MAPPING THE SOCIAL LANDSCAPE OF LAND USE DECISION MAKING IN A NEW HAMPSHIRE WATERSHED

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The New Hampshire seacoast is a mere 18 miles in length, but includes over 40 coastal watershed communities experiencing tremendous population growth and development pressure. Within this system is Great Bay, an estuary in the National Estuarine Research Reserve network and National Estuary Program. Pressures affecting the health of Great Bay are largely related to land use decisions by towns in the coastal watersheds. The communities within the Lamprey River watershed, a contributing watershed for Great Bay, are the subject of my dissertation research. Key questions include: Do towns in this watershed communicate upstream and downstream when making land use decisions? Are cumulative effects on the watershed considered while debating development proposals? The ultimate research goal is to define the existing components which could support a watershed based land use decision making framework. En route to this goal, this text outlines the process in mapping the existing social landscape of land use decision making within the towns of the Lamprey River watershed.

Background: Regional Issues

Coastal New Hampshire, like elsewhere, is suffering anthropogenic impacts from population pressures and related development. The northeastern population has swelled dramatically, increasing 52% from 1970 to 1990 (U.S. EPA, 2004). Impacts are broadly discussed in the U.S. EPA's National Coastal Condition Report (NCCR) as well as the Heinz Center's State of the Nation's Ecosystems report (Heinz Center, 2002). According to the NCCR, estuaries in this region, such as Great Bay, are among the most threatened in the country. New Hampshire's population nearly quadrupled in the two coastal counties from 1940 to 2000, and growth from 1974 is characterized by increased sprawl, impervious surfaces and larger lot rural development for single family homes (Zankel, et.al., 2006). In this state, the overall rate of population growth from 1990-2004 was 17.2% and U.S. Census figures report the current population for the two coastal counties as roughly 450,000. This population pressure has challenged land use decision making in coastal communities and threatened the ecological health and functioning of Great Bay.

Great Bay comprises the bulk of New Hampshire's coastal estuarine system. It is one of the largest estuaries on the east coast, with 370 km of sensitive inland tidal shoreline. This drowned river valley is a tidally dominated estuary with dramatic tidal flow, exposing over half of the sediment as mudflats at low tide. Significant habitats include eelgrass meadows, salt marsh, channel bottoms and rocky intertidal. Impacts due to population pressure and development have resulted in degraded and lost habitat (especially wetlands), decreased

biodiversity and the loss of many species such as anadromous fish. Growth-related impacts are evident in the indicators measuring the health of the estuary. All six contributing watersheds are under increasing population pressure and impervious surface areas are added each year to Great Bay's watershed at an average rate of 1185 acres (NHEP, 2006). In 2005, this trend was exhibited in all but one of the 42 coastal communities.

Great Bay is designated as a site in both EPA's National Estuary Program (NHEP) and NOAA's National Estuarine Research Reserve system. The NHEP was established with the goal of safeguarding environmental quality by identifying, abating, and preventing non-point source pollution in New Hampshire's estuaries. Great Bay's NERR program (GBNERR) was established to promote management thorough stewardship, education and scientific understanding, with a key focus on land use. Both programs have outreach and education initiatives with efforts directed at the watershed scale. GBNERR's needs assessment (GBNERR, 2004) emphasizes studies of impervious surface area, management strategies and cumulative impact of local land use planning decisions on Great Bay watersheds (Smith, 2004; NOAA, 2005). Although management efforts have resulted in some improvements in the indicators for Great Bay's health, impervious surface area and sprawl are not among them. In the meantime, while coastal watershed communities may not necessarily have Great Bay in mind, they are increasingly concerned with managing growth and protecting natural resources within their own communities (Peterson, 2006).

Research Question and Grounded Theory

Strategies for Great Bay coastal management call for further efforts within coastal watersheds, specifically related to growth, development and land use planning. What constitutes a potential framework for watershed based land use decision making? My research seeks to answer this question, by defining the existing components which could support or impede a watershed approach. This text outlines the methods involved for initially mapping or characterizing the social landscape of current land use decision making within the towns of one of Great Bay's watersheds. This methodology will help to build a framework of the understanding, communication network, cooperation potential, and limitations for developing watershed based land use decision making.

The methodology for this research is a grounded theory approach with mixed qualitative methods following the modern constructivist practice (Charmaz, 2006; Schram, 2006). Grounded theory is often best used when trying to understand a process. It is a well established social science technique used to develop a substantive theory or framework which emerges during rigorous analysis, and is both derived from and grounded in data (Glaser and Strauss, 1967; Strauss and Corbin 1998). It consists of a set of flexible tools, which in this case consists of semi-structured interviews and map biographies. Grounded theory is characterized by simultaneous data collection and analysis, the pursuit of themes, the construction of abstract categories that describe social processes,

and the integration of such categories into a theoretical framework. The constructed theoretical framework, in this case, is the social landscape of land use decision-making within one of Great Bay's watersheds.

In a grounded theory study, several critical definitions are needed to describe the case, outline the research overall, direct the formation of interview questions and identify knowledge sought. The Lamprey River watershed was chosen as the case after consultation with local experts. It is one of the six major contributing watersheds to Great Bay and is characterized by a range of natural and cultural features, from dams, fish ladders and archaeological sites, to historic mills and wild and scenic designation. It also contains a great diversity of towns with unique demographic, economic and socio-political character. Active research in a variety of disciplines is focused on the Lamprey River watershed and it was recently recognized as an unofficial research unit at the University of New Hampshire. Theoretically, this study is bounded physically by the watershed and socio-culturally by the fourteen towns within it and their respective public decision making bodies. The units of analysis, or key concepts used to approach the research question and develop the interview questions, include resource inventorying, watershed communication and connections, and policy adoption and implementation.

Data Collection and Analysis

Prior to collecting primary data, it is necessary to become familiar with the towns and land use decision making characteristics. To do this, a database was constructed of federal, state, NGOs and other organizations and a series of meetings are underway with key experts from these groups to gather opinions and share information about this research. Another database was constructed concerning the fourteen towns of the watershed, their characteristics, key planning documents, regulations and land use decision making groups. In New Hampshire, towns can have a Planning Board, Conservation Commission, Zoning Board of Adjustment, Open Space Commission and Heritage Commission, all of which have a role in the land use decision making process. However, not all towns have all of these groups and, in fact, each town follows its own home rule form of government, so the configuration per town can be unique. To learn more about this, and become familiar with the towns and board members, attendance of weekly town meetings is a critical research activity. Also, town web sites, meeting notes and documents are being examined.

Semi-structured interviews with map biographies will serve as the instrument for primary data collection. The subjects will be drawn from each town's Planning Board, Conservation Commission and Zoning Board of Appeal, and where they exist, the Heritage Commission and Open Space Commission. The map biographies are meant to serve as a tool during the interviews for encouraging narrative and literally drawing examples from the participants' experience with the town's land use decision making process. With traditional surveys or interviews, local knowledge of the social context of a community's decision-

makers is not incorporated and the map biography method was developed as a way to address this. It specifically functions by including local knowledge within a spatial framework, which is argued to help broaden community level participation in ecosystem management (St. Martin, 2001; St. Martin and Hall-Arber, 2007).

Data collected will be coded, managed and analyzed within qualitative data analysis software. Analysis is detailed and rigorous in grounded theory studies. Emergent themes are identified, in early data analysis, which describe basic social processes inherent in the data. Abstract categories are then inductively constructed, sampled, refined and compared until a theoretical saturation is reached (Schram, 2006). The categories are then integrated into a theoretical framework, which, in this case, will describe the social landscape of land use decision making within Lamprey River watershed.

Conclusion

This text outlines an ongoing dissertation funded by a NOAA Social Science Research Fellowship. By examining the process by which towns make land use decisions, it will be possible to define the existing components which could support watershed based decision making, such as watershed master planning, should these towns choose that route. Barriers to a watershed approach can also be identified, which will help local and regional groups, and state and federal partners to allocate resources. It is this researcher's hope that the methodology produced can be replicated in adjacent watersheds, or elsewhere in communities that are exploring watershed based management and decision making.

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