Designing Enviromental Planning Strategies that Intergrate Stakeholder Beliefs and Scientific Models: A Case Study of Lake Lanier

Sarah Coffin
Georgia Institute of Technology
204 Old Architecture, Atlanta,
GA 30332-0155 USA
Tel.: +1 404-894-6489
Fax.: +1 404-894-1628
E-Mail.: sarah.coffin@arch.gatech.edu

Introduction

Integrated assessment modeling (IAM) is a method for handling complex issues, integrating information from various scientific disciplines and stakeholders, such that decision-makers are informed of the science as well as the stakeholder interests (van Asselt and Rotmans, 1995). It was popularized as the method for studying the impacts of global climate change on various environmental factors such as agricultural production. The focus of IAM is on process, with integration among disciplines and stakeholders, offering solutions that otherwise would have been ignored by a study with singular focus, for example climatology (Rotmans et. al., 1997). While typically focusing on the larger issues associated with global change, we find the IAM exercise offers lessons in integrating multiple disciplines and community interests in studying the impacts of the environmental issues associated with planning. We have applied IAM to the issue of water quality, focusing on the effects of various determinants on the water quality of a rapidly urbanizing watershed.

Lake Sidney Lanier was created in 1956 as one of the US Army Corps of Engineers projects designed to manage water flow and supply, river navigation, and to provide additional power supply to the rural regions in the Southeastern section of the US. The project involved construction of the Buford Dam, which impounded stream flow from the Chattahoochee River, just south of where it is joined by the Chestatee River. Originally intended to serve rural communities, Lake Lanier is now considered part of the rapidly growing Metro Atlanta, Georgia Region of the US, providing additional important economic development opportunities such as

recreation and tourism. As a multi-use reservoir, the lake provides recreation, water supply, electrical supply, navigation,and flood control. In 1991, Lake Lanier was the most frequently visited of the Army Corps lakes in the US. Given the region's rapidly developing urbanization, the Lake Lanier watershed is facing increasing pressure to make wise land-use decisions, thus bringing more focused attention to the area (Hatcher, et. al., 1994; Beck, et. al., 1998; Kundell, et. al, 1998; Limno-Tech, inc., 1998).

This proposed research focuses on the role of stakeholder involvement in water resources decision-making. It builds upon a methodology developed for integrating stakeholder beliefs and preferences with scientific modeling of lake ecosystem processes, and is part of a larger study involving the application of integrated assessment models to water resource management1. Through a detailed case study of Lake Lanier, we will explore the benefits of stakeholder involvement in management of an impounded water source facing rapidly urbanizing development pressures. We will study the various stakeholder and decision-making groups, surveying participants as to their involvement, hopes, and concerns for the lake watershed, identifying four different planning strategies - means, ends, scenarios, and targeted scenarios. We will examine the strengths and weaknesses of each strategy, paying particular attention to the inclusion of local community values into this modeling framework. We believe that incorporating a community vision allows for a more place-based approach in the decision-making process (Norton and Steinemann, forthcoming; Holling, 1978, Gunderson et. al, 1995; Lee, 1993). And, this sort of forward thinking, when coupled with a sound scientific understanding of the performance of ecosystem processes, provides timely and important scientific information that is necessary for lake watershed development in accordance with environmental guidelines.

Rationale for Proposed Research

The future state of the community and surrounding environment depends on the land use practices in the area. Local land use and environmental decisions are made for any number of reasons, often forced by the most expedient or influential needs. Effective decision-making, however, needs to rely on place-based citizen participation regarding a community vision of the future, much like the adaptive ecosystem management practices described by Holling (1978), Lee

(1993), and Gunderson, et. al. (1995). In this research, we identify four types of management/planning strategies for the interaction between society's value-based vision and scientific information. The four strategies are means, ends, scenarios, and targeted scenarios. Each of these practices involves varying degrees of science and/or citizen involvement and we explore the strengths and weaknesses of each approach relative to examples found in Lake Lanier. To further understand the approaches to decision-making, we chose the case study method to examine the roles of various stakeholder groups affiliated with Lake Lanier. The groups we are studying have been operating both collectively and individually in addressing growth and development pressures affecting the water quality of Lake Lanier. Interestingly, two groups in particular are actively seeking scientific understanding of lake ecosystem processes yet seem to be doing so for different purposes, thus we feel that they will make for an excellent case study. For the purposes of this immediate research exploring the role that citizen involvement plays in environmental decision-making, we opted for a combination of open and close ended questions distributed via a mail survey to a representative sample of stakeholders within the Lake Lanier watershed. Through our work, thus far, we have established some initial understanding of how groups approach management of the watershed and view the relationship between citizens and decision-makers. The role of the decision-maker depends on the levels or absence of interaction between the science, the decision-maker, and the stakeholder. We believe that the process of interaction is iterative yielding a triangular relationship among the three entities.

Stakeholder Scientist

Each of four the planning approaches mentioned earlier focuses on the interaction described in a slightly different way:

- The means-based approach emphasizes method over results and has a low input of social vision or scientific information. This style of management is rational but bounded by perceived limits to capabilities. The decision-maker reacts to immediate problems with short-term solutions. It is akin to the bounded rationality model of policy development described by Charles Lindblom (1959) as 'the science of muddling through.' This approach rarely results in a future collective vision and is reactionary to citizen complaints and political pressures. Typical examples associated with Lake Lanier seem to involve the planning practices of

individual local governments. Their obvious objective is to secure a strong local planning strategy that benefits their immediate community.

- The ends-based approach requires strong social organization to agree upon a common vision and a moderate amount of scientific information. As stated by advocacy planner, Norman Krumholz, there is not one, but a multiplicity of public interests, and we need to plan for this collective of individuals as we would for ourselves. Thus, this illustrates the nature of an ends-based approach as uniquely activists focused (Krumholz, 1982). Other planners argue from this perspective that those in opposition to decided management plans should prepare one of their own (Davidoff, 1965). This approach is citizen-based but often divisive, lacking integration with science and decision-makers.
- The scenario-based approach has minimal social consensus building and high dependence on scientific information. It is also rationalist in nature, utilizing a top-down planning process, however, the focus is on information rather than process. The scenarios offer comprehensive information regarding various scenarios, providing planners and decision makers with results based on scientific data, yet without much input from the community. The planner serves as technocrat, providing decision-makers with a high degree of control. Followers of this approach argue that there are no alternatives to rationalism, stating that it is fundamental to all other decision-making processes (Faludi, 1987). This approach is typical in most local government agencies.

  Data is collected that is typically absent citizen involvement and analyzed in isolation of the problem, water quality in this case. This sort of approach is what creates controversy among citizens as they feel left out of the planning process.

- The targeted scenario-based approach appears to have the most potential for sound watershed management because it integrates social and scientific knowledge. It utilizes the concept of social learning whereby the scientific community and the stakeholders (both citizens and decision makers) inform each other, yielding outcomes that are community-based, and perhaps more readily accepted and successfully implemented. The process involves change agents that provide a learning loop, integrating knowledge from both the citizens and the scientific community, such that decision-makers and citizens arrive at mutually agreed upon outcomes

(Schon, 1983; Friedmann, 1987). We feel that this multidisciplinary approach is beneficial because it promotes collaboration among scientists and decision makers and stakeholders.

Conclusion

We have found evidence of each of the four approaches to watershed management associated with Lake Lanier and feel that the targeted scenarios approach offers the best prospect for a sustainable future in the Lake Lanier watershed. Targeted scenarios offer an integrated look at the present and yield a more sound watershed management strategy that is inclusive of both long and short term goals that are shared by the citizens and the decision-makers. Our contribution to the process comes through combining citizen hopes and concerns with current science of the Lake Lanier ecosystem. The interface between science and society comes about because the users (society) are choosing future targets to which we (the scientists) project. The future opportunities and constraints offered from this landscape, however, are largely the result of present social, not scientific decisions. Therefore, it is crucial to distinguish between which issues are social, which are scientific, and to understand the relationship between the two. To this effect, it becomes increasingly important to understand the multi scalar issues associated with individuals and communities such that individual values and preferences are linked with science and lake management relative to an integrated assessment model of lake water quality. Such iterative management practices have the potential to ultimately yield sustainable outcomes that will be shared by the community and the decision makers, not only in the present, but for generations yet to come.

Literature:

Beck, M.B., T. C. Rasmussen, B. C. Patten, K. G. Porter, B. Norton, and A. Shepherd, 1998. *Community values and the long-term ecological integrity of rapidly urbanizing watersheds*. In: Proceedings 1998 Water and Watersheds Program Review, January 28-29,Corvallis, OR.

Davidoff, p. 1965, *Advocacy and Pluralism in Planning*. The Journal of the American Institute of Planners. 31:4.

Fath, B., S. Coffin, M.B. Beck, B.G. Norton, and A. Steinemann. 1999. *Integrating Community Values into Scientific Models*. In: Proceedings of the 1999 Georgia Water Resources Conference, held March 30-31,1999, at the University of Georgia. K. J. Hatcher, editor, Institute Ecology, The University of Georgia, Athens, Georgia.

Faludi, A. 1987 *A Decision-Centered View of Environmental Planning*. Oxford, England: Pergomon Press.

Friedmann, J. 1987 *Planning in the Public Domain: From Knowledge to Action*. New Jersey: Princeton University Press.

Gunderson, L. H., C.S. Holling, and S. S. Light., editors, 1995. *«Barriers and bridges to the renewal of ecosystems and institutions.»* Columbia University Press, New York, NY.

Hatcher, K.J. M.A. Callaham, M.A. Nearing, O. Pancorbo, B.C. Patten, L.F. Rogers, J. sellers, and M.J. Van Den Avyle, 1994. *Diagnostic/Feasibility study of Lake Sidney Lanier, Georgia.* Prepared for Georgia Environmental Protection Division under the U.S.

Environmental Protection Agencies Clean Lakes Program.

Holling, C.S., editor, 1978. *Adaptive environmental assessment and management.* John Wiley & Sons. New York, NY.

Krumholz, N. 1982. *A Retrospective View of Equity Planning: Cleveland, 1969-1979.* The Journal of the American Planning Association. 48:4.

Kundell et al., 1998. *Diagnostic/Feasibility study of Lake Sidney Lanier, Georgia.* Prepared for Georgia Environmental Protection Division, under the U.S. Environmental Protection Agency's Clean Lakes Division

Lee, K. N., 1993. *Compass and gyroscope: integrating science and politics for the environment.* Island Press, Washington, DC.

Limno-Tech, Inc. 1998. *Development of linked watershed and water quality models for Lake Lanier.* Prepared for: Upper Chattahoochee Basin Group, Gainesville, GA.

Lindblom, C.E. 1959. *«The Science of Muddling Through,»* Public Administration Review. 19:1:79-99.

Norton, B.G., 1995. *Ecological integrity and social values: at what scale?* Ecosystem Health, 1(4): 228-241.

Norton, B.G., 1998. *Improving ecological communication: the role of ecologists in environmental policy formation.* Ecological Applications. 8(2): 350-364.

Norton, B.G., R. Costanza, R.C. Bishop, 1998. *The evolution of preferences: Why 'sovereign' preferences may not lead to sustainable policies and what to do about it*. Ecological Economics, 24: 193-211.

Norton, B.G., A. Steinemann, *Forthcoming. Environmental Values and Adaptive Management.*

Rotmans, J., H. Dowlatabadi, and E. A. Parson. 1997. *«Integrated Assessment of Climate Change: Evaluation of Methods and Strategies.»* Human Choice and Climate Change: An International Social Science Assessment. S. Rayner and E. Malone, eds. Boston: MIT Press.

Schon, D. 1983 The Reflective Practitioner: *How Professionals Think in Action.* New York: Basic Books. 1983. 21-69

van Asselt, M. B. A. and J. Rotmans. 1995. *«Uncertainty in Integrated Assessment Modelling: A Cultural Perspective-based Approach.»* RVIM-report no. 461502009. National Institure of Public Health and the Environment (RVIM), the Netherlands, Bilthoven.

1 The objective of this larger research project is to develop the prototype of a new approach to engaging both community interests and a complex (mathematical) map of the science base of Lake Lanier's ecosystem. Thus, we are exploring how shorter-term individual preferences can be reconciled with longer-term community values in regard to maintaining the integrity of an environmental system (Norton, 1995; Norton, 1998; Norton et. al., 1998). The larger project has two distinct programs of research: 1. Eliciting community values and encoding stakeholder-derived futures and 2. Developing a foodweb, sediment, and hydrological model of lake systems. The unique aspect of the larger project is that these two elements will be integrated such that the stakeholder-derived futures will be reconciled with the lake systems model yielding a model of water quality that integrates community hopes and fears with sound science and decision-making. One of the stated goals of this larger research project is to move beyond stated preference models common in environmental valuation studies today. Hence, one of the innovations we are undertaking is to articulate values that can be understood and valued over multiple scales of time and management horizons. Through evaluating values on more than one level, simultaneously, we argue that a more accurately stated preference toward environmental values can be developed that moves well beyond the traditional economic valuation framework and into a more sustaining model of growth and development for rapidly urbanizing watersheds.