WORKING PAPER
2001-13

sustainable forest management network

réseau sur la gestion durable des forêts

Discussion Paper for SFMN Project: "Factors Influencing Kraft Pulp Mills when Reducing Impacts of Effluent Discharge"

Kate Lindsay and Daniel W. Smith

A Network of Centres of Excellence
Un réseau de centres d'excellence

For copies of this or other SFM publications contact:

Sustainable Forest Management Network
G208 Biological Sciences Building
University of Alberta
Edmonton, Alberta, T6G 2E9
Ph: (780) 492 6659
Fax: (780) 492 8160
http://www.ualberta.ca/sfm

This Working Paper is published by the Sustainable Forest Management Network. All Network Researchers are invited to present ideas and research results in this forum to accelerate their application and to foster interdisciplinary discussion on knowledge, strategies and tools leading to sustainable management of Canada's boreal forest. Working Papers are published without peer review.

DISCUSSION PAPER FOR SFMN PROJECT: "FACTORS INFLUENCING KRAFT PULP MILLS WHEN REDUCING IMPACTS OF EFFLUENT DISCHARGE"

KATE LINDSAY

Ph.D. Candidate, Department of Civil & Environmental Engineering,
304 Environmental Engineering Building,
University of Alberta, Edmonton, Alberta T6G 2M8
780-481-0211 yukon2@telusplanet.net

DANIEL W. SMITH

Ph.D., P.Eng., DEE, Professor and Director,
Environmental Engineering and Science
Department of Civil & Environmental Engineering,
304 Environmental Engineering Building,
University of Alberta, Edmonton, Alberta, T6G 2M8

Submitted to:
Project Report Editorial Committee
Sustainable Forest Management Network
G208 Biological Sciences Building
University of Alberta Edmonton,
Alberta T6G 2E9

November 2001

ABSTRACT

One Sustainable Forest Management Network purpose is to reduce impacts from the forest industry through technology development in an interdisciplinary research program. Understanding legislative mechanisms for pollution control through setting effluent parameters, as relationships among government, industry and public evolve, is part of the SFMN project, titled "Factors Influencing Kraft Pulp Mills When Reducing Impacts Of Effluent Discharge". This working paper reviews "Managing the Environment Report", recently commissioned by the Ontario government, to investigate pollution control methods. Topics include compliance, economic instruments, emerging issues, scientific expertise, risk analysis, watershed management, permitting, public involvement, and policy options. Because the main SFMN project goal has been addressed in "Managing the Environment Report", this discussion paper proposes project objectives' changes to develop a long-term perspective, addressing institutional mindset changes for better environmental improvement.

INTRODUCTION

One purpose of the Sustainable Forest Management Network (SFMN) has been to reduce environmental impacts from the forest industry by investigating policy and institutional analysis through an interdisciplinary research program. Investigating pollution control legislative mechanisms of setting effluent parameters, as relationships among government, industry, and public evolve, is an objective of the SFMN project entitled "Factors Influencing Kraft Pulp Mills When Reducing Impacts of Effluent Discharge". As partial fulfillment of the project objectives, this working paper reviews recent investigations by the Ontario Government and suggests a new direction for the SFMN project.

While the SFMN project's original intention was to investigate new institutional arrangements, project research revealed this type of work has already been pursued in "Managing the Environment Report" (Executive Resource Group 2001) recently commissioned by the Ontario Government. This comprehensive independent study investigated best practices of various jurisdictions to meet environmental challenges and management responsibilities. Topics included compliance, economic instruments, governance models, knowledge management, emerging issues, scientific expertise, monitoring, performance, risk analysis, watershed management, permitting, public involvement, and policy development. The study presents an excellent approach for government environmental agency restructuring and better environment protection.

Since this institutional investigation achieves one of the objectives of "Factors Influencing Kraft Pulp Mills When Reducing Impacts of Effluent Discharge", a new approach is proposed for the SFMN project. While the Ontario report deals primarily with immediate challenges, suggesting incremental solutions for the next 5 to 10 years, the SFMN project should now consider longer-term alternative institutional arrangements. This change in perspective would consider a far-reaching innovative environmental agency model that might be realized in 20 to 30 years, as part of the SFMN " Policy and Institutional Analysis" 2002-2003 strategy. This revised research approach can extend the discussion horizons within SFMN and lead to better institutional arrangements for environmental protection.

RESEARCH APPLICATIONS

"Managing the Environment Report" (Executive Resource Group 2001) investigates new institutional arrangements for environmental protection in Canada and across the globe[1] (See Synopsis in Appendix). A team of experts completed this independent study of best practices for the Ontario Government Secretary of Cabinet. The report was aimed at answering the following question: "What are a model environmental department's defining characteristics?" The research was prepared from internal Ontario government information, external meetings with other jurisdictions, extensive literature reviews, and a series of research reports prepared by leading experts. Volume I of the document comprises a 50-page executive summary and a 274-page report synthesizing the research results. Volume II (approximately 870 pages) presents detailed research expert reports on thirteen different environmental management issues. These topics include compliance, economic instruments, governance models, Canadian issues, knowledge management, emerging issues, scientific expertise, monitoring, performance, risk analysis, watershed management, permitting, public involvement, and policy development. The report covers many current challenges facing environmental departments in meeting their legislated responsibilities and suggests solutions using modern management techniques. Researchers investigating environmental policy will find "Managing the Environment Report", an excellent review of current governmental mechanisms for controlling pollution for the next 5 to 10 years.

"Managing the Environment Report" presents considerable information applicable to the SFMN 2002-2003 Research Area "Policy and Institutional Analysis". The report indicates that governments should become a centre of strategic knowledge and a leader in developing broader public environmental understanding. This initiative would involve building partnerships with research communities, public, industry, and NGOs, similar to the approach taken by the SFMN. Creating effective management and information-sharing infrastructures were determined to be essential. Providing financial resources to plan and implement organizational change is also critical. In short, more formal research on effectiveness and leadership of environmental governance is required.

Overall, "Managing the Environment Report" identified three critical factors required for jurisdictions to move ahead to better protect the environment. Firstly, senior government leadership is essential to provide sustaining political energy, develop a clear interdepartmental

[1] A number of jurisdictions were used in the investigation and some include: Alberta, Australia, British Columbia, California, Chesapeake Bay, Denmark, Massachusetts, Netherlands, New Jersey, New Zealand, Norway, Oregon, Pennsylvania, Sweden, United Kingdom, and Wisconsin.

vision, and ensure staff continuity. Secondly, while the difficulty of cultural change, persistence of command-control mentality, and complexity of departmental functions needs to be recognized, adjustments to these processes are challenging. Finally, financial resources are needed to develop strategic knowledge and broader understanding environmental complexities by the government and public. These three factors and the other findings formed the basis of recommendations to the Ontario Government to become a leading jurisdiction involved in environmental management.

While extensive, the report missed a few issues or did not cover some in sufficient detail. These topics include the mechanics of ecological risk assessment, critical role of public involvement, and use of land-use planning for setting landscape objectives. While "Managing the Environment Report" discussed human health risk assessment, it only briefly mentioned ecological risk assessment, considered to be an emerging pollution control innovation, linking point source pollution to watershed environmental impacts. Thomas (2000) suggested that effluent standards based on best available technology may not be sufficient to adequately protect the environment and ecological risk assessment may better estimates impacts. Different from standard risk assessment, ecological risk assessment approximates potential ecological impacts instead of human health impacts based on epidemiology and toxicology. Ecological risk assessment mechanisms employ watershed indicators and ecological benchmarks for estimating the risk of environmental harm. Research on identifying ecological criteria and indicators has become a new Research Area within the 2002-2003 SFMN priorities. Since ecological risk assessment has been recently adopted by the USEPA, it may also become popular in Canada, as with many other past environmental policy trends. As ecological risk assessment becomes more popular, SFMN research may want to better understand how ecological risk assessment can be applied across boreal ecosystems linking forest sectors.

"Managing the Environment Report" repeatedly mentions the importance of the public involvement, but does not indicate how to specifically address it. Frustration with the lack of adequate involvement has lead a number of environmental groups to take government agencies and companies to court, contesting judicial review of administrative procedures for project approvals, i.e., *Sunpine*[2], *Cheviot*[3], and *Express*[4] and exemplifies the conflict between value-based world views on economic growth and ecological protection. In an attempt to find common ground between the two perspectives, the World Commission on Environment and Development (Bruntland 1987), precipitated a world paradigm shift on the environment by introducing the

[2] *Friends of the West Country Association* v. *Minister of Fisheries and Oceans Director, Marine Programs, Canadian Coast Guard* [1998] F.C.J. No. 976 (F.C.T.D.) (QL).
[3] *Alberta Wilderness Association* v. *Cardinal River Coals Ltd*. [1999] F.C.R. No. T-1790-98 (F.C.T.D.) (Q.L.).
[4] *Alberta Wilderness Association* v. *Express Pipelines Ltd*. (1996), 137 D.L.R. (4th) 177 (F.C.A.).

term “sustainable development”. More recent discussion on appropriate public involvement in resource decision-making involves better understanding of the Declaration of Human Rights beyond the context of eliminating racism, gender inequality and even sexual harassment in the workplace. Today, human rights include adequate public involvement in government planning and decision-making for resource management. More than an environmental bill of rights, human rights recognizes “the inherent dignity and equality and inalienable rights of all members of the human family of freedom, justice and peace in the world” (United Nations 1948). As we move through this new realization, we will see the people of the world wanting an active role in decision-making, meaningful consensus-based consultation as equal partners, and perhaps new government structures more responsive to people’s needs as a great number of ordinary people redefine how they see themselves. Public involvement in the future will require governments and industry to re-examination attitudes and assumptions that currently underlie approaches to social and economic development, policy improvement, resource utilization, planning procedures, implementation methodologies, and organizationally achieving sustainability. This vision of the participatory public involvement in governmental environmental management was not well captured in “Managing the Environment Report”. While many elected officials recognize these ongoing international changes, SFMN researchers would be well advised to continue to pursue new approaches in public involvement.

Ultimately, land use planning is a model aimed at establishing ongoing trusting relationships with the public in the short term and sound resource management decisions over the long term. This concept was not adequately mentioned in “Managing the Environment Report”. Realigning resource development through resource land use planning would mean establishing a meaningful public process whereby citizens could partner with industry and government to establish regional landscape planning objectives. The current BC Land and Resource Management Plans (BC LUCO 2000) and the recent NWT *Mackenzie Valley Resource Management Act*[5] are two such models, using the environmental round table consensus-based approach. With higher-level land use plans in place, the public may allow government and industry to implement resource activities according the established objectives and not get “worn out” by endless more detailed project approval level discussions. With the financial commitment from government for ongoing extensive vegetative inventories and environmental monitoring, these plans would also provide industry with certainty over a longer time frame and less vulnerably to market fluctuation during project approval processes. When local residents have a say in ensuring proper environmental management, they are less likely to support outside contentious environmental extremists who have less cooperative agendas. Land use planning

[5] S.C. 1998, M-0.2 c. 25.

should also be well supported by ongoing extension programs by both government and industry. Community extension programs are not new and have been ongoing in agriculture over the years. Unfortunately, industry and government have been reluctant to financially support the role of extension and lengthy land use planning processes. SFMN might consider research to identify the long term financial benefits and certainty offered by land use planning as a key component of comprehensive forest management programs, sustainable development, and biodiversity protection.

NEW PROJECT DIRECTION

While comprehensive, "Managing the Environment Report" focused primarily on incremental changes within existing relationships among the public, industry, and government. Although these changes may improve environmental management in the short term (5 to 10 years), a longer perspective (20 to 50 years) is also required to address the evolution of public, industry, and government relationships and the nature of long-term environmental impacts. We need to combine what we know about the workings of human inner nature and psychological processes of change with what we are learning about the nature of our physical world to ultimately resolve the paradoxes and complex issues that have long baffled traditional sciences and environmental legislative mechanisms (Land and Jarmen 1992). Ultimately, we need to imagine a time when the current organizational structure will have altered to such a degree as to implement highly functional legislative mechanisms based on principles and environmental values, both of which are critical to achieving sustainable development. We need to research an entirely new paradigm on how to best manage the environment in the future.

Land and Jarman (1992) offer a new organizational analysis perspective on systems theory. Their approach integrates "new physics" into modern change management approaches, challenging the conventional scientific "cause and effect relationship". They suggest a "Creative Worldview", built on three fundamental concepts: releasing creative capacity, understanding relationships, and vision-based management. Creative thinking is needed to expand rational thinking. Individuals and organizations, in a state of continual growth, must have the capacity to implement flexible rules, standards, and procedures. Next, relationships should connect through the acceptance of diversity, not by enforcing conformity. System components become interdependent, replacing competition with trust and cooperation. Finally, analysis based on past trends needs to be replaced with organizational change driven by future visions, applying nonlinear/discontinuous thinking. Reality manifest unexpressed future potential and depends upon the ability to imagine, integrating the pull of the future into day-to-day decision making

framework. This Creative Worldview challenges command-control methodology and suggests an innovative mechanism for future institutional arrangements for environmental protection.

Applying this theory to environmental institutional arrangements forms the basis of the SFMN project modifications. Factors influencing the development of effluent standards, guidelines, and improved regulatory incentives for the pulp industry will be investigated against the Creative Worldview approach through a number of steps.

1. Examine and highlight new physics that challenging cause and effect, which forms the basis of environmental impacts and command control mechanisms.

2. Investigate the key elements of the creative worldview put forward by Land and Jarman (1992) that would apply to public, government, and industrial relationships.

3. Propose a new paradigm or model for pulp mill regulatory mechanisms, based on continuous change and vision management.

4. Verify and adapt the new model with the input from a series of workshops with regulators, First Nations, stake holders, and industry.

CONCLUSIONS

This SFMN Legacy III working paper presents a review of the recently commissioned "Managing the Environment Report" investigating best practices of government environmental agencies in Canada and internationally. By investigating pollution control topics on compliance, economic instruments, emerging issues, scientific expertise, risk analysis, watershed management, permitting, public involvement, and policy options, the report provides good coverage of many current challenges facing governments, meeting legislative responsibilities and recommends realistic modifications for the next 5 to 10 years. While extensive, the report was a bit brief on a few other important related topics, namely, the mechanics of ecological risk assessment, importance of vegetative inventories, critical role of partnerships with the public, and land-use planning to set high level objectives. For the longer term, additional policy research is needed to propose innovative institutional mechanisms for setting regulatory pulp mill effluent standards as future relationships among public, government, and industry evolve. This working paper proposes adjustments to the current project objective to investigate the creative worldview approach, based on continuous change and vision management.

REFERENCES

British Columbia Land Use Coordination Office (BC LUCO). (2000) *Land and Resource Management Plans – A Statement of Principles and Process.* Victoria: www.luco.gov.bc.ca/lrmp/home.htm <opened online 10/11/00>

Bruntland, G. H. 1987. Our Common Future. World Commission on Environment and Development, Geneva Switzerland.

Executive Resource Group. 2001. "Managing the Environment Report": a review of best practices, volume I and II. Available online at: www.ene.gov.on.ca/envision/ergreport/ <opened July 16, 2001>.

Land, G. and Jarman, B. 1992. Break-point and beyond – mastering the future today. HarperCollins Publishers Inc., New York, NY, 10022.

Thomas, L. 2000. The role of science in setting the environmental agenda. TAPPI Journal, 83:9 pp. 35.

APPENDIX - SYNOPSIS OF

"MANAGING THE ENVIRONMENT REPORT" EXECUTIVE SUMMARY

Overall, "Managing the Environment Report" was comprehensive in addressing complex mechanisms used in environmental governance. This section presents the key findings of the study. A series of essential trends or strategic shifts from a traditional regulator approach to one based on strategic management were presented. These shifts formed the standard to which many environmental departments are moving towards.

- Strategic shift #1 — a high-level government-wide approach was required across different departments, not leaving one ministry with sole responsibility for environmental protection.

- Strategic shift #2 — continuous improvement in environmental performance and accountability across all pollution sources, as opposed to setting minimum standards for large stationary facilities.

- Strategic shift #3 — protection for air/water/land integrated with total cumulative impacts on people and places, based on natural ecological watershed boundaries, not on older administrative boundaries and unconnected departments.

- Strategic shift #4 — flexible comprehensive regulatory and non-regulatory incentives including participation, changes in behaviour, and inter-jurisdictional cooperation, not just rigid command-control compliance mechanisms like inspections, abatement, investigations, and enforcement.

- Strategic shift #5 — obligation of environmental protection shared with industry, NGOs, public, and research communities, making it more than an exclusively government responsibility.

The main report focused on eight other topics, namely, compliance, governance, knowledge management, emerging issues, monitoring, scientific expertise, risk analysis, and policy development. For compliance, many jurisdictions were moving away from rigid command-control legislation towards an integrated methodology of compliance assurance. This new approach included a combination of education, validation with joint monitoring/research, performance recognition, and negotiation, in addition to regulatory compulsion. Across the

globe, these new policies, such as cooperative agreements, compliance assistance, and economic instruments, emphasized flexibility and effectiveness. Compliance assurance fostered a commitment to continuous improvement in environmental performance, not just meeting minimum pollution standards by providing incentives to recognized leaders meeting performance-based requirements. Government, industry, and communities cooperated to solve complex environmental challenges like multi-sector non-point source pollution. While ongoing monitoring was essential for accountability, successful compliance assurance also required strong abatement and enforcement presence, but based on risk-driven targeting, remote computer-assisted inspections, compliance assistance for new approvals, and comprehensive training for agency staff. These many initiatives were changing compliance from a control-based mechanism to a multi-facetted cooperative system.

Governance for environmental management was decentralizing authority to more local control. While little research on the governance models for environmental management could be found, jurisdiction effectiveness appeared to be depend upon political leadership, broad vision, and extensive public, NGO, and industry involvement through consensus building. In many cases, departments were shifting the day-to-day implementation to arms-length agencies or regional and municipal governments. This arrangement allowed governments to focus on inter-ministerial strategic directions and to engage stakeholders in more open consultative partnerships. As governments modify to meet new perspectives on the public's role, the ministries were more effectively protecting the environment.

Knowledge management was critical to improved governance. Leading environmental management organizations were heavily dependent upon effective information and knowledge flows. While widely accepted by industry, the public sector was slow to recognize the importance of acquiring, creating, adding value to broadly shared information. Although many public organizations were aware of knowledge management, few have had the time, resources, leadership, or strategic focus to implement the required information frameworks. Without knowledge managements, the investigation concluded that the many newly identified directions would not be achievable.

Identifying emerging issues was recognized as a main component of knowledge management and effective environmental management. Some foresight was required to assemble new issues for decision-making, and new policy development. Studying emerging issues provides for early preventative action, better financial investment decisions, and enhanced market opportunities. Overall, few environmental organizations were found to have formally implemented emerging issues processes.

Environmental monitoring was seen as another cornerstone of knowledge management and critical for successful compliance assurance. In order to better support decision-making, monitoring was shifting from emphasising analytical equipment towards implementing information systems that integrate data from environmental, economic, and social issues. Environmental markers were being used to indicate ecosystem health. Rather than traditional top-down reporting, centralized data technologies enabled the public to use information portals, even at the watershed level, for more meaningfully participation. Inter-jurisdictional data sharing provided for more effective resolution of trans-boundary pollution issues. Rather than being dependent upon having information filtered by experts, new technology and information systems enabled everyone to more effectively use monitoring data.

Leading environmental departments considered accessing scientific expertise to be a critical part of sound decision-making. Past financial constraints and research program downsizing created many challenges in recent years. However, leading environmental agencies actively supported research initiatives through relationships with professional organizations, academia, industry, and NGOs. While addressing specific immediate problems, research directions were shifting towards broader longer-term environmental issues integrating social and economic concerns.

Science-based risk assessment was recognized as a primary tool for developing environmental standards. The traditional one chemical/one-media model was being expanded into a broader Risk Analysis processes, integrating assessment with risk management and communication, while emphasising other disciplines like sociology, economics, law, and ecological health. This new approach required different skills, better understanding of biological response to stressors, and more effective transparent interactions with public stakeholders. Even though leading jurisdictions used the enhanced Risk Analysis approach, there remained some debate on how Risk Analysis should be used in government decision-making and policy implementation.

Policy development needed to function in concert with knowledge management systems by processing emerging issues, evaluating data, including researchers, and considering public concerns. The investigation found that many jurisdictions had not formalized policy development as a discipline and struggled to redefine and strengthen their policy development capacities. The policy development trend was to become more comprehensive, strategic, long-term, crosscutting and knowledge based. High-level professional thinking was recognized as a critical to sound environmental management based on continual improvement.

Overall, the investigation found that some agencies were lagging behind the strategic shifts made in other jurisdictions. Some ministries were firmly entrenched philosophically, culturally, and programmatically in the traditional command-control model, which although effective in the past, it is no longer adequate for current challenges. Governments lacked a coherent vision of environmental protection and a political consensus to realize it. Agencies had confusing positions on partnerships, innovation, compliance assurance, and other required changes.

In conclusion, the investigation identified three critical factors required for jurisdictions to move ahead. Firstly, strong political commitment and leadership from senior government was essential to sustain the effort, develop an interdepartmental vision, and ensure staff continuity in leadership positions. Secondly, the difficulty of cultural change and adopting alternatives needs to be recognized, including the persistence of the command-control mentality and complexity of departmental functions. Finally, strategic knowledge must be supported financially and intellectually to develop a broader understanding in government and the public. These three factors and the other findings formed the basis of recommendations to the Ontario Government for it to become a leading environmental management jurisdiction.