Managing for Science — Creating Conditions for Success[1]

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Abstract

Relevant, credible science is a critical input to sustainable resource management planning in British Columbia. Several models to develop and incorporate science in decision-making processes have been tried and have achieved varying degrees of success. This paper reviews what we have learned from the Clayoquot Scientific Panel and Coast Information Team models; it also reflects on what is needed to create conditions for success in managing processes to develop relevant, credible science to support sustainable resource management planning.

Credible science is a critical input to sustainable resource management

Keywords: *Coast Information Team, Clayoquot Scientific Panel, land and resource planning, project management, scientific knowledge, science-based decision-making, sustainable forest management*

What We Are Seeking

Science can be defined as "a body of knowledge that is constructed via observation, hypothesis, experimentation, and logic for the purpose of explaining and predicting events or behaviour." Developing a body of knowledge is a lengthy process that involves incremental acceptance of findings through a peer review process and development of a "scientific consensus." In practical terms, this means that the process of developing science can be complicated, its costs are difficult to estimate, and it is hard to schedule.

To produce credible science, we must actively manage for it

By comparison, the resource planning processes that we want science to support are characterized by tightly constrained schedules and budgets, and cover a broad array of scientific disciplines. Science is often only one factor in decision-making, along with considerations such as socio-economic conditions, stakeholder values, and political concerns.

To use science effectively in supporting these processes, I believe that we must aggressively manage for it.

[1] This paper summarizes a presentation to the FORREX annual general meeting and conference "The Art and Science of Sustainable Management," September 28, 2006. It draws on the author's experiences in providing support to the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound (1994-1996) and the Coast Information Team (2002-2004).

The first step in managing for science is to clarify the type of scientific product we want. Is it:

- new knowledge, such as that generated by research on topics where we have little information;
- expert opinion;
- the application of existing knowledge to a new or specific location;
- the integration of information from several scientific disciplines;
- the integration of western science with indigenous and local knowledge; or
- a synthesis of what is known on a particular topic at a given level of confidence?

We must be clear about the type of scientific product we want, and how we intend to use it

We must also clarify the reasons we want "the science," and how we intend to use it. Are we looking for a scientifically based answer to a particular problem? Is the scientific information one of several inputs that will be considered in making or negotiating a decision? Is it to develop new policies (e.g., thresholds for ecosystem-based management)? To improve our practices (operational trials)? Or is it to justify an unpopular decision?

The type of science desired, and how we plan to use it, greatly influence the timeline and budget, and, ultimately, the structures and processes we put in place to develop the science.

What We Have Learned

We can learn much about the components of successful structures and processes by reviewing some of the models that have been used to deliver science in support of land and resource planning in British Columbia. Two of these deserve particular mention.

The Clayoquot Scientific Panel and Coast Information Team experiences offer insights into how governance and management structures affect the type of science that is delivered

Scientific Panel for Sustainable Forest Practices in Clayoquot Sound[2]

The Scientific Panel for Sustainable Forest Practices in Clayoquot Sound introduced the notion of "independent science" to issues of land use and resource management planning in British Columbia.

This international Panel was initiated in 1993 by then Premier Mike Harcourt to seek an end to the blockades that characterized resource development in the area. The Panel's mandate was "to develop world-class sustainable forest practices for Clayoquot Sound's unique characteristics, based on the best scientific knowledge available."

[2] Reports of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound can be downloaded from http://www.cortex.ca/dow-cla.html.

The Panel of 19 included 15 scientists representing a range of disciplines, and four First Nations elders from Clayoquot Sound. Panel members were independent of government, industry, and environmental non-government organizations (ENGOs).

The Clayoquot Scientific Panel included 15 scientists and 4 First Nations elders

The Clayoquot Scientific Panel model was fairly straightforward — the provincial government invited scientists who were acknowledged authorities in their fields, and First Nations elders whose families had lived in Clayoquot Sound for millennia. The Panel was given clear terms of reference, few constraints, and set loose under the guidance of co-chairs Dr. Fred Bunnell, of the Centre for Applied Conservation Biology at UBC, and hereditary chief Dr. Richard Atleo.

The first activity of the Panel was to develop a protocol by which it would reach decisions that reflected the Nuu-Chah-Nulth approach to group processes. The protocol was characterized by respect for one another, for different values, and for data founded both in science and "lived experience." The Panel next defined nine principles to guide its work. These were based on a commitment to the management of forest ecosystems for their long-term health and for a mix of resource values and products.

In May 1995, 18 months after its inception, the Panel submitted its three-volume final report. Government accepted the more than 120 recommendations on forest practices and First Nations issues.

Key learnings from our experience with the Clayoquot Scientific Panel model included:

- The importance of vision and clear terms of reference.
- The effectiveness of strong scientific leadership from co-chairs representing western science and indigenous knowledge.
- The utility of a Panel-developed protocol and guiding principles that members could fall back on when struggling with specific issues or situations.
- It is possible to integrate broad scientific expertise (conservation biology, ecology, engineering, ethnobotany, forestry, hydrology, geomorphology, soils and terrain stability, etc.) with deep traditional knowledge based on occupancy (four First Nations elders).
- Independence from the political stakeholder environment enabled the science to be free from the influence of social values—that is, the science was integrated by the experts, rather than negotiated by stakeholders.
- It was possible to deliver a solid scientific product within a reasonable timeframe by applying and integrating expert knowledge of the history and ecosystems of Clayoquot Sound—that is, the Panel undertook no new research.

The Panel applied and integrated scientific and expert knowledge, but undertook no new research

Coast Information Team[3]

Seven years after Clayoquot, the Coast Information Team (CIT) was established in January 2002 to bring together the best available scientific, traditional, and local knowledge to develop independent information and analyses in support of ecosystem-based management (EBM) in the north and central coasts and Haida Gwaii.

The CIT undertook 10 distinct scientific studies that included new applications and relatively new methodologies

This information was to be provided to the Central and North Coast subregional land and resource management plan (LRMP) tables and the several First Nations land use plan (LUP) tables to assist them in developing practical recommendations to resolve land use and natural resource management issues.

The CIT governance model consisted of a management committee, executive director, secretariat, and project leaders for 10 distinct scientific studies and an arms-length peer review process. The management committee included representatives from local First Nations; local communities; the forest industry partners in the Coast Forest Conservation Initiative (CFCI), the provincial government (primarily the then Ministry of Forests and Ministry of Sustainable Resource Management); and partnering ENGOs in the Rainforest Solutions Project.

The management committee approved terms of reference, schedules, and budgets for 16 contract project teams that undertook analyses and developed recommendations related to ecosystem-based management; ecosystem, cultural, and economic gain scenarios; and community wellbeing. Analyses were peer reviewed and delivered to the management committee and the land use planning tables as they were completed.

The CIT was a complex and ambitious undertaking. Several of the analyses had not been done previously in BC, and some represented the application of relatively new methodologies. Not all components were delivered when the CIT concluded in October 2004.

We learned a great deal about managing for science in our experience with the CIT. So much, that I wrote a report with recommendations on processes and structures for creating conditions for success in similar projects.[4] I will highlight only a few examples by major category here, and refer you to the report for more.

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[3] Information on the CIT can be found at http://www.cortex.ca/pro-cit.html and http://www.citbc.org

[4] Hadley, M.J. 2004. CIT experience: Recommendations on processes and structures for success. Available from http://www.cortex.ca/pro-cit.html

Structuring for Scientific Products

The importance of structure in the delivery of science to support land and resource management planning cannot be overemphasized.

Detailed planning is key to ensuring that you get the type of science you need, when you need it

At the outset, ensure consensus (signed by clients and stakeholders) on project scope, inputs, and deliverables. Focus analysis at the appropriate spatial scale to meet client needs. Limit complexity and the amount of innovation in consideration of budget, timetable, availability of data, and expertise. Assess and manage risk—in particular, establish data acquisition and distribution as an independent component of the program with clear milestones and adequate resources. Define integration requirements (common landbase categories, input data specifications, output product standards) for component projects before deciding on methodologies. Implement a change control process.

Finances

Complete fundraising before projects begin. Create one fund for program disbursements. Do not allow funders to target specific projects.

Governance

Ensure that Steering Committee members have skills and expertise suited to the program and commit to actively participate for its duration. Where "independent science" is an objective, separate the political (multi-stakeholder, funding partner) aspects from the scientific and technical aspects of the program. Retain a scientific leader with exceptional qualifications to advise the Steering Committee on scientific content and guide the work of project teams. Where subject matter is extensive, establish a standing scientific advisory committee to guide the Steering Committee and scientific leader. Follow established project management principles and processes.

Include local and First Nations expertise on project teams to "ground truth" projects, build understanding and capacity, and assist in interpretation of project outputs to stakeholders. Allocate resources to build, launch, and support teams and project integration.

Incorporate two types of peer review: internal program review by a scientific advisory committee to advise on issues such as appropriate scale, planning unit boundaries, and project integration; and external review of project outputs by reviewers selected by an independent peer review chair.

Communications

Develop a communications plan at the outset and communicate continuously and appropriately with all parties.

What We Need

We can gain three "big picture" lessons from our experiences in managing for science:

1. Good science isn't good enough—the success of "science" in land use and resource management is often not about the quality of the science, but the appropriateness of the science to the task at hand.
2. We must specify the type of science required consistent with our needs, timetable, budget, and available data.
3. We must rigorously manage the process by which we develop and deliver the science so that it is timely and appropriate for its intended use.

How do we accomplish this?

The extent to which science can inform land use and resource management planning depends on it being timely and appropriate

How To Manage For Science

First, we need clear agreement on who the science is for and how we will use it; the kind of "science" or other information we need; working constraints (time, budget, data, resources); and the roles and responsibilities of parties involved in developing the scientific products, including data holders, managers, and contractors.

Second, we need to design and implement appropriate structures and processes to develop the science, including: governance; change control; funding; and data acquisition, use, and storage. This includes explicitly addressing the scientific independence of contractors and peer reviewers, and the integration of datasets, scientific methodologies, and analyses.

Third, we need rigorous project management that includes managing expectations and changes in scope, assessing and managing risk, procuring appropriate resources, assessing progress (against workplans, timelines, budgets), implementing quality assurance, and maintaining project documentation (project plan, estimates, actuals, lessons learned).

Last but no where near least, we need relentless communication from project conception through initiation, execution, and closure. To be effective, our communications must be in a form, at a level, and with a frequency appropriate to the roles and relationships (internally) or interests and needs (externally) of each audience.

In summary, to use science effectively in supporting sustainable resource management planning, we must be clear about the type of science we need, the way we intend to use it, and the resources we have to develop it. In so doing, we can create an effective framework to manage for science.

To manage for science we must be clear about:

- **what we need**
- **how we intend to use it**
- **the resources available to develop it**
- **when it is required**