm-long unrooted cuttings. • Survival rates of unrooted cuttings were ~50% for the Walker and Assiniboine clones, ~80% for Northwest clone. • Best Practices silviculture manual for poplar farm establishment produced. **Recommendations**: **Preliminary** • Refer to Best Practises document for recommendations and details.	In progress till 2003	University du Quebec; New Dendrology Inc. **Al-Pac Contact:** B. Thomas
Prairie Farm Rehabilitation Administration (PFRA)	Al-Pac developed a relationship with the PFRA for sharing costs in the poplar breeding program. Silviculture research needs being considered (e.g., herbicide trials).	**Results:** • 2001 and 2002 breeding program with hybrid poplars completed. • 2001 seedlings in nursery trial.	Project from 2001–2005	Prairie Farm Rehabilitation Administration **Al-Pac Contact:** B. Thomas

Fibre Enhancement Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		Recommendation: Pending		
Effect of Increased Carbon Dioxide (CO_2) on Aspen and Hybrid Poplar Growth	This project was designed to assess the impact of increased CO_2 on the growth and performance of aspen and hybrid poplar clones and determine the allocation and sequestration potential of this material after outplanting.	• **Results: Preliminary** • Trees (aspen and hybrid poplars) show significantly greater growth under doubled ambient CO_2 levels in the greenhouse. • After outplanting to two agricultural sites and two Oil & Gas sites, mortality was reduced with the high CO_2 treatment for aspen planted at the Syncrude site. **Recommendations:** Pending • Determine effect of CO_2 required to produce trees for target sites. • Consider implementation of early selection based on greenhouse performance.	In progress until 2003. Data analysis completed for 2001	University of Alberta **Al-Pac Contact:** B. Thomas
Poplar Hybridization Project	A risk assessment for utilizing hybrid and exotic poplars in Northern Alberta.	**Results:** MSc. Student completed thesis in 2002. • Hybrid poplars in shelterbelts in northern Alberta can hybridize with native balsam poplar under greenhouse conditions. • Native and non-native poplars and aspens have overlapping flowering patterns (see thesis). • In trees less than 5-years of age, leaf morphology characteristics were not deterministic in identifying hybrids. **Recommendation:** • Ensure silvicultural techniques are used to minimize the chance	2000–2004, 1st year data collected	University of Alberta **Al-Pac Contact:** B. Thomas

Fibre Enhancement Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		of hybrid seedling establishment. • Review thesis results and discussion. • Continue with molecular genetics work on identification of hybrids.		
Mycorrhizae Fungae and Fertilizer for use in Aspen/Poplar Planting	A project to determine the growth potential of utilizing different mycorrhizae slurries and optimal greenhouse fertilizer regimes in combination when planting poplar and aspen onto previously cleared agricultural lands.	**Deliverables:** • Two trials, 12 treatment combinations, with native aspen, balsam and hybrid poplars. **Recommendation:** Pending • Completed report Fall 2002.	2002 completion	University of Alberta **Al-Pac Contact:** B. Thomas
Gender Determination of Aspen	A project to develop molecular markers to assist with the determination of the gender of an aspen tree in order to assist with the tree improvement programs currently underway.	**Results:** Preliminary • A molecular marker has been found to identify male clones although not always present. **Recommendation:** Pending	Complete 2001	University of Alberta **Al-Pac Contact:** B. Thomas
Rust Disease and Clonal Resistance	An assessment of the potential risk of Melampsora rust through determination of clonal resistance and understanding the natural species in northeastern Alberta.	**Results:** • Different species of rust were identified on poplars vs aspens. • Currently rust appears to have an insignificant effect on the trees. **Recommendation:** • See final report by Dr. Pat Crane, Feb. 2002. • Avoid planting poplar farms near larch.	Complete 2002	University of Alberta **Al-Pac Contact:** B. Thomas
British Columbia Research Inc. (BCRI)	This project is aimed at the developing an economically robust method of propagation for commercialization of superior aspen and hybrid aspen clones as they come on line from our breeding program.	**Results:** • Initial propagation protocols identified through previously funded work. **Recommendation:** • Pending economic analysis.	In progress	British Columbia Research Inc. **Al-Pac Contact:** B. Thomas

Fibre Enhancement Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Carbon Sequestration by Poplars (BioCap)	This project addresses national carbon sequestration issues with a focus on afforestation and agroforestry as one of four components.	**Deliverables:** • Membership on Research Overview Committee and AgroForestry and Reforestation Advisory Council **Recommendation:** Pending	2002–Ongoing	BioCap Foundation; Queen University **Al-Pac Contact:** B. Thomas; K. Plourde
Silk Moth	This project involves the development of a commercial pheromone lure for detection of exotic satin moth, *Leucoma salicis*, populations in Alberta.	**Deliverables:** • Final Report **Recommendation:** • Pending final report.	2002 complete	Sustainable Resource Development **Al-Pac Contact:** B. Thomas, D. Fox
Pollen Study	Pollen flow around the mill is being monitored to help understand and assist with minimizing the risk of hybridization from our hybrid trees. This project also includes some work on the catkin moth, pollen development and viability testing.	**Results:** Preliminary • Strong trends in seasonality of species pollen disbursement. • Site variability and year are also strong contributors to overall trends. **Recommendations:** • Pending results from scanning electron microscopy of poplar pollen.	Complete 2002 (3 years)	University of Alberta; Canadian Forest Service **Al-Pac Contact:** B. Thomas
Tree Improvement Program	An on-site tree improvement for both aspen and poplar for both the poplar farms and FMA area needs.	**Results:** • Ongoing tree improvement cycle with new material being selected or bred. • Tested and selected at different stages of growth for different traits. **Recommendation:** • Follow 'Recommended Clones' guide.	Ongoing program	**Al-Pac Contact:** B. Thomas
Evaluation of Hybrid Poplars for Oil Sands Reclamation	Clonal selections of hybrid poplar are being tested in a companion trial at Syncrude to determine suitability of stock for reclamation sites. Material from Kazakhstan is also being screened for salt tolerance on a consolidated tailings site at Syncrude.	**Results:** • Survival variable. **Recommendation:** • Pending further performance assessment.	Ongoing program	Syncrude **Al-Pac Contact:** B. Thomas

Fibre Enhancement Research

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Poplar/Aspen Tree Improvement	An extensive selection and tree improvement program designed to produce new material on an on-going basis for continuous improvement of the material being planted into the poplar farm program. The project also aims to provide superior native balsam poplars for reforestation on the FMA area.	**Results:** • Extensive testing is underway to assess new material. • New hybrid breeding material is being produced for both aspen and poplars. **Recommendation:** • From current clonal material available, 6-8 clones have been selected to kick-start the operational implementation of the poplar farm program.	Ongoing program	**Al-Pac Contact:** B. Thomas

Effects of Landuse on Animals and Plants

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Woodland Caribou Ecology and Response to Industrial Development in Northern Alberta	A large, ongoing, government-industry research program. More than 300 caribou have been radio collared since 1991. Studies have addressed: • habitat use • predator-prey interactions • population dynamics • effect of industrial activity For details and a list of publications see: http://www.deer.rr.ualberta.ca/caribou/BCRP.htm	**Results:** • Caribou inhabit peatlands throughout the FMA area. • Wolves are the major predator of caribou in northern Alberta. • Caribou avoid roads, wells and seismic lines within their ranges. • Roads act as semi-permeable barriers to caribou movements. **Recommendations:** • Landuse guidelines revised in 2001 (see BCRP website for details). • Range planning process launched in 2002. • Important species for Integrated Landscape Management (ILM) plans (i.e., coordinating activity within and between different industrial sectors).	Ongoing since 1991	Boreal Caribou Research Program **Al-Pac Contact**: E. Dzus, S. Dyer, T. Gaboury
Moose Ecology	Moose are likely the most valued wildlife species in Al-Pac's Forest Management Agreement (FMA) area. As such Al-Pac has invested in understanding the relationships between moose and their habitat on the FMA area. Such information will be combined with the wealth of scientific and traditional knowledge to create management plans that incorporate moose management objectives within the broader planning framework that Al-Pac operates within.	**Results:** • Moose responses to habitat composition are rather complex, and moose appear to depend highly on interactions among the quantity and quality of various habitat features on the landscape. • Access management may be as or more important than habitat enhancement for sustainability of healthy moose populations. **Recommendations:** • Given the adaptability moose display toward variable habitat, Al-Pac believes the habitat needs of moose will be best addressed by the present system	1994–Ongoing	University of Alberta **Al-Pac Contact**: T. Osko

Effects of Landuse on Animals and Plants

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		of structured harvest guided by our Ecosystem Management principles (i.e., the coarse-filter approach). (Implemented) • Al-Pac's aim is to establish partnerships with stakeholders to build consensus with respect to access management and other moose management issues within the FMA area. (Under Review) • The goals of this cooperative approach among the company, government agencies, and various user groups will be to: 1. Formulate comprehensive moose management plans for the FMA area. 2. Address issues of habitat manipulation, and moose harvest. 3. Manage human access through use of educational signs, non-hunting corridors, reclamation of roads and other access management techniques. 4. Participate in improvement of "moose management zones" established by the provincial wildlife agency to protect moose during critical periods.		
Alberta Forest Biodiversity Monitoring Program (AFBMP)	A collaborative venture to implement a comprehensive, long-term monitoring program to measure success towards the goal of sustainable development in Alberta's forests. The program focuses on: • landscape structure and diversity	**Results:** • Protocols drafted, field tested and revised (March 2002). **Recommendation:** • Prototypes should be evaluated. (Note: Al-Pac and Alberta	1997–Onwards into the future	See website for list of contributors and additional details (www.fmf.ab.ca/pro.html). **Al-Pac Contact**: E. Dzus

Effects of Landuse on Animals and Plants

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
	• habitat structure • number of species of selected groups of organisms • anthropogenic disturbance For details and a list of publications see: http://www.fmf.ab.ca/pro.html	Research Council to launch prototypes in 2002.) • Governance model and funding strategies to be proposed by senior government and industry staff in 2002. • Broadscale implementation pending results of prototypes, governance and funding.		
Biodiversity Indicators Research Group of the Sustainable Forest Management Network (SFMN)	An initiative through the Sustainable Forest Management Network to work on "Validation Monitoring" which determines key relationships between management activities and observed effects. The SFMN Biodiversity Indicators Research Group will function as a n interim research arm of the Alberta Forest Biodiversity Monitoring Program.	**Results:** Pending **Recommendation:** Pending	Initiated in 2000, ongoing	University of Alberta **Al-Pac Contact**: E. Dzus
Cumulative Effects Assessment Using ALCES (Aspatial Landscape Cumulative Effects Simulator)	Forem Technologies (in consultation with Alberta-Pacific and others) has created an aspatial computer model to evaluate the cumulative effects of the 'human footprint' on future wood supply and ecological patterns. This comprehensive model allows rapid evaluation of alternative management actions. For details see: http://www.foremtech.com/	**Results:** • Overlapping industrial practises under 'business-as-usual' in the forestry and energy sectors will have negative effects on habitat fragmentation and wood supply. **Recommendation:** • Alberta-Pacific has engaged the energy sector in an Integrated Landscape Management initiative to increase coordination of activities within and between industries to minimize the effects of future 'human footprint' (**Implemented**).	1998–Ongoing	Forem Technologies; Alberta Chamber of Resources; Government of Alberta **Al-Pac Contact**: B. Rabik; D. Pope; S. Dyer
Biodiversity in Cutblocks with a Few Large Versus Many Small Residual Patches of Trees and Snags	This study evaluated the extent to which biodiversity in cutblocks was affected by the size, number and spacing of tree patches that were left after harvest. Twelve experimental cutblocks were created in each of two study areas. Within each of the cutblocks, 3% of the pre-harvest merchantable trees were retained	**Results:** • As this study only examined two years post-harvest, it is not surprising that for all biotic communities studied, cutover habitats incorporated many open	1997–2000	Alberta Research Council **Al-Pac Contact**: T. Gaboury, E. Dzus

Effects of Landuse on Animals and Plants

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
	in patches. One third of cutblocks had patches with a mean size of either 0.64 ha, 0.14 ha or 0.04 ha. Study focused on the biotic community (low and tall understorey, beetles, bats, red squirrel, amphibians and birds); secondary objectives included evaluating falldown rates of trees and snags left standing after harvest. Sampling occurred one year before harvest and two years after harvest.	country and pioneering species that were absent or rare in continuous old forest. • For many groups (understorey vegetation, beetles, squirrels, birds) large residual patches had more similar communities to continuous old forest than did small residual patches. • Falldown rates of trees and snags increased as patch size decreased. **Recommendation:** • Residual patches create refugia or 'lifeboats,' for some forest species, with large residual patches creating refugia for more biota than small residual patches. Managers should retain a variety of different patch sizes in cutblocks. (**Implemented**) • Retaining residual patches near the cutblock edge, in conjunction with retaining non-merchantable trees and shrubs, will incorporate additional forest biota (birds and squirrels) into the cutblocks. (**Implemented**) • Managers should not rely on tree patches as the only habitat for forest biota and should retain adequate amounts of old forest on the landscape (being implemented through Forest Management Planning process). • Large residual patches in this study were 0.8 ha; it may be necessary to leave 10-40 ha		

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Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		patches to retain all biota in continuous old forest. (In Review)		
Evaluation of Alternative Policies and Practises	The Boreal Ecology and Economics Synthesis Team (BEEST), in partnership with Al-Pac and other industrial operators, is investigating the effects of various policy alternatives on ecology of the boreal forest ecosystem and economics of operating therein. The research provides a bridge between science and the application of sustainable forest management practises. Primary areas of research interest include: • Improved understanding of the relationships between natural processes and human activities • Development of tools capable of incorporating these interactions • Analysis of policy alternatives See . http://www.rr.ualberta.ca/research/beest/ for more details	**Results:** • A three-year study of Alberta land tenure systems indicated that costs of the present tenure arrangements (economic and environmental) are substantial enough to warrant a thorough examination of forest policy in Alberta with respect to landbase designation and overlapping tenure. **Recommendation:** • Forest landbase should be managed as a single or common landbase (as opposed to deciduous versus coniferous areas). **(Implemented by Alberta Sustainable Resource Management 2001)**	1997–Ongoing	BEEST researchers; Alberta Government; Weyerhaeuser **Al-Pac Contact**: E. Dzus
Trapper Monitoring Program	This program was developed as an integral part of the trapper compensation program. Trappers affected by logging activities have the choice between compensation for long-term loss of habitat or to enter the monitoring program which can return a greater monetary benefit than compensation. The trapper in turn will keep accurate records of trapping efforts and catches, that can be used to monitor furbearer populations and the effects of timber harvesting.	**Results:** • Although trends are visible that indicate changes in furbearer populations seasonally, none of the changes are statistically significant. Small sample size and large variation in trapping effort are contributing factors to the uncertainty. **Recommendation:** • A monitoring program that is not tied to the compensation program may improve data collections.	1994–Present	**Al-Pac Contact**: M. Spafford

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Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Winter Habitat Use by Fishers	A two-year study was conducted in Alberta's boreal mixedwood forests to compare winter habitat use of fisher in harvested and unharvested landscapes. Information on home ranges, relative abundance, food habits and morphometric (body size) measurements were also obtained.	**Results:** • Capture rates, relative abundance and home range size was similar in harvested and unharvested study areas. • Fishers showed increased use of areas with greater canopy height and more snowshoe hare tracks. • Radio telemetry indicated no habitat selection by fishers within home ranges. **Recommendation:** • Suggest continued monitoring of fisher populations during the low phase of the hare cycles (especially after the next harvesting pass). • Forest harvesting practices should leave residual patches, downed woody material and brushpiles in cutblocks; especially near the edge of the cutblock.	1995–1998	Alberta Research Council **Al-Pac Contact**: G. Grover
Effects of Timber Harvesting and Reserve Size on Songbird Communities (also known as the Calling Lake Fragmentation Study)	This project examines the effect of habitat fragmentation on the richness, diversity, turnover, and abundance of breeding bird communities in old, boreal mixedwood forests by creating isolated and connected forest fragments of 1, 10, 40, and 100 ha. Connected fragments were linked by 100 m wide riparian buffer strips.	**Results:** • No significant change in species richness after harvesting. • Community structure was altered; maintaining connections between fragments helped mitigate effects. • Magnitude of fragmentation effects were small relative to those observed elsewhere. • Breeding boreal bird community is quite resilient to major disturbances. • Study area lies in a landscape matrix which may buffer local	1992–2003	Universities of Alberta and British Columbia; Vanderwell Contractors Ltd. **Al-Pac Contact**: E. Dzus

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Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		fragmentation effects. **Recommendation:** Pending		
Responses of Birds and Mammals to Riparian Buffer Strips	As part of the Calling Lake Fragmentation Study (CLFS) and the Terrestrial Riparian Organisms Lakes and Streams (TROLS) study, bird use and movements in riparian buffers were examined one year before and one year after harvesting.	**Results:** • Lakeshore corridors are used more frequently as travel corridors by some forest bird species than adjacent harvested; results are less pronounced four years after harvest for some species inhabiting mature forest (e.g., Philadelphia Vireo and Ovenbirds). • Following timber harvest Ovenbirds were absent from 20 m buffers but showed no influence on abundance, territory size or pairing success in 100 m or 200 m buffers. • Corridor value is probably species-dependent and effects wane with rapid aspen regeneration in adjacent harvested areas. • No effect of buffers on small mammal community or deer. **Recommendation:** • Riparian buffer management guidelines should be reviewed.	CLFS 1993–1995 TROLS 1996–1997	Universities of Alberta and British Columbia; Vanderwell Contractors Ltd. **Al-Pac Contact**: E. Dzus
Songbird Response to Variable Retention Timber Harvesting	Several projects have examined bird community response to type, amount, and dispersion of trees, and snags and shrubs that were retained at harvest in mixedwood boreal forests of Alberta. Studies also evaluated whether the degree of similarity between bird communities in harvested and older forest areas was related to the type and amount of material retained at harvest.	**Results:** • Bird communities in harvested areas were more similar to old-growth forests when more trees, particularly large deciduous trees were retained and when trees were retained in clumps. • For many forest birds, density	1994–1997	University of Alberta; Alberta Research Council **Al-Pac Contact**: E. Dzus

Effects of Landuse on Animals and Plants

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		was lower in cutblocks with residual trees and snags than in old-growth forest. • Bird species commonly associated with parkland and open country habitat had high densities in harvested areas that contained abundant shrubs and few residual trees or snags. **Recommendation:** • To match the diversity created by fire, managers should create some cutblocks with few or no residual live trees, other cutblocks with scattered residual live trees, and other cutblocks with loose or dense clumps of residual live trees. • Also prudent to retain adequate amounts of old-growth forest in the landscape (pending extensive studies that evaluate whether retaining large trees in harvest areas can replace some of the old-growth requirements in a harvest landscape.		
Short-Term Effects of Timber Harvesting on Artificial Nest Predation	Several projects have examined the effects of timber harvesting and associated human-caused (anthropogenic) forest edges on nest predation. Due to the difficulty in conducting nesting studies on forest songbirds, artificial nests were used as surrogates for natural nests.	**Results:** • No effects of were found relative to nest predation in cutblocks or through the creation of anthropogenic edges. **Recommendation:** None	1993–1998	University of Alberta **Al-Pac Contact**: E. Dzus
Effects of Forest Harvesting on Raptors	Project objectives included monitoring changes in raptor communities in continuous forest and in forests fragmented by harvesting; and to determine the effect of logging on a potentially sensitive species, the Barred Owl.	**Results:** • Red-tailed Hawk and American Kestrel sightings increased in harvested areas. • Barred Owls were found not to be old forest obligates (i.e., they	1994–1997	University of Alberta **Al-Pac Contact**: E. Dzus

Effects of Landuse on Animals and Plants

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		were more tolerant of forest fragmentation than previously thought). • Barred Owls select habitat at different scales. Old forests are important at the scale of the nest tree and patch, and home range; younger forests are used for foraging. **Recommendation:** • Sufficient old forest should be retained at the proper spatial scales.		
Integrating the Effects of Forest Harvesting Over the Landscape on Bird Communities	An ongoing synthesis of various monitoring or experimental studies relating to the effects of timber harvesting on bird communities.	**Results:** • Natural regeneration on harvested (aspen) areas has been rapid and recolonisation by songbirds dramatic. • No net loss of species from forest fragments. • Some shifts in composition of the bird community. • Some areas may be unlikely to provide productive habitat for species dependent on older forest between subsequent passes (10-15 years) or with short rotation periods (70 yrs) planned. • Past reliance on island biogeographic theory is inappropriate and a broader landscape view is needed to assess species responses to habitat fragmentation. **Recommendation:** • Progress in delivering management recommendations	1993–Ongoing	University of Alberta **Al-Pac Contact**: E. Dzus

Effects of Landuse on Animals and Plants

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		achieved through integration with other initiatives (e.g., BEEST) to relate tactical and strategic level forest planning through integration with models of fire, stand dynamics, harvesting, and habitat availability relative to an evaluation of various forest management scenarios.		
Amphibian Monitoring and Ecology	This project addresses habitat attributes that influence the presence and abundance of wood frogs and boreal toads. Proposal to develop an amphibian monitoring program.	**Results:** Pending **Recommendation:** Pending	1995–1997	University of British Columbia; University of Victoria **Al-Pac Contact**: E. Dzus
Effects of Timber Harvesting on Small Mammals		**Results:** Pending **Recommendation:** Pending	1993–1997	University of Alberta; University of British Columbia **Al-Pac Contact**: E. Dzus
Effects of Conifer Tree Configuration on Black-Throated Green Warblers (BTGW)	This project evaluates the habitat associations of BTGW.	**Results:** • BTGW seemed most abundant where conifer abundance is 10-20% (use of deciduous trees was much greater than expected). **Recommendation:** Pending	1996–1997	University de Moncton **Al-Pac Contact**: E. Dzus
Timber Harvesting and the Ecology of the Short-Tailed Weasel in the Mixedwood Boreal Forest in Alberta	Project objectives relate to understanding habitat use, home range size, diet, the use of harvested and intact forest areas for resting and foraging and the use of retained ground cover (slash) within a harvested landscape. Project complements a small mammal project led by S. Boutin (University of Alberta).	**Results:** Pending **Recommendation:** Pending	1995–1997	University of British Columbia **Al-Pac Contact**: E. Dzus
Ducks and Trees Program	The goal of the pilot project is to examine ways in which to conserve wetland and riparian habitat, and where warranted, to improve the ecological function of associated upland habitats for their ecosystem, biodiversity and societal values. Pilot area is a 1.47 million acre area (10% of the entire Ducks and Trees program area) that extends from Lac La Biche southeast to St. Paul.	**Results:** Pending **Recommendation:** Pending	2000–Ongoing	Ducks Unlimited; Alberta Environment; Alberta Public Lands; Alberta Conservation Association; University of Alberta **Al-Pac Contact**: K. Plourde

Fire Ecology & Effects on Vegetation and Landscape Patterns

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Fire Incidence, Forest Cover and Riparian Buffers	Explores the relationship between the amount of buffer area and the incidence of lightning-caused wildfire at the township scale. Additional analysis examines the burning frequencies and fire fuel preferences.	**Results:** • No significant relationship detected between percent area adjacent to rivers, streams and lakes (i.e., buffers) and fire frequency. • Confirmed other reports that fire frequency is negatively correlated with abundance of deciduous stands and positively correlated with abundance of white and black spruce. **Recommendation:** • Landscape level fuels management may be feasible in the boreal mixedwood forest of western Canada (further research underway).	Fires between 1980–1993	University of British Columbia; University of Alberta; Boreal Ecosystems Research Ltd. **Al-Pac Contact**: E. Dzus; T. Gaboury
Fire and Harvest Residual (FAHR) Project	Evaluated the impact of wildfire and harvest residuals on forest structure and biodiversity in aspen-dominated boreal forests of Alberta.	**Results:** • Greatest difference between fire and harvest stands occurs immediately after disturbance. • Snags, downed wood, understorey plants and bird communities converged in first 28 years. • Differences at 28 years of succession were largely restricted to differences in relative abundance rather than presence or absence of species. • Removal of carbon from harvest manifests as a loss of snags, downed logs and eventually lower soil carbon content. • Early fire communities are unique and cannot be replicated by any harvest plan.	1995–1999	Alberta Research Council; Canadian Wildlife Service; Canadian Forest Service; Alberta Conservation Association; University of Alberta **Al-Pac Contact**: T. Gaboury, E. Dzus

Fire Ecology & Effects on Vegetation and Landscape Patterns

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
		Recommendation: • Retention of trees at harvest provides a continuing source of advanced forest structure for future stand development. (**Implemented**) • Increasing the amount and patch size of residual leads to more old stand attributes. (**Implemented**) • Long term reduction in carbon and potential reduction in biodiversity requires further consideration. • Maintenance of wildfire communities requires some protection from salvage logging.		
Evaluation of Methodology to Analyze Landscape Patterns	Two broad initiatives undertaken to evaluate statistical and landscape simulation computer programs to characterize and predict landscape patterns. Goal will be to evaluate the effects of management actions (e.g., different harvesting patterns) on current and future landscape patterns.	**Results:** Pending **Recommendation:** Pending	1998–Ongoing	ESSA Technologies; GAIA Consultants; Forem Technologies **Al-Pac Contact**: E. Dzus
Shrub and Herbaceous Succession Following Combined Treatments of Burning and Logging	Investigate: 1) how different post-fire plant communities are from post-harvest and salvage-logged plant communities; and 2) what management options could be applied to make these communities more similar earlier in succession.	**Results:** Pending **Recommendation:** Pending	1999–2001	Alberta Research Council; Alberta Environment **Al-Pac Contact**: S. Wasel
Patterns of Live Residual Trees Surviving after Fire	Project evaluates patterns of unburnt trees following fires in mixedwood stands of the boreal forest. Sought information on the amount and distribution of live residuals within stands of different sizes and the pattern of residuals in relation to water features and larger residual islands.	**Deliverables:** • Description of the patterns of unburnt trees within fire boundaries to provide guidelines for revision of stand structure protocols for harvesting operations. **Recommendation:** Pending	1999–2001	Alberta Research Council; University of Alberta **Al-Pac Contact**: E. Dzus

Fire Ecology & Effects on Vegetation and Landscape Patterns

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Synopsis of Fire Research in the Boreal Mixedwood Forests of Northern Alberta	S. Cumming synthesized fire ecology research in the context of boreal mixedwood forests.	**Results:** • Burn rates are variable and hence the age structure is non-stationary. • Fire return intervals vary with forest composition (see above). • Within the outer boundary of a fire, there is considerable variability in intensity resulting in a patchy distribution on unburned or partially burnt areas of various sizes (referred to as 'islands'). • Islands tend to be composed of forest types with low overall burn rates. • No consistent results found in relation to riparian areas and area burned (three studies examined). • Distribution of fire sizes is best described by a truncated exponential distribution (many small and few large fires). • Data corrected for fire suppression show an increasing trend in area burned. • With suppression considered, fires are generally smaller in recent decades. • **Recommendation:** Pending	1999–2000	Boreal Ecosystems Research Ltd. **Al-Pac Contact**: E. Dzus
Monitoring Forest Tent Caterpillar Populations	Aim of the studies is to identify forest characteristics which either increase the severity of tent caterpillar outbreaks or which might reduce outbreaks. Project also aims at developing protocols for monitoring populations of FTC.	**Deliverable:** • Effective monitoring protocols developed. **Recommendation:** Pending	1996–2001	University of Alberta **Al-Pac Contact**: E. Dzus

Aquatic Programs

Project Title	Description	Results & Adaptive Management Recommendations	Status	Collaborators
Terrestrial Riparian Organisms in Lakes and Streams (TROLS)	Collaborative Research and Development Project "The role of buffer strips for maintenance of terrestrial, riparian and aquatic communities in the boreal plain," by Dr. E. Prepas.	**Results:** • Buffers are not natural and provide limited protection to biodiversity. **Recommendations:** • Riparian based forestry that plans harvest based on sensitivity for the watershed.	Year range	University of Alberta; Natural Science and Engineering Research Council of Canada; Alberta Environment; Weyerhaeuser; Ainsworth; Environment Canada; Syncrude; Manning Diversified Products **Al-Pac Contact**: M. Spafford
Ecology, Hydrology and Disturbance of Western Boreal Wetlands	Evaluation of large land disturbance and effects on hydrology, water quality and biota.	**Deliverables:** • Watershed assessment tool, buffer evaluation.	2001-2004	University of Alberta; Ducks Unlimited; Natural Science and Engineering Research Council of Canada; Weyerhaeuser; Syncrude **Al-Pac Contact**: M. Spafford
Lake Fisheries	Traditional land use of fisheries in the Ft. McKay Band area. Population assessment of fish for external effects from industry.	**Results:** • Key sensitive fisheries that are important to the community may be at risk. **Deliverables:** • Fish tissue survey—in lab.	Ongoing	Ft. McKay 1st Nations; Regional Aquatic Monitoring Program **Al-Pac Contact**: M. Spafford
Northern Watersheds	Describing the effects of large land disturbances (fire and logging) on succession, water quality and quantity, and aquatic biota.	**Results:** • Buffers are not natural and provide limited protection to biodiversity. **Recommendations:** • Riparian-based forestry can allow harvest and protect riparian areas.	Ongoing	Daishowa-Marubeni; Manning Diversified; TransCanada Pipeline; Alberta Conservation Association; Alberta Research Council; Alberta Environment **Al-Pac Contact**: M. Spafford
Joint Lake Inventory	Assessment of 200+ lakes in the FMA. Defined range of sensitivity, and did comparison to the forest cover.	**Results:** • Method for identifying and protecting sensitive lakes. **Recommendations:** • Support for riparian forestry decisions. • Identifies sensitive sites.	Complete	University of Alberta/Regional Aquatic Monitoring Program; Alberta Environment **Al-Pac Contact**: M. Spafford