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The Atlantic Environmental Sciences Network: Lessons Learned in the Formation of an Environmental Development Network

Working Paper No. 25
Science Policy Branch
Environment Canada

Document de travail n° 25
Direction de la politique scientifique
Environnement Canada

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in

the Formation of

an Environmental Development Network

April 2003

TABLE OF CONTENTS

Executive Summary

This "lessons learned" document was requested by leaders of the Canadian Environmental Sciences Network (CESN) of Environment Canada for the purpose of ascertaining key issues arising during the formation and initial development of the Atlantic Environmental Sciences Network (AESN), a regional network of Environment Canada. Although the challenges facing the development of each network are often unique, it is envisaged that some of the experiences related in this document may facilitate the meeting of those challenges by other new networks.

AESN is an environmental knowledge development network with a mandate for environmental research and training as well as the application of research and training to economic and social development in Atlantic Canada.

In its brief (two and one-half years) history, AESN has developed as multi-institutional, and multi-sectoral. Strategic focus areas (Biodiversity, Climate Change, Watersheds, Environment and Human Health, Environmental Engineering and Marine Life) were chosen by partners in response to present and perceived future environmental imperatives.

Communication and partner interaction have been key to network formation and function. The collaboration of disparate groups has become a network strength. Linkages have been created within AESN, with other networks, with research supporters, and between users and providers of environmental knowledge.

The "lessons learned" in the collaborative approach to the building of AESN may be one of the greatest network assets.

1. INTRODUCTION

1.1 Purpose of the Study

The Atlantic Environmental Sciences Network (AESN) received support from the Canadian Environmental Sciences Network (CESN) for the compilation of a "Lessons Learned" document outlining key issues arising during network formation and initial growth. AESN has undertaken an ambitious scope of network development in response to early strategic partner decisions. Results thus far have been positive and endorsed by partners in academe, governments and industry.

It is intended that an outline of key factors contributing to AESN development may be helpful for new networks which are just commencing their collaborative initiatives. Although each developing network will face unique challenges, there may be insight gained in an examination of the processes which worked (and those which did not) during a similar initiative elsewhere.

1.2 AESN Description

AESN is a network of networks (thematic cooperatives) with partners from universities, governments, industry, and NGOs. Network partners authored the network's mission statement, objectives and six initial strategic focus areas, each forming a thematic cooperative. Additional information is given in ANNEX C.

AESN Mission:

> *To facilitate excellence in cooperative and strategic environmental research, development, and training, thereby building effective partnerships and enhancing knowledge-based environmentally sustainable economic development in Atlantic Canada.*

AESN Objectives:

- *facilitate active linkages and communications among research institutions, governments, and industry associations;*
- *enhance student education, professional development and training in environmental sciences;*
- *promote research to address environmental issues in Atlantic Canada;*
- *act as a resource for environmental information;*
- *develop and promote a proactive environmental research agenda for Atlantic Canada and facilitate its application.*

Thematic Cooperatives:

- *Biodiversity*

- *Watersheds*
- *Climate Change*
- *Environment and Human Health*
- *Environmental Engineering / Technology*
- *Marine Life*

1.3 AESN HISTORY

AESN has been evolving over the past two and one-half years.

November 2000:
The concept of the network, based on the highly successful Atlantic Cooperative Wildlife Ecology Research network (ACWERN) initiated by Environment Canada (EC), was first officially discussed at the November 2000 meeting of Deans of Arts and Science of Atlantic universities. A presentation was made by Dr. Allan Sharp, Dean of Science, UNB, and an ACWERN Board member. The enthusiastic response resulted in a series of invitations to EC personnel to discuss the network concept / opportunities with the faculties of universities throughout Atlantic Canada.

December 2000-April 2001:
Presentations were made to senior decision makers and faculty researchers at 12 Atlantic universities. Potential areas of interest / participation were discussed. Meetings were also held with government departments and industry associations. Attendees requested a two-day Atlantic workshop to collectively further explore the network concept.

May 2001
A two-day AESN workshop, held at Mount Allison University in Sackville, New Brunswick, was attended by 57 representatives of Atlantic universities, governments, industry associations and NGOs. Attendance was by invitation sent to those who had previously (in meetings) indicated an interest. (Invitations were limited to two / institution, with the suggestion that attendees include one senior executive / administrator and one researcher.) Workshop attendees endorsed the network concept, formed a pro tem Board, drafted a mission statement and objectives, and recommended initial network scope and focus (six thematic cooperatives) to the Board. Potential network structures were also discussed. No existing model was accepted; rather, desirable components were recommended to the Board for further consideration.

June 2001-July 2002
Workshops were held to develop thematic cooperatives. Network partners were invited to propose focus areas. In cooperatives up to four focus areas were chosen for initial research, development and training efforts. In some instances, initial collaborative projects were also proposed.

August 2002-March 2003:
Proposal development workshops were held with the objective of developing initial collaborative research and training proposals for submission to appropriate funding agencies. EC and the Atlantic Canada Opportunities Agency (ACOA) agreed to partner to support the hiring of a consultant to develop initial proposals in cooperatives. Proposals in two cooperatives (Climate Change and Environment and Human Health) were initiated in March 2003.

Linkages with other networks (Canadian Water Network (CWN), Climate Change Impacts and Adaptation Research Network (CCIARN), CESN, BCESN) were also pursued.

ACOA initiated joint participation to develop / enhance the environmental research / technology capability in Atlantic Canada through the formation of environmental sector teams and program participation. The potential for Atlantic capacity enhancement is also being explored with ACOA and the granting agencies.

In March 2003, AESN, on behalf of EC-AR, co-sponsored the CWN symposium "Water Resources 2003", and hosted a special session on interface issues (ANNEX C). An AESN workshop was also co-scheduled and co-located at the symposium.

2. STRUCTURE

In both structure and funding formulae, simplicity should be the key. AESN is a knowledge development network, with a Board consisting of 15 members and a Secretariat consisting of one full-time and one part-time position. An early decision was made to direct minimal resources to structure / administration, and to direct maximal resources to programs / projects.

2.1 Knowledge Networks

In an excerpt (ANNEX A) from a report on formal knowledge networks prepared for the International Institute for Sustainable Development, Dr. Howard Clark, President Emeritus of Dalhousie University, listed ideal characteristics of these networks and suggested that there are two kinds:

> *"**Open networks** are those which have a well-defined theme, exist to undertake research and generate knowledge, have formal constitutions, and have invitation-based participation.*

> ***Development networks*** *are those which have a well-defined theme and carefully chosen criteria for participation, exist to create knowledge and to accelerate the application of that knowledge to economic and social development, and have a formal constitution and tight governance."*

Clearly, AESN is designed to be a "development knowledge network". Partners made an early decision to include environmentally sustainable economic development in the network mission. Similarly, partners directed that all cooperative programs / projects are to contain socio-economic and policy components. Network design and early initiatives feature the essential knowledge network characteristics listed by Dr. Clark, as well as the majority of those on the optional list.

The expanded scope of development networks provides additional challenges for network organization and administration. Socio-economic and policy considerations are often aspects of physical research programs which have not been well developed by researchers. Economic development parameters of funding programs have often been viewed as unnecessary constraints. The challenges of facilitating the initial collaboration of disparate groups are considerable. The key exists in the organization of the initial group sessions and discussions. (Extensive consultation during agenda formation, and frequent partner communication facilitates process ownership.) Pursuant to meetings, there has usually been a willingness of participants to consider an expanded scope of research focus. Pragmatically, the increased funding options which follow are welcome.

2.2 Board

The AESN *pro tem* Board consists of 15 members at the senior decision-making level. This includes representatives of Atlantic universities (large and small), provincial governments, federal departments, National Research Council, and industry (representing *Team Atlantic Environment,* composed of 4 Atlantic associations and 4 Atlantic Provinces).

Experience has shown that the Board members can be extremely helpful in establishing network liaisons within their respective (and other) organizations. Their senior level also ensures their active roles in other relevant networks, boards, and associations. This has greatly facilitated the linkages with these and related organizations. Board members, individually, are often consulted regarding specific initiatives and their input has been key in program development.

2.3 Secretariat

The Secretariat is composed of one full- time and one part-time position. Given, the resource-intensive requirements of network start-up activities, this often provides a constraint to the speed of network development. The addition of the half-time position in January, 2003 has facilitated collaborative workshop / meeting schedules, as well partner communication.

2.4 Thematic Cooperatives

Partners recommended six thematic cooperatives: Biodiversity, Watersheds, Climate Change, Environment and Human Health, Environmental Engineering / Technology and Marine Life. Within each of these, partners with similar interests have identified program focus areas.

It has become apparent that each thematic cooperative requires a dedicated half-time coordinator. These should be individuals with a close association to the cooperative research area, but preferably not as a principal investigator. Resources have not allowed the hiring of these individuals. Creative arrangements are underway to source these individuals from the lead partners in each thematic cooperative. This has not always been possible; however, in cases where it has occurred (e.g. Climate Change) the progress of cooperative development has accelerated.

Often, partners have expressed an interest in working in more than one cooperative, or in working on cross-over projects. The program (ANNEX B) of the AESN special sessions of the joint CWN "Water Resources 2003"symposium illustrates this. At the associated "Watersheds Workshop", lead researchers from three other cooperatives proposed "cross-over projects" for potential collaboration with watersheds researchers. The ability to facilitate collaborative projects, with other cooperatives, and indeed with other networks, while still maintaining the focus of the designated thematic program, has been a strength of AESN. Clear rules of engagement / disengagement are required as programs develop.

2.5 Membership

The membership of AESN includes 12 universities, provincial governments, environmental industries associations, federal departments, and NGOs. There is a need to enhance partnership in key areas. Requests have been made to become more proactive in recruiting at the community / NGO level. Similarly, there are other federal departments which have expressed interest. The community colleges have also requested involvement in the network and initial collaboration is occurring (Environment and Human Health). These must all be

pursued actively. The resources required for this next phase of network development have not yet been identified.

3. DEVELOPMENTAL PROCESS

3.1 Consensus Building

The development of AESN has relied upon consensus building at every juncture. Care was also taken to *simultaneously* engage the senior decision makers (VPs Deans, etc) and the front line researchers. It is essential to have the support of the institutional administration as well as the engagement of the researchers if the development of the larger network and component thematic programs are to occur.

This process, although essential, requires considerable commitment of human resources. Personal contact is required for initial development stages of the network, cooperatives, and focus groups. Interpersonal skills are key. In the Atlantic region, travel requirements can challenge resources (human and fiscal) and schedules. It is envisaged that many future initiatives (with coordinators in place, and projects underway) could rely to a greater extent on electronic communication. The establishment of a dedicated interactive web site would be an asset in this regard. The Board has agreed to this approach although funding has not yet been identified.

3.2 Value-added

The network must provide a clear value-added service to its partners. The value of the collaborative approach must be multifaceted, not only as an enhancement of funding successes (although this is a significant deliverable).

The initiating and cementing of partner alliances provides a significant benefit. Collaboration often would not be initiated, or not initiated to as great an extent, in the absence of network activities. This has become repeatedly evident in the workshops held during the last 18 months. The interactions occurring during the development of proposals have been a positive outcome in addition to the resultant funding proposals.

An enhanced *relevant* information flow to partners is often cited as valuable. Network partners' interests and abilities are well known to the Secretariat and other partners. Information dissemination, opportunity identification, and linkage formation (often with previously disparate groups) tend to occur to a greater degree.

3.3 Communication

Effective communication is the key to network development, function and growth. Communication within the network is essential. Personal interaction (meetings, workshops, etc) is preferred. However, the geographic distribution of partners poses a challenge to both fiscal and human resources.

Electronic means of communication can be supplemental (preliminary and follow-up activities). An interactive web site, referenced previously, would be an asset during network development, and essential subsequently.

Communication with other networks (national and international), potential partners, granting agencies, and funding sources must also be achieved. With the challenges referenced previously, the resources to undertake this effectively do not exist. The facilitation of the national and international interaction by CESN would be optimal. Location and existing contacts of CESN principals would make this desirable and cost-effective.

4. RESOURCE REQUIREMENTS

Atlantic Canada may be one of the most challenging areas in which to establish and operate a network incorporating academe, governments, industry and NGOs . There are many universities of varying sizes, four provincial governments, and industries primarily composed of small companies. However, it may be one of the areas with the greatest chances for network success. There exists a realization that there is an imperative to collaborate to be competitive in research and in business. Innovation and economic development are similarly dependent on this approach. Although network support requires dedicated resources, the investment is minimal compared to resource requirements in the absence of network initiated and maintained activites.

4.1 Fiscal

Recent activities confirm that the previously discussed requirement of $200. K per year appears to be a minimal figure for effective network development and support. In addition, funds are required to initiate research in identified priority areas. Funding agencies are prepared to support certain initiatives, although usually on a "matched" basis. The leverage ratio of 6:1 achieved by ACWERN after nine years of operation provides a useful target.

4.2 Funding Sources

Most of the funding thus far has come from EC-AR and CESN. More recently, ACOA has partnered with EC in funding the cost of developing collaborative proposals in each of the thematic cooperatives. The CESN funding has facilitated the recent (January – March 2003) network activities referenced earlier.

Clearly, dedicated Secretariat funding is a necessity if AESN is to continue. The ongoing involvement of ACOA and the granting agencies will determine the scope of network collaborative activities possible. Partners are now providing much in-kind support (administrators and researchers time, facilities, etc.); financial contributions may also be a requirement. A mechanism for determining these which would not unduly burden the smaller institutions / companies must be considered. Various models exist.

Many potential network funding sources require the network to be a separate (from government) entity. This is a policy decision which ultimately depends upon the role envisaged for networks within EC and the willingness to support that role.

4.3 Human

The participation of a Board of senior decision makers is critical. Thus far, AESN has managed to achieve the participation of such a Board. As previously referenced, individual Board members can play a significant role in facilitating the work of the network.

A funded Secretariat composed of one full time and one half time individual is the minimal requirement.

Thematic cooperative coordinators who are free to spend at least half of their time on network issues are required for optimal cooperative development.

In the final analysis, it's all about people.

5. LINKAGES

One of the greatest values of the network has been the linkages created within and without. Although today's enhanced communication devices allow an unlimited degree of global communication, the time constraints on the individual

remain the limiting factor. The AESN experience has shown that the linkages outlined below are often not undertaken by individuals, or individual institutions / departments; however these become the norm as network collaborative events occur.

5.1 Partners

AESN is multi-institutional and multi-sectoral. Although individual researchers may have previously linked with individual colleagues at other institutions, the extent of collaboration and the collaboration among *teams* from various institutions has developed to a much greater degree as a consequence of network activities.

The multi-sectoral aspect of AESN has facilitated the interaction of disparate groups. The researchers involved in socio-economic and policy aspects of AESN projects are often collaborating for the first time with researchers in the physical sciences from their own, as well as other, institutions. The linkages thus created are expected to strengthen subsequently. The decision of partners to include socio-economic and policy components in all AESN programs / projects has proven to be key.

Similarly, the disconnect between university researchers and industry (especially small industry) has often been referenced, but still remains a problem. It has been noted by funding agencies as a particularly significant problem in the environmental sector. Board members have recommended various partner initiatives to address this, in collaboration with the funding agencies. The linkages between public and private sector are anticipated to increase as network activities continue.

5.2 Funding Agencies / Granting Councils

AESN interacts with supporters of research and engages them in the network. This has proven to be beneficial in identifying problem areas and in addressing capacity issues. ACOA is represented on the AESN Board. As a result of frequent interactions, ACOA has requested AESN to assist with the development of environmental sector teams which will facilitate a more strategic approach to the development of capability in environmental research. Similarly, ACOA has asked AESN to develop a concept paper which will be used to engage the granting councils in environmental science capacity issues in Atlantic Canada. AESN is anticipating similar interaction with NRC and is developing initial collaborative projects. The involvement of research supporters in network formation has proven to be strategic.

It is envisaged that the linkages with CESN could be similarly helpful. The location of CESN principals and their frequent interactions with representatives of the national granting councils would be an asset to other networks, particularly to those which are not headquartered in NCR.

5.3 Other Networks

Most AESN partners are also members of other networks. They have indicated that they see their activities as complementary rather than conflicting. Similarly, AESN has initiated activities (previously referenced) with various other networks (e.g. CCIARN and NCE-CWN). Although there is a perception that members of national thematic networks may not see the "need" for interaction with regional networks, this has not proven to be the case. Indeed, the testimonials received thus far indicate that principals of other networks have found collaboration to be positive and they are requesting more future joint initiatives.

There is a recognition that today's research initiatives must involve collaborative teams which consist of more that one or two representatives per region, and that national initiatives have regional components which are optimally addressed in partnership with regional teams.

5.4 Users / Providers of Environmental Knowledge

AESN partners have indicated a strong interest in linking the providers and users of environmental knowledge. Policy issues / decisions require scientific input. Researchers are also often (but not always) interested in identifying and addressing the information gaps thus identified. There is an imperative that both groups interact with community groups, many of which form a significant research resource. Knowledge translation issues become extremely important in this milieu.

The AESN experience has shown that regional networks are uniquely positioned to facilitate these interactions. They are, and are perceived to be, closer to community issues. They also link provincial and federal decision makers with each other, with area researchers, and with local industry. This presents opportunities for network initiatives.

5.5 Human Resources / Training

Nationally, the existing shortage of skilled talent is anticipated to persist and increase in universities, governments and industry. Regionally, this challenge is often more acute. AESN partners directed that the issue of training / retraining should be addressed by the network and that particular consideration should be

given to developing initiatives involving students who could move easily between universities and industry / government departments.

Similarly, the national "Vitesse" reskilling program is of great interest to partners. Regional networks are uniquely positioned to facilitate and promote such a program. The economic development parameters of such a program are well suited to the AESN mandate.

6. PATH FORWARD

A recent Board meeting endorsed various AESN activities, subject to funding constraints. All of the proposed activities involve a lead role for AESN in facilitating the development of programs and projects requiring the collaboration of multi-institutional, multi-sectoral, and often multi-jurisdictional groups in strategic areas where a void exists due to the lack of engagement of one or more of the key players.

The "lessons learned" in the building of AESN may become one of the greatest network assets for the future.

ANNEX A: CHARACTERISTICS OF FORMAL KNOWLEDGE NETWORKS

Clark, Howard, *Formal Knowledge Networks: A Study of Canadian Experiences. A report of the International Institute for Sustainable Development. 1998. 106 p., p.1-2.*

> ***Open networks*** *are those which have a well-defined theme, exist to undertake research and generate knowledge, have formal constitutions, and have invitation-based participation.*
>
> ***Development networks*** *are those which have a well-defined theme and carefully chosen criteria for participation, exist to create knowledge and to accelerate the application of that knowledge to economic and social development, and have a formal constitution and tight governance.*

Open networks and development networks can be regarded as formal knowledge networks. Certain ideal characteristics of formal knowledge networks can be identified:

1. *Their main purpose is to create and disseminate knowledge for use beyond the membership of the network;*
2. *Their structure and operation are designed to maximize the rate of knowledge creation;*
3. *The network must provide recognizable direct benefits to all participants;*
4. *There is a formal organization and a well-defined management structure;*
5. *Participation is by invitation, based on criteria of merit or peer review;*
6. *There is a well-developed communication strategy; and*
7. *The network results in a reduction of boundaries between sectors such as universities and industry.*

Additional elements of a formal knowledge network *may* include:

- *Culture shifts within institutions towards collaborative activities between institutions and sectors;*
- *Multidisciplinary, multisectoral and multi-national regional in terms of both network participants and in audience;*
- *Better relations with funders such as industry and government;*
- *Strong involvement in graduate education and training;*
- *Typically, networks produce knowledge at a faster rate than otherwise possible;*
- *Cost effectiveness in operations and possibly revenue generating through sales of products and frequently mobilization and / or more efficient use of human resources;*

- *More effective influence on decision-makers through size of network, reputation of network members and quality of collaborative work – this is maintained through a careful balance of management and degree of selectivity;*
- *International scope, either potential or actual, reflecting the reality that knowledge networks cannot isolate themselves from what is going on elsewhere;*

Knowledge networks can make a considerable contribution to sustainable

- *development.*

ANNEX B: SPECIAL SESSIONS of NCE-CWN "Water Resources 2003"

Wednesday, March 26, 2003
10:00 a.m. to 12:30 p.m.

Special Session-Freshwater, Coastal and Estuarine Issues: Exploring the Interface
Co-hosted by Atlantic Environmental Sciences Network (AESN) / Environment Canada, Atlantic Region

Co-chairs: Dr. Graham Daborn, Acadia University and Dr. Linda Cooper, AESN

Overview Presentations:
Cumulative Effects of Human Activity on Coastal Ecosystems –*Current patterns of human use of coastal resources and suggested initial steps in the long road toward sustainability.*
Dr. Michael Healey, Institute for Resources and Environment, University of British Columbia

Finding the Right Solution: Looking Where You Don't Expect It.
Mr. Sean Brilliant, Executive Director, Atlantic Coastal Action Plan (ACAP) St. John, NB

Panel Discussion: *"How do you manage wastes / watersheds from source waters to the coast?"*
Panel Presentations:

1. *Provincial Perspectives.*
   Mr. Kim Hughes, Director, Environment and Local Government, Sustainable Planning Branch, Government of New Brunswick

2. *The Ashkui Project: Linking Western Science and Traditional Knowledge in Labrador, NL.*
   Mr. Geoff Howell, A/Manager, Ecosystem Science, Environmental Conservation Branch, Environment Canada

3. *Pesticide Impacts on Fish in Coastal PEI.*
   Dr. Kevin Teather, Chair, Department of Biology, University of Prince Edward Island

4. *Technology Challenges / Solutions.*
   Dr. Graham Gagnon, Professor, Faculty of Engineering, Dalhousie University (tbc)

5. *Industry Perspectives.*
   Mr. Bill Borland, Director of Environmental Affairs, J.D. Irving Ltd.

Discussion:
Open discussion among overview presenters, panelists and audience.

WEDNESDAY, MARCH 26, 2003
1:00 p.m. –5:00 p.m.

AESN WATERSHEDS WORKSHOP
Hosted by the Atlantic Environmental Sciences Network (AESN), Environment Canada

The Atlantic Environmental Sciences Network (AESN) is a partnership of universities, governments, industries and NGOs in Atlantic Canada. The AESN mission is:
to facilitate excellence in cooperative and strategic environmental research, development, and training, thereby building effective partnerships and enhancing

knowledge-based environmentally sustainable economic development in Atlantic Canada.
AESN is a network of networks (thematic cooperatives) including *Environment and Human Health, Climate Change, Watersheds, Biodiversity, Environmental Engineering, and Marine Life.*

The purpose of the workshop is to determine the potential for collaborative initiatives (within the Watersheds thematic cooperative, with other AESN cooperatives, and with other networks), and to identify, in discussion with the larger symposium audience, key areas for future collaboration.

1:30-3:00 p.m.
SESSION A: Panel Discussion:
Panelists will provide an update on the work of other cooperatives and will lead a discussion on the potential of "Watersheds" cross-over projects.
Panelists:
Ms. Eileen Johnson, Policy Advisor, Environment Canada.
The Canadian Environmental Sciences Network (CESN)

Dr. Judy Guernsey, Professor, Department of Community Health and Epidemiology, Dalhousie University
AESN Environment and Human Health Cooperative

Dr. Graham Gagnon, Professor, Faculty of Engineering, Dalhousie University
AESN Environmental Engineering / Technology

Dr. David Burton, Research Chair in Climate Change, Department of Engineering, Nova Scotia Agricultural College
AESN Climate Change Cooperative

Dr. Joseph Culp, Project Chief, Cumulative Impacts on Aquatic Biodiversity, National Water Research Institute, Environment Canada
NWRI Cumulative Impacts Research

3:30-5:00 p.m.
SESSION B: General Discussion: Potential Collaborative Initiatives
Discussion Co-leads:
Dr. Rick Cunjak, *Director, Canadian Rivers Institute, University of New Brunswick (CRI)*
and
Dr. Graham Daborn, *Director, Acadia Centre for Estuarine Research (ACER), Acadia University*

A discussion will be held on the potential for collaboration in previously proposed areas, including cumulative effects, non point sources, and estuaries / salt marshes. A representative of DFO (tbc) will identify key estuarine issues in Atlantic Canada. New proposals will be welcomed.

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22 *Canadian Environmental Sciences Network (CESN) Discussion Paper*

23 *International Comparative Study of Approaches Used to Address Issues that Cut Across Science-Based Departments*

24 *Framework to Assess Environmental Science and Technology Research Capacities in Canada*

25 *The Atlantic Environmental Sciences Network: Lessons Learned in the Formation of an Environmental Development Network*

26 *A Stakeholder Relations Strategy for Federal S&T*

27 *The Changing Federal S&T Innovation Institutional System: An Exploratory Look*

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