

Ecosystem Management Applied to Riparian and Aquatic Habitat Restoration*

Karl Lauten, Saskatchewan Environment & Resource Management, Regina

Abstract:

Ecosystem-based management is not a new concept but its widespread acceptance and implementation by resource managers in Saskatchewan has just begun. It involves both conservation of resources to sustain the provision of products from the ecosystem to society, as well as the management and adaptation of human and natural events to protect or conserve the structures and functions of an ecosystem which conveys upon itself resilience and the capacity for renewal. The ecosystem management approach presents itself as a new paradigm that challenges the environmental, social and economic values of many of our past and present land, flora and fauna, and water use practices. Among the important ecosystem components which have been substantially altered by past practices are riparian habitats. This presentation attempts to identify the importance of riparian areas and their associated aquatic habitats, to identify the major causes of riparian habitat loss, and to provide some suggestions for maintaining and restoring riparian area structure and function in all watersheds of Saskatchewan.

Riparian habitats are areas adjacent to aquatic systems (streams, rivers, wetlands, bogs, lakes) that contain physical, chemical and biological features of both aquatic and terrestrial ecosystems which interact with each other. Though comprising only a few percent of the total landscape riparian areas are being recognized as one of the most important components of the ecosystem and that they are essential to the ecological health of watersheds. Some of the significant ecological and social values associated with riparian areas include: provision of critical wildlife habitat and travel corridors, direct contributions to aquatic and terrestrial habitat diversity and food resources for aquatic biota, trapping of pollutants, water purification, reducing intermittency of flow, slowing of the rate of movement of energy, materials, and nutrients in watersheds, erosion and flood control, recreation and aesthetics. In virtually every province, past land and water use practices have resulted in various levels of alteration and damage to much of the riparian habitats and associated aquatic habitats in all but the most remote of watersheds. Wetland drainage, reservoir construction, channelization, and shoreline development have altered hydrological regimes or directly involved removal of riparian vegetation and resulted in the most severe damage to riparian habitats. Agricultural practices, forest harvesting and road construction either because of the extent of activity on the landscape or their occurrence too close to the shorelines of waterbodies have also contributed to the destruction of riparian habitat and to the loss of riparian ecosystem function.

Although the main causes of riparian habitat loss or damage are known, prevention of further losses and restoration of impacted areas is currently hampered by a lack of information about riparian habitat (ie. inventories), a lack of riparian ecosystem

* Presented at the 24th Annual Meeting of the Canadian Land Reclamation Association held jointly with the Saskatchewan Environmental Industry and Managers Association, Saskatoon, Sask., Sept. 28-30, 1999.

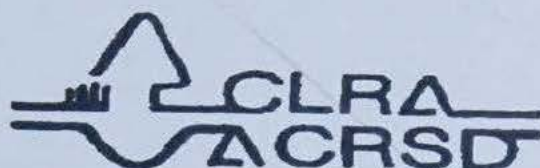
management guidelines, a lack of an ecologically-based riparian and aquatic habitat classification system, as well as by conflicting mandates amongst government agencies responsible for resource management. It is proposed that application of ecosystem-based management principles in all aspects of land and water use management practices can provide the framework to overcome the barriers to riparian habitat management and restoration. The ecosystem-based management approach emphasizes partnerships between stakeholders, multidisciplinary planning between agencies, and a common commitment to protection of ecosystem health and integrity as a means to overcome the historical sectoral or narrow view approach to resource management. Application of ecosystem-based management to riparian and aquatic habitat management and restoration could also provide the means for resolving many ecological and environmental issues beyond those related to water resources. Positive steps to apply ecosystem-based management have been initiated in Saskatchewan.

Key References

- Knutson, K.L. & V.L. Naef. 1997. *Management Recommendations for Washington's Priority Habitats: Riparian*. Wash. Dept. Fish.& Wildl., Olympia. 181pp.
- Naiman, R.J. & H. Dechamps. 1997. The Ecology of Interfaces: Riparian Zones. *Annu. Rev. Ecol. Syst.* 28: 621-658.
- S.E.R.M. 1999. *Ecosystem Management Plan of Action*. Saskatchewan Environment & Resource Management. Regina. 188pp.

Perspectives in Land Reclamation and Restoration

Presented by:



Canadian Land Reclamation Association/
Association Canadienne De Réhabilitation Des Sites Dégradés



Including the Canadian Land Reclamation Association's
24th Annual Meeting

This document may be cited as:

Zeister, A.M. (compiler), 1999. Perspectives in land reclamation and restoration. 24th meeting of the Canadian Land Reclamation Association held jointly with the Saskatchewan Environmental Industry and Managers Association, Saskatoon, SK. 175pp.
-5927

Conference Sponsors

Platinum

Department of Indian Affairs and Northern Development

Diamond

Prairie Farm Rehabilitation Administration

Gold

LUSCAR LTD.

COGEMA Resources Inc.

Silver

Aquaphyte Remediation

Bronze

MATRIX SOLUTIONS INC.

Native Plant Society of Saskatchewan Inc.

NORWEST SOIL RESEARCH LTD.

Saskatchewan Environment and Resource Management

Iron

Beulah Tec Ltd.

CAN-AG ENTERPRISES LTD.

Clifton Associates Ltd.

Conor Pacific Environmental Technologies Inc.

Enviro-Test Laboratories

Organizing Sponsor

Alberta Environmental Protection

Nelson Dynes & Associates Inc.

Northern EnviroSearch Ltd.

Red Stone Environmental Inc.

Saskatchewan Wheat Pool

Stantec Consulting Ltd.

Conference Program / Table of Contents

Monday, September 27th

7:00 - 9:00 Registration Booth Open

Tuesday, September 28th

7:15 - 7:45 AM Registration

7:45 - 8:00 AM Bus Loading from Saskatoon Inn Lobby

8:00 AM Field Tour Departure (no delays)

7:00 - 10:00 PM Wine and Cheese, Registration

Wednesday, September 29th

Page #

7:30 Registration

8:00 - 8:05 Introductory Remarks – Saskatchewan Room ‘B’
Tracy Patterson (CLRA) and Theresa Salamone (SEIMA) n/a

8:05 – 8:25 Opening remarks from Saskatchewan Environment and
Resource Management n/a

8:25 – 10:05 Saskatchewan Policy – Saskatchewan Room ‘B’
Session Chair: Lorne Veitch – Saskatchewan Agriculture and
Food, Lands Branch, Swift Current

8:25 – 8:45 Drilling waste management guidelines.
Todd Han, Saskatchewan Energy and Mines..... n/a

8:45 – 9:05 Saskatchewan upstream petroleum sites remediation guidelines.
Todd Han, Saskatchewan Energy and Mines..... n/a

9:05 – 9:25 Surface lease policy and seismic activity on agricultural Crown
Lands.
Wilf Pyle, Saskatchewan Agriculture and Food 2

9:25 – 9:45 Lease conditions and restoration criteria on Saskatchewan
Agriculture and Food Crown Land.
Todd Jorgenson, Saskatchewan Agriculture and Food 12

9:45 – 10:05 Environmental liability and contaminated site management in
Saskatchewan.
Victor Chang, Saskatchewan Environment and Resource
Management 14

10:05 – 10:30 Refreshments

10:30 – 12:10 Concurrent Sessions

Session A: Remediation – Saskatchewan Room 'A'

Session Chair: Darlene Howat – Department of Renewable Resources, University of Alberta

- 10:30 – 10:50 Bioremedial options.
Allan Jobson, StanTec..... 46
- 10:50 – 11:10 In-situ biodegradation of ethanol-amine in low permeability soils.
Stuart Lunn and Ron Goodman, Esso..... 48
- 11:10 – 11:30 Yield and nutrient uptake of wheat on oil well sites: effects of topsoil depth and organic amendments
Akinremi, O.O., Lethbridge Research Centre; F.J. Larney, Semi-Arid Prairie Agriculture Research Station; R.L. Lemke, Semi-Arid Prairie Agriculture Research Station; and V. Klaassen, PanCanadian Petroleum Ltd..... 161
- 11:30 – 11:50 Investigation of microbial bioremediation in a gold mill tailings pond.
Carl Paton, Cameco Corporation and Ram D. Mehta, Prairie Biological Research Ltd. 71
- 11:50 – 12:10 Use of crop selection and cattle manure to bioremediate a heavy oil-polluted loamy sand for grain production.
Bix Biederbeck, Agriculture and Agri-Food Canada..... 82

Session B: Revegetation and the ESSA – Saskatchewan Room 'C'

Session Chair: Suzanne Gill – Alberta Agriculture, Food, and Rural Development, Public Lands Branch

- 10:30 – 10:50 Native prairie revegetation on wellsites in southeastern Alberta.
Etienne Soloudre and M. Anne Naeth, and Andy Hammermeister, University of Alberta..... 106
- 10:50 – 11:10 Vegetation characteristics on a pipeline right-of-way twelve years after construction in Southern Alberta.
Kelly Ostermann, University of Alberta 109
- 11:10 – 11:30 Bioengineering and reclamation to stabilize a lakeshore slope.
Jim Schaefer, University of Alberta..... 112
- 11:30 – 11:50 Restoration based on ecological function: grazing management in an endangered Australian ecosystem.
Kim Allcock, David Board, David Hik, Alan Newsome, Roger Pech CSIRO Wildlife and Ecology, Australia, and University of Alberta..... 146
- 11:50 – 12:10 Employment Futures: What does Environmental Science Student Association have to offer?
Margaret Wilson, University of Saskatchewan..... 157

12:10 – 1:45 **Lunch** -- Saskatchewan Room 'B'

1:45 – 3:25 **Concurrent Sessions**

Session C: Native Plants and Revegetation – Saskatchewan Room 'A'
Session Chair: Anne Naeth – Department of Renewable
Resources, University of Alberta

1:45 - 2:05 Relative performance of native prairie grasses and forbs for
revegetation of a pipeline disturbance on native prairie.
David Walker, Walker and Associates..... 126

2:05 – 2:25 Revegetation of wellsite disturbances on Fescue Prairie in east-
central Alberta.
Jay Woosaree, Alberta Research Council..... 118

2:25 – 2:45 The evolving native plant industry in Saskatchewan.
Nora Stewart and Andy Hammermeister, Native Plant
Society of Saskatchewan..... 115

2:45 – 3:05 Cameco, Key Lake greening project, in harmony with nature -
(1978-1999 & beyond).
Lotfi Haji, Cameco..... n/a

3:05 – 3:25 Rare Plant Rescue During Pipeline Construction (*Erigeron*
compositus Pursh. var. *glabratus* Macoun, Fern-leaf Fleabane on
the 1998 Foothills Pipe Lines Expansion Project.)
David Walker, Walker and Associates..... n/a

Session D: Soils and Restoration– Saskatchewan Room 'C'
Session Chair: Mike Solohub – Department of Soil Science,
University of Saskatchewan

1:45 - 2:05 Soil information resources for the prairies.
Alvin Anderson and Glenn Padbury, Agriculture and
Agri-Food Canada n/a

2:05 – 2:25 Setting reclamation standards: When is soil decompacted?
Richard Johnson, Alberta Research Council..... 175

2:25 – 2:45 Using oily waste to restore productivity in a severely eroded
loamy sand.
M.C.P. Jarvis^{1,3}, V.O. Biederbeck², K.G. Hanson², T.A.
Fonstad³ ;¹ Imperial Oil Resources, ² Semiarid Prairie
Agricultural Center, and ³, University of Saskatchewan 68

2:45 – 3:05 Remediation of potash slime tails through use of cross-linked
polyacrylamide hydrogel.
Kathleen Cameron, University of Saskatchewan..... 169

3:05 – 3:25 Fifteen years of subsoil/mine spoil development on a

reconstructed profile.

Danielle Bailey and Donald Pluth, University of Alberta..... 174

3:25 – 4:00 Refreshments

4:00 CLRA National Annual General Meeting – Sask. Room ‘C’

5:30 – 6:30 Cocktail Hour – Saskatchewan Room ‘B’

6:30 Banquet and Awards – Saskatchewan Room ‘B’

Awards

Banquet Presentation: New forms of work organization in the Canadian mining industry.

Dr. Bob Russell, Department of Sociology, University of Saskatchewan n/a

Thursday, September 30th

8:10 - 8:15 Announcements

8:15 - 10:00 Alberta Policy – Saskatchewan Room ‘B’
Session Chair: Steven Deugau – Knox Resources Inc.

8:15 - 8:35 Development and status of reclamation certification criteria in Alberta.
Chris Powter, Alberta Environmental Protection..... 18

8:35 - 8:55 Pipeline reclamation certification standards - a capability assessment approach.
Al Fedkenheuer, TransCanada Transmission Ltd. 24

8:55 - 9:15 Alberta's new native plant guidelines.
Heather Gerling, Alta. Agric. Food and Rural Dev. 31

9:15 - 9:35 Alberta's orphan well program.
Pat Foo, Alberta Energy and Utilities Board 39

9:35 – 9:55 Qualified reclamation practitioners in Alberta.
David Lloyd, Alberta Environmental Protection 40

9:55 – 10:30 Refreshments

10:30 – 12:00 Focus Sessions (Plenary) – Saskatchewan Room ‘B’
Session Chair: Kerby Loewen – Prairie Seeds Inc.

10:30 – 11:15 1)The Great Sandhills
Planning and development authority for Saskatchewan Rural Municipalities and planning districts.
Ralph Leibel, Saskatchewan Municipal Government..... 128

	Use of ecological management planning in Western Saskatchewan Wayne Pepper and Jim Ireland, ERIN Consulting Ltd.	136
11:15 – 12:00	2) Focus Session - Legal Considerations in the Environmental Sector Julian Bodnar, Barrister and Solicitor (Stevenson Gillis Hjelte Tangjerd)	n/a
	Gary Meschishnick, Barristor and Solicitor Wallace Meschishnick Clackson Zawada	n/a
12:00 – 1:30	Lunch – Saskatchewan Room ‘A’	
1:30 – 3:10	Concurrent Sessions	
Session A:	Remediation – Saskatchewan Room ‘C’ Session Chair: Lisa Groves – EnviroTest Labs	
1:30 – 1:50	Phytoremediation as an in-situ technique for the restoration of oil-contaminated sites. C.M. Frick, J.J. Germida, and R.E. Farrell, University of Saskatchewan	95
1:50 – 2:10	Integration of toxicity testing and chemical analyses for site assessment and remediation. Deib Birkholz, Enviro-Test Laboratories and Stephen Goudey, HydroQual Laboritories Ltd.	98
2:10 – 2:30	Evaluating soil amendments for brine spill remediation. Ken Greer, Western Ag. Consulting and Jeff Schoenau, University of Saskatchewan	n/a
2:30 – 2:50	Decommissioning and reclamation of an abandoned herbicide plant. Ralph Bock, Saskatchewan Environment and Resource Management	n/a
2:50 – 3:10	Surface water management with the Little River Pond Mill. Kathleen Cameron, Sunset Solar Systems Ltd.	99
Session B:	Ecosystem Restoration – Saskatchewan Room ‘B’ Session Chair: Corinne Tchorzewski – Saskatchewan Environment and Resource Management, Sustainable Land Management Branch	
1:30 – 1:50	Physical restoration of the Kingsmere River in Prince Albert National Park. Michael Fitzsimmons, Prince Albert National Park and Guy Melville, Saskatchewan Research Council	138
1:50 – 2:10	Fire management for Prince Albert National Park - planned and random ignition prescribed burns.	

	Jeff Weir, Prince Albert National Park	141
2:10 – 2:30	Ecosystem management applied to riparian and aquatic habitat restoration. Karl Lauten, Saskatchewan Environment and Resource Management	144
2:30 – 2:50	Working relationship of SERM and industry in the West Boreal EcoRegion of Saskatchewan. Randy Slater, Saskatchewan Environment and Resource Management; Stan McBride, Wascana; and Shawn Daschuk, NESL	n/a
2:50 – 3:10	Composite Tailings (CT) reclamation research & development at Syncrude Canada Limited's oilsands mining operation. Clara Qualizza, Syncrude Canada Ltd.	n/a
3:10 – 3:30	Refreshments	
3:30 - 4:40	Social and Forestry Issues – Plenary – Sask. Room ‘B’ Session Chair: Sheila Lamont – Saskatchewan Conservation Data Centre	
3:30 – 3:50	Ecosystem based management in El Salvador. Jim Ireland and Wayne Pepper, ERIN Consulting Ltd.	154
3:50 – 4:10	Public participation in a multi-stakeholder process. Mark Liskowich, Northern Mines Monitoring Secretariat	156
4:10 – 4:30	Innovative regeneration applications to reclaim harvested sites in the boreal forest. Derek Sidders, Canadian Forest Service	n/a
4:30 – 4:40	Closing Remarks – Saskatchewan Room ‘B’	