



Annual Report
1996 – 1997

Annual Report
1996 – 1997

©1998, Queen's Printer for Ontario
Printed in Ontario, Canada

Copies of this publication are available from:

**Centre for Northern Forest
Ecosystem Research (CNFER)**

955 Oliver Road
Thunder Bay, ON P7B 5E1
<http://www.cnfer.on.ca>

**Northeast Science
& Technology (NEST)**

PO Bag 3020
South Porcupine, ON P0N 1H0
nestne@epo.gov.on.ca
<http://www.nest.on.ca>

**Northwest Science
& Technology (NWST)**

RR#1, 25th Sideroad
Thunder Bay, ON P7C 4T9
sciencn2@epo.gov.on.ca
<http://www.nwst.on.ca>

Terrestrial Assessment Unit (TAU)

PO Bag 3020
South Porcupine, ON P0N 1H0
nestne@epo.gov.on.ca
<http://www.nest.on.ca>

Cette publication spécialisée
n'est disponible qu'en anglais

TABLE OF CONTENTS

Message from the Manager—Ralph Wheeler	iii
1996–1997 Expenditures	iv
Publications	v
Workshops	xv

Centre for Northern Forest Ecosystem Research—CNFER

Message from the Co-ordinator—Kim Armstrong	3
Coldwater Lakes Research—Rob Steedman	4
Comparative Aquatic Effects—Rob Mackereth	5
Evaluation of Moose Guidelines—Art Rodgers	6
Full Tree Harvest—Dave Morris	7
Landscape Analysis—Rob Rempel	8
Tourism Effects—Wolfgang Haider	9
Vegetation Dynamics—Mark Johnston	10

Northeast Science & Technology—NEST

Message from the Co-ordinator—Mary Ellen Stoll	13
Aquatics—Steve McGovern	14
Wildlife Habitat and Diversity—Bob Watt	18
Terrestrial Ecology—Kim Taylor	19
Vegetation Management—Alison Luke	20

Northwest Science & Technology—NWST

Message from the Co-ordinator—Ron Waito	23
Lake of the Woods FAU—Tom Mosindy	25
Nipigon Lake FAU—Rick Salmon	27
Quetico-Mille Lacs FAU—Mike Fruetel	29
Regional Fish & Wildlife Ageing Unit—Susan Mann	31
Northwestern Ontario Ecological Land Classification—Gerry Racey	32
Stand Management—Colin Bowling	33
Terrestrial Ecosystems—Gerry Racey	35

Boreal Terrestrial Assessment Unit—BTAU

Message from the Co-ordinator—Chris Davies	39
--	----

— MESSAGE FROM THE MANAGER OF BOREAL SCIENCE SECTION —

Welcome to the first Annual Report of MNR's Boreal Science Section. Boreal Science was formed in a 1996 ministry-wide organization adjustment, and is part of MNR's new Science Development and Transfer Branch. Boreal Science includes Northeast Science & Technology in Timmins, and Northeast and Northwest Science & Technology and the Center for Northern Forest Ecosystem Research in Thunder Bay.

1996/97 was a year of challenges and opportunities. April saw the end of the first ever public service strike in Ontario. In May, MNR went through a significant downsizing exercise that impacted every section in the Ministry. July brought the news that the Section Manager, Al Willcocks, accepted a position as Director of Forestry in Saskatchewan. But we continue to do our important work in resource management science.

As a "Boreal-wide" Section, our mandate remains the same...the delivery of the best and most current scientific knowledge in the field of resource management. The opportunities to combine and integrate programs, expertise, and transfer of our products cannot be understated. We continue to work toward timely, efficient, and effective mechanisms to meet the needs of Crown land resource managers.

Our staff continue to deliver a diverse range of top-quality products, all focused on helping our clients make sound natural resource management decisions. The integration of research, development and extension services within one section is showing dividends. A comprehensive list of our accomplishments is included in this report.

I would like to take this opportunity to thank all the staff for making my transition into the Manager position a very positive experience. I am confident that the 1997/98 year will be rewarding to staff, and clients of the Boreal Science Section.

Ralph Wheeler
Manager, Boreal Science Section

Funding Source	Unit	Standard Accounts	Allocation	Expenditures	
Fish & Wildlife Business Plan	NWST	Salary	686.8	620.8	
		ODOE	370.6	329.0	
		Unit Total	1057.4	949.8	
	NEST	Salary	354.4	269.5	
		ODOE	133.3	112.2	
		Unit Total	487.7	381.7	
	BTAU	Salary	44.6	39.1	
		ODOE	987.5	1223.0	
		Unit Total	1032.1	1262.1	
Fish & Wildlife Business Plan	Total Boreal Science	Section Total (ODOE & Salaries)	2577.2	2593.6	
Forest Management Business Plan	CNFER	Salary	1101.5	1074.6	
		ODOE	1235.0	1104.9	
		Unit Total	2336.5	2179.5	
	NWST	Salary	622.6	575.7	
		ODOE	442.1	426.8	
		Unit Total	1064.7	1002.5	
	NEST	Salary	771.8	694.0	
		ODOE	400.3	420.9	
		Unit Total	1172.1	1114.9	
	BTAU	Salary	342.5	250.8	
		ODOE	752.9	469.7	
		Unit Total	1095.4	720.5	
	Forest Management Business Plan	Total Boreal Science	Section Total (ODOE & Salaries)	5668.7	5017.4
	NODA	NWST	Salary	72.1	62.8
			ODOE	31.2	28.5
Unit Total			103.3	91.3	
NEST		Salary	56.0	86.8	
		ODOE	130.5	52.2	
		Unit Total	186.5	139.0	
NODA	Total Boreal Science	Section Total (ODOE & Salaries)	289.8	230.3	
MNR Capital	CNFER	ODOE	3.0	3.9	
	NWST	ODOE	20.0	19.0	
MNR Capital	Total Boreal Science	Section Total	23.0	22.9	
MNR General - Inventory \$	BTAU	Salary	0.0	0.1	
		ODOE	266.2	85.2	
		Unit Total	266.2	85.3	
MNR General - Inventory \$	Total Boreal Science	Section Total (ODOE & Salaries)	266.2	85.3	

PUBLICATIONS

CENTRE FOR NORTHERN FOREST ECOSYSTEM RESEARCH

Archibald, D. J., B. W. Wiltshire, **D. M. Morris**, and B. Batchelor.

1997. Forest management guidelines for the protection of the physical environment. Queen's Printer, Toronto (in press).

Dore, M., **M. Johnston**, and H. Stevens. 1997. Global market relations and the phenomenon of tropical deforestation. In Satya Dev Gupta and Nandas K. Choudhry (eds.) *Globalization and development: growth, equity and sustainability*. Kluwer Academic Publishers, Amsterdam (in press).

Dore, M., **M. Johnston**, and H. Stevens. 1997. An ecological-economic analysis of the role of Canada's forests in mitigating global climate change. *Journal of Sustainable Forestry* 5: 205–212 (in press).

Dore, M., H. Stevens, and **M. Johnston**. 1997. The carbon cycle and the value of the forests. *Journal of Forest Economics* (in press).

Duckert, D. R., and **D. M. Morris**. 1996a. Calibrating the FORECAST model for Ontario black spruce sites as a tool to evaluate the impacts of silviculture on long-term site productivity. Page 138 in 14th North American Forest Biology Workshop: Forest Management Impacts on Ecosystem Processes. June 16–21, 1996, Quebec City, Quebec. 174 p.

Duckert, D. R., and **D. M. Morris**. 1996b. Calibrating the FORECAST model for Ontario black spruce sites as a tool to evaluate the impacts of silviculture on long-term site productivity. Pages 75–76 in 88th Annual Meeting of the Canadian Institute of Forestry: Global Influences-Local Realities: A Cross Country Check-up. August 18–22, 1996, Thunder Bay, Ontario. 90 pp.

France, R., R. Peters, R. Lehmann, and **R. Steedman**. 1997. Differences in DOC concentration and water clarity in boreal lakes in relation to catchment forest clearance: implications for potential effects of climate warming on UV-b depth penetration. In review, *Forest. Ecol. Monog.*

France, R. F., and **R. J. Steedman**. 1996. Energy provenance for juvenile lake trout in small Canadian Shield lakes as shown by stable isotopes. *Trans. Am. Fish. Soc.* 125: 512–518.

Gluck, M. J., and **R. S. Rempel**. 1996a. The effect of spatial scale on landscape measurements of post-disturbance vegetation. *Advances in Remote Sensing* 4: 170–176.

Gluck, M. J., and **R. S. Rempel**. 1996b. Structural characteristics of post-wildfire and clearcut landscape. *Environ. Assess. Monit.* 39: 435–450.

-
- Gluck, M. J., **R. S. Rempel**, and P. Uhlig. Evaluating remotely sensed wetland mapping for applications in landscape management. For. Res. Report No. 137, Ontario Forest Research Institute, Sault Ste. Marie, Ontario. 74 pp.
- Gordon, A. G., and **D. M. Morris**. 1996a. Nutrient cycling and productivity of red spruce ecosystems. Pages 24–33 in Northeastern Forest Soils Conference - Great Lakes Forest Soils Conference Joint Meeting: The Right Stuff for the Future. July 7–9, 1996, Dorset, Ontario. 85 pp.
- Gordon, A. G., and **D. M. Morris**. 1996b. Long-term soil chemistry changes: conifer, tolerant hardwoods, and red spruce plantation. Pages 60–64 in Northeastern Forest Soils Conference-Great Lakes Forest Soils Conference Joint Meeting: The Right Stuff for the Future. July 7-9, 1996, Dorset, Ontario. 85 pp.
- Haider, W.** 1996. A decision support system for remote tourism in boreal mixedwood forests. Pages 144–147 in C. R. Smith and G. W. Crook, eds. Advancing boreal mixedwood management in Ontario: Proceedings of a Workshop, October 17–19, 1995. Ontario Ministry of Natural Resources, Sault Ste. Marie, Ontario.
- Haider, W.**, D. A. Anderson, T. C. Daniel, J. J. Louviere, B. Orland, and M. Williams. 1997. Combining calibrated digital imagery and discrete choice experiments: An application to remote tourism in northern Ontario. In M. E. Johnston, D. Twynam, and W. Haider, eds. Shaping tomorrow's North. Proceedings of an international conference on northern tourism and recreation. Thunder Bay, Ontario: Centre for Northern Studies, Lakehead University.
- Haider, W.**, and J. Hetherington. 1997. Effects of forest regeneration practices on resource based tourism and recreation. Chapter 29 in B. Wagner and S. Colombo, eds. Regenerating Ontario's forests.
- Haider, W.**, and **L. Hunt**. Remote tourism in northern Ontario: Patterns of supply and a motivational segmentation of clients. *Journal of Applied Recreation Research* (in press).
- Haider, W.**, and G. Morgan. 1996. A choice based decision support system of winter anglers in the Sudbury area. Freshwater Research Cooperative, Laurentian University, Sudbury, Ontario (on computer disk).
- Hunt, L.**, and **W. Haider**. 1997. Pricing and packaging strategies of remote fly-in tourism operations in northern Ontario. In M. E. Johnston, D. Twynam and W. Haider, eds. Shaping tomorrow's

North. Proceedings of an international conference on northern tourism and recreation. Thunder Bay, Ontario: Centre for Northern Studies, Lakehead University.

Hutchison, C. L., and **A. R. Rodgers**. 1996. Influence of environmentally considerate silviculture on small mammal communities at cut edges in an Ontario boreal mixedwood forest. Pages 173–177 in C. R. Smith and G. W. Crook, eds. *Advancing boreal mixedwood management in Ontario: Proceedings of a Workshop, October 17–19, 1995*. Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario.

Johnston, M. H. 1996. The role of disturbance in boreal mixedwood forests of Ontario. Pages 33–40 in C. R. Smith and G. W. Crook, eds. *Advancing boreal mixedwood management in Ontario: Proceedings of a Workshop, October 17–19, 1995*. Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario.

Johnston, M. H. 1996. Can harvesting emulate natural disturbance in Boreal Mixedwoods? Pages 155–157 in C. R. Smith and G. W. Crook, eds. *Advancing boreal mixedwood management in Ontario: Proceedings of a Workshop, October 17–19, 1995*. Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario.

Johnston, M. H., and J. A. Elliott. 1996. Impacts of logging and wildfire on an upland black spruce community in northwestern Ontario. *Environmental Monitoring and Assessment* 39: 283–297.

Johnston, M. H., and J. A. Elliott. 1997. The effect of fire severity on ash, plant and soil nutrient levels following experimental burning in a boreal mixedwood stand. *Canadian Journal of Soil Science* (in press).

Johnston, M. H., and J. A. Elliott. 1997. The effect of fire severity on ash and soil nutrient levels following experimental burning in a boreal mixedwood stand. Oral presentation at “Sustainable site Productivity in Canadian Forests: Ecosystem Processes Affected by Disturbance and Recovery,” conference sponsored by Canadian Forest Service, Great Lakes Forestry Centre, February 18–20, 1997, Sault Ste. Marie, Ontario.

Johnston, M. H., J. A. Elliott, J. Kayll, and B. Towill. 1997. Fuel consumption and fire intensity in relation to timber harvesting treatments on an experimental prescribed fire in NW Ontario. *International Journal of Wildland Fire*. (In press.)

-
- Johnston, M. H.**, P. S. Homann, J. K. Engstrom, and D. F. Grigal. 1996. Changes in ecosystem carbon storage over 40 years on an old-field/forest landscape in east-central Minnesota. *Forest Ecology and Management* 83: 17–26.
- Kelso, J. R. M., **R. J. Steedman**, and S. Stoddart. 1996. Causes implicated in changes to Great Lakes fish stocks and the direction they provide for ecosystem rehabilitation. *Can. J. Fish. Aquat. Sci.* 53(Suppl.1): 10–19.
- Kershaw, H. M., J. K. Jeglum, and **D.M. Morris**. 1996. Long term site productivity of boreal forest ecosystems. II. Survey of expert opinion on the impact of forestry practices in boreal forest ecosystems. *Nat. Resour. Can., Can. For. Serv., Sault Ste. Marie, Ontario. NODA/NFP Technical Report TR-23.*
- Kershaw, H. M., J. K. Jeglum, and **D.M. Morris**. 1997. Long term site productivity of boreal forest ecosystems. III. Development of best practices for maintaining site productivity. (In press.)
- Lawson, E. J. G., and **A. R. Rodgers**. 1997. Differences in home-range size computed in commonly used software programs. *Wildl. Soc. Bull.* 25(3): (in press).
- Luckai, N. J., **D.M. Morris**, and **D. R. Duckert**. 1997. Impacts of harvesting on soil microbial biomass and activity in black spruce ecosystems. Page 41 in *Sustainable Site Productivity in Canadian Forests: Ecosystem Processes Affected by Disturbance and Renewal*. February 18–20, 1997, Sault Ste. Marie, Ontario. 63 pp.
- Marshall, T. R., W. Haider**, D. A. Anderson, and R. A. Ryder. 1996. Lake trout ecosystem health index. Ontario Ministry of Natural Resources, Centre for Northern Forest Ecosystem Research, Thunder Bay, Ontario (on disk).
- Morris, D. M.** 1996. Ecological processes and forest management implications for black spruce ecosystems. Pages 21–22 in *88th Annual Meeting of the Canadian Institute of Forestry: Global Influences-Local Realities: A Cross Country Check-up*. August 18–22, 1996, Thunder Bay, Ontario. 90 pp.
- Morris, D. M.** 1997. The role of long-term site productivity in maintaining healthy ecosystems: A prerequisite of ecosystem management. *For. Chron.* 73 (in press).
- Morris, D. M., D. R. Duckert**, and A. G. Gordon. 1996a. Studying the impacts of full-tree harvesting on long-term site productivity of black spruce ecosystems: a project overview. Page 152 in *14th North*

American Forest Biology Workshop: Forest Management Impacts on Ecosystem Processes. June 16-21, 1996, Quebec City, Quebec. 174 pp.

Morris, D. M., D. R. Duckert, and A. G. Gordon. 1996b. Studying the impacts of full-tree harvesting on long-term site productivity of black spruce ecosystems: A Project Overview. Page 77 in 88th Annual Meeting of the Canadian Institute of Forestry: Global Influences-Local Realities: A Cross Country Check-up. August 18-22, 1996, Thunder Bay, Ontario. 90 pp.

Morris, D. M., A. G. Gordon, and J. K. Jeglum. 1996. Ecology, organic soil development, and chemistry of white, red, and black spruce wetlands. Pages 34-38 in Northeastern Forest Soils Conference-Great Lakes Forest Soils Conference Joint Meeting: The Right Stuff for the Future. July 7-9, 1996, Dorset, Ontario. 85 pp.

Morris, D. M., J. P. Kimmins, and **D. R. Duckert**. 1997. The use of soil organic matter as a criterion of the relative sustainability of forest management alternatives: A modelling approach using FORECAST. *For. Ecol. Manage.* 94: 61-78.

Osika, M. 1997. Potential impacts of clearcut logging on lake trout (*Salvelinus namaycush*) reproduction in Northwestern Ontario lakes. M.Sc.F. Thesis, Lakehead University Faculty of Forestry. 68 pp.

Rempel, R. S. 1996. Long-term raptor migration monitoring in the lower Fraser Valley. (Archived at Natural History Museum, Victoria, British Columbia.)

Rempel, R. S., K. F. Abraham, T. R. Gadawski, S. Gabor, and R. K. Ross. 1996. A simple wetland habitat classification for boreal forest waterfowl. *J. Wildl. Manage.* 61: 746-757.

Rempel, R. S., P. C. Elkie, **A. R. Rodgers**, and M. J. Gluck. 1997. Timber management and natural disturbance effects on moose habitat: a landscape evaluation. *J. Wildl. Manage.* 61(2): 517-524.

Rempel, R. S., G. D. Racey, and K. A. Cumming. 1997. Predicting moose browse production using the Northwestern Ontario Forest Ecosystem Classification. *Alces* 33: 19-31.

Rempel, R. S., and **A. R. Rodgers**. 1997. Effects of differential correction on accuracy of a GPS animal location system. *J. Wildl. Manage.* 61(2): 525-530.

Rodgers, A. R., R. S. Rempel, and K. F. Abraham. 1996. A GPS-based animal location system. *Wildl. Soc. Bull.* 24: 559-566.

-
- Rodgers, A. R., R. S. Rempel**, R. Moen, J. Paczkowski, C. C. Schwartz, E. J. Lawson, and M. J. Gluck. 1997. GPS collars for moose telemetry studies: a workshop. *Alces* 33: 203–209.
- Rodgers, A. R.**, and A. R. E. Sinclair. 1997. Diet choice and nutrition of captive snowshoe hares (*Lepus americanus*): interactions of energy, protein, and plant secondary compounds. *Ecoscience* 4(2): 163–169.
- Rintoul, T., and **M. Johnston**. 1997. Vegetation response to harvesting, harvesting and prescribed burning, and wildfire in Northwestern Ontario. *Journal of Vegetation Science* (in press).
- Scarratt, J. B., **M. H. Johnston**, and B. J. Sutherland. 1996. The Black Sturgeon Mixedwood Research Project: Ecosystem research in support of Integrated Resource Management. Pages 202–207 in C. R. Smith and G. W. Crook (compilers) *Advancing Boreal Mixedwood Management in Ontario: Proceedings of a Workshop, October 17–19, 1995*. Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario.
- Steedman, R. J.** 1996. The evolving context of science for land-water ecotones. *Sustainable Forestry Partnerships: Forging a Network of Excellence*, International Conference March 7–10, 1996, Edmonton, Alberta. Conference summary, pages 80–82 in *sustainable Forest Management Network of Centres of Excellence*.
- Steedman, R. J.**, R. L. France, **R. S. Kushneriuk**, and R. H. Peters. 1997. Control of littoral water temperatures in small boreal forest lakes of northwestern Ontario, Canada, and likely effects of riparian deforestation. In review, *Boreal Environment Research*.
- Steedman, R. J.**, and R. T. Kavetsky. 1996. Work group sets targets and indicators for Lake Superior ecosystem health. *Focus* (The newsletter of the International Joint Commission) 21(1): 5–6.
- Steedman, R. J.**, and P. Morash. 1997. Effects of forestry and forest regeneration on aquatic ecosystems. Chapter 28 in B. Wagner and S. Colombo, eds., *Regenerating Ontario's forests*. In press.
- Steedman, R. J.** et al. 1996. Use of retrospective information for aquatic habitat conservation and restoration. *Can. J. Fish. Aquat. Sci.* 53(Suppl.1): 415–423.
- Trepanier, M., and **W. Haider**. 1995. Shoresite: A method for sampling and analysing the biophysical characteristics of shoreline forest communities for the purpose of modelling the scenic beauty of forested shorelines. Ontario Ministry of Natural Resources, Centre for Northern Forest Ecosystem Research, Thunder Bay, Ontario. 18 pp.

NORTHEAST SCIENCE & TECHNOLOGY

Technical Reports

Evaluating laser technology in measuring tree heights and establishing permanent sample plots. W. Lewis. NEST TR-016.

Wetlands evaluation in Ontario: Models for predicting wetland score. S. Chisholm, J. Chris Davies, G. Mulamoottil and D. Capatos. NEST TR-025.

Using chemicals to control root growth in container stock: A literature review. Faye Johnson. NEST TR-026.

The Eastern Habitat Joint Venture (EHJV) Project Hilliardton Wetland Creation Project: Pre-project inventory. Chris Davies, Barry G. Warner, Paul Adams, H. Wilson and P. Davis. NEST TR-027.

Aspen management literature review. Bruce Miller. NEST TR-028.

Small mammal habitat association in the Lake Abitibi Model Forest of Northeastern Ontario. John Boos and Bob Watt. NEST TR-030.

Mattagami River lake sturgeon entrainment: Little Long Generating Station facilities. John Seyler, J. Evers, Scott McKinley, R.R. Evans. G. Prevost, Rob Carson and Dale Phoenix. NEST TR-031.

An analysis of the Burt Lake permanent sample plots second measurements. W. Lewis. NEST TR-032.

Technical Notes

CSP culvert installation at water crossings on forest access roads. Bob Wilson. NEST TN-013.

An approach to pre-harvest silviculture prescriptions in Boreal Ontario. Wally Bidwell, B. Turner, David J. Archibald and Neil Maurer. NEST TN-014. (A joint publication with NWST)

Predicting Wetland Score: Is it wet? Is it significant? J. Chris Davies, S. Chisholm, G. Mulamoottil, John Parton and D. Capatos. NEST TN-015.

Field Guides

Instream sediment control techniques field implementation manual. Trow Consulting Engineers Ltd. NEST FG-007.

Technical Manuals

Costing a prescribed burn: An illustrative example using the fire management prescribed burn. D. Manol, C. Kingsburgh and Jim Duncan. NEST TM-007.

Information Reports

A bibliography of literature on large river ecosystems in the Moose River Basin. Wayne Fiset, Charles Hendry and John Seyler. NEST IR-008.

NORTHWEST SCIENCE & TECHNOLOGY

Technical Reports

White pine in northwestern Ontario: Distribution, Silviculture history and prospects. Colin Bowling and Glen Niznowski. NWST TR-94.

Status of older white pine plantations in northwestern Ontario. Tim Bryson, Ron Storie and Colin Bowling. NWST TR-95.

Jack pine aerial seeding on three soil types of the Pakwash Forest. Brian Bulley and Colin Bowling. NWST TR-96.

Old growth red and white pine forests: Northwest Region report on protection. Evan Simpson (compiler). NWST TR-98.

Mini-plug seedlings and shelter seeding on three moisture regimes in the Pakwash Forest. Robert Whaley and Lisa Buse. NWST TR-99.

Forest humus forms in northwestern Ontario. Robert Sims and Ken Baldwin. NWST TR-100. (A joint publication with Forestry Canada)

Sphagnum species in northwestern Ontario: A field guide to their identification. Robert Sims and Ken Baldwin. NWST TR-101. (A joint publication with Forestry Canada)

Status of the lake whitefish fishery in Lake Nipigon. Rick Salmon and Albertine van Ogorp. NWST TR-102.

Caribou winter habitat in the new forest: Lessons from Lucy Lake. Gerald Racey, Allan Harris and Robert Foster. NWST TR-103.

Site quality evaluation, site quality maintenance and site specific management for forest land in northwest Ontario. Willard Carmean. NWST TR-105.

Jack pine leader clipping trial: Fifth-year results. Brian Bulley, Colin Bowling and Glen Niznowski. NWST TR-106.

Effect of Vision® on seed germination of red raspberry from the soil seed bank. C. Chourmouzis, Chris Hollstedt, Wayne Bell, Donna Myketa and A.M. Gordon. NWST TR-107.

Allelopathic potential of large-leaved aster (*Aster macrophyllus* L.): A preliminary study. Azim Mallik and H.A. Quayyum. NWST TR-108.

Estimate of relative aesthetic impact of Northwest Region Caribou Strategy on remote tourism. Jennifer Line and Gerald Racey. NWST TR-110.

Jack pine fertilization: A review of literature. Wayne Bell, Paul Bastarache and Len Meyer. NWST TR-111.

Ingress of natural regeneration in plantations after tree-length harvest in northwestern Ontario. Colin Bowling, Glen Niznowski and Madeline Maley. NWST TR-112.

Technical Notes

Fungi and plant toxins for forest vegetation management. Donna Myketa, Michael McLaughlan and Wayne Bell. NWST TN-33.

An approach to pre-harvest silviculture prescriptions in boreal Ontario. Wally Bidwell, B. Turner, David Archibald and Neil Maurer. NWST TN-34. (Joint publication with NEST)

The Shelterwood Silvicultural system as related to vegetation management. Donna Myketa and Michael McLaughlan. NWST TN-35.

Aerial application of herbicides: A review of common aircraft and drift prediction tools. Michael McLaughlan, R. Mickle and Wayne Bell. NWST TN-36.

Managing vegetation with herbicides: A review of glyphosate, 2,4-D, hexazinone, triclopyr and simazine. Michael McLaughlan, Donna Myketa and Wayne Bell. NWST TN-37.

Forest Vegetation Management Alternatives: A forward to the guide. Robert Wagner and Michael McLaughlan. NWST TN-38.

Cut stump herbicide treatments to reduce sprouting and root suckering. Azim Mallik, Kate Wood, Christine Hollstedt and Michael McLaughlan. NWST TN-39.

Field Guides

Field guide to the Wetland Ecosystem Classification for northwestern Ontario. Allan G. Harris, Sean C. McMurray, Peter W.C. Uhlig, John K. Jeglum, Robert F. Foster and Gerald D. Racey. NWST FG-01.

Terrestrial and wetland ecosites of northwestern Ontario. Gerald D. Racey, Allan G. Harris, John K. Jeglum, Robert F. Foster and G.M. Wickware. NWST FG-02.

Field guide to the Forest Ecosystem Classification for northwestern Ontario. Richard Sims, William Towill, Ken Baldwin, Peter Uhlig and Greg Wickware. NWST FG-03. (Revision)

Field guide to the common forest plants in northwestern Ontario. Ken Baldwin and Richard Sims. NWST FG-04. (Revision)

Steven G. Newmaster, Allan G. Harris and Linda J. Kershaw. Wetland plants of Ontario. Lone Pine Publishing. Edmonton, AB.

Workshop Proceedings

“Fish”—To stock or not to stock. Paul MacMahon (compiler). NWST WP-03.

Recent trends in the Lake of the Woods muskellunge fishery. Mosindy, T. Kerr, S.J. and C.H. Olver [eds.]. 1996. Managing muskies in the '90s. SRST WP-007.

The Lake of the Woods bass fishery: a case history. Mosindy, T. Armstrong, K. and R. Mackereth [eds.]. 1997. Smallmouth bass in northwestern Ontario. [in press].

Journal Articles

Rusak, J.A., and T. Mosindy. 1997. Seasonal movements of lake sturgeon in Lake of the Woods and the Rainy River, Ontario. *Canadian Journal of Zoology*. 75: 383-395.

Fact Sheets

Lake of the Woods Fisheries Assessment Unit. 1996. Winter creel surveys of lake trout and black crappie. Lake of the Woods FAU Fact Sheet No. 1. 4pp.

Others

Mosindy, T. 1997. The tag as a fisheries regulatory tool. Fisheries Assessment Unit Update Series. Ontario Ministry of Natural Resources. [in press].

Salmon, R. 1996. Status of the Ombabika Bay Walleye Fishery (1981–1995): a data summary

Electronic database - Fishnet II database summaries for all projects conducted in 1996

This section summarizes the workshops, presentations, lectures and courses given by the NWST, NEST and CNFER specialists in 1996/1997. Despite a year of uncertainty, reorganization of the Boreal Science Section, loss of staff and the addition of others, Boreal Science has continued to deliver presentations and participate in workshops across North America.

Science and technology transfer programs, through education, extension and training, are considered important services provided by the science and technology units. They are thought to be the principle tool by which MNR shares knowledge and applications.

Science and technology is the process of conveying knowledge so that it can be understood and used in policy, planning, and program decisions. Transfer links theory to application and is a component of every program and project so that the Ministry can achieve its vision of sustainable development.

This year Boreal Science delivered 23 workshops, helped to organize and lead two conferences, made over 60 presentations, participated in four tours and gave a number of media interviews.

Specialists spoke at meetings and workshops in Vancouver, Edmonton, Banff, Saskatoon, Montreal, Quebec City, and Ottawa. They were called on to participate in tours for senior Ministry and forest industry staff, and host a visiting scientist from Japan. Closer to home, the specialists were invited to speak to schools, provincial park visitors, church groups and Scouts in addition to the more traditional presentations and lectures to technical advisory committees, university and college students.

Whether it's a provincial fishing show or preparing an exhibit for an international conference on wildland fire, marketing science and information to our clients is a core requirement and a component of communicating with clients about priorities.

The following workshops were delivered in 1996–1997.

Sediment Control Workshop

Hearst	May 22, 23 1996	Bob Wilson, Steve McGovern
Wawa	May 29, 30 1996	Bob Wilson, Wayne Fiset

Forest Ecosystem Classification Workshop

Hearst	June 25 1996	Kim Taylor, John Parton
--------	--------------	-------------------------

7th North American Caribou Conference - Caribou in an Ecosystem Context

Thunder Bay	August 19-21 1996	Arthur Rodgers, Gerry Racey
-------------	-------------------	-----------------------------

Canadian Institute of Forestry, 88th Annual Meeting-Global Influences Local Realities, A Cross Country Check-Up

Thunder Bay August 18-22 1996 Matsy Kenney

Wetlands Ecosystem Classification Workshop

Geraldton September 10-13 1996 Al Harris, Rob Foster,
Gerry Racey

Stream Hydraulics Field Tour

Thunder Bay October 2 1996 Kim Armstrong, Dan Cook

The Role of Fire in Boreal Landscape Ecology: Approaches to Emulating Natural Disturbances

Thunder Bay October 10 1996 Dave Archibald

Land Classification Tour-One Day Information Sessions

10 District and Area offices in Northwest Region
October/November 1996 Gerry Racey/Al Harris

1996 Annual Northwestern Ontario American Fisheries Society Meeting/Workshop, Innovative Approaches to Rehabilitating Fisheries

Kenora October 22-23 1996 Tom Mosindy

Airphoto Interpretation of Ecosites

Sault Ste. Marie January 20-24 1997 Gerry Racey, Rob Arnup

FISHNET v.2.0

Dryden January 21-24 1997 OFIS, Mike Fruetel

FISHNET v2.0

Thunder Bay February 13,14 1997 Mike Fruetel, Renate Nitsche

Managing Smallmouth Bass in Northwestern Ontario

Thunder Bay March 18-20 1997 Kim Armstrong, Rob Mackereth

Protecting Your Wood Supply from Jack Pine and Spruce Budworm

Thunder Bay March 25 1997 Jim Duncan

Dryden March 26 1997 Jim Duncan

Innovative Approaches to Rehabilitating Fisheries

Kenora October 22, 23 1996 Tom Mosindy

COURSES TAUGHT IN 96/97

Multivariate Statistical Analysis of Ecological Data

Lakehead University Ron Mackereth, Mark Johnson

Forest Ecology

Confederation College Mark Roddick (assistant lecturer)

CENTRE FOR
NORTHERN FOREST ECOSYSTEM
RESEARCH (CNFER)

CNFER

MESSAGE FROM THE CO-ORDINATOR

I write this message from an interesting perspective. As the year 1996/1997 came to a close I began my tenure at CNFER. Looking back over a very tumultuous period in our organization's history I can very much appreciate the way that the staff here handled a very difficult time. They did that by keeping focused on the work at hand and by producing a wide variety of products as the program summaries and list of publications can attest.

While not immune to the turmoil of downsizing and continual budget reductions we can be proud that we have maintained the integrity of the core programs at CNFER. These programs revolve around macro-scale and meso-scale ecological research within the Terms and Conditions set down by the Environmental Assessment Board. The focus is on two Terms and Conditions. The first deals with the effects of full-tree harvesting on long term site productivity. The second deals with testing the effects and effectiveness of various provincial guidelines in protecting non-timber values during forest management operations.

One key aspect of CNFER is that it is the only research unit in the MNR to be part of the same section as the Science Transfer Units. This came about as part of the restructuring over the last few years and will show dividends over the coming years as we develop a closer working relationship and a clearer understanding of each other's role. I see this link as strengthening the conduit of our science not only toward policy formulation and testing but also to the field staff that implement the policies and guidelines, and put the knowledge to work in practice.

Although I did not share the experiences of 1996/1997 with the staff here I take pride in what has been accomplished and look forward to a productive and rewarding 1997/1998 as we move ever closer to a better understanding of boreal ecology.

Kim Armstrong
Co-ordinator (Acting), Center for Northern Forest Ecosystem Research

The Coldwater Lakes research project was initiated in 1990 to experimentally evaluate the effects of logging on lake ecosystems and to provide information about the effectiveness of shoreline buffer strips in preventing those effects. The research is based on detailed monitoring of the ecological responses to commercial timber harvest operations on a small group of headwater lakes and their drainage basins. To detect ecosystem responses five years of intensive pre-harvest monitoring was accomplished (1991 to 1995) followed by five years of post-harvest monitoring (1997 to 2001). The experimental harvest took place this fiscal year (1996/1997).

The data collection for this project is intensive as well as extensive and includes a large suite of research partners ranging from within CNFER to across North America. This past year saw continued monitoring of key ecological processes in lake ecosystems including: meteorology, lake and outflow hydrology, upland hydrology and biogeochemistry, sedimentation, physical properties (temperature, dissolved oxygen, transparency), water chemistry and biota (phytoplankton, zooplankton and fish populations).

Within the overall target of delivering a set of quantitative relationships that predict the response of aquatic ecosystems to timber management activities in Ontario many interim results have been produced as well. A number of manuscripts were submitted for review and accepted for publication during the past year. In addition a number of the research partners have published on their components of the Coldwater Lakes research. There were contributions to transfer outside the published literature that took the form of government reports and presentations at workshops and conferences.

Rob Steedman
(807) 343-4008

COMPARATIVE AQUATIC EFFECTS

The Comparative Aquatic Effects program was initiated in 1995 and is focused on coldwater streams. It is designed to measure the effects of timber management practices on aquatic ecosystems and test the effectiveness of current guidelines in mitigating those effects.

Within the overall program four main studies have been developed. The first is synoptic survey that will: identify the key aquatic habitat variables to monitor the effects of timber harvest; determine the spatial scale of harvest impacts on aquatic systems; measure cumulative impacts in disturbed watersheds and monitor fish population characteristics with the emphasis on brook trout. A second and related component is taking a case study approach to examine the impacts of watershed disturbance on the north shore of Lake Superior tributaries. Since these studies are in the development phase most of the activity in the last year was on refining sampling protocols and selecting sites for study.

One of the key purposes of leaving riparian vegetation in the form of buffer strips is to prevent sediment from moving overland and into waterways—streams in this case. This study is measuring surface sediment movement through riparian strips as related to disturbance (road, harvesting), riparian vegetation and soil type(s). The main focus last year was on the development of traps to quantify the movement of sediment in surface water runoff and the selection of appropriate study sites.

The final component within this study group is examining the effect of logging roads on fish habitat, specifically as temporal and spatial barriers to migration. The project is focusing on whether field-installed culverts pose a migration concern to fish at critical times of their life history and whether fish habitat fragmentation occurs as a result of culverts causing changes in resident fish community structure. The past year saw the development of this concept into a workable project.

Although this program is in development, members were active in transfer particularly in presenting at workshops and conferences.

Rob Mackereth
(807) 343-4009

EVALUATION OF MOOSE GUIDELINES

This project will assess the effectiveness of the provincial guidelines for moose and determine the effect of current timber management practices on moose and other wildlife habitat. Effects refers to the effects of forest road construction, logging and other timber management activities on other forest values and effectiveness refers to the effectiveness of Ontario's Timber Management Guidelines for the Provision of Moose Habitat in protecting key values of these resource uses.

Fiscal year 1996/1997 saw the second full field season with 60 collared moose. Data recorded on GPS collars were downloaded in late May/early June and early September 1996 as well as at the time of recovery and refurbishment in late January/early February, 1997. Thus far more than 300,000 records have been downloaded from the GPS collars. The collars deployed in the winter of 1996 were recovered and refurbished in 1997. In conjunction with collecting location data, studies continued with determining moose condition associated with their habitat use. Blood, hair and faecal samples were collected at the time of capture, and body measurements and condition scores were recorded for each animal. In addition ultrasound measurements of back fat were made on each moose.

Other field components included the continued evaluation and monitoring of moose aquatic feeding areas in the main habitat study area and at the Coldwater Lakes Experimental Study Site near Atikokan. The main objective of monitoring moose aquatics is to refine the current ranking system and develop a repeatable and quantifiable method of ranking.

Efforts continued on testing differential correction software from Lotek Engineering Inc. as has assessment of home range analysis software. Five publications were achieved this year with another submitted for review. Numerous non-refereed contributions were also made. Papers were presented at a number of conferences and workshops, and invited lectures were given at Lakehead University.

Art Rodgers
(807) 343-4011

FULL TREE HARVEST

Despite the economic and silvicultural advantages of full-tree harvesting there are questions whether the productivity of the forest can be maintained over multiple rotations. The overall goal of the study is to develop predictive models that can be used to evaluate the effectiveness of silvicultural alternatives in maintaining site productivity. This will be accomplished by studies, focused at the process level, that examine the nutrient cycle, supply and availability as well as the accumulation and loss of nutrients. Comparisons of ecosystem recovery, again at the process level, post-harvest with recovery after natural disturbance are also being studied.

Fiscal year 1996/1997 was a busy one particularly in field data collection and analysis. The pre-harvest baseline data collection and chemical analysis is complete and the experimental harvest has been conducted. Major field activities this year included the planting of 3,600 seedlings, collection of water and litter samples as well as continuation of the microclimate monitoring. Further sample collections and laboratory analysis for nitrogen mineralization, litter decomposition and fine root ingrowth were also completed, and soil respiration rates were monitored. Nutrient analysis for the vegetative component was completed this year as well.

Models to quantify water and litter fall fluxes are being developed. Sensitivity analysis of FORECAST was completed last year. This is a stand management model that looks at impacts of harvesting on nutrient cycling and predicts future productivity. In cooperation with the University of Quebec (Montreal) we are calibrating the model for northern Ontario and eastern Quebec boreal species.

This program was active in publishing in the primary literature as well as in government publication series. Appearances at workshops and conferences contributed to transfer of knowledge to various clients and peers. Supervision of undergraduate theses was also an important component of this program.

Dave Morris
(807) 343-4006

Work in landscape ecology has focused on developing new methods of data capture and new analytical techniques. Emphasis has been in four areas: landscape analysis, wildlife response analysis, landscape-habitat mapping and planning tools, and GIS and GPS application development.

A number of projects are underway in landscape analysis and are in various stages of completion. For example, there are projects examining for differences, if any, between landscape patterns created by forest management activities and those created by natural disturbance. The objective is to understand key differences in landscape structure among the major forces of disturbance in northern Ontario. Natural disturbance patterns may also differ between ecoregions. Characterization of spatial indicators on an ecoregional basis will support the development of the new Environmental Guidelines for Landscape Management which will soon be available.

Wildlife response projects have been focused on moose to date and whether the guidelines for the Provision of Moose Habitat have been effective at increasing moose population density. An article will be published early next fiscal year (1997/1998) describing the results of that particular analysis. Another project is looking at other factors such as landscape disturbance, habitat suitability, hunting effort, latitude and longitude in explaining patterns of moose distribution across northwestern Ontario. The objective is to understand if landscape disturbance and habitat suitability are key factors explaining moose abundance or if other factors such as hunting and ecoregional level factors are of relatively greater importance. Inclusion of forest birds and other wildlife in these types of analyses is contingent on funding.

A computer based natural disturbance and analysis planning tool (NDAPT) has been developed and we are seeking approval for distribution. Five manuscripts were either published or accepted for publication last year. A number of appearances at conferences and workshops also contributed to knowledge transfer. Three graduate students were supervised as part of the ongoing work in landscape analysis.

Rob Rempel
(807) 343-4018

The goal of performing research in the human dimension realm is to increase understanding of how timber management impacts on tourism—specifically, remote tourism. The tourism guidelines are being evaluated with both synoptic and behavioural studies. The synoptic analysis will describe key indicator variables that relate to location and other physical characteristics of the operation, economic performance and information on timber management activities in the vicinity. Behavioural research is focused on tourists and other user groups to examine revealed and stated preferences regarding Ontario's forests.

During the past year work continued on a number of fronts. The shoreline aesthetics project attempts to understand the aesthetic value that water-based recreationists place on different forest types as well as a range of natural and anthropogenic disturbances on the landscape. The third year of this project was completed which involved collection of images and forest descriptions. A pilot study was conducted with Forestry and Outdoor Recreation students from Lakehead University to link aesthetic value to various measurable statistics of the forested site.

A complex questionnaire was developed to examine the issue of road access and activities permitted on crown land in the Sudbury area. The questionnaire involves both specific and generic choice based questions that provide an ability to examine trade-offs for various management options for a land base. To date, a pilot study has been completed but further data collection is contingent on future funding.

Two functional decision support systems were developed after interviews with Sudbury area anglers. The models (one for walleye and one for lake trout) examine the various regulations that could be imposed and the support anglers would have for those initiatives through choice-based questions. These computerized decision support systems are available for distribution to interested resource managers.

Work continued on the tourism spatial database. Three separate databases on remote tourism were linked over the past year. As well the remote tourism establishments were geo-referenced which has led to a draft spatially referenced database.

The tourism research group was also active in knowledge transfer by attending workshops and conferences across the province and country as well as publishing reports and manuscripts. Graduate student work was an important contributor to the program as well.

Wolfgang Haider
(807) 343-4007

The focus of the vegetation dynamics research during fiscal year 1996/1997 was the Black Sturgeon prescribed fire and subsequent monitoring. The goal of the experiment was to determine how soils and vegetation respond to fires of varying intensity in the Boreal Mixedwood forest type. In addition this will provide an opportunity to compare the impacts of fire in mixedwoods to the impacts of harvesting from a companion experiment established in the same area by the Canadian Forest Service. The prescribed fire was carried out on May 29, 1996. Extensive data had been gathered prior to the fire, and plots were established immediately following the fire to ensure adequate post-fire data collection. Samples of ash, soil, forest floor, seedbank, species composition and plant tissue were collected in the two months following the fire and lab analyses were completed for nutrient content. A seedbank experiment was established in the Lakehead University greenhouse to determine the effects of fire intensity on recruitment from the seedbank.

A graduate student stipend was established with the University of Toronto in association with Dr. Terry Carleton to examine in detail the relationship between fire intensity and regeneration mechanisms in selected species. Collaborative relationships have been established between researchers at Lakehead University, Northwest Science & Technology and Canadian Forest Service.

The second major component to this area of research is the study on Atikokan Coldwater Lakes Terrestrial Ecology. After three years of pre-harvest data collection, the experimental harvesting was carried out on the Atikokan site in the summer of 1996. This program financially supported the upland hydrology network established by Dr. Craig Allen from the University of North Carolina. This included the installation of weirs on the three streams and associated water samplers and soil water lysimeters. A graduate student stipend was established with Queen's University in association with Dr. Julian Szeicz to determine fire history in the experimental lakes area through the use of tree ring chronology and lake sediment cores.

Four publications in the primary literature were achieved this year and four others have been submitted to journals for review. An additional three publications were achieved as part of a workshop proceedings and seven presentations or posters were given at a variety of conferences across the country.

Mark Johnston
(807) 343-4012

NORTHEAST SCIENCE & TECHNOLOGY (NEST)



MESSAGE FROM THE CO-ORDINATOR

In a recent article about modern business by J. Laabs, she paraphrases a medieval philosopher named William of Ockham, as having given the following advice:

“Simplify, simplify. Find the essential core of any situation. Learn to concentrate on that, and all the complications will fall into place.”
On the other hand it was Albert Einstein who said

“We must strive to make things as simple as possible,
but no more than that.”

That has been the challenge of the staff in the Northeast Science and Technology Unit (NEST) since its inception, but most particularly in the 1996/97 year. Take some very complicated science and turn it into simple, doable, on the ground advice and tools for resource managers. And along the way simplify and streamline your unit to concentrate on core business.

Like most organizations within MNR in 1996/97, we saw significant workplace upheaval. NEST became a smaller unit. Staff from Timmins and Cochrane were consolidated in one new work location at the Ontario Government Complex in Timmins. With the emphasis on core business functions, the Engineering Unit was moved into Field Services Division. The Aging Lab in Cochrane was closed, moving the “fish and wildlife aging” services to the remaining lab in Dryden.

A number of staff who contributed their talents and efforts to NEST’s work over the years have moved on to new challenges both within and outside OMNR. They all deserve recognition for their commitment and work towards our mission:

“The delivery of practical and innovative solutions to our clients
in support of sustainable resource management.”

In this annual report from the members of our Terrestrial and Aquatics teams we summarize the work we completed in 1996/97. This work involved extension services, delivering science and technology workshops, publications, and continuing project work, and this all in a year of upheaval and relative turmoil. We relocated The NEST technical library to the Ontario Government Complex with the rest of our offices in December of 1996 and have since redesigned the way we provide library services by developing the NEST Information Centre, to serve a broader range of clients, and link more closely to MNR’s Document Management and Library Services team in Peterborough.

Mary Ellen Stoll
Co-ordinator, Northeast Science & Technology

The 1996/1997 period was one of significant changes to the NEST aquatics team in terms of work focus, team structure and corporate direction. It marked the first full year at the helm for the new aquatics team leader, Steve McGovern. As with most components of MNR, NEST Aquatics underwent some major changes relating to the formation of the Science Development and Transfer Branch and the initiation of program-based business planning systems.

Structurally the team lost the formal participation of the Engineering Unit as this group was placed within Operations Branch. The Engineering Unit still maintains an interest in the aquatics team and participates in meetings and integrated work activities when their other commitments and priorities permit.

Budgetary constraints and downsizing necessitated our group to focus more on extension activities and less on aquatic science development projects, which previously would be initiated by the districts and sponsored by the aquatics team. The Large River Ecosystem Unit (LREU) was notable in being able to pursue a number of projects by developing key partnerships both within (e.g., via the Moose River Basin Environmental Information Partnership—EIP) and outside the MNR (e.g., Ontario Hydro, University of Waterloo, Mattagami Region Conservation Authority, Federal Department of Fisheries and Oceans).

In February 1997 the aquatics team contributed to a provincial process initiated to identify and prioritize science needs across the programs and divisions of the Ministry in a manner consistent with business plans and in anticipation of meeting challenges of sustainable resource management and a new planning process. This initial “science prioritization exercise” will continue into fiscal year 1997/1998 and evolve with direct input from district staff and client groups through needs analysis workshops which will affirm aquatic science direction into the near future.

PROJECT ACTIVITIES - LREU

The LREU showed extraordinary initiative during this period of fiscal constraint by managing to secure successful partnerships and collaborative ventures which enabled substantial progress of developmental projects with “outside” funding. Studies were initiated to examine habitat requirements and develop suitability indices for both adult and juvenile sturgeon. In conjunction with these studies local high school students were brought in to the site as part of their science program. In addition, the sturgeon habitat study was featured on the CBC series “Down to Earth”—giving significant profile to the LREU and their work.

(Continued...)

Work was initiated toward developing a GIS-based watershed classification system for the Moose River Basin. Key metrics for the classification system include geology, climate and topography. This year's progress involved literature review of appropriate classification schemes and compiling an inventory of existing databases. The project will continue for two more years with collaboration from Canadian Forest Service, Ontario Forest Research Institute and the Moose River Basin EIP.

The LREU conducted the field component of a collaborative project with the Ministry of Environment and Energy (MOEE) and the EIP to examine mercury contaminant levels in sportfish throughout the Moose River Basin. This work continues into fiscal year 1997/1998 and will culminate in a contaminants synthesis report. An additional collaborative venture involving Ontario Hydro and the EIP examined changes in aquatic communities downstream of a peaking hydroelectric facility (Abitibi River). The report on this project will be ready in the fall of 1997 and will include recommendations on sampling protocols.

A River Information Management System (RIMS) was also initiated in 1996/1997. RIMS is a GIS-based, multimedia information system designed to efficiently manage physical, biological and chemical information pertaining to rivers in northeastern Ontario, with future application beyond the region. This is a three year project which we expect to integrate with the EIP's MR BIMS development in 1997/1998. The 1996/1997 product was a prototype of RIMS developed for the Moose River Basin.

In addition to development project work the LREU was also involved in developing information synthesis reports for the Moose River Basin. Subject areas include: water quality, hydrology, aquatic invertebrates, spatial and temporal variability in runoff/stream flow, and biology of riverine fish species. To date the aquatic invertebrates and riverine fish syntheses have been completed and published; the remaining reports are due for completion in October of 1997.

NON-LREU PROJECTS

No new development projects were solicited from the districts in 1996/1997. Rather the focus for this period was to salvage products from existing development projects and increase our effort towards providing more extension services.

(Continued...)

Gogama Rotational Fisheries Project

This was the final year of Northern Ontario Development Agreement (NODA) funding for this project and the first opportunity to test the original hypothesis of the study. An annual report was produced. Funding is anticipated for the 1997/1998 period to conduct a final year of field data, synthesize the information from preceding years' work and produce a final report in the form of a NEST publication. A technical note was produced on implications of this technique in terms of angler response to the regulation.

The study examining effects of water level fluctuations on walleye year class strength (Timmins District) continued with financial support from NEST Aquatics. This project is due to wind down in 1997/1998. Products will include a final report summarizing project results as well as a technical note on alternate sampling techniques, which are due in the winter of 1998.

A literature review on the ecological impacts of hydroelectric generation was initiated in 1997/1998. This project has since become a joint project of EIP and the aquatics team. It is scheduled for publication in the winter of 1998.

No progress was made towards wrapping up the Montreal River walleye habitat study. The intent is to salvage any incomplete projects in 1997/1998 by providing analytical support and to finalize them into publications. This will enable the aquatics team to receive new development project priorities forthcoming from the Needs Analysis workshops planned for 1997/1998.

EXTENSION SERVICES

Extension services increased substantially with diverse requests ranging from environmental assessment consultations for hydroelectric and mining developments to more specific information requests pertaining to habitat protection, fish stocking and fish population management measures, as well as expert advice on sampling methods and protocols. Examples of extension requests received by the aquatics team (including LREU):

- Hearst District, Area West: Shekak Hydro Development Project - fish habitat compensation issues.
- Hearst District, Area East (Kapuskasung): Saganash Lake Dam replacement - walleye habitat issues.
- Wawa District, Manitouwadge Area: Twin Falls Hydro Development - aquatic habitat impacts.
- Cochrane District, Lake Abitibi: fish migration/habitat issues - drawdown.

-
- Timmins District, Aquarius Mine Development: fish habitat/water quality issues.
 - Wawa District, Magpie Hydro Development: instream flow mitigation.

WORKSHOPS/TRAINING

The aquatics team and LREU consolidated all planned 1996/1997 workshop training into the “Managing Boreal Ecosystems” workshop week which occurred during the second week in April. This enabled the team to deliver a broad spectrum of training material in a cost-effective manner. MNR staff, as well as representatives from industry, consulting firms and academia, participated. Material was presented in modular format under the headings of:

- Management Tools for Assessing Fish Exploitation
- Aquatic Habitat Identification and Impacts
- Mitigation and Compensation
- Hydro Development and Fisheries
- Measuring Aquatic Ecosystem Health
- Sediment Control Planning (led by Engineering Unit)

Evening sessions during the week provided additional transfer opportunities to profile LREU projects, specifically RIMS and the sturgeon habitat projects. Singular training sessions in Aquatic Habitat Training modules were provided, upon request, in Manitouwadge and Cochrane. The aquatics team assisted the Engineering Unit in delivering sediment control planning workshops to staff in Hearst and Wawa, and industrial clients at Martel Lumber in Chapleau.

On a final note we would like to acknowledge past contributions and efforts of Wayne Fiset. Wayne was successful in obtaining a new job as senior wildlife biologist with the Northeast Region Policy and Planning Branch. We all wish Wayne well in his new role and thank him for the substantial presence he brought to both the LREU and aquatics team in his former position of aquatic ecologist.

Steve McGovern
(705) 235-1211

During the last year the habitat and biodiversity program has been involved in a variety of activities at all levels of the ministry. We completed the development of new forest management guidelines for marten. We co-led the development of the Forest Ecosystem Module for the Ecological Sustainability Leadership Program in cooperation with staff at the South Central Science & Technology Unit and the Ontario Forest Research Institute

We completed a three-year study of the habitat affinities of small mammals based on FEC in partnership with the Lake Abitibi Model Forest. The resulting technical report (Boos and Watt 1997) is now available.

We have been very active in the calibration of landscape analysis techniques to forest management planning in the boreal parts of Northeast Region, and have conducted landscape analysis for a number of planning teams. In the same vein, we have been heavily involved in the development and implementation of habitat supply modelling in forest management planning through the calibration of the habitat module of Strategic Forest Management Model (SFFM), training of planning teams, and follow-up extension.

We have also been involved in a number of forest management plans as advisors related to the implementation of the marten guidelines as well as the implementation of ecosystem management and biodiversity concepts into the forest management plans.

The development and criteria and indicators for sustainable forest management has also been addressed through participation at the Canadian Standards Association (CSA) Sustainable Forest Management System workshop, the Criteria & Indicators workshop sponsored by the Boreal Science Cooperative (presentation), and the hosting of training sessions on CSA standards and the use of LEAP to measure spatial indicators of landscape diversity.

FUTURE ACTIVITIES

A number of initiatives remain to be completed including forest bird habitat studies and a case study application of Fragstats to the measurement of landscape fragmentation in forest management planning. A number of publications are in varying stages of readiness including a guide to managing snags in boreal forests and a background literature review on marten habitat ecology and management.

Robert (Bob) Watt
(705) 235-1234

TERRESTRIAL ECOLOGY

It has been a busy time for the Terrestrial Ecology program since the last annual report. Through funding from the Ecological Land Classification Program a number of projects have either been completed, or are nearing completion.

During the summer of 1995, The Field Guide to the Forest Ecosystems of Northeastern Ontario (FEC) was published. A number of workshops have been given on the FEC system during the field seasons in years since.

The FEC harmonization project, a joint project between Northeast and Northwest Science & Technology, is proceeding on schedule. The data collection phase of the project is complete and the northeast data set has good representation of all of the forest communities with the eastern part of the boreal forest. Data analysis to create draft ecosites and vegetation types is also complete. The draft ecosites will be field tested during the summer of 1997. It is hoped that this field work will complement the analytical work already done and verify the forest ecosites for the eastern boreal forest. Reports on the analysis will be prepared as soon as the analysis is finalized.

Work in wetland ecosystems is also progressing. The Northeast Wetland Classification project collected one hundred and fifty field data plots during the summer of 1995. This data was analyzed with the data from northwestern Ontario to determine if the wetlands in the northeast were different from those found in the northwest. This analysis is now in its final stages. To complement the data analysis, the Northwest Wetland Classification Key will be field tested in northeast region during the summer of 1997. It is hoped that these two efforts together will allow us to determine if the northeast requires its own wetland classification system or if the northwest system will adequately describe the wetlands.

The Terrestrial Ecology program has also been working with the Large River Unit in their Watershed Classification Program and is pleased to have been a part of this project.

Many members of NEST and NWST contributed to the creation of the Silvicultural Guide project. The incorporation of the Forest Ecosystem Classification System into this guide was an important milestone for the Ecological Land Classification program and the Terrestrial Ecology program was very pleased to have been able to contribute to this project.

Kim Taylor
(705) 235-1228

VEGETATION MANAGEMENT

The Vegetation Management program at Northeast Science & Technology went through great changes during 1996/1997. Formerly part of the provincial Vegetation Management Alternatives Program (VMAP), the program, due to fiscal constraints and lack of resources, drastically decreased in size. The following is a list of projects that were indefinitely dropped in 1996:

- Cover cropping project studying application rates for red and white clover and birdsfoot trefoil.
- Cover cropping with large-leaved aster project.
- Pre-harvest treatment in spruce/poplar stands trial.
- Demonstration of the effect of competition on spruce and jack pine.
- Night application of herbicides and the impact on non-crop species.
- Comparison of ground herbicide applicators project.

During the 1996 field season we continued to collect data on the Gibson Lake Sheep grazing trial (established 1995). This trial was installed to test the effects of seasonal timing and length of grazing as well as competitiveness of the herb, shrub and grasses around crop trees.

Data collected from the Gibson Lake trial and past sheep grazing trials has been cleaned and is ready for analysis. The analysis will look at the crop tree response from the grazing treatment and plant species composition shift over time. The results will be included in a technical report to be out early 1998. A second report will include the operational logistics of sheep grazing.

The Vegetation Management program continued to provide extension services for questions about vegetation management strategies, autecology, and general information requests.

Workshops held during the 1996/1997 year include one during “Managing Boreal Ecosystems” workshop week. “Developing Silvicultural Management Strategies” was a one-day event with 15 participants, primarily from forest industry. Five other workshops during workshop week were facilitated and organized to assist the silviculture extension specialist.

The largest work area for the vegetation management specialist was revising and rewriting the Silvicultural Guide to Managing for Black Spruce, Jack Pine and Aspen on Boreal Ecosites in Ontario with a team of specialists. It was completed on April 18th, 1997 with a final version coming off the press in early 1998. Flowing from the guide development, we provided training for forest management planning teams on developing silvicultural ground rules during the planning process.

Alison Luke
(705) 235-1237

NORTHWEST SCIENCE & TECHNOLOGY (NWST)



MESSAGE FROM THE CO-ORDINATOR

1 996–1997 was a very busy year for Northwest Science & Technology. You will read more about what the unit was involved in as you leaf through this annual report. Here are some of the highlights from the past year.

Our Fisheries Assessment Units (FAUs) were able to maintain their various long term monitoring programs on Lake Nipigon, Squeers, Savanne, Grouse and Whitefish Lakes and on Lake of the Woods. Information provided by the Lake Nipigon FAU, which is staffed by Rick Salmon, Norm Hissa, Albertina Van Ogtrop and Brian Livingston, was used by Nipigon District in the decision to close Ombabika Bay on Lake Nipigon to protect the walleye fishery from over exploitation. The Quetico Mille Lacs FAU monitoring program led by Mike Fruetel with the assistance of Jon George and Jay Wright, provided important information to Thunder Bay District on the status of the Lac de Mille Lacs fishery. This information was used to implement new regulation changes for 1997–1998, including a 13 inch slot limit for walleye. Tom Mosindy, Chris Bell and Jim McNulty of the Lake of the Woods FAU continued to provide information to Kenora District for use when dealing with their American counterparts on matters pertaining to fish quotas along the international border.

Of course none of this would have been possible without the support provided by Susan Mann who heads up our Aging Laboratory in Dryden and the data entry support that was provided by Renate Nitsche and Kathryn Hardnen.

In recent years we have seen an increasing interest in the Northwest Region in angling for smallmouth bass. This has been demonstrated by the increasing popularity of bass angling tournaments in the western part of the region. In response to a need to improve fisheries managers' overall general knowledge of this species, Kim Armstrong from our Aquatics Unit, with the help of Rob Mackereth from CNFER, hosted a very successful smallmouth bass workshop in March.

The terrestrial specialists spent a large portion of their time this past year involved in writing two important provincial guidelines. Dave Archibald was the science lead in the production of the *Guidelines for the Protection of the Physical Environment*. Bill Towill, Colin Bowling, Bob White, Brian Polhill, Gerry Racey, Mike McLaughlan and Matsy Kenney—part of a larger team that included staff from Northeast Science & Technology—were responsible for revising and rewriting the spruce, jack pine and aspen silvicultural

(Continued...)

guides. These three guides were combined into one guide entitled *A Silvicultural Guide to Managing for Black Spruce, Jack Pine and Aspen on Boreal Ecosites in Ontario*. Other notable new publications produced under the leadership of Gerry Racey, were the *Field Guide to the Wetland Ecosystem Classification for Northwestern Ontario*, *Terrestrial and Wetland Ecosites of Northwestern Ontario* and *Wetland Plants of Ontario*. Both the *Field Guide to the Forest Ecosystem Classification for Northwestern Ontario* and its supporting publication, *Field Guide to the Common Forest Plants in Northwestern Ontario* underwent revisions and were reprinted in 1997.

The unit was successful in hosting a number of workshops and in publishing a significant number of reports, technical notes and guides. Hats off to Annalee McColm, Karen Punpur and Ruth Berzel for their fine efforts.

The production of technical reports and the provision of science advice and support to our clients is highly reliant on the resources contained in the Northern Ontario Ecosystem Library (NOEL) which was managed by Cathleen Schell. Of course without the help of our office manager Louise Dasti, her assistant Pat Mealey and Matt Schell, our forestry systems officer in providing overall support to everyone, we would not have had the successful year we did.

All in all it was a busy and productive year for NWST staff. Congratulations and many thanks to everyone in the unit for the dedication and effort that was put forth in keeping to our mission to *develop and provide scientific and technical knowledge that will contribute to the implementation of the best natural resource management practices possible* in Ontario and especially the Northwest Region.

Ron Waito
Co-ordinator, Northwest Science & Technology

TECHNICAL DEVELOPMENT

The Lake of the Woods Fisheries Assessment Unit (LWFAU) completed the final year of the two-year South Sector monitoring program which included index gill netting, small fish and young-of-the-year assessment, fish contaminant sampling (MOEE) and commercial fish sampling projects. Data, along with fish aging samples, were analyzed and the resulting information provided a summary of the current status of fish communities and fisheries in Sectors 5 and 6 which border directly with Minnesota portions of Lake of the Woods. This information forms the basis for ongoing management initiatives in these border water areas and was presented at a number of stakeholder meetings during the fall of 1996 and the winter of 1997 by the LWFAU. Data are also being incorporated into the current revision of the *Border Waters Fisheries Atlas*.

During 1996 and 1997, the Lake of the Woods FAU conducted winter creel surveys of important winter angling fisheries on Whitefish and Sabaskong bays. These surveys provide information on the effectiveness of trophy regulations for lake trout on Whitefish Bay and regional impacts of the Border Waters Fisheries Conservation license which was introduced in 1994. The LWFAU produced a fact sheet which was distributed to participating anglers and local tourism businesses, illustrating how data from creel surveys is used to manage these fisheries.

The LWFAU completed a two-year Lake of the Woods Muskie Angler Diary program that involved volunteer participation by over 20 tourist lodges and fishing guides around the lake. Information from over 500 muskie angling trips was summarized and provided valuable insights into current status of this fishery and its response to recent changes in minimum size regulations for this species on Lake of the Woods. Results from this program have much wider application to other lakes throughout Ontario. Information was transferred in the form of a fact sheet to program participants.

The LWFAU continued to participate, as a working group member, in a number of regional and provincial initiatives. It contributed data, case histories and summary reports to the provincial Walleye Synthesis, as part of the Harvest Control Working Group. As a member of the Border Waters Sturgeon Management committee, it played a lead role in producing an implementation plan to coordinate lake sturgeon management in the border waters area between Ontario and Minnesota.

(Continued...)

The LWFAU made numerous presentations to update local managers, stakeholders and the public on current trends in the Lake of the Woods fishery. It organized a workshop, held in Kenora on October 22 and 23, 1996, in conjunction with the northwestern Ontario Chapter of the American Fisheries Society, entitled “Innovative Approaches to Rehabilitating Fisheries” which brought together fisheries researchers and workers from across northwestern Ontario, Manitoba and Minnesota. The LWFAU also contributed a paper and presentation to the smallmouth bass management workshop held in Thunder Bay, March 19–21, 1997. Throughout 1996/1997, the Unit continued to provide a wide range of extension services in response to requests from a variety of clients.

Tom Mosindy
(807) 468-2609

For the first time in many years, LNFAU was able to operate with a full complement of staff (Biologist/Unit Leader, Project Biologist, Senior Fisheries Technician, Fisheries Technician)—an allocation of 3.7 person-years.

SAMPLING PROGRAMS

1 Index and Fish Community Monitoring

The objective of this program is to collect long-term, trend-through-time, stock status information on primary fish species to support decision-making by resource managers.

Annual sampling programs are conducted to collect biological attribute data on fish stocks (abundance, size and age structure, growth, maturity, etc.). Assessment efforts during the 1996 field season focused on sampling smelt, lake whitefish, walleye and lake trout stocks.

Smelt index fishing was conducted over a 17 day period during the spawning run (May 9–25) at the Postagoni River mouth. A total of 5,145 smelt were captured of which 853 were sampled for biological data.

Whitefish index fishing was conducted during the first three weeks of June at two fixed sampling locations. A total catch of 524 lake whitefish was sampled for biological attribute data.

Walleye index fishing was conducted at two locations during two sampling periods (July 7–10; August 19–23). A total of 725 walleye were captured and sampled for biological data.

Fish community index fishing was conducted in Pijitiwabik Bay (July 15–25) and Humboldt Bay (July 29 to August 14). A total of 1862 fish were captured and sampled for biological attribute information.

A tagging project was conducted during the fall (September 23 to October 6) at a known lake trout spawning shoal. A total of 40 lake trout and three brook trout were captured, tagged and released. Severe weather conditions compromised the sampling effort.

Data summaries for all index and fish community monitoring projects have been compiled on electronic database (Fishnet II) for further analysis and reference.

(Continued...)

2 SportfishHarvestAssessment

The objective of this program is to provide information on angler harvest, effort and fishing location, and biological characteristics of angler catches.

With the cooperation of the Municipality of Beardmore and the support of Environmental Youth Corps funding, LNFAU coordinated an Access Creel Survey which was conducted at two access points from June 15 to September 15. Survey crews conducted 1,054 complete trip interviews and sampled more than 700 angler-caught fish.

LNFAU staff were able to sample fish entered in the Lake Nipigon Trout Hunt (a fishing derby) which was held July 19–21. A total of 28 trophy lake trout were sampled for biological attributes.

LNFAU staff also provided data management and analytical support for the ongoing Nipigon District Cooperative Angler Diary program.

Data summaries for all sportfish harvest assessment projects have been compiled on electronic database (Fishnet II) for further analysis and reference.

3 CommercialHarvestAssessment

The objective of this program is to collect harvest, effort, fishing location and biological attribute information from commercial fish catches.

Commercial catch sampling targets were not met in the 1996/1997 fiscal year. Although various methods of obtaining samples were attempted (i.e. cooperative sampling, rent/buy fish, contract sampling), LNFAU staff were only able to obtain a total commercial catch sample of 264 lake whitefish.

Rick Salmon
(807) 887-5000

During the 1996/97 fiscal year, the unit conducted field programs on Whitefish Lake, Savanne Lake, Squeers Lake and Grouse Lake. Our program had two major focuses: continued development and testing of walleye index netting standards for the Walleye Synthesis, and the long term assessment of the effect of the controlled winter fishery on Squeers Lake lake trout. Other work included data entry and management in preparation for the smallmouth bass workshop, Fishnet II training for area staff, data entry support for the Lake of the Woods FAU and area biologists and extension services.

WHITEFISH LAKE

During 1996, the unit conducted index fishing projects and contracted out a winter creel survey on the lake. The netting program included spring trap netting, random trap netting in June, July and August and fall index gill netting. The purpose of the program was to develop an index of abundance using trap nets and gill nets, mark fish for population estimates and describe the biological attributes of the major fish species present. Index fishing results were similar to those obtained in 1995. Population estimates for walleye indicate a density of about 25 fish >30 cm per hectare. Data from the winter creel survey provided an estimate of 41 angler hours per hectare with a harvest of about 140,000 yellow perch and 15,000 walleye.

SAVANNE LAKE

The unit conducted index netting projects on Savanne Lake this year in order to collect information to help calibrate catch per net values obtained from proposed netting standards with known population densities. The lake has been intensively studied in the past by the Walleye Research Unit. Previous data suggested an adult density of about ten walleye per hectare. A summer program to index the abundance of juvenile walleye was also conducted.

SQUEERS LAKE

The 1996/1997 program at Squeers Lake included fall tagging and the winter fishery. During the fall we tagged about 400 lake trout and estimated the adult population to be about 1,000 fish greater than 399 mm. The 1997 winter fishery was the 13th to date. A total of 1,030 anglers participated and harvested 1,561 lake trout. The yield in 1997 was 1.85 kg /ha. Catch rates were similar to previous years, however, a slight decline in the average size of harvest fish was noted. The exploitation rate during the 1997 fishery was about 21 percent.

(Continued...)

GROUSE LAKE

The unit has conducted studies on the lake trout population of Grouse Lake for the past three years. The programs were designed to obtain population estimates and creel information on this lightly exploited population as a reference lake for comparison with Squeers Lake. The 1996 fall tagging program produced a population estimate of about 1500 adult lake trout that range in size from 45 to 58 cm.

Mike Fruetel
(807) 939-3114

REGIONAL FISH & WILDLIFE AGEING UNIT

The prime function of the ageing lab is to prepare and age fisheries structures for the District and Regional fisheries assessment units (FAUs). During 1996/1997, the ageing lab received a total of 19,600 structures. The wildlife tooth preparation and ageing from the Northwest and Northeast has been handled by Linda Dix-Gibson at the Parry Sound ageing lab. John Bayes joined our team in November 1996 from Chatham. His main purpose will be to prepare fish structures for age assessment.

There were 73 projects submitted for preparation and age assessment over the year. The majority of the fish were walleye, northern pike, whitefish, lake trout and smallmouth bass. The following table shows the proportion of structures that are prepared and aged.

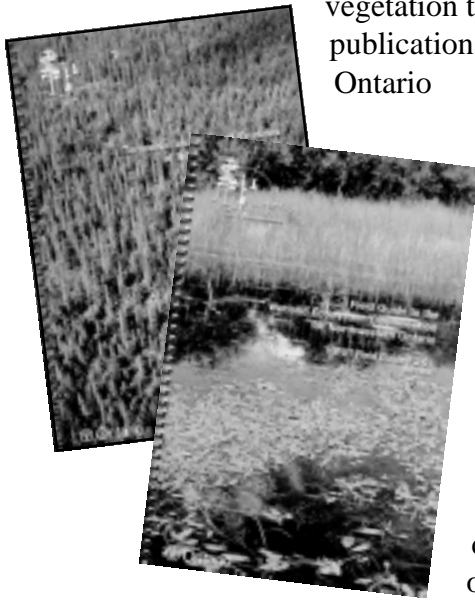
	Scales	Spines/ Finrays	Bones	Otoliths (C&B)	Otoliths (G&P)	Total
District	2,833 (70%)	5,480 (60%)	734 (83%)	976 (24%)	109 (8%)	10,132 (52%)
FAUs	1,191 (30%)	3,702 (40%)	150 (17%)	3,155 (76%)	1266 (92%)	9,464 (48%)
Total	4,024	9,182	884	4,131	1,375	19,596

Part of the program delivery of the ageing lab is the transfer of scientific knowledge with regards to calcified structures: their collection, preparation and age assessment. We encourage districts and FAUs to participate in structure preparation to speed up turn around time. We offer fish structure preparation training in the lab for one or two week periods.

The ageing lab participated in the Co-operative Education program with the Dryden High School. Mike Dennis (September 1995 to January 1996), Leigh Godfrey and Dustin Murray (September 1995 to January 1997) and Harry Van Ryswyk were all excellent people helping out at the lab.

Susan Mann
(807) 223-7543

1995–1996 was a significant year for implementing Ecological Land Classification (ELC) products. Two significant products were published: *Terrestrial and Wetland Ecosites of Northwestern Ontario*, and *Field Guide to the Northwestern Ontario Wetland Ecosystem Classification*. The year also saw a revision and re-printing of the NWO Forest Ecosystem Classification with the addition of three new vegetation types and an updating of the soil description section. These publications were at the centre of an implementation initiative in Ontario



At the centre of this implementation initiative was linking ecosites to the traditional Forest Resources Inventory, and using ecosites to organize ecological and silvicultural information in the revised silvicultural guides.

Northwestern Ontario was in the process of FRI re-inventory on four management units. Ground cruising with the collection of ecosite and soils information occurred on the Flanders, Kenora Crown, Sapawe and Fort Frances Management Units. Air photo interpreters were field trained, a set of air photo interpretation keys was developed and a detailed photo interpretation course was offered for FRI interpreters in January of 1997. Each field office in northwestern Ontario was visited in the fall of 1996.

During this visit, both field guides were distributed and we provided a one day introduction to ecosites and their implementation implications to silviculture, forest inventory and ecosystem management.

A four-day training course for the wetland ecosystem classification was completed in Geraldton in July. Numerous extension calls were also supported during 1996/1997. A full range of extension calls were offered, and contributed to basic classification training of field staff, three lectures at Lakehead University, policy and program development, and regional land use planning.

Implementation initiatives involving training, cruising, interpretation and inventory will continue in 1997/1998.

Gerry Racey
(807) 939-3102

STAND MANAGEMENT

As increasing expectations met decreasing financial and human resources, fiscal 1996/1997 was another year where success had to be measured in little victories. Provincial priorities bumped regional targets off the table, allowing for only sporadic progress on a number of projects and extension targets originally set out in the work plan. In this frantic (manic?) atmosphere, maintaining emotional balance became critical. For me, one way to do this was to squeeze in as much “fun” work as possible during 1996/1997, and a few highlights are summarized below.

EXTENSION ACTIVITIES

Ah! Getting out to the bush always calms the soul. And I always learn something, too! In no particular order, here are a few extension calls handled in 1996/1997.

Sioux Lookout: old growth red pine stand on Vickers Lake. Field visit with district staff to confirm and assess stand conditions to compare with known old growth red pine stands in the region.

Kenora: two major issues this year. One was the potential for underburning selected islands on Lake of the Woods to encourage white and red pine regeneration. The second issue dealt with pre-commercial thinning of overdense jack pine resulting from the 1980 burn between Kenora and Vermilion Bay.

Ignace: riparian management. What are the opportunities to increase timber harvest in riparian strips? North of Ignace are some 15-year-old examples of clearcutting (patch, strip) to the water’s edge, followed by establishment of jack pine.

Domtar, Red Rock: once again, a fieldtrip to assess potential for pre-commercial thinning of jack pine.

Avenor, Thunder Bay: commercial thinning in mid-rotation mixedwoods. Apart from field visits to evaluate pre and post-thin stand conditions (including collecting data from thinned and control areas of a 30ish black spruce plantation), a presentation was made to the Forestry Futures Fund Committee dealing with various aspects of commercial thinning.

Dryden: sadly, not an extension call to the bush, but a very important one nonetheless. Asked to review silviculture ground rules in the draft Wabigoon forest management plan.

Lakehead University: acted as second reader for three BScF theses. Two of these dealt with aspects of the Stanley and Thunder Bay Spacing Trials. As a result, time was spent collating historical datasets from these trials into one clean database.

(Continued...)

Head Office: in the Kenora area, assisted in ecosite training for both contractor and MNR FRI staff as part of the new, enhanced FRI.

PROJECTS

Managed to spring loose a bit of time to work on projects and reports. The jack pine leader clipping report was published, as was the jack pine fertilization report (I only edited this one). The ingress of naturals report finally got a science review (after five months of trying to get someone) and should be completed this year. Field measurements were done on the cone loading trial (fifth year) and this fall will see the final data collection for the remaining treatments.

OTHER

Spent three days helping (?) the Lake of the Woods Fisheries Assessment Unit with their summer program (picture at right). Assisted with the field portion of the Canadian Institute of Forestry annual meeting held in Thunder Bay in August, 1996. Also helped plan and establish the next generation of spacing trials at the Natural Resource Centre. Oh yeah, did a bit of work on Silviculture Guides.....



Laurie and Gavin
setting net at Monkey Rocks.

Colin Bowling
(807) 468-2645

TERRESTRIAL ECOSYSTEMS

The terrestrial ecosystems program for 1996/1997 was once again dominated by woodland caribou habitat issues, but was also involved in developing a wildlife habitat matrix for use in the Strategic Forest Management Model, regional contributions to the Landscape and Diversity Implementation Team and hosting of the 7th North American Conference.

A significant effort was expended on the revision of the draft management guidelines for woodland caribou in northwestern Ontario. Revisions addressed many of the major concerns expressed during broad public and special interest group consultation since 1993. NWST formally entered a collaborative research partnership with Laurentian University, Avenor, Abitibi-Price, Kimberly Clark and Domtar to collect basic insight into caribou range use, habitat, movement patterns and predator-prey relationships.

The 7th North American Caribou Conference, *Putting Caribou Knowledge into an Ecosystem Context*, was delivered at Lakehead University, August 19–21, 1996. Field tours included the Slate Islands and caribou range near Armstrong. Over 250 people participated. The proceedings are now being edited and should be available by early 1998.

Documentation of new aspects of caribou management knowledge continues to be a high priority. Details of 40-year-old, previously harvested areas near Nakina were documented in *Caribou Winter Habitat in the New Forest: Lessons from Lucy Lake* (NWST TR-103). In addition, a preliminary examination of the question of aesthetics of larger cutovers with respect to the remote tourism industry was documented in *Estimate of Relative Impact of Northwest Region Caribou Strategy on Remote Tourism* (NWST TR-110).

Support for the Forest Management Planning process was offered through extension services and included development and support of first approximation NWR wildlife habitat matrix. In addition, support included use of the ELC framework for land-base description, landscape description and wildlife habitat.



Lichen cover associated with harvested areas near Nakina (NWST TR-103)

Gerry Racey
(807) 939-3102

BOREAL TERRESTRIAL ASSESSMENT UNIT (BTAU)

MESSAGE FROM THE CO-ORDINATOR

As part of the 1995 MNR restructuring the Boreal Terrestrial Assessment Unit (BTAU) was formed as part of Boreal Science. The BTAU combines the Growth & Yield, Wildlife Assessment, and Wildlife Inventory programs under a single manager. Since all three programs have a field inventory role they form a logical set. Combining the three into a single unit will help develop a coordinated approach to inventory in Boreal Science.

In July 1995 Chris Davies was appointed as co-ordinator of the BTAU. George Holborn was the first staff member who joined as the Wildlife Assessment Unit Biologist in Thunder Bay. In the fall of 1996 we added Dean Phoenix (Timmins) and Neil Dawson (Thunder Bay) as the WAU program leaders; Bruce Richard and Mark Roddick as the operations coordinators; and, Al Bisset (Kenora) as the Boreal Wildlife Inventory program leader. In 1997 we completed our staffing by hiring John Parton as the Boreal Growth & Yield program leader. Each of the three programs that make up this unit are briefly described below.

BOREAL WILDLIFE INVENTORY PROGRAM

Al Bisset is the Wildlife Inventory program leader for Boreal Science. The key purpose of this program is to coordinate wildlife inventory identified as part of the Fish and Wildlife Business Plan. This includes such wildlife surveys as moose aerial inventories, caribou populations and habitat surveys, big game harvest surveys, black bear population surveys and wildlife habitat surveys for forest management plans. A strategic plan is currently being developed to set long term program direction and all of the standards and guidelines for data collection will be reviewed and revised as necessary. Some highlights from the past year include:

- a record number of moose surveys completed in each of the past two years so that by the end in 1998 all core units will have been completed on a three year schedule;
- development of a program to monitor caribou populations in the northern part of the Boreal;
- development of a black bear bait station network for monitoring black bear populations; and,
- development of more efficient data entry and analysis programs.

If you have any questions about this program please contact Al Bisset at 807-468-2610 or Chris Davies at 705-235-1243.

(Continued...)

BOREAL GROWTH & YIELD PROGRAM

The Growth and Yield (G&Y) program in Boreal Science lost both of the regional G&Y specialists to other challenges in 1996. Despite this obstacle the program continued with help from southcentral region and the continued efforts of Bruce Richard and Mark Roddick. In 1997 we are starting the remeasurement phase of the permanent sample plots. The number of plots to be remeasured far exceeds our current funding and staffing levels, so we have been actively working through the Boreal Science Cooperative to develop partnerships with forest industry. This is an exciting win/win situation as we all need the same information for sustainable forest management. As a direct result of this partnership we will be able to measure over twice as many plots in 1997 compared to what we could have accomplished on our own. Highlights from the past two years include:

- establishment of over 50 permanent sample plots (PSP);
- publication of fact sheets on established PSPs;
- development of a PAM minifront system for field data recording (currently being field tested);
- publication of Regional Site Index Curves and Tables for Jack Pine in NE/SC Region;
- development of a density management diagram for poplar.

If you have any questions about this program please contact John Parton at 705-235-1238 or Chris Davies at 705-235-1243.

BOREAL WILDLIFE ASSESSMENT PROGRAM

The Wildlife Assessment Units (WAUs) were, for the most part, staffed in the fall of 1996. In what remained of the 1996/1997 fiscal year, these staff put primary effort into planning the direction for the Wildlife Assessment Program. As this is a completely new program this report will concentrate on where the program is headed, rather than what was undertaken in the 1996/1997 fiscal year.

WHO ARE WE?

1996/1997 saw the Wildlife Assessment Program (WAP) moving into its implementation phase with the staffing of three units in North Bay, Thunder Bay and Timmins. Staff include:

- Merilyn Twiss (program leader) in North Bay;
- Neil Dawson (program leader), George Holborn (unit biologist), and Mark Roddick (operations coordinator) in Thunder Bay; and.
- Dean Phoenix (program leader) and Bruce Richard (operations coordinator) in Timmins.

The three WAUs are associated with the Science and Technology Units located at their respective locations.

WHAT DO WE DO?

The Wildlife Assessment Program is the mechanism whereby the MNR intends to meet its legal obligations under Term & Condition 81 (T&C 81) of the Class Environmental Assessment for Timber Management on Crown Lands in Ontario.

This term and condition requires that the MNR monitor trends of selected terrestrial vertebrate wildlife species. In other words, monitoring wildlife species by consistent methods to describe the distribution and abundance of these species over time. The Timber EA provides some direction for species selection. T&C 81 applies to the so called "Area of the Undertaking." That is, that area of Ontario where commercial forestry occurs on crown land and so the species selected must be essentially only forest wildlife. T&C 81 also specifies that these selected species shall be species that benefit from the habitat management guidelines for moose, white-tailed deer, marten and pileated woodpeckers. In addition, species that require snags, woody debris, riparian areas, mature and over mature stands, or large areas in similar successional stages are to be selected. This list translates to include all forest vertebrate species.

Program staff have begun a selection process to narrow the focus down to a manageable list. For this process some additional selection criteria have been adopted. These criteria include sensitivity to forestry activities, conservation priority (the proportion of a species' range within Ontario) a range of body sizes and trophic levels, and practicality of monitoring. A list of selected species that the WAUs intends to monitor by some means is expected to be distributed in the summer of 1997.

STRATEGIC PLAN

A strategic plan has been initiated as one of the preliminary tasks of the Assessment Program. The purpose of this plan is to clearly scope out the purpose of the WAP. That is, our mandate under T&C 81, the relationships to other programs, the products (information) we intend to deliver in both the short and long terms, and the cost of delivering those programs. A draft of this plan will be prepared by the fall of 1997.

INTRODUCING THE WAP TO MNR STAFF

To introduce the Wildlife Assessment program, an introductory note and questionnaire were sent to MNR resource practitioners and managers in early February. This introduction served to provide basic information about the program and requested internal clients to comment. Plans were also made to visit all the district and area offices in the spring of 1997 to discuss the program with these staff.

(Continued...)

IN THE MEANTIME:

ONGOING AND DEVELOPING MONITORING PROGRAMS

The need for information exists now and other agencies are already conducting wildlife monitoring programs. The WAP is forming partnerships with many of these agencies to gain access to their information and assist them in expanding their monitoring coverage. It is expected that these ongoing monitoring programs will cover many of the species that we will end up selecting. Some of the programs our monitoring partners are undertaking include migration monitoring (Long Point Bird Observatory and Thunder Cape Bird Observatory) and forest bird monitoring (Canadian Wildlife Service).

Program staff are also in the process of developing monitoring methods for those groups of species, again likely to be in our final selection, for which monitoring methods do not exist or need refinement. Examples included the nocturnal owl surveys and red-shouldered hawk surveys which are near final development by Long Point. Staff are working with the Universities of Guelph and Laurentian to develop monitoring programs for small mammals, amphibians and furbearers. In addition, the WAUs are working on methods of monitoring cavity nesters, looking into the use of coverboards for salamander monitoring and developing a formal wildlife observation program.

SO WE DETECT A DECLINE IN A WILDLIFE SPECIES.

NEXT QUESTION: WHAT IS THE CAUSE?

Wildlife Assessment staff recognize that it is not simply good enough to monitor population trends without providing resource managers with some insight into the causes for these trends. A related Term and Condition (80) of the Timber EA is the requirement for the MNR to undertake research on the effects of forestry practices on wildlife. The WAUs, though not formally funded to undertake this research, will work with the Centre for Northern Forest Ecosystem Research (CNFER) and Wildlife and Natural Heritage Science Section to contribute to increasing our knowledge of forestry effects on wildlife.

For more information on the Wildlife Assessment Program contact

Dean Phoenix, 705-235-1241

Neil Dawson, 807-939-3120, or

Chris Davies, 705-235-1243.

51140
(0.3k P.R., 98 02 04)
ISSN 1480-5995