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Presidents' Message

March 31, 1997 saw the end of the five-year Canadian Model Forest Program, Phase I. The Manitoba Model Forest, MBMF, ended Phase I having completed over 150 research projects in the five theme areas of education, culture and public awareness, integrated resources management, advanced forestry practices, technology transfer, and economic diversification - some of which are reviewed in this annual report. In late 1996 Natural Resource Canada (NRC) announced that there would be a Phase II of the program extending to 2001, but with only half the original funding. The Model Forest Board and volunteers spent the latter part of 1996 and over half of 1997 working on their Phase II proposal. This involved consultations with various communities and other stakeholder groups. In particular, the results of a well attended week of workshops held in Great Falls helped the Board and staff immensely in developing the Phase II vision and proposal.

Early in 1997, the Board of Directors submitted the first draft of their Phase II proposal to NRC. In the spring, NRC reported back to the Board that they would be required to address some minor, as well as a fundamental concern, before moving forward. The fundamental concern identified by the review team was the need for the development of a clearer plan for increasing First Nation participation in the Model Forest program. In the ensuing months the Board of Directors worked with various groups to address the concerns raised and in November 1997 submitted a revised proposal as well as a plan for increased First Nation involvement. This was accepted by NRC and a new five year agreement was signed.

With the signing of the agreement, a number of challenges still face the Manitoba Model Forest. While the Five-Year Proposal outlines many of the project and program challenges, we feel that the following deserve particular attention in the coming year. The Board must encourage projects in the area of social values in order that a better understanding of these values is obtained so that means are established for ensuring they play a greater role in day to day forest management. As well, given that over five years have past, it also seems that the time is right for the Model Forest to get more involved in local on the ground forest management issues in the region - in particular the Ecosystems Based Management project of the province of Manitoba and the new forest management plan of Pine Falls Paper Company. Further, the Model Forest must continue to place an emphasis on the development of local criteria and indicators of sustainable forest management, as required by NRC as part of Phase II studies. Obviously, the Board must also continue with their efforts and discussions with Aboriginal peoples in the Model Forest area to facilitate their involvement at the Board level and to establish a protocol for the development and implementation of projects.

Dealing with these challenges will take considerable time and effort in the coming year. The social issues and science and technology working groups will need to work closely with the local communities in the Model Forest, especially in the areas of criteria and indicators and social values. The Board, as well as the working groups can also look to the Canadian Model Forest Network in these and other areas. The Network is a growing source of information and advice. Lastly, the Board is going to have to address the scope of issues considered by the Manitoba Model Forest in order to improve our progress in showing practical advancement of sustainable forest management.

A. John Sinclair and John A. McQueen

Integrated Resource Management, IRM, Projects

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96-2-05 FEC Mapping

A current problem in Manitoba is the inconsistency in the quality of aerial photographs used in forest resource inventory mapping. This inconsistency affects photograph interpretation and subsequently the resultant accuracy of the forest inventory map developed from these photographs. Project 96-2-05 was designed to develop a set of air photo specifications based on the interpretation performance of Manitoba photo interpreters, which will be used when contracting aerial photography services. In addition, this project strove to provide quality control procedures that will help ensure future photography acquired for forest inventory mapping will be consistent in quality and therefore meet contract specifications.

Improvement in aerial photography and thereby forest inventory mapping is fundamental to meeting the goals of the Integrated Resource Management program area of the Manitoba Model Forest program. Photographs and the data they provide, are key components in the data collection process for production of accurate forest inventory maps.

An important source of data to ecosystem classification in the production of an ecosystem management plan, aerial photography must be consistent and accurate if it is to prove useful in terms of long term planning accuracy. Developing specifications for aerial photography improves the input data used in producing the management plan, and this will improve the quality of forest resource data used in defining relationships with resource values.

Providing the technical knowledge and procedures for contracting and acquiring aerial photography that is used in conducting inventory assessments will assist in ensuring a consistent accuracy level of this data. As aerial photography is a base information source used in the practice of sustainable forestry it is important the future standards of aerial photography for forestry in Manitoba ensure consistent and accurate data flow.

For additional information contact Russell Bell, Manitoba Natural Resources Tel: (204) 945-7953, 200 Saulteaux Crescent, Winnipeg, Manitoba R3J 3W3

96-2-07 Experimental Watershed

The Experimental Watershed project examined the effect forestry has on fish habitat in the Manitoba Model Forest by monitoring sites before, during and after timber harvesting. The study focused on physical changes to the environment which are known to be harmful to fish and their habitat. To monitor physical changes such as increased runoff, erosion, and sedimentation, the study was divided into two parts. The first part involved the measurement of suspended solids and sedimentation at aquatic sites. The second part consisted of the measurement of erosion and deposition at terrestrial sites that had been logged and treated for forest regeneration.

The study area was to the South of Happy Lake. This area is drained by the Moose River, a small tributary of the Moose River and several streams which flow directly into Happy Lake. The study commenced in 1993, prior to timber harvest. Harvest began in 1994 and continued through 1996. Site preparation for replanting began in 1995 and study sites were replanted in 1996.

One of the goals of this five-year study was to determine the width of the buffer strip required to trap sediment eroding from cutover areas. Given the absence of erosion observed at most sites it appears that buffer widths can be established to meet other resource management

objectives such as the need to maintain riparian zones. At sites where erosion was noted, a relatively small amount of ground cover such as shrubs and grasses was required to trap sediments.

For additional information contact: F. Vieira-Schneider, North South Consultants Inc., 202-1475 Chevrier Blvd., Winnipeg, Manitoba R3T 1Y7 Tel: 204-284-3366 fax: 204-477-4173

96-2-13 Forest Ecology Chair

In 1994, the Manitoba Model Forest provided funding for the establishment of the Forest Ecology Chair at the University of Winnipeg. Since that time, the teaching and research position has been occupied by Dr.Geoff Wang. Dr.Wang has been involved in many aspects of Manitoba Model Forest Research in an advisory capacity as well as being principle researcher in project 96-2-26 Ecosystem Dynamics.

In addition to his research activities, which have included articles for two publications and workshop presentations, Dr Wang teaches at the University of Winnipeg. Courses currently under his direction are Forest Ecology and Silvics, or the ecology of tree species. Added to his teaching roster for the 1996\97 winter term is a new course in the department of biology, Ecological Methodology. This course, taught in a small class environment is computer intensive. The course provides hands-on experience in the design of experimental and observational studies for conducting biological research. It also examines how to analyze data and interpret research results and how to produce statistical graphics of publication quality through the use of SYSTAT for Windows, a PC-based statistical package.

For additional information contact: Geoff Wang, Chair of Forest Ecology, University of Winnipeg, 515 Portage Ave. Winnipeg, Manitoba, Canada . R3B 2E9 Tel: (204) 786-9435 FAX: (204) 783-7981.

96-2-16 Cooperative Moose Management

The Cooperative Moose Management initiative began in 1993 when it was recognized that there was a need to develop a common vision for moose management on the east side of Lake Winnipeg. The main objective was to develop a consensus between stakeholders which combined the traditional aboriginal beliefs, current rights and non-aboriginal views into a common vision for moose management in the Manitoba Model Forest Region. Since 1993, all stakeholders have worked towards understanding opposing views and learning to accept mutual compromise in the development of a common vision. The Committee for Moose Management was formed in 1995 and represents a diverse group of stakeholders with different views and interests on moose management. These interests include First Nations people, environmental groups, wildlife clubs, industry and government.

This project represents a milestone for the Manitoba Model Forest. In addressing the social dimension of integrated resource management it has allowed stakeholders to have an awareness and appreciation for different values and cultures with respect to the forest and its uses. It has resulted in a mutually acceptable five year moose management project spanning three study areas across the Manitoba Model Forest. It has successfully demonstrated that public involvement

can lead to potential management techniques that are based on stakeholders working together into the next century, with a common vision built from their differing views and opinions.

For additional information contact: Bob Enns, Manitoba Natural Resources, Wildlife Branch, Box 4000, Lac du Bonnet, Manitoba Canada R0E 1A0, tel: (204) 345-1453 fax:(204) 345-1440

96-2-17 Forest Bird Study

In 1993, a breeding bird survey was designed with the purpose of documenting the abundance and distribution of forest birds within the Manitoba Model Forest. The data gathered from this study would provide some insight into the use of interior forest habitats by birds over time.

In 1994, the focus shifted to determining the effect on bird populations of fire verses logged regenerating areas. By 1995, sampling at over 240 listening posts continued to build the database to be used in the final analysis. The 1996 season saw researchers focusing on the use of riparian habitat types by the bird community and how relationships were affected by logging, fire and urban development.

In the past forest managers and environmentalists alike viewed mechanical disturbances in the forest, such as logging, as having a negative impact on bird populations. Data collected in this study suggests that bird communities in areas disturbed by fires could not be distinguished from communities disturbed by logging. Bird communities in both disturbance areas were found to contain large numbers of species found in interior or mature boreal forest habitats. There were some forest birds however that rely on residual trees left in forest areas after either fire or logging for habitat. If the numbers of these trees are too greatly reduced the forest birds relying on these trees for habitat tend to be replaced by grassland edge or marsh species.

It appears that birds in the Manitoba Model Forest are capable of using habitats within the regenerating structure of the forestlands regardless of disturbance patterns. Even areas which have been completely clear cut, not theoretically considered as suitable habitat for a given species, are utilized. The similarity of populations in previously logged areas compared to fire areas suggests that previous harvesting methods resulted in little change in bird communities. It should be noted however, that only continuing, detailed ecological studies, especially into vegetation diversity , insect abundance, and bird reproduction in both harvested and fire disturbance areas will allow us to truly predict whether bird populations will remain the same or change over time.

Ultimately the final report of this project, now available from the Manitoba Model Forest library, will assist resource managers to incorporate the habitat needs of forest birds into management plans and to aid in the maintenance of a diversity of wildlife species and habitats encountered on the forest landscape. More research is needed to understand how changes in the Manitoba Model Forest will drive successional processes in these forests . It will also assist us to understand how these forest changes will ultimately drive changes in regional and global bird populations.

For additional information contact: Robert Berger, Wildlife Resource Consulting Services MB, Inc., 249 Bell Ave. Winnipeg Manitoba Canada R3L 0J2 Tel: (204) 452-2197 FAX (204) 474-1888.

96-2-26 Impact of Crown Fire and Clear-cut Logging on Lowland Black Spruce Ecosystem Dynamics(II)

Predicting growth and yield is fundamental to the development of any timber management plan. With timber management an integral component of ecosystem based forest management, it is necessary to ensure that prediction models are accurate as possible and encompass known ecosystem dynamics for the forest type being modelled.

Overall the Impact of Crown Fire and Clear-cut Logging on Lowland Black Spruce Ecosystem Dynamics study was designed to investigate ecosystem dynamics following crown fires and clear cut logging on lowland black spruce. It was to address questions about how fire and logging differ in affecting vegetation, soils, and seedbanks. To do this the study undertook investigation in four primary components.; regeneration of trees and understory plants; growth and yield; soils; and seedbanks. This project, 96-2-26, focused on growth and yield components of the overall study.

The objective of 96-2-26 was to develop growth and yield models for lowland black spruce stands. During the project, the researchers developed various types of individual tree models, height \site index models and stand yield models. Data compiled during the study was used to test individual tree volume models used by Manitoba Forestry Branch and Repap Manitoba Inc. Models used by the Pine Falls Paper Company, the primary forest industry in the Manitoba Model Forest region were not available for testing and therefore were not included in the project.

Seven individual tree models were developed during the project. These models were:

1. the height - diameter model that can be used to predict total height from breast height diameter.
2. the stump - breast height diameter model that can be used to predict stump diameter from breast height diameter or visa versa.
3. the diameter inside\outside bark model that can be used to predict the diameter inside the bark from the diameter outside the bark or visa versa;
4. the taper model that can be used to predict diameter at any height of a tree stem from its breast height diameter and total height;
5. the total volume model that can be used to predict total volume of a tree either from its breast height diameter or from its breast height diameter and total height.
6. the merchantable volume model that can be used to predict merchantable volume of a tree (defined according to either Manitoba Forestry Branch's or Pine Falls Paper Company criteria) from its total volume;
7. the volume inside\outside bark model that can be used to predict the volume inside the bark from volume outside the bark or visa versa.

A merchantable volume model used by Manitoba Forestry and a total volume model used by REPAP Manitoba were tested against data used for this study. Testing results indicated that both models underestimated volume.

Since all models developed during this study were based on a small data set obtained from one geographical region, further development is necessary to refine, improve and test the models

. Considering the economic importance of black spruce in Manitoba, it is expected that further research will be done in the future in order to further develop ecologically based growth \yield models that can be applied to any geographical region.

For additional information contact: Geoff Wang, Chair of Forest Ecology, University of Winnipeg, 515 Portage Ave. Winnipeg, Manitoba, Canada . R3B 2E9 Tel: (204) 786-9435 FAX: (204) 783-7981.

96-2-28 The Development and Application of Animal Borne Global Positioning System (GPS) Technology on Woodland Caribou - (Caribou non-winter habitat)

For two years, in a cooperative project with Manitoba Hydro, the Manitoba Model Forest has been involved in a development initiative on The Development and Application of Animal Borne Global Positioning System (GPS) Technology on Woodland Caribou . Other agencies cooperating on this project include; Manitoba Natural Resources (MNR), the University of Manitoba Natural Resources Institute, TAEM Consultants and various wildlife associations. The research involves the testing of a complex satellite tracking system for wildlife which has the potential to significantly enhance the efficiency of environmental planning and mitigation.

In total, eight Lotek GPS collars have been tested. To date, tests have resulted in 6226 woodland caribou GPS relocations or fixes being logged by the system. Additional data collected includes time, date, activity, temperature and precision fields. This GPS data has been integrated into a Geographic Information System (GIS) for mapping and analysis purposes.

Data gathered in this method represents a significant advancement in animal tracking and relocation information in comparison to standard approaches. Although the results to date are very encouraging, some collars have not yet performed to the manufacturers specifications and require further testing.

In addition to information on equipment performance this study also provides data for other uses. The data allows researchers to investigate the correlation of woodland caribou activity and movement relative to vegetation associations in Manitoba's boreal environment for potential use in transmission line site selection, environmental impact assessment and licensing processes. Data will be used to further develop a comprehensive made in Manitoba woodland caribou database with habitat data. This data provides the opportunity to develop insights into woodland caribou behaviour as it relates to roads, transmission rights-of-way and other man-made linear facilities.

Testing of new technologies in the field allow for researchers to broaden the tools they have to research forest wildlife. By developing more accurate and reliable databases regarding woodland caribou, their habits and needs, this cooperative effort is allowing forestry managers and planners to develop meaningful ecosystem based management practices which encompass the needs of forest wildlife.

For additional information contact: Doug Schindler, T.A.E.M. Box 383, Selkirk, Manitoba Canada R1A 2B3. Tel: (204) 482-9054 FAX: (204) 482-9055

96-2-30 Leachate Toxicity

For decades, effluent from mechanical and chemical pulpwood processing has been regarded as a significant source of toxic compounds. Recent studies have also identified leachate from log storage yards as another source.

The leachate toxicity project is examining the toxicity of leachate from softwood storage yards; the effect of toxins on aquatic and soil organisms; and the fate of toxins once they enter the environment.

Using experimental cribs constructed for the express purpose of simulating log storage conditions, leachate was collected after significant rainfall events. The leachate, originating from fresh cut Jack Pine and Black Spruce logs was assessed for toxicity using Daphnia bioassays. Jack Pine and Black Spruce were chosen for the assessment due to their role as the preferred commercial wood species being used in the Manitoba Model Forest region.

The effects of softwood leachate on forest soil microorganisms was also assessed. As soil microorganisms play such an important role in the functioning of soils, changes to the composition and activity of microbial communities in forest soils, due to interactions with softwood leachate, are important to evaluate. It is hoped that in the final analysis that researchers will be able to determine the influence softwood leachate has on soil microorganisms in two ways. The first way is the leachate's effect on the microbial mediated processes of nitrogen mineralization and respiration. The second way is the effect leachate has on microbial biodiversity.

The mineralization of nitrogen in soils is a fairly well understood, and ecologically important process. Results obtained from the assessment of nitrogen mineralization will allow for a greater understanding of the role leachate has in changing this process.

Assessment of the functional biodiversity of soil microbial communities is assessed by examining the ability of the soil communities to utilize various carbon substrates. While it is extremely difficult to assess taxonomic diversity of soil microorganisms, simply due to the potential magnitude of varieties, it is believed that an assessment of carbon utilization diversity will be a valuable method for assessing the changes in biodiversity that may occur in the microbial population due to leachate.

Preliminary assessment and analysis indicates that leachate from softwood storage yards does have a degree of toxic affect on aquatic organisms. Understanding the complete role that leachate has in terms of its longer term effects in the environment will require further analysis.

For additional information contact Les Fuller, Department of Soil Science, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2. Tel: (204) 474-8153 Fax: (204) 275-8099.:

96-2-31 Budworm Management and Biodiversity

Eastern Manitoba has become the site of some of the worst spruce budworm infestation in the province. To combat the problem the Manitoba Model Forest began participating in Spruce Budworm research with project 96-2-31.

A total of 13 forest sites were established in eastern Manitoba for the purposes of

researching the effects of budworm management on biodiversity. These sites represented one of three site types.; control sites in which no spruce budworm infestation has occurred; sites in which budworm infestations have occurred but where no pesticide application has occurred; and sites where infestation has occurred along with pesticide application.

Light traps were used to sample for spruce budworm moths and pitfall traps to sample carabid beetles. A preliminary assessment of moth data has occurred. As one might expect, sites which have been treated with pesticide do appear to have a lower frequency of moths than sites which have not been treated. While researchers are still analysing the data, it would appear that this difference may relate to the vegetation structure of the habitat rather than directly to toxicity to the moths of any spraying occurring previous to the sampling period. Ongoing data analysis is still in its preliminary stage and so no conclusions can thus far be drawn regarding the carabid beetle. Ongoing data gathering will be completed during the 1997 field season. After completion, a complete analysis will be performed.

For additional information contact: Dr. Richard Westwood, Box 70, 200 Saultaeux Cres., Winnipeg, Maniotba R3J 3W3. Tel: (204) 945-8444 Fax:(204)489-1360

96-2-34 American Elm

Dutch elm disease is a vascular wilt disease, which has afflicted American elm (Ulmus americans L.) trees within Manitoba for the last 20 years. Caused by the fungus Ophiostoma ulmi, it is transmitted from infected to healthy trees by elm bark beetle species. The fungus invades the water transport vessels and renders the tree incapable of supplying adequate amounts of water to the crown of the tree. An initial symptom of the disease is wilting of the leaves in the affected portion of the crown, followed by flagging or yellowing of affected leaves. Usually the disease kills the tree within a year of exhibiting visible signs of infection such as flagging.

Dutch elm disease management programs in Manitoba have reduced the annual loss of trees to about two per cent of the population. Even at this rate however, the eventual loss of the American elm in Manitoba is possible as new American Elms are not being planted. Several research programs in the United States have developed resistant clones of American elm, but these may not suitable for Manitoba's growing season and climate. The lack of a resistant elm or even a program searching for a resistant elm in western Canada led to the development of a research program in the Department of Plant Science at the University of Manitoba. in partnership with the Manitoba Model Forest.

The project initiated in the spring of 1993 as a Masters Study project by Fred Meier, under the supervision of Professor Bill Remphrey, project 96-2-34 focussed on testing remaining native elm material for resistance from areas devastated by Dutch Elm Disease. Seed collected from populations throughout Manitoba were germinated and are being tested for resistance to Dutch Elm Disease.

In cooperation with Manitoba Natural Resources and the City of Winnipeg, the Manitoba Model Forest established experimental plots for the outplanting of laboratory propagated material.. Field testing of these seedlings for resistance commenced in 1996. Testing elms for resistance usually requires several years before trees are mature enough to show symptoms, but the Department of Plant Science has focussed its research on developing a technique to rapidly analyze seedlings for resistance, at a relatively young age.

The project's two component design allows for the development of laboratory techniques as well as field trials. The first component, the measurement of mansonones within the elm callus in the laboratory allows for the early screening for potential resistance. While still being tested and refined this component can save considerable time. The field testing component takes the seedlings identified in the laboratory as having a potential for resistance to a more mature stage in their development for testing by inoculation with Dutch Elm Disease..

Throughout the growing season seedlings have been evaluated for their resistance. The 300 trees planted in the Manitoba Model Forest test area will have their mortality rates assessed in 1997. The degree of resistance to Dutch Elm Disease inoculation will be assessed and the more resistant seedlings will be taken further along in the development of resistant elm.

To date, over 500 native seedlings have been evaluated and results are promising. It therefore seems possible that the resistance trait may be enhanced in future generations. To do so requires ongoing propagation and evaluation activities.

The development of a Dutch Elm Disease resistant elm tree is a long term program. As such, future research activities should be focusing on evaluating as many seedlings and clones as possible. To succeed, the project must continue uninterrupted in terms of testing and propagation. Due to the time necessary to grow seedlings to a stage appropriate for evaluation, missing one season in planting and selection means a four-year lag in the program. As the native elm population dwindles because of increasing infection, so does the reservoir of elm material needed for resistance development. If there is one benefit of increasing Dutch Elm Disease occurrence in Manitoba, it is that the spread of the disease will assist in identification of survivors to use in the program.

For additional information contact: William R. Remphrey, Department of Plant Science, The University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2, Tel: (204) 474-8221 FAX (204) 261-5732

96-2-36 Stable Isotope Analysis

Monarch butterflies from eastern North America migrate up to 5000 kilometers annually to over winter at discrete roost sites in the Oyamel Forests of the Sierra Madras of central Mexico. In recent years there has been a concern that this amazing natural process is in danger. In both Canada and the United States, the milkweed plant upon which the Monarch larvae relies is on the noxious weed list and therefore the target of agricultural herbicides. In Mexico, deforestation and development pressures are threatening Monarch wintering roosts.

There are many questions regarding Monarch migration. In particular there is no information on links between the Monarch overwintering roosts in Mexico and their summer natal grounds. Such basic knowledge would be a powerful tool in the protection of the Monarch as conservation officers in both countries could be better coordinated in their efforts to help specific populations.

The recent development of the ability to measure naturally occurring stable isotopes of fundamental elements in animal tissues has been used to delineate geographically distinct populations. The basis of the research approach which has been supported in part by the Manitoba

Model Forest, is the fact that stable isotopes of key elements in food sources are reflected in the body tissues of the consumers. In North America, hydrogen isotopes in precipitation vary according to broad north south and east west geographic gradients. Thus, the researchers are able to determine the natal origins of butterflies based on the type of hydrogen ratio in their tissues.

With the collaboration of partners at Instituto Nacional de Investigaciones Forestales Y Agropecuarias and the Bosque Modello Mariposa Monarca in the state of Michoacan, Mexico, 100 Monarch adults were collected from natural mortality at over wintering sites. With careful sampling , researchers based in Saskatoon's Stable Isotope Hydrology and Ecology Laboratories at the National Hydrology Research Institute, are establishing whether or not populations at wintering roosts in Mexico are composed of distinct populations from specific summering areas in Canada and the eastern United States. Results from this study, in addition to being published in peer review journals will also be accessible through postings on the Green Lane and Monarch Watch WWW Internet sites.

For additional information contact Keith Hobson Canadian Wildlife service, 115 Perimeter Road, Saskatoon, Sasktchewan, Canada S7N 0X4

96-2-37 Grasslands and Forest Birds Project

The bird populations in Manitoba and the rest of North America are under stress. In some instances, the end result of this stress is the decline of populations over the long term as a response to the change in the environment. Monitoring of bird populations can serve as a method of environmental monitoring as the relative health of bird populations is often an indicator of the overall health of an ecosystem. This monitoring can therefore give early indications of environmental change within ecosystems and the way that change may be affecting other inhabitants, such as people.

The Grasslands and Forest Birds Project is a cooperative effort of concerned organizations and individuals working together to conserve and improve the status of forest and grassland birds in the province and beyond. The main objectives of the project are to coordinate the province's bird monitoring and management programs; and exchange information with other programs running at provincial, national and international levels.

Through informing and involving Manitobans in the conservation and enhancement of local habitats for forest and grassland birds, the Grasslands and Forest Birds Project is helping to establish and maintain bird habitat. This preservation, conservation and enhancement will assist to establish practices and attitudes which will maintain ecosystems not only for bird populations, but for the benefit of all who depend upon the variety of habitats these bird populations represent.

Current project partners include the Candian Wildlife Service, Delta Marsh Bird Observatory, Ducks Unlimited Canada, Manitoba Conservation Data Centre, Manitoba Habitat Heritage Corporation, Manitoba Natural Resources, Manitoba Naturalists Society, and the many private landowners in Manitoba who are participating in the preservation and management projects of the Grasslands and Forest Birds Project.

For additional information contact:Grasslands and Forest Birds Project,
tel: (204) 945-6784 or 1-800-214-6497.

96-2-38 Lake Sturgeon Habitat

Traditionally, aboriginal peoples of the east side of lake Winnipeg have fished Lake Sturgeon. Recent declines in the population have resulted in attention being focused on the need for information regarding Lake Sturgeon, its habitat and spawning areas. To assist in developing a better understanding of the natural history of Lake Sturgeon the University of Manitoba, in cooperation with the Manitoba Model Forest, and Manitoba Natural Resources undertook a study of Lake Sturgeon at Round Lake on the Pigeon River and the Winnipeg River.

Assessment of fish species composition in Round Lake showed the lake to have a complex fish community which is representative of the east side of Lake Winnipeg. Sampling showed that there is a wide range of sizes of Lake Sturgeon and preliminary analysis show that some recruitment into the population is occurring. Using live sample techniques the researchers determined length, weight and age structures for all fish. The data obtained allowed for expansion on the spring sample performed by Natural Resources on the Winnipeg River to include a catch per unit effort of the Lake Sturgeon in the river from Seven Sisters to Slave Falls.

In addition to developing a fish profile of the study area, researchers also completed morphometry of Round Lake. This data was computerized and researchers are in the process of superimposing preliminary Lake Sturgeon movement data onto the morphometric map. Radio tagging was tested and subsequently used to gather data regarding sturgeon movements in the study area.

In addition to the research work conducted in the Round Lake study area, researchers were also involved in work with Sagkeeng First Nation on Lake Sturgeon. Researchers provided an information session, about the biology and history of Lake Sturgeon, in the community of Sagkeeng. In addition, consultation with elders and local fishermen occurred regarding future stocking efforts. These consultations will aid in identifying spawning and nursery areas of the Lake Sturgeon.

For additional information contact the Manitoba Model Forest , box 10, Pine Falls, Manitoba R0E 1M0, Tel: (204) 367-5232

96-2-39 Wanipigow River Cleanup

The Wanipigow River, a tributary of Lake Winnipeg, is classified as one of best fish spawning grounds and habitat areas of the region. In addition to its value as habitat, the Wanipigow is also valued highly for its recreation uses such as tourism, canoeing and angling. Recent concerns about the number of trees which are dying and falling into the water course has fueled concern that habitat degradation may be occurring.

In response to rising concerns over potential habitat loss the Manitoba Model Forest initiated an evaluation of the problem. Using aerial video techniques the study area, from Wanipigow Lake to Wallace Lake, was evaluated. From this evaluation it was concluded that the potential for falling debris degrading fish habitat in the river was real.

The evaluation discovered that large numbers of trees were falling into the river largely as a result of spruce budworm infestations along the river. The situation is expected to get worse.

This evaluation project identified 21 individual projects which could provide an immediate

benefit to the river. These projects include removing blockages caused by fallen debris; clearing areas where deadfall will occur and a project to modify existing management techniques along waterways. If implemented, these projects will provide an immediate benefit to the Wanipigow River in terms of habitat improvement. To benefit the river over the long term however, serious consideration will have to be given to buffer zone management surrounding waterways and an examination and review of alternative techniques for protecting waterways in the boreal forest.

96-2-41 Pit Rehabilitation

Sand and gravel are routinely taken from pits during the construction of roadbeds in the Manitoba Model Forest. It is fortunate for road builders that there is an abundant supply of this material in the locality of construction sites. It is equally unfortunate however, that little has been done to improve or rehabilitate these pits once they have outlived their usefulness.

Project 96-2-41, Pit Rehabilitation focused attention on the reclamation of abandoned pit sites as natural habitats. The major rehabilitation need for reclamation is that of a stable substrate that resists erosion on slopes of the pit. Once the pit walls are stable, vegetation can begin and natural regeneration can proceed.

The project examined the potential use of paper sludge from the Pine Falls Paper Company as a material to stabilize slopes and control erosion. The material was applied both as a protective mulch for establishing plants and as a component of a hydro-seeding slurry.

Results from the project indicate that plant quality in those trials using sludge as a protective mulch was superior to other mulch materials. Plants were able to become established faster and the amount of pit wall erosion was reduced.

Hydro seeding slurry tests indicted that sludge performed multiple tasks. The sludge was able to act in the capacity of an erosion inhibitor. In addition, the sludge acted not only as a seedbed for new growth, but also as an effective weed suppressant. Based on the project results researchers feel that additional trials be undertaken to test the potential role of sludge as a soil amendment and hydro-seeding component not only in pit rehabilitation but also in other applications.

This project has indicated that successful pit rehabilitation using sludge is possible. It has also provided a new use for the sludge material from the pulping process which may otherwise have been discarded into landfills.

For additional information contact Stan Kaczanowski, Manitoba Natural Resources, Box 4000 Lac du Bonnet, Manitoba Canada R0E 1A0 Tel: (204)345-7453 fax: (204) 345-1440

96-2-42 Seedbank Information to Ecosystem Dynamics

Forest regeneration after timber extraction and after fire is dependent upon survival of plant propagules in the soil. Propagules such as seeds, rhizomes and surviving plants will contribute to the regeneration of the forest from which they originated. In addition, seed immigration from adjacent areas will also contribute to the regeneration of the forest.. The composition of the initial propagule community left after fire or harveing activity will determine

what species will be found in the regenerating forest. Availability of propagules therefore, determines the diversity of forest flora that will be found in the regenerating forest. Those species which do not have propagules in the regenerating area or in a nearby area will be lost to the regenerating forest at least in the short term, if not permanently.

Project 96-2-42 examines seedbanks of the some of the black spruce stands being investigated in project 96-2-26, Impact of Crown Fire and Clear-cut Logging on Lowland Black Spruce Ecosystem Dynamics(II). It is the intent of this project to determine whether the composition of seedbanks can be used to predict future forest compositions. The practical value of this research is to allow predictions to be made regarding the presence, absence or persistence of weedy species, and rare, or valuable, spees in the forest after major disturbances.

To date over 300 soil samples have been subjected to germination trials. These trials have resulted in the emergence of over 600 seedlings. As many seedlings are too small to be identified until well after germination only those seedlings having conspicuous characteristics have been tentatively identified. These include: Agrostis scabra, Campanula aparinoides, cirsium arvense, Drosera rotundiflora, Epilobium spp., and Carex spp. Due to the fact that many seedlings have not had time to grow to an identifiable taxonomic characteristics, no trends have been identified between burnt, lowland and upland sites.

An interest in this project has been shown by researchers at the Fundy Model Forest. This has resulted in the commencement of a similar project in that area. This project has therefore become an Inter-Model Forest venture with information exchange extending to joint research between the Fundy and Manitoba Model Forests. In late June 1996, researchers from Manitoba visited New Brunswick and began a cooperative project. Results from both Model Forests will be compared. This seedbank study is just one example of cooperation between Model Forests.

For additional information contact: Richard Staniforth, Biology Department, University of Winnipeg, 515 Portage Ave. Winnipeg, Manitoba Canada R3B 2E9 Tel: (204) 786-9862 Fax: (204) 786-1824

96 -2- 43 Forest Birds in Riparian Areas

The goal of the Forest Birds in Riparian Areas study was to identify and describe the factors affecting the distribution and abundance of breeding birds using mature forest in southeastern Manitoba. The results from this research could be used to develop and verify bird species habitat suitability indices for use in analysis of habitat supply in the forest. This information would allow resource managers to incorporate habitat needs of forest birds into forest management plans. By using this approach it is hoped that true ecosystem based management can become a reality and thus maintain the diversity of wildlife species and habitats on the forest landscape.

Research efforts during the year saw the establishment of sampling plots for those species using riparian habitats, or habitats adjacent to water bodies and watercourses, in the boreal forest. Using data gathered at these sampling sites local information on bird status and habitat utilization for those bird species in either young or mature riparian habitats.

The local information gathered during the course of this research was provided to the

Manitoba Forestry/wildlife management Project which used the information in the development and validation of bird HSI models and in validating the habitat association matrix being used in the species selection process. In addition to providing information to the Manitoba Forestry/wildlife management Project, data gathered also became part of the regional forest bird database being developed by the Canadian Wildlife Service (CWS).

For additional information contact:Robert Berger Wildlife Resource Consulting Services MB, Inc.249 Bell Ave Winnipeg Manitoba Canada R3L 0J2 Tel: (204) 452-2197 FAX (204) 474-1888.

Advanced Forest Management Working Group, AFM, projects

96-3-01 Alternative Harvesting Equipment

96-3-04 Alternative Vegetation Management

96-3-05 Black Spruce Regeneration on Difficult Sites

96-3-06 Regeneration of Difficult Site

96-3-07 Spruce Budworm Management Plan

96-3-11 Advanced Harvest Trials

96-3-12 Growth and Yield Curve Production

96-3-14 GPS Controlled Harvest

96-3-16 Hardwood on Agricultural Lands

96-3-18 Demonstration of Small Site Preparation Equipment

96-3-01 Alternative Harvesting Equipment

Abitibi-Price Inc., Pine Falls Division, like many other forest harvesting companies in the 1980's, were searching for an improved harvesting method with higher productivity and safer working conditions for their employees. Manual felling and delimbing with powersaws, followed by cable skidding and mechanical slashing was the normal operating method. In 1986 the Company introduced a full tree', harvesting system into its operation. Still, one-half the production was by manually felling and cable skidding the full tree to roadside for processing. The other half of the production came from a new Koehring Feller Buncher with rotosaw head, followed by grapple skidding the tree bunches to roadside. Two rail delimbers at roadside removed the branches and tops and neatly piled the tree lengths for slashing with the two new ,one man,' slashers. This full tree system provided increased production and a safer working environment for the operators.

In 1990 the Company's Eight Year Forest Management Plan was subject to an Environmental Impact Assessment (E.I.A.) and public hearings before licencing. The E.I.A. study found potential problems with the full tree logging system. The search commenced for a more environmentally friendly logging system.

In 1993 the Manitoba Model Forest undertook to assess the merits of various logging systems being employed by the forestry industry in the Model Forest region. The project set out

four major objectives to assist in the advancement of forestry practices in Manitoba. These objectives were to find a more environmentally friendly harvesting system; to determine the feasibility of FMG cut-to-length harvesting systems and *Rotosaw tree length harvester/delimber (at stump) system in the Model Forest area; to determine the environment improvement with new systems including site degradation, advanced regeneration protection, post-harvest regeneration, wilidlife habitat changes, impact changes and road and landing requirements; and to assist Manitoba harvesting operators to comply with delimbing at stump directives.

This project promotes the advancement of forestry practices in Manitoba by providing for the trial and implementation of a potentially more environmentally friendly harvesting system. A cut-to-length harvesting system was compared to the existing full tree harvesting system in use by then Abitibi-Price, now Pine Falls Paper Company. Evaluation of the equipment and impacts to the environment were carried out by FERIC. In depth botanical studies pre and post harvest were conducted by the Department of Botany, University of Manitoba. Wildlife habitat comparisons were made by Terrestial and Aquatic Environmental Managers Inc. (TAEM).

The cut-to-length method of logging and equipment required to perform it was found to be superior to the full-tree method in a variety of aspects. The ability to operate on soft terrain or rocky ground, reduction in ground disturbance, a superior operator environment, and the ability to increase value from the forest by cutting quality sawlogs, as well as pulp, were just a few of the advantages the cut-to-length method had over the full-tree system.

Short term evaluations carried out during the past four years support the change to the cut-to-length system of harvesting. Longer term impact studies have been recommended to assess the long term impact that this system of harvesting will have on the forest. Based on the preliminary results however, the Pine Falls Paper Company has reviewed its equipment and has successfully implemented the new cut-to-length harvesting system and equipment in its operations.

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96-3-04 Alternative Vegetation Management

A problem continually faced by forest managers is competition from undesirable species. Competition with crop trees can result in a reduction of growth and in some cases an entire plantation can be destroyed. Fortunately, plantation managers have a variety of tools for controlling undesirable vegetation. Herbicides have been used within the Model Forest area by Manitoba Natural Resources and Pine Falls Paper Company Limited for the control of competing vegetation and the subsequent enhancement in survival and growth of softwood plantations on softwood and mixedwood sites. The continuous use of herbicides, particularly aerial application, has been questioned and concerns have arisen on the impacts that herbicides have on wildlife, water resources and public safety. With the Manitoba Model Forest striving towards ecosystem based management and thereby an ecologically sustainable forest, a need was identified to study alternative methods of vegetation control.

First initiated in 1993, Alternative Vegetation Management project set out to evaluate alternative techniques for vegetation management in softwood plantations. The hope was that

through this evaluation it would be possible to reduce the dependency on broadcast aerial herbicide applications. Initially, a trial evaluating four different techniques was established and post treatment measurements were completed in the fall of 1993 and 1994. The techniques chosen for the study were the Seppi Forestry Mower, hand snapping, brush saws followed by a stump treatment of herbicide, and a ground application of herbicide. Two additional recommended techniques were also evaluated in this study. These included a basal treatment of the herbicide triclopyr (trade name Release) and a brush saw treatment.

The findings of this study have not shown one particular treatment to be superior over the other. In fact, each of the treatments have their merits and could be applied within the Manitoba Model Forest in certain situations. Preliminary results to date have shown that treatments using herbicides have been more effective in controlling aspen than the nonchemical treatments. The chemical treatments had much lower stem counts and lower canopy cover percentages. Also there was no evidence of suckering in chemical treatments. Suckering was present in the Seppi and hand snapping treatments. The lower aspen densities in the chemical treatments have not resulted in better crop tree response. In fact height response was greater in the non-chemical treatments. One thing is certain. All of the treatments have improved growth response among the crop trees when compared to the control blocks and the trees in the treated blocks are outperforming the trees in the control block.

As mentioned previously each of the treatments have their unique advantages and could he used in particular situations. The ground application of Vision using a skidder mounted applicator is the most cost effective alternative available This system is effective in controlling aspen and can treat a large area at a relatively small cost. This system however, does have its disadvantages. It could not be used in advanced plantations where the larger crop trees are prone to damage from the skidder running over them. It is better suited as a pre-planting preparation treatment. This system is also susceptible to non-controllable factors such as the weather.

The Seppi, although not as cost effective is another viable option where the use of herbicides is not practical or not permitted. Like the ground application however, the Seppi is restricted to only treating young plantations.

The brush saw and stump treatment could be used in both young and advanced plantations where the competition is moderate and the treatment area is small and selective (i.e. around the crop tree). This method does have the disadvantage of being labour intensive and therefore relatively expensive. Due to its high operating cost, this treatment would not be feasible in treating large areas where the competition is severe.

The hand snapping method is unlikely to be used as a means of vegetation control on a operational basis mainly due to its low productivity rates. The treatment however could be used in situations such as seed orchards and Christmas tree plantations where the risks of damaging the crop trees should be minimized.

The brush saw and Release treatments were established in 1995 and therefore is still in the establishment stage of the trial. Re-measurements are scheduled in the near future and until further data becomes available no conclusive results on the effectiveness of the treatments are available.

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96-3-05 Black Spruce Regeneration on Difficult Sites

This Black Spruce Regeneration Assessment project was undertaken to determine limiting factors for natural regeneration of lowland black spruce sites following harvesting. The project was initiated in 1993 and split into two phases. Phase I focused on assessing previous lowland black spruce cutovers to determine factors contributing to the failure of some of these sites to meet the provincial regeneration standards. Preliminary results indicated that topping and delimbing at the stump might be impeding regeneration .

Phase II involved confirmation of the initial results through the establishment of harvesting trials on lowland black spruce sites and analysis of the various harvesting techniques currently being used within the Manitoba Model Forest. Phase II included the monitoring of seedling germination and survival by harvesting method and forest ecosystem classification V-type; determining the extent of site degradation following harvesting; determining the amount of productive land lost, and comparing different harvesting methods.

Three harvesting techniques were chosen for analysis. These techniques included: the full tree method where cut trees are skidded to the landing for delimbing and processing to 8 foot logs; the tree length method where cut trees are delimbed and topped at the stump then skidded to the landing for processing; and the cut to length method where cut trees are delimbed, topped, and processed at the stump.

Phase II work began in 1994 with the establishment and initial measurements of the plots. Details and results obtained during this period are outlined in the 1995 report Black Spruce Regeneration Assessment , (Manitoba Model Forest Report 94-3-05). In 1996 those seedlings reaching a minimum of 0.2 meters in height were tagged and measured for root collar diameter and height. Re-measurements of plot ground cover and seedling densities were also completed. The 96-3-05 Black Spruce Regeneration on Difficult Sites report details the methods and findings of the work carried out during 1996.

Any interpretations and conclusions thus far are based on the recognition that the sample set is small; the sampling intensities between the various harvesting method and V-type combinations are varied; and that all-possible combinations were not sampled. It is also recognised that the assessment conducted to date is an initial benchmark because only three growing seasons have passed since initial harvest. The full regeneration period for these sites extends well beyond this period. In addition, the seedling densities and the site attributes have changed since 1994 and will continue to do so into the near future. Conclusions will not be final until regeneration for these sites has stabilized and a final assessment is made at some point in the future.

When the harvesting methods were assessed alone, the methods that did not involve delimbing or topping at the stump had better regeneration results. When the harvesting methods were viewed in conjunction with the pre-harvest V-type classifications, the method that had the best results when assessed alone, varied between the various V-types.

No relationship was identified between water table levels and initial seedling germination. Water table levels did however, appear to have an effect on seedling growth beyond the establishment phase. The abundance of slash, and seedbeds other than sphagnum moss showed potential for promoting seedling germination. The exclusion of the abundance of sphagnum moss from this list would seem highly suspect since many of the seedlings are found in this substrate.

The presence of surface water, grass, and plants & shrubs appear to impede seedling establishment.

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96-3-07 Pheromone Trapping of Adult Male Spruce Budworm

The spruce budworm, *Choristoneura fumiferana,* outbreak in eastern Manitoba has persisted for over 20 years with a loss of 295,632 m^3 of spruce/fir timber within the Pine Falls Paper Co. Forest Management License area. These losses occurred mainly in the Bird Lake, Wanipigow River and Manigotagan watershed areas and are in addition to .considerable damage to prime recreational forested areas within Nopiming Provincial Park.

In 1994 the Manitoba Model Forest undertook a cooperative project which used pheromone trapping of spruce budworm adults to monitor populations within the Model Forest region in an area east of Lake Winnipeg and northeast of the Winnipeg River. This area has approximately 14,000 ha of budworm vulnerable forest types. The objective of the project was to develop an effective system for monitoring budworm populations throughout this area during periods of low population density (endemic and early outbreak phase) and to establish at what point more intensive conventional sampling methods are required.

Sexually mature spruce budworm female moths produce sex pheromones (chemicals produced by an individual for the purpose communicating with other individuals of the same species) prior to mating. This pheromone allows receptive males to detect and make contact with the female. Due to species specificity and high potency, sex pheromones have received considerable attention for detecting and monitoring populations (Sanders *et al.* 1995). The sex pheromone of the spruce budworm has been identified (Sanders and Weatherston 1976) and a synthetic pheromone is available for monitoring purposes. A modified version of this synthetic pheromone is now in use for monitoring populations throughout much of the spruce budworm's range in Canada.

Moth captures ranged from 60 to 2,050 per trap over the three year study period with the mean moth capture per trap ranging from a low of 97 to 1,921. The mean moth capture per trap for all plots combined was 792 in 1994, 591 in 1995 and 629 in 1996. Moth captures per plot ranged from 291 to 5,762.

Regression analysis indicated weak correlations between: moth captures and subsequent egg mass densities; moth captures and the following year's defoliation; and the current year's defoliation and moth captures.

When the data was analyzed using the moth capture per trap/risk of severe defoliation relationship, the moth capture values predicted defoliation more accurately than the regression analysis suggested it might. In the plots where the moth capture predicted the risk of severe defoliation to be low, 65% experienced light defoliation, 22% moderate defoliation and 13%

severe defoliation the following year. In the plots where the moth capture predicted the risk of severe defoliation to be moderate, 19% experienced light defoliation, 61% moderate defoliation and 19% severe defoliation.

The comparison of egg mass densities to subsequent defoliation yielded similar results to that of the moth capture and subsequent defoliation. In the plots where light defoliation was predicted, 57% experienced light defoliation, 40% moderate defoliation and 3% severe defoliation. In the plots where moderate defoliation was predicted, 27% experienced light defoliation, 53% moderate defoliation and 20% severe defoliation.

Moth captures and egg mass densities produced similar results when used to predict subsequent defoliation. Statistical analysis showed the two methods were not significantly different. These results indicate that pheromone traps have the potential to be used as a predictive tool for spruce budworm defoliation. Pheromone trapping is less labour intensive than egg mass surveys and may be a useful alternative in certain situations. Additional work must be performed however before spruce budworm pheromone traps can be used as an operational survey technique in Manitoba.

For additional information contact;Keith Knowles, Manitoba Natural Resources, Forest Health And Ecology, Forestry Branch, P.O. Box 70 , 200 Saulteaux Cres. Winnipeg, Manitoba, R3J 3W3

96-3-14 GPS Guidance of a Tree Harvester

Global Positioning Systems, GPS, have found their way into agriculture and forestry as a tool for improving efficiency. In addition to this role GPS has also allowed for more accurate field operations and the lessening of environmental impacts caused by inappropriate equipment operation, or inaccurate application of management techniques.

The purpose of this project was to provide Differential Global Positioning System (DGPS) capabilities in a tree harvester. The system would allow the operator of the harvester to see their current position displayed on a background map of the cutting area. This would enable the operator to navigate along the edges of defined buffer zones and generally position themself with respect to geographic features such as roads and streams displayed on the map. This ability would help to reduce costs by eliminating the need to measure out and flag buffer zones. It would also ensure that the likelihood of violating a buffer accidentally would be greatly reduced. It would also provide a permanent record of where the machine had operated. In addition, it would allow for a greater degree of safety and efficiency by allowing the operator to move equipment and know where they are at all times, even when operating at night.

The most important requirement for this project to be a success was an accurate base map upon which to display the GPS position. The existing digital Forest Resource Inventory maps were not sufficiently accurate for this purpose. To address this, a 26 square kilometre area was remapped with existing aerial photography to a horizontal accuracy of approximately one metre. This new map was used as a base map to which other pertinent information, such as cover types roads and buffers were added. When displayed on a colour screen in the cab of the harvester, a flashing dot in the correct geographic position on the map shown allows the operator to locate their position relative to known features. The accuracy of the system is 1-2 metres.

As a result of initial field experience and operator's requests additional features were added. Operators require a simple interface, such as a touch screen and a few functional icons which would enable them to store the locations of wood piles, create a record of the machine's activity over a shift , or record the path to a cutting area. This information could then be conveyed to the operator of the next shift or to the operator of the forwarder so that they can more readily locate the piles of cut wood, even when they are snow covered

The ongoing evaluation and improvement of this system is ongoing. It is expected that in the near future the application of this technology within the cabs of harvesters may assist in reducing the unintentional environmental impacts which may occur during harvesting and other forest activities

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96-3-16 Hardwood on Agricultural Lands

Agricultural pressure within the Manitoba Model Forest has resulted in some deforestation to produce marginal farmland. This land has limited agricultural value as many years crops do poorly. This coupled with shifts in crop prices and ever increasing input costs often results in much of this marginal land becoming vacant after a few years of production. To address concerns about vacant marginal lands the Manitoba Model Forest in cooperation with the Canadian Forest Service is field testing hybrid aspen on this land. The hybrids, if successful, may represent an opportunity to have sustainable yield crops on land which may otherwise remain vacant for years at a time.

Initiated in 1995 (project (95-3-16), the hardwoods on agricultural lands project began with the establishment of over four thousand hybrid aspens in field test sites in the Manitoba Model Forest. During the 1996/97 research year vegetation management was completed on treatments requiring vegetation mat installation and localized herbicide (Glyphosate) application. Mowing and mulching was completed between rows of hybrid aspen twice during the growing season. Mowing was used to control quack grass height. Growth response measurements, taken in at the end of the growing season, recorded mortality, height and base diameters.

Indications to date confirm the need to intensively manage aspen in plantations established from seedlings. Intensive management includes aggressive site preparation of the rooting environment, big planting stock and repetitive localized competition vegetation control until year five. The worst and best survival through year two was 62 % in the no vegetation control treatment and 78 % in the vegetation mat treatment. Girdling from mice and deer browsing are the primary damage agents.

Interest in plantation management of fast growing hardwoods is increasing in the agriculture-forest transition zone. This plantation is the first in western Canadian aspen plantation established using genetically advanced seedlings (hybrids). Ongoing monitoring of the growth response of the various treatments will continued.

For additional information contact Derrek Sidders, Canadian Forest Service, Northern

Forestry Centre, 5320 - 122 Street, Edmonton, Alberta Canada T6H 3S5. Tel: (403) 435-7355, Fax: (403) 435-7221

96-3-18 Demonstrations of Small Site Preparation Equipment

Microsite preparations requiring specialized treatments are a problem often faced by forest industry. Preparation can take the form of ground sensitive treatment for wet or understory scenarios and often involve new equipment and techniques which are constantly evolving. In the summer of 1996 a meri-crusher mounted on a 65 horsepower skid-steer loader was demonstrated to industry as well as the Manitoba Forest Branch and other interested groups. This small site preparation combination was developed to accommodate operations on sites with access or physical ground limitations which require a narrow, light weight piece of equipment. The site preparation tool is a high-speed horizontal bed mixer, creates an enhanced seedbed or microsite which addresses heavy competition and cold soil, biological limiting factors. The site preparation tool is mounted in front of the prime mover allowing the operator to view the final site preparation product progressively.

Sites included in the demonstrations were recently harvested mixed woods with hardwood residuals and backlog mixed wood sites.

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Technology Transfer Working Group Projects

96-5-05 Pinawa Channel Demonstration Woodlot

96-5-08 Manitoba Model Forest Open House and Symposium.

96-5-11 Environmentally Responsible Harvesting Guidelines

96-5-17 Aboriginal Forest Use Workshop

96-5-18 Silviculture Trial: Silviculture Applications and Responses in the Boreal Forest

96-5-22 Private Woodlots in the Manitoba Model Forest

96-5-24 Christmas Tree Growers Workshop

96-5-26 School Tree Planting

96-5-05 Pinawa Channel Demonstration Woodlot

The Pinawa Channel Demonstration Woodlot is a quarter section of Crown land located along PTH 520, approximately 8 km northwest of Pinawa Through the efforts of the Manitoba Model Forest and numerous other individuals this land was secured through a Crown land lease for the purposes of demonstrating sustainable forest management. The main objective of this project is to demonstrate various forest management techniques which if implemented on private woodlots, could result in economic, social, and environmental benefits. This project represents a cooperative partnership between the Manitoba Model Forest, the Woodlot Association of Manitoba (WAM), the LGD of Pinawa, various provincial and federal departments, stakeholder groups, and local interests.

The inherent biophysical values of the Pinawa Channel Demonstration Woodlot in combination with its proximity to the community of Pinawa provides numerous opportunities for education and extension of proper forest management techniques. Interpretation of ecological processes, and ongoing research opportunities also exist, and are a key element of the Pinawa Channel Demonstration Woodlot. In 1996, project 96-5-05 resulted in the development of a management plan which included a self guiding trail and demonstration plots to be established in 1997.

The Pinawa Channel Demonstration Woodlot is ideally suited for its educational role as it has been influenced by both human activities and natural disturbances. Low intensity fire, forest pests and disease have impacted the vegetative and successional composition of forest flora in the area. Historical land use such as commercial logging, unauthorized and permitted fuelwood cutting and Christmas tree harvesting have likely had the greatest influence on the areas landscape and forest structure. The area is characterized by a predominantly hardwood/mixedwood forest with uneven aged and immature forest stands. The area has also been used for general recreational activities such as snowmobiling, ATV use, cross country skiing, and recreational hunting. Commercial resource use in the area does occur and includes trapping and some limited outfitting.

96-5-08 Manitoba Model Forest Open House and Symposium.

Information, ideas and innovative technologies were on display at the third annual Manitoba Model Forest Open House and Symposium. The Open House, held once again in Great Falls, Manitoba was visited by over 600 Model Forest region students. Also touring the event were seventeen members of the World Commission on Forestry and Sustainable Development. The delegates represented over eight countries including Switzerland and Ghana. The Commission delegates were also joined by representatives from the Mexican Model Forests.

Technology Transfer is a large component of Model Forest activities. It was therefore appropriate that state of the art technology and its applications were a key component in many of the displays and presentations. Visitors were able to see for themselves Global Positioning System, GPS, collars worn by caribou as well as discover the wide variety of resources available from across the Model Forest Network through the Internet.

For additional information contact Bev Dube, Manitoba Model Forest, Box 10, Pine Falls, Manitoba. R0E 1M0 Tel:(204) 367-5232 Fax: (204) 367-8897

96-5-11 Environmentally Responsible Harvesting Guidelines

Early on, the Manitoba Model forest recognized that forest workers were coming under increasing pressure to be more environmentally responsible in their work. To assist them in becoming more responsible the Manitoba Model Forest in cooperation with Louisiana Pacific Limited, REPAP Manitoba Inc., Manitoba Natural Resources and the Pine Falls Paper Company, designed a field manual to provide practical assistance and methods which are more environmentally responsible.

In 1996/97, these guidelines were improved and revised . The new document Environmentally Responsible Harvesting Guidelines built upon the existing document, incorporated input from industry and government to make a more operationally usable and accurate publication. The revised document was redesigned and published in durable format which could take the conditions of a field operation setting.

Today, this publication is seen as one tool to be used in the pursuit of more sustainable forestry practices in Manitoba. In addition it is being viewed as a starting point in the pursuit of forest industry certification. Other benefits include the enhancement of operations for wildlife and public viewing.

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96-5-17 Aboriginal Forest Use Workshop

The Manitoba Model Forest region has a long history of aboriginal forest use. In recent years however, the skills and techniques needed to make traditional use of the forest have been in decline. As increasing emphasis is placed on traditional aboriginal forest use as one method towards achieving not only some level of sustainable forest use and employment for the aboriginal populations of the area but also in terms of sustainable forestry as a whole, the Manitoba Model Forest sponsored an Aboriginal Forest Use Workshop.

The Aboriginal Forest use workshop was held in the community of Patricia Beach, located on the shores of Lake Winnipeg, the model forest's western border. The full day workshop, involved a wide variety of traditional forest use presentations by a variety of Aboriginal people, experts in their craft or traditional forest uses in the area. Presentation topics were: Animals found in the forest and their use by Aboriginal people; Traditional medicines gathered in the forest; Legends of the forest; How to erect a teepee; Use of forest materials in traditional musical instruments; Aboriginal art made from materials found in the forest; and moccasin making. The presenters varied from Metis entertainers and story tellers to traditional Ojibway people from local communities.

96-5-18 Silviculture Trial: Silviculture Applications and Responses in the Boreal Forest

Silviculture trials have been ongoing in the Manitoba Model Forest region for decades. With the advent of the Model Forest Program, these trials have been intensified and the various sites enhanced for technology transfer purposes. In 1996/97 the Manitoba Model Forest was involved in numerous tours and workshops involving silviculture techniques. One such workshop was a cooperative effort by the Manitoba Model Forest, Pine Falls Paper Company, Manitoba Forestry Branch and the Technology Development Unit of the Canadian Forest Service Edmonton.

The Silviculture Applications and Responses in the Boreal Forest workshop involved a visit to some of the oldest silviculture applied research and operation sites of the Boreal Forest within the Manitoba Model Forest. A two day workshop it explored the crop tree/vegetation response of intensive management treatments initiated in 1960 to the present. Areas discussed and field toured included harvesting techniques, site preparation, seeding, planting, tending and release techniques in softwood and mixed wood conditions.

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96-5-22 Private Woodlots in the Manitoba Model Forest

A variety of land ownerships including Crown, Municipal, First Nations and private land exist within the Manitoba Model Forest. Private land constitutes a significant portion of the southwest corner of the Model Forest region and therefore has the potential to contribute to the overall wood supply and provide economic diversity to landowners within the region. Private land forests also provide benefits to regional ecological diversity and ecosystem maintenance. Project 96-5-22 assessed the commercial value of private woodlots and examined how they might be managed to enhance their contribution as a source of wood fibre on a sustainable basis without compromising their ecological value within both a local and regional context.

The Manitoba Model Forest encompasses over one million hectares. Within this area is represented the Boreal Forest Region located on the east side of Lake Winnipeg. Parts fall within the Boreal Shield Ecozone and the Lac Seul Upland and Lake of the Woods Ecoregions The Boreal Region is primarily coniferous with white spruce and black spruce as characteristic species; with other prominent conifers being tamarack, balsam fir and jack pine. White birch and poplar make up the majority of the hardwood component. All of these species have some commercial potential and occur at varying levels on private lands and so potentially contribute to the economic and environmental health of the region.

The project determined the levels of privately owned productive timber within the Model Forest. The final report describes forested private land and identifies potential landowners that may benefit from management plans. This information provided a basis for the development of specific management plans for several individuals within the Manitoba Model Forest region. Specific management plans are presented as well as the findings of Forest Resource Inventory (FRI) and ownership analysis in the final report. Constraints and opportunities for future private

woodlot management are also identified.

For additional information contact: Doug Schindler, T.A.E.M. Box 383, Selkirk, Manitoba Canada R1A 2B3. Tel: (204) 482-9054 FAX: (204) 482-9055

96-5-24 Christmas Tree Growers Workshop

The Manitoba Model Forest has supported numerous workshops all with the purpose of taking knowledge gained through research and applying it to practical use in the forests and woodlots of Manitoba. The Christmas Tree Growers Workshop held in Marchand, Manitoba, was an opportunity for Christmas Tree growers and woodlot owners to learn through exhibits and demonstrations about methods and techniques which may enhance their operation while assisting them to be sustainable into the future.

This single day workshop covered numerous topics of interest to the average tree grower or woodlot owner. Presentations such as Bugs and Insects in your Christmas Trees and Woodlot helped many participants to identify some of the more common insect pests they may be facing in their particular operation. For those involved in woodlot operations presentations such as Hybrid Poplar Production and Trees to Lumber gave not only information and advice for the woodlot owner but also provided practical demonstrations of equipment and techniques.

The final presentation of the day, Christmas Trees for Fun and Profit, was followed by an opportunity for participants to acquire white spruce seedlings. The white spruce is Manitoba's provincial tree and so was a fitting species to distribute for planting in the woodlots and yards of the province.

For additional information contact Andy Fast, Woodlot Association of Manitoba, 700 Corydon Ave., Winnipeg, Manitoba Canada Tel: (204) 453-3182 Fax: (204)477-5765

96-5-26 School Tree Planting

Education of up and coming decision makers about the value of the forest is an ongoing task. In order to enhance the educational experience the Manitoba Model Forest in cooperation with Manitoba Hydro and other partners established a tree planting project at two local schools in the Manitoba Model Forest.

This project was undertaken to provide tree planting at the Powerview and Pine Falls School which would enhance the school property by providing much needed shelterbelts and green space. Coupled with the tree planting exercise was an substantial educational component which included classroom as well as field instruction. The field, educational component of the project involved an educational tour of urban trees and landscape. This was followed by students planting over 80 trees at the two school sites.

In addition to having the benefit of students educated about trees the project also provided students with an opportunity to enhance their community through their own efforts. This project, with its lasting effect upon the landscape, has created a better awareness of the role trees play in the environment in the minds of students. It has also provided a lasting legacy to serve as a reminder to students as they grow into adulthood of the precious forest resources around them and the need to think sustainably.

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Economic Diversification Working Group Projects

96 - 4-09 The Harvest, Market and Availability of Special Forest Products in the Manitoba Model Forest

Special forest products can best be defined as any non-timber product that can be derived from the forest. This includes such products as essential oils, extracts, teas, tinctures, decorative woods, edible plants, floral and botanical products, pharmaceuticals, and ecotourism. Well known and economically exploited in some regions of the world it is only in recent years that these products have received a great deal of attention throughout North America.

The purpose of project 96-4-09 was to explore and document the economic opportunities for special forest products from the Manitoba Model Forest. The identification and documentation of markets and other significant factors such as availability have been assembled into a working manual on the harvest availability and marketing of special forest products. The study focuses on the Manitoba Model Forest region and therefore is representative of the products available there. It should be noted however, that the working manual, can be used as an aid in identifying opportunities which exist in other forest communities for developing forest based products. This is especially true in areas which may have a similar forest type and composition.

The study of the forest products covered by this project included the evaluation of published data; analysis of consumer buying habits; and market requirements. It also included extensive discussions with those actually harvesting special forest products and the companies which market them. This special forest product information has been cross referenced with the forest ecosystem classification system. It was through this procedure that maps were developed for the entire Manitoba Model Forest region to indicate where these products might occur and be of sufficient quantity for sustainable harvesting.

The final report, or working manual, represent those special forest products that have been found to have significant, current market potential. That is to say that there is an established, documented market for these products. Other products, which may have the potential for a reliable market, are known to exist in the region. These products however, have not been included as there is no documented, reliable market in existence at this time. Where possible, the special forest product discussed are presented with optional value adding techniques to show how the resource can be better developed the resource.

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Education, Culture, and Public Awareness Working Group Projects

96-6-01 Video and Curriculum Guide

96-6-03 Model Forest Video File

96-6-09 Manigotagan Waterway Trail

96-6-19 Outdoor Youth Education

96-6-24 Trail Interpretation.

96-6-25 Model Forest Tour

96-2-27 North Community Trail Development

96-6-32 ForestEd Workshop

96-6-33 Youth Business Training

96-6-01 Video and Curriculum Guide

The video program The Boreal Forest: a case for sustainability, and the accompanying teacher's guide was distributed to Manitoba secondary schools in 1996/97. This educational tool was developed by the Manitoba Model Forest for the Manitoba Grade 10 geography curriculum unit, The North . The video explores the boreal forest, our use of its vast resources and our approaches to managing this vast resource base.

The video and guide was developed by the Formal education subcommittee of the Manitoba Model Forest; a diverse group representing industry, academia, government and the environmental community. When the committee first met to discuss the common interest in developing an education package on forest management it was clear that these individuals held a wide range of values. It was with considerable satisfaction therefore that the committee was able to unite and develop this package using a consensus approach to decision making, as advocated in the video.

The Boreal Forest: a case for sustainability is now being used in Manitoba schools. Requests for copies have been received from across Manitoba as well as other provinces where boreal forest communities flourish.

For additional information contact Bev Dube, Manitoba Model Forest, P.O. Box 10, Pine Falls Manitoba Canada R0E 1M0 Tel: (204) 367-5232 Fax: (204) 367-8897

96-6-03 Model Forest Video File

Since its beginnings the Manitoba Model Forest realized that documentation of activities would play an important role. The Model Forest Video File was developed to ensure that activities were not only documented but available for use in educational videos, documentaries and other forums where video taped images could be used. Today, the Model Forest has a library which documents on video tape the scientific endeavours of the Model Forest as well as the educational and technology transfer enterprises undertaken during Phase I of the program.

The images captured in the video file are all broad cast quality and available for use in video projects. So far, in addition to being used for the development of the educational video The Boreal Forest: a case for sustainability, images of the Manitoba Model Forest have found their way into numerous broadcast projects. A summary video of the first five years of Manitoba Model Forest activities is now complete and will soon be distribute to both educational and media outlets. In addition, the high quality images are available for use by media outlets.

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96-6-19 Outdoor Youth Education

Many of today's youth have lost the connection to the forests that their ancestors had, even a generation ago. The increased separation of people from their natural environment has resulted in young people not experiencing the wilderness activities that their grandparents may have taken for granted. As a result, many youth are unaware of the environmental problems that are facing us today. In order to address this, youth were exposed to forests and environmental impacts of their activities by actual participation and experience of the forest events that surround them.

In both the Hollow Water Outdoor Youth Educational Project, and the Youth Outdoor Education Program Seymourville, youth were selected from the community who had little experience with the forests which surround their community. They were given the opportunity and benefit of experiencing the true outdoors. They discovered the value of preserving forests, not only for the trees, but all of the different species to be found there. They were exposed to the different species in part by learning about the different traditional medicines that originated in the forest.

The Projects also exposed the students to different activities as they related to the seasons of the forest. Through both summer and winter sessions in the forest, the youth participated in the following activities; exploration of areas with low human disturbance, trapline experience; natural history; pulping and milling operations; winter survival skills; canoeing and boating skills; fishing; forest fire prevention; outdoor camping; and traditional forest uses.

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96-6-24 Trail Interpretation.

In 1994 the Manitoba Model Forest developed a trails strategy for the area which identified the needs and goals for trail development. Since its inception, the trails strategy has assisted the Model Forest in the development and enhancement of trails throughout the region. One such trail is the Ironwood trail.

Located along the banks of the Winnipeg River in the town of Pinawa, the Ironwood trail introduces the traveller to the ecology of the ironwood tree and the variety of habitats located along the trail route. The Manitoba Model Forest has had an ongoing involvement with this educational trail. In previous years the Manitoba Model Forest has assisted in the development of the trail as well as participating in research performed by students from the Campus of the Deep River Science Academy.

A valuable educational tool in the area, the Ironwood trail was improved during project 96-6-24 through the completion of a self guiding brochure and the installation of interpretive signs along the trail route. The focus of the additional interpretive components developed during this project was the ironwood tree. Near its ecological limits in the Manitoba Model Forest , the trail and other interpretive components assist the traveller in understanding the ecological variation, uses and historical place of the ironwood in Manitoba's history.

Another trail to be improved under project 96-6-24 was the North Star Trail located in the Bel Air Forest. Initiated in 1995, the Manitoba Model Forest assisted in the original development of the North Star Trail. Since its inception, the trail has become a popular destination for hikers, road weary drivers and nature enthusiasts of all types wishing to discover more about sustainable forest use in the Manitoba Model Forest.. To enhance the experience the Manitoba Model Forest, under project 96-6-24 assisted in improving and maintaining interpretive signs along the route.

For additional information contact Dan Bulloch, Manitoba Natural Resources, 200 Saultaeux Cres., Winnipeg, Manitoba CanadaR3J 3W3 Tel: (204) 945-8238 fax: (204) 945-3077

96-6-25 Model Forest Tour

One of the greatest challenges facing the Manitoba Model Forest is defining for the public what it is and what it does. To address this challenge, Manitoba Model Forest representative Trisha Dube took to the road during the summer of 1996 with an informational display.

Due to the diverse nature of the Manitoba Model Forest's communities a central location for a static informational display is not a practical way for the public to be exposed to the sustainable development ideas and philosophies which define the Manitoba Model Forest. While excellent attendance is always the case at the Annual Open House and Symposium, its audience tends to be restricted to schools. To reach the public it was necessary to travel to major communities throughout the Model Forest region.

Beginning in the south at the community of Pinawa, Communication Assistant, Trisha Dube, spoke to hundreds of Model Forest residents about the concepts of sustainable forestry and the achievements thus far obtained by the Manitoba Model Forest. Trisha's travels took her to the communities of Traverse Bay, Grand Beach, Bissett, Manigotogan and Sagkeeng. This effort to

reach the public with information not only informed about past achievements and concepts which guide the Manitoba Model Forest but has laid the foundation for future activities in all Manitoba Model Forest communities.

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96-2-27 North Community Trail Development

The northern communities of the Manitoba Model Forest were in part created in response to the discovery of gold and other minerals in the region. Today, there are several active gold mine sites and many abandoned mining operations with histories dating back to the turn of the century. It was the long mining history of the Long Lake area which prompted the development of the Long Lake Mines Hiking Trail.

Located near Long Lake in Nopiming Provincial Park the trail exposes hikers to the mining history of the region. Many mining relics such as steam boilers and mechanical hoists remain along the trail route. Each has been identified along with the mine site. Interpretive signs introduces the traveller to the type of mine and the uses of mining equipment they encounter.

In addition to mining sites, the trail travels through some diverse natural areas. These areas include ponds, forest and small waterfalls. The observant can not only experience some of the native wildflowers but also catch a glimpse of the many natural residents of the forest which are taking up residence at the abandoned sites and in the aging equipment.

For additional information contact Stuart Janssen, Box 49, Great Falls, Manitoba Canada R0E 0V0 tel: (204)367-2501 Fax: (204) 367-4758

96-6-32 ForestEd Workshop

The Manitoba Model Forest has had an ongoing involvement with the ForestEd Workshop for Teachers. In a partnership consisting of Manitoba Hydro, Manitoba Natural Resources, Manitoba Education and the Manitoba Forestry Association the ForestEd Workshop provided the opportunity for 28 participants from across Manitoba to upgrade their teaching skills and increase their forest knowledge base over a three day period. The workshop, which stressed hands on learning experiences, featured teaching tools were from Project Learning Tree (PLT) and Project Wild as well as thirteen presenters representing a wide range of information and activities.

Over the three days participants experienced the forest through a variety of presentations and tours. The learning experience began with a field trip from Winnipeg to Star Lake, where the majority of the workshop was held. Along the way participants toured the Foresters' Footsteps Trail with expert guides provided by Manitoba Natural Resources, Forestry Branch. This tour provided an opportunity for participants to study insects, fire ecology and forestry techniques.

The workshop exposed participants to forest plants and soils through lectures and field activities. Formal sessions were complemented by tours of the White Pine Trail and the Whiteshell

Fish Hatchery. To make the most of evenings participants engaged in numerous activities including an evening of frog identification and a frog calling contest.

The workshop finished with a stop at the Manitoba Forestry Association's Sandilands Forest Centre near Hadashville. Here they participated in activities from PLT and Project Wild, and planted three green ash trees to commemorate the ForestEd. Workshop. 96-6-32 ForestEd Workshop.

For additional information contact Diane Beaven, Manitoba Forestry Association, 900 Corydon Ave, Winnipeg, Manitoba Canada Tel: (204) 453-3182 Fax: (204) 477-5765

96-6-33 Youth Business Training

Since its inception the Manitoba Model Forest recognized that education was one of the most important components in its quest to achieve sustainable development within the region. Whether that education took the form of interpretive trails or educating new or existing work forces, the Manitoba Model Forest has tried to provide resources towards the education of the communities with in its region.

In 1996, the Manitoba Model Forest assisted the Brokenhead Ojibway Nation in their quest to train their youth. Through financial support the Manitoba Model Forest has provided some of the funding for the Brokenhead Ojibway Nation to offer youth business training under the banner of the Manitoba Aboriginal Youth Entrepreneur Program.

The Manitoba Aboriginal Youth Entrepreneur Program offers 16 weeks of technical training followed by a mentorship component with businesses operating within the Southeast area of Manitoba.

The program offered 15 training positions for entrepreneurs who wished to start their own business and 5 positions for individuals who wish to manage but not own a business. The entrepreneurial group, at the end of the program, produced a detailed and complete business plan from which they will build their business.

Upon graduation, participants have at their disposal, 20 hours of individual business counselling. The business management group participants are expected to secure positions within their community or other communities as management trainees.

The program is held at the newly renovated training centre on the Brokenhead Ojibway First Nation in Scanterbury, Manitoba. Participants from communities outside of driving distance from Brokenhead are billeted in private residences in the community. Eligible participants are between 18 and 29 years of age, of Aboriginal descent and reside within one of the Southeast Tribal Council communities.

Jim Prince, Economic Development Officer, Brokenhead Ojibway Nation, Scanterbury, Manitoba Canada R0E 1W0