Aspirational Goals and Incremental Tools:

Does forecasting exclude other frameworks for strategic planning?

Gregory Hill, University of Portland, Institute for Culture and Ecology
Michael Monticino, University of North Texas
Eric T. Jones, Institute for Culture and Ecology
Steven Kolmes, University of Portland
Rebecca McLain, Institute for Culture and Ecology

Abstract. *In this paper, we explore how modeling tools used in the multi-stakeholder process for salmon recovery in the Columbia River basin implicitly frame strategic planning so as to exclude other perspectives such as backcasting and the Precautionary Principle.*

Introduction. In the Columbia River basin, a complex multi-stakeholder process is underway to plan for the restoration of endangered runs of native salmonids. Driving the multi-stakeholder process are the thirteen runs of endangered or threatened species of salmon and steelhead and the mandate from the Endangered Species Act to plan for, and achieve, their recovery. Stakeholders from a wide range of backgrounds are confronted with the complex biology of salmon recovery, an area of science fraught with uncertainties. In choosing among the many possible recovery actions (dam removal, habitat restoration, hatchery reform, fishing regulation) stakeholders must balance a vast array of ecological, economic, and cultural factors, as well as the uncertain science. Decision support systems (DSS) and modeling tools designed to deal with this scientific complexity are a pervasive component of the planning process.

The increasing use of DSS tools in environmental decision-making raises a number of questions that merit critical study: How are these technical tools influencing decision-making processes and what is the effect on the breadth of public participation? When a computer-based decision support system arrives at the table, which stakeholders have their voice amplified and which have their voice diminished? In which scenarios do these tools promote equity among the various stakeholders? In which do they reinforce existing power differentials? Do these tools impose an implicit, unexamined, frame on the process? Although a great deal of technical research has gone into the creation of DSS tools for natural resource problem solving, these critical questions remain unanswered and largely unstudied. It is widely acknowledged that public participation is crucial to effective and long-lasting solutions to environmental problems. So, it is important to understand how the use of DSS tools affects collaborative problem-solving.

Background. The Institute for Culture and Ecology, located in Portland, Oregon, recently was awarded a National Science Foundation grant to use qualitative and quantitative methods to address the above questions by investigating the salmon recovery process in the Columbia River basin. Using a mixed-method design, the 24-month exploratory phase of the project begins with a rapid ethnographic assessment. This will be followed by the wide-scale distribution of a survey instrument informed by the ethnographic findings, and then statistical analysis of the survey results will be performed.

Rapid ethnographic assessment (REA) is a social science technique used to quickly identify key informants, circumstances, issues and processes within a cultural system or around an event (e.g., salmon

recovery in the Columbia Basin). It uses many of the same methods of traditional ethnography, but takes place in a timeframe of weeks or months instead of years. RAE trades the in-depth, nuanced understandings obtained through long term ethnographic work for a quick and general introduction. It is an appropriate approach for exploratory research phases, such as our application, to help determine items to include in broadly disseminated survey instruments (Trotter and Schensul 1998).

Our research goes beyond previous work in this field which has focused on case studies involving one or two factors related to participation (breadth, quality, or equity in participation) and thus has not attempted to understand interactions among the factors across multiple sites. Rapid ethnographic assessments will be conducted in three of 47 subbasins that developed subbasin management plans as part of the Northwest Power Planning Council's efforts to expand local capacity for salmon recovery during the early 2000s. These assessments will provide a detailed and contextualized understanding of which decision support tools were used, how they were used, and how their presence affected the ability and willingness of different types of stakeholders to participate in salmon recovery planning. The basin-wide survey will examine differences across the 47 subbasins in how the use of DSS influenced breadth, quality, and equity of participation. Statistical analysis of the survey results will be conducted to quantify how DSS choices affect the breadth and quality of public participation in the planning process. For example, we will measure the degree of interaction between DSS choice and the empowerment perceived by stakeholder groups (perception will be measured through survey responses). The planned analysis will be an important contribution to quantifying the effect of DSS tools on environmental planning processes; as such analyses are rare or non-existent.

Findings from this study will serve as the foundation for a long-term applied research project aimed at developing decisions support tools and associated planning processes that facilitate more expansive and meaningful stakeholder participation in natural resource management situations characterized by uncertainty, high risk and competing values.

Preliminary Results. Our analyses to-date of the subbasin planning documents together with preliminary key informant interviews conducted in spring 2008 lead us to conjecture that the culture of standard modeling approaches used in DSS tools implicitly imposes a forecasting frame for strategic planning in the multi-stakeholder process and that other frames for strategic planning are excluded. In particular, traditional DSS forecasting methodologies lead to a perception that mitigation scenarios which differ significantly from "business as usual" have greater risk than scenarios more aligned with current practices. This perception exists apart from any formal risk assessment and hinders a full exploration of mitigation strategies.

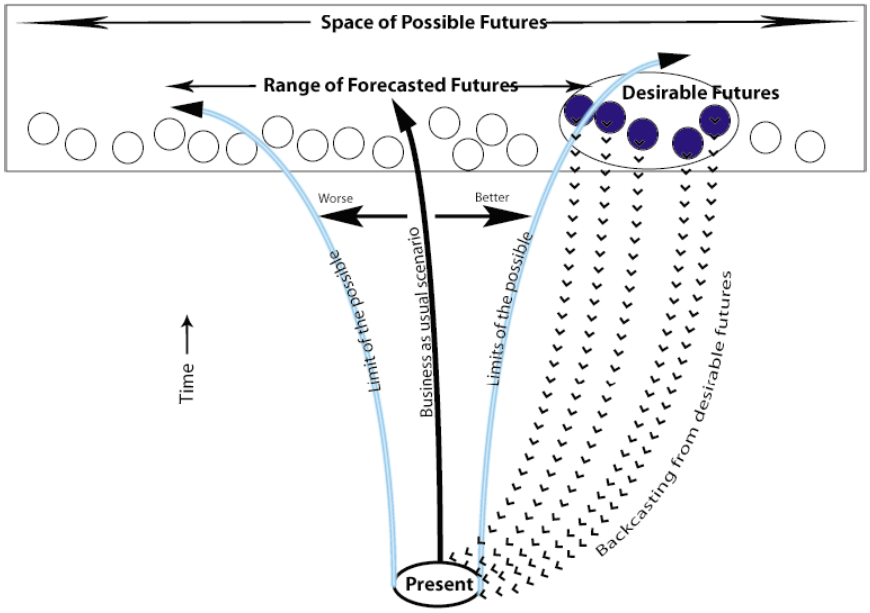
Using methods rooted in the culture of analytical modeling, forecasting is a standard framework for exploring the effect of policy scenarios on future states. This modeling culture looks temporally forward, beginning with causes then proceeding to outcomes. Typically, models are built from a small range of values for the explanatory variables. Modelers following best-practices are hesitant to extrapolate far from the data design set when exploring alternative policy scenarios. While this is good practice from a modeling perspective, it discourages exploration of substantial departures from status-quo, even when such departures may offer the only opportunities of achieving long-term aspirational goals. This framework promotes a disciplined approach of representing the mechanisms moving from cause to effect, an approach that serves science well. However, the approach and associated focus on incremental variations from existing data (status quo) limits policy discussions to "the path" and not to the ultimate destination. Many of us (including the authors of this paper) were educated in this culture and work inside this paradigm. Overall, disciplined analytic modeling encourages sound, data-based policy decisions. However, in the context of a participatory public process, this modeling culture combined with the extra

legitimacy inferred from computer-based DSS's, discourages full participation of stakeholders with more aspirational viewpoints and thus limits consideration of a full range of policy alternatives.

Backcasting is the name given by Robinson (1982) to describe a method of analyzing future options in which the concern lies "not with what futures are likely to happen, but with how desirable futures can be attained. It is thus explicitly normative, involving working backwards from a particular desirable future end-point to the present in order to determine the physical feasibility of that future and what policy measures would be required to reach that point" (Robinson, 1990). Thus, backcasting contrasts with forecasting by the adoption of an explicit focus on desired outcomes as opposed to an emphasis on the process of modeling cause and effect.

Backcasting has been used most often in planning scenarios requiring a substantial revisioning of the current state of affairs to achieve "desirable futures" that accommodate a particular goal. Robinson credits Amory Lovins with developing backcasting as a planning tool in his work on "soft energy paths" and the method continues to be used in sustainability planning. The "Natural Step" method for sustainability planning, developed by Karl Henrik Robert, uses "backcasting from principles" as its main method for breaking from familiar practices and moving to a different paradigm. In these and other examples, backcasting is a method that accommodates aspirational goals, often ones derived from deeply held beliefs and concerns.

Figure 1. Backcasting and Forecasting Planning Modalities



Such aspirational goals are not hard to find in the planning arena for recovery of endangered runs of wild salmon in the Columbia River basin.. In a document composed by the Catholic bishops of the Columbia River watershed, "The Columbia River Watershed: Caring for Creation and the Common Good" (Catholic Bishops, 2001), ethical and spiritual beliefs are brought to bear to describe the "Rivers of Our Vision." The "Salmon Nation" concept, promoted by the Portland, Oregon based non-profit Ecotrust, describes "a community of caretakers and citizens that stretches across arbitrary boundaries and bridges urban-rural divides", in their vision of a future that accommodates recovery of wild salmon stocks. The Endangered Species Act (United States, 1973) itself, rather than promoting an incremental approach to

the preservation of species, has as its stated purpose "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." The 2003 book "Salmon 2100: The Future of Wild Salmon" (Lackey et al, 2006) can be viewed as a collection of twenty-three visions, each by separate authors, of futures that support the recovery of wild stocks of anadromous Columbia River fish.

The stated goal of the National Oceanographic and Atmospheric Administration, the federal agency charged with fulfilling the mandate of the ESA in this case, is to reduce the risk of extinction for the evolutionary significant units of the listed species to below 5% over the next 100 years. This goal contrasts sharply with the goals from the previous examples which posit a vision of a future state that supports healthy runs of wild salmon. The former is well-suited to the incremental change methodologies inherent in the forecasting framework. Indeed, the main DSS tools used by NOAA are built around traditional forecasting models. Our research examines the degree to which such goal statements are influenced by the collection of tools in use.

Several of our ethnographic informants have demonstrated a backcasting point of view. For example, one subject while discussing his experiences with modeling complained that the modelers "get lost in the weeds." The situation in question concerned modeling mortality rates for migrating salmon as they pass the hydroelectric dams both upstream and downstream. In the view of this subject, the differences between the various methods of moving salmon past the dams are irrelevant. In his words "none of them get us where we need to go." The future state he had in mind was one resembling a "river of the past" in which the four hydroelectric dams on the lower Snake River had been breached.

Other stakeholders have invoked the Precautionary Principle as a guiding framework. As adopted in 1992 by the UN Conference on the Environment and Development, the Precautionary Principle holds that in situations of high risk for serious and irreversible damage, lack of certainty should not be used to justify delayed action. According to a recent paper (von Krauss et al, 2005), the following list of conditions are applicable in order to invoke the principle:

- There are major uncertainties;
- There is some evidence and a science-based scenario of possible harm;
- The potential harm is significant, difficult to contain and possibly irreversible;
- The potential harm relates to an important value, e.g. human or environmental health;
- Uncertainties cannot be significantly reduced in the near future without thereby increasing the chances for the harm to occur and/or without making the control of the harm more difficult.

The circumstances of salmon recovery in the Columbia Basin constitute a remarkably good fit to these criteria.

Our preliminary analyses also suggest that the prevailing ways in which decision support and modeling are used excludes the framework of the Precautionary Principle from consideration in planning for salmon recovery. There are several possible reasons for this. In so far as modeling drives support of a forecasting frame for planning, it serves to privilege the "business as usual" scenario as mentioned above. A likely result of this special status is that the status quo is not treated as a "proposed action" and thus is not even eligible for evaluation by the Precautionary Principle. Typical forecasting approaches also de-emphasize uncertainty associated with the status quo scenario. Questions of unintended consequences and uncertainty of outcomes are focused upon scenarios that differ from status quo, while there is the implicit assumption that long-term consequences of continuing with current practices, or slight variations, can be projected with a high degree of certainty. Indeed the main modeling tool used in the subbasin planning process does not report out, or even calculate, uncertainties. In a recent stakeholder meeting, questions arose about the role of global climate change as it might impact the modeling results. The modelers had

not included global climate change predictions in their work. Do the uncertainties associated with global climate change make its inclusion in modeling suspect, but the uncertainties associated with a more status quo scenario do not need to be reported? If these uncertainties were included in the planning modeling, the case for invoking the Precautionary Principle would be strengthened. Toward this end, our study seeks to help reframe the concept of multi-stakeholder deliberation such that it can more readily accommodate multiple analytical approaches, including, but not limited to modeling.

Bibliography

Trotter, R.T., Schensul, J.J. 1998. "Methods in applied anthropology." In Bernard, H.R. (ed.). Handbook of methods in cultural anthropology. AltaMira Press: Walnut Creek, CA. pp. 717-718.

Lackey, R. T., D. Lach, et al. (2006). Salmon 2100: The future of wild Pacific salmon, American Fisheries Society.

Catholic Bishops of the Pacific Northwest (2001). The Columbia River watershed: Caring for creation and the common good.

Robinson, J. (1982). "Energy backcasting: a proposed method of policy analysis." Energy Policy **10**(4): 337-344.

Robinson, J. (1990). "Futures under glass: a recipe for people who hate to predict." Futures **22**(8): 820-842.

United States (1973). "The Endangered Species Act of 1973."

von Krauss, M., M. B. van Asselt, et al. (2005). "Uncertainty and precaution in environmental management." Water Science Technology **52**(6): 1-9.