



Informing Community-Relevant Research in the Northern Forest

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Preface

In October 2014, the Hubbard Brook Research Foundation organized and facilitated a Hubbard Brook Roundtable entitled “Forging a New Model of Public Engagement with Science” as part of its Forest Science Dialogues initiative, a pilot project to develop and test mechanisms for dialogue-based engagement between ecosystem scientists and public audiences. The roundtable convened a group of Hubbard Brook scientists with leaders of stakeholder groups and networks from New Hampshire, Vermont, and Maine. The group was charged with the goal of identifying areas of overlapping interest and concern between ecosystem scientists and public audiences in the Northern Forest region of the northeastern United States. Among the outcomes of the roundtable was agreement that social science should be embedded in the Forest Science Dialogues project and process. Dr. Shannon Rogers, an environmental policy specialist, volunteered to work with project leaders to aggregate existing social science resources to inform the project. The first step was a review of existing resources and data on “what people care about” in the Hubbard Brook Valley, Pemigewasset Watershed, and more broadly, the Northern Forest region. The following report presents the results of this first step and offers recommendations for future work.

Introduction

The Northern Forest stretches nearly 400 miles from New York across Vermont and New Hampshire to Maine (Northern Forest Center). It is the largest intact forest in the eastern United States, comprising 30 million acres. Supporting species of fir, pine, maple, beech, birch, and ash, the Northern Forest provides habitat for moose, black bear, Canada lynx, beaver, bald eagle, peregrine falcon, brook trout, and many other species native to the region. It is also the headwaters of major watersheds including the Hudson, Connecticut, Merrimack, and Penobscot Rivers. Northern Forest ecosystem services include biodiversity, carbon storage, and the regulation of water and air. The Northern Forest is home to more than two million people in 1,140 communities, occupying 33 counties across four states. More than 70 million Americans live within a single day’s drive of the region (Lewis et al. 2002).

This white paper was a project of the master’s-level graduate course at Plymouth State University on environmental ethics, taught by Dr. Shannon Rogers. Additional contributions were made by Sarah Garlick, Director of Science Policy & Outreach at the Hubbard Brook Research Foundation, and Shannon Rogers, Assistant Professor of Environmental Science & Policy and Ecological Economist, Plymouth State University.

Though not associated with heavy industry today, towns in Vermont and Maine once vied for the title “lumber capital of the world.” In the 19th century, rich forest resources and navigable rivers supported the growth of major timber and paper mill industries. Communities emerged around these operations which attracted job-seekers from across the country. Regional companies supplied the world with timber and paper products and owned large tracts of the Northern Forest. By the end of the 19th century, the forest’s cultural, recreational, and aesthetic values were also gaining appreciation. Grand hotels became destinations, and passenger railways made the Northern Forest a refuge for urban residents hoping to escape the noise of city life. Writers and artists including Henry David Thoreau and Thomas Cole romanticized wild lands and experiences in nature. This environmental consciousness coincided with the Northern Forest’s lowest level of forest cover due to extensive timber harvesting. Concerns for the massive loss of forest and concomitant floods, fires, and failing water quality eventually led to the passage of the Weeks Act in 1911. The White Mountain National Forest was created as a result, setting a precedent for the purchase of millions of acres of land by the federal government for preservation and management and in the interest of public benefit and enjoyment (Johnson 2006).



Today, the Northern Forest landscape and resources define community economies, cultures, and recreational activities. With more than 70 percent of Northern Forest lands privately owned, the trajectories of the region’s ecosystems and human communities are entwined. Northern Forest lands are currently managed through a range of federal, state, and community programs that incentivize and support sustainable private forestry practices. These programs ensure a balanced use of resources, enabling the region to meet the emerging needs of biomass energy markets, tourism, and high-quality wood product manufacturing, all identified as areas of opportunity for a thriving region (Northern Forest Center).

Forest Science Dialogues

Forest Science Dialogues is a two-year pilot project undertaken by the Hubbard Brook Research Foundation (HBRF) and supported by the National Science Foundation’s Division of Research on Learning. The goal of the project is to develop and test mechanisms for dialogue-based engagement between ecosystem scientists and local citizens in the rural Northeast. The project includes a series of facilitated dialogues and co-designed outcome activities and products involving scientists who participate in the Hubbard Brook Ecosystem Study and community members, decision makers, and leaders from various stakeholder groups and networks.

To launch the project, HBRF conducted a “needs assessment” to determine the areas of overlap between the interests, concerns, and perspectives of public audiences in the target region and the research interests and experiences of the ecosystem scientists who contribute to the long-term Hubbard Brook Ecosystem Study, with the intention of building the pilot project and future public engagement work around these findings. The following report is a key outcome of this needs assessment process.

Conducting a Meta-analysis and Systematic Review

A meta-analysis has been defined as “the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings” (Glass 1976). Figure 2 illustrates the systematic review concept. Both approaches summarize existing literature, and the process often involves quantitative and qualitative analyses (Walker et al. 2008).

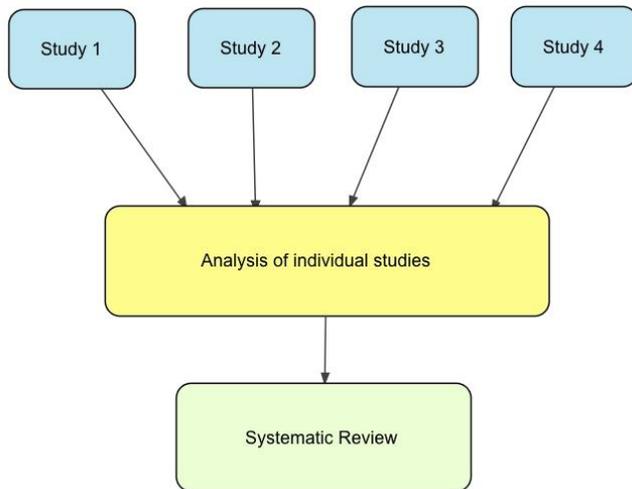


Figure 2. Systematic Review, inspired by University of Minnesota, 2011.

Reasons for conducting a meta-analysis or systematic review vary. Objectives include summarizing results from individual studies (Walker et al. 2008), assessing the quality of previous studies (Khan et al. 2003), and determining if further investigation is warranted (Walker et al. 2008).

In this particular study, efforts were made to consolidate the literature describing the values and concerns of Northern Forest inhabitants. We began by searching for work that included the key words “Northern Forest values,” “Northern Forest surveys,” and other similar combinations. In particular, we were looking for research that had included surveys or direct interaction with community members and/or stakeholders; this information is considered primary social science data. We combed through a variety of peer-reviewed journal articles, white papers, foundation reports, and a

selection of master plans. We then focused on studies that pertained to the New Hampshire/Vermont region of the Northern Forest. Through a general content analysis, we were able to identify the following themes:

1. Sense of place/rural identity
2. Land use development, including forest management practice.
3. Local agriculture and farming
4. Water quality
5. Forest management, logging, forest services, wood products, maple syrup
6. Intrinsic value & tourism

These themes are described in detail below. The intent of our analysis is to document and summarize the existing data in order to identify research data gaps. Our study also includes the development of potential questions for future investigations that will address these gaps.

Sense of Place/Rural Identity

When asked about their reasons for living in the Northern Forest, a 1990 report to Congress (Harper et al. 1990) revealed that residents tend to make the decision to live in the region even when presented with options. Many accept lower wages, have fewer job opportunities, and live with fewer amenities in order to have easy access to the outdoors, live in small communities, and raise families in these rural areas of the Northern Forest (Harper et al. 1990). Residents care about the outdoors and support forest conservation, preservation and limited development in order to protect their rural way of life (Belden Russonello & Stewart 2002).

The Northern Forest Wealth Index, published in 2000, provides detailed insight into a variety of the themes presented here. The Wealth Index takes stock of the well-being of Northern Forest Communities and includes measures of culture, economy, educational systems, and environment. “The Wealth Index presents a snapshot of the Northern Forest as a place defined by shared community, cultural, economic, educational and environmental assets. Indicators, which come from a wide variety of state and national sources, are based on county level data related to 27 Northern Forest counties” (Northern Forest Center 2000).

Regarding a sense of place and rural identity, the Wealth Index indicated that culture is based on the maintenance of cultural identity and traditions (through local historical societies); opportunities to participate in cultural events (via community arts organizations); self-reliance and resourcefulness (for example, proprietors in the work force); and personal connection with the landscape. There are greater numbers of local historical societies in all of the Northern Forest states with the exception of New Hampshire. Regionally, there are twice as many local historical societies in Northern Forest counties compared to non-Northern Forest counties. To local citizens, historical societies are a source of culture and tradition. Community arts organizations exist in higher numbers in Northern Forest regions of New York, New Hampshire, and Maine. Compared to non-Northern Forest counties, Northern Forest counties tend to support nearly double the number of community arts organizations. Northern Forest counties also have a higher number of proprietors in the work force, who often pride themselves on their self-reliance and resourcefulness. The authors of this study conclude that there is no realistic indicator to measure the personal connection with the landscape. Those living in the Northern Forest tend to maintain a personal connection with the landscape that reminds them of their place in the natural world and of their responsibility as environmental stewards (Northern Forest Center 2000).

In 2008, a sample of Northern Forest residents participated in a telephone survey designed to assess public preferences for sustainable investment strategies (Cox et al. 2010). With support from the Northeastern States Research Cooperative, the survey focused on the priorities of Northern Forest inhabitants. Relative to a sense of community and place, the following excerpt was taken directly from the survey results: “[Results] show that respondents overwhelmingly want to retain the rural character of their communities and favor economic development but not at the expense of environmental protection. Almost all of the telephone survey respondents agreed that the forest surrounding their communities was important, but largely disagreed that their livelihoods depended on forests, farms, recreation or tourism, implying that Northern Forest residents value the forest around their communities but not because their livelihoods necessarily depend on it.” Survey results indicate that 87 percent of respondents agree that a strong rural identity is important to them. Approximately 73 percent of respondents agree that social and cultural programs are a mainstay of the region. This ranks among the most agreed upon indicators, following economic development (81 percent), environmental protection (86 percent), physical infrastructure (89 percent), and human development projects (91 percent) (Cox et al. 2010).

Land Use Development, Including Forest Management

Master plans contain valuable information related to land use, including subdivision activity. Subdivision activity may be presented by year and lists the number of subdivisions, number of lots created, and boundary line adjustments made. Master plans present visions for the future based on input from residents, taxpayers, and town officials. They are typically updated every five years, and surveys often gauge public opinion on various topics. For these reasons, master plans are excellent opportunities to assess, quantify, and convey citizen values at a particular point in time. We reviewed several recent master plans of two larger communities in northern New Hampshire, Berlin and Colebrook. The following summarizes the highlights from these master-planning processes. While the scope of our project did not afford time to review additional master plans in the Northern Forest region, this would be a worthwhile focus of future research. While these examples represent two specific towns, we are comfortable stating that many themes are likely to apply broadly, throughout the Northern Forest.

“Land is a finite resource, and the thoughtful use of land is a critical issue for all communities” (City of Berlin 2010). Natural factors such as slope, soil, groundwater, and surface water vary across the landscape, and growing communities must take these factors into consideration when planning their futures.

Predictions and planning for future land use are typically included in a master plan. Current trends for the Town of Colebrook reflecting community values of both residents and visitors include:

- Growing interest in local foods
- Increasing number of people who desire to live in a friendly, walkable village in close proximity to varied outdoor recreation opportunities
- Growing awareness of New Hampshire’s landscape and clean water are critical foundations of the state’s economic base.

The master planning process provides the opportunity for citizens to have a voice in governmental planning. Local Planning Boards hold public hearings on proposed developments and provide an opportunity for the public to speak in favor or against a project. Despite the perception that few residents participate in the planning process, as part of the Berlin and Colebrook master planning processes, more than 400 people in each community submitted surveys regarding their visions for the future of the communities.

Based on a review of the master plans in these communities, which we consider a small but representative sample of the Northern Forest, particularly in New Hampshire, land uses within Northern Forest cities and towns include:

- Undeveloped: Land which lies idle. Land typically in early stages of forestation or previously used for agriculture but now abandoned.
- Forest: Land which supports tree growth and is typically greater than one-quarter acre in size.
- Agricultural: Land supporting tilled croplands, pastures, orchards, and other cultivated land.
- Residential: Land used for supporting residences, including single-family homes, multi-family dwellings, mobile homes, and seasonal homes.
- Commercial/Industrial: Land used for activities carried out for financial profit, including stores, professional offices, and manufacturing.
- Other Uses: Public (federal, state, local) lands and utility rights-of-way.

The environmental features of the Northern Forest are significant factors in the settlement of a town. For example, the town of Colebrook's farmlands comprise clean air, water bodies, agriculturally suitable soil, vast forestlands, and an attractive rural landscape (Town of Colebrook 2010). Historically, fertile agricultural soils supported a farm economy; stands of hardwoods and softwoods yielded abundant resources for logging operations and wood products industry; and abundant fish and wildlife provided hunting and fishing opportunities.

The economy and culture of Berlin also reflects its natural features, especially the Androscoggin River. Its economy has been driven by the forest products industry. Approximately 85 percent of Berlin (i.e., 33,000 acres) is covered by forestland. Most of this forestland is located in the White Mountain National Forest. "With significant portions of Berlin protected as conservation land, or covered with valuable natural resources and working landscapes, a pattern of development has developed that concentrates most activities within the Downtown area making Berlin a wonderful example of a Smart Growth community" (City of Berlin 2010).

Many towns in northern Coos County, including the city of Berlin, depend on the forest industry for jobs and as a tax base for municipal services. This continues to be true despite the closing of many paper mills. A biomass electricity plant, for example, recently replaced the Berlin paper mill. Tourism has always been important to the region and is exemplified by the Bretton Woods resort in Carroll, NH, and also by popular ski areas, including Bartlett, NH (Attitash Mountain), and Lincoln, NH (Loon Mountain).

In summary, the major themes from two town plans that we consider indicative of trends in the wider Northern Forest are: maintaining low property taxes, protecting natural resources, creating opportunities for the expansion of local businesses, and preservation of scenic beauty and recreational areas. Additional findings suggest that land use and even forest management can depend upon the community in which the planning takes place. In both communities' plans, we found a strong desire for community members to have a say in the planning process for new projects.

Local Agriculture & Farming

As in the greater New England area, Northern Forest residents are striving to produce "50 percent of clean, fair, just and accessible food for all New Englanders by 2060" (Donohue et al. 2014). In the Northern Forest between 1987 and 1997, agricultural services grew but still only represented less than one percent of jobs in 1997 (Northern Forest Center 2000). In terms of land cover, 19 percent of New York's section of the Northern Forest is agricultural land. In 2004, taxpayers in Colebrook, NH, were surveyed, and 58 percent of respondents supported town involvement in preserving working farms. Colebrook's Master Plan indicated that growth in family and community gardening, the installation of a town commercial kitchen, the creation of a nearby USDA- certified meat processing plant, and equipment-sharing would aid the growth of a healthy farming population (Town of Colebrook 2010).

The growing agricultural sector employs a variety of marketing strategies. The Northern Forest has 188 farmers markets: 92 in New York, 33 in Vermont, 15 in New Hampshire, and 48 in Maine (NH Dept. of Agriculture, Markets, and Food 2014; Maine Dept. of Agriculture 2015; Northeast Organic Farming Association of Vermont 2014; New York State Dept. of Agriculture & Markets 2015). "Farm to School" initiatives in multiple states incorporate local food into school lunch programs. Farm to table, farm to desk, and other marketing endeavors have grown in popularity. For example, the Community Loan Fund is currently running an online survey about an

initiative to incorporate local food into hospitals (Community Loan Fund). Although the Northern Forest reflects the local food trends of New England, it faces issues with distribution due to the rural nature of its landscape and communities. Coos County and Plymouth, NH, depend on local distribution systems for access to local farm produce through the winter months. For example, the North County Farmers Coop collects farm produce and delivers it to restaurants, hotels, schools, and hospitals on a 200-mile northern New Hampshire route (Robinson 2013). Another organization in New Hampshire, Local Foods Plymouth (LFP), surveyed their members and found that more than 50 percent of respondents have been using LFP for three or more years (Berg and Garvey 2013).

Why is the local food movement gaining support in the Northern Forest region? More than 55 percent of participants in the LFP survey indicated a desire to “support local farmers, keep their dollars local, get fresh food, know where their food comes from, and have personal well-being” (Berg and Garvey 2013). Along with the cherished rural character of Northern Forest farmland, one New Hampshire community desires to maintain productive farmland, fertile soils, and a healthy farm economy (Town of Colebrook 2010).

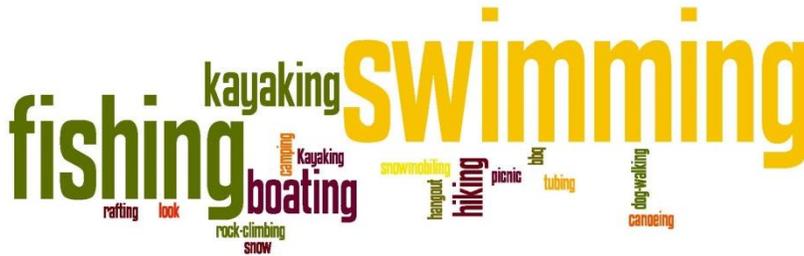
Water Quality

Although the Northern Forest has an abundance of fresh water, the quality of the water impacts residents and visitors throughout the northeastern United States, since the headwaters of the region’s major river systems are situated in the Northern Forest. Many human land uses, from both point and non-point sources, can deposit sediment and nutrients into water systems. This pollution threatens the health and well-being of organisms and ecosystems. Impaired rivers—those that are too polluted or too degraded to meet the water quality standards set by states, territories, or authorized tribes (U.S. Environmental Protection Agency)—vary significantly among the four states. New Hampshire and Vermont contain a higher percentage of impaired river miles than New York and Maine (Northern Forest Center 2000). When comparing Northern Forest regions to non-Northern Forest regions of each state for 1998, New York and New Hampshire sections have greater percentages of impaired river miles than their non-Northern Forest counterparts with the following percentages: 2.5 vs. 2.7 vs. 3. Vermont & Maine have the opposite comparison, with the Northern Forest regions having less impairment than the rest of their respective states. How do impairments impact society? All four Northern Forest states have fish consumption advisories due to elevated mercury levels in fish tissues.

When questioned about water quality, the citizens of the Northern Forest region of New Hampshire, from Plymouth north, believe that the economic stability of their community depends on clean waterways (Rogers and Farrel 2014). In fact, 67 percent are willing to pay a \$15 annual fee to de-ice roads without salt if it protects the town’s water, and 60 percent are willing to pay higher water and sewer fees to improve community waterbodies (Rogers and Farrell 2014). This work corresponds with a previous study indicating that 47 percent of Mirror Lake, NH, users would be willing to pay \$20+ annually for a de-icing product that was less harmful to water quality (Tyler et al. 2013). Respondents are also concerned with clean drinking water (70 percent), pollution levels in waterbodies (90 percent), and impacts on fish and wildlife (97 percent) (Rogers and Farrel 2014). Of the 200 respondents in the White River watershed in Vermont, 89 percent agree that a forest management plan should address water quality in streams and rivers (Hermans 2006). When Colebrook, NH, taxpayers were asked about the regulation of rivers and ponds, they were split between saying that rivers and ponds are adequately regulated (44 percent) and unsure (33 percent), with 13 percent in favor of increased regulation (Town of Colebrook 2010). Based on these studies, it’s clear that Northern Forest residents care about water quality. LoVoTECS is a citizen science network in New Hampshire, Maine, and Vermont. These volunteers maintain water-quality sensors in

local water bodies in an effort to collect long-term data and to answer their own personal questions about local water quality issues (NHEPSCoR).

How do people benefit from clean water? The following word art (created through wordle.net and used with permission from Rogers & Farrell 2014) depicts the most popular responses.



Forest Management, Logging, Forest Services, Wood Products, Maple Syrup

Rural groups in the Northern Forest consistently cited forest-related jobs and income as playing major roles in the local economies of their towns and in their personal livelihoods (Racévskis and Lupi 2006). Maple syrup, wood products, forestry, and other forest services are sources of support and pride for residents and to visitors of the Northern Forest region, as well. Several forest functions take priority according to regional surveys, focus groups, and other studies on forest-value orientations.

According to a study conducted in 2011, maple syrup is important to landowners of the Northern Forest (Farrell and Stedman 2011). This pride in maple syrup and other maple products applies also to landowners who are not producers. Agro-tourism is a growing initiative in the region as evidenced by increasing promotion and awareness of maple production through Maple Weekends (e.g. <http://www.nysmaple.com/nys-maple-weekend/>) and other initiatives.

Regionally identified wood products, especially furniture, appeal to Northern Forest residents and consumers. For example, regionally branded wood furniture draws the strongest consumer attraction compared to the other three regions of the United States (Packer et al. 2006). A 2012 survey revealed that logging companies in the Northern Forest are small and run by owners who have been in the business for 30 years or longer (Leon and Benjamin 2012). While these owners enjoy their work and the independence that it affords, they find it challenging to make a living in the logging industry. The challenges might be comparable across the region, but the harvesting systems are not. Whole-tree systems of logging are much more popular in Maine than in Vermont, while the opposite is true for tree-length systems. Despite these differences, loggers in every state agreed that weather conditions are the most important factor affecting production rates.

The concern for protecting natural habitats and ecosystems has been exceeding material needs at an increasing rate, reflecting a postindustrial society (Bengston et al. 2004). Again, balance seems to be the key among the residents of the Northern Forest. Multifunction is regarded as an important consideration of forest managers (Klein and Wolf 2007).

Intrinsic Value/Tourism

Intrinsic value is ingrained in the socio-environmental landscape of the Northern Forest. In this context, intrinsic value refers to the inherent worth in the abiotic and biotic world. It is valuing a place, just for existing—valuing the Northern Forest because it is a forest. This inherent worth is related to the emotional conventions of culture, morals, aesthetics, and spirituality. The view that forests have inherent value is prevalent among Northern Forest communities. This sentiment is not unique to the Northern Forest. There has been a marked shift in attitudes toward forests across the country (Bengston et al. 2004). This change is seen in decreasing anthropocentric views (using the forests for their instrumental value) and increasing biocentric views (in line with conservation and preservation practices or placing greater emphasis on intrinsic values). Increasing biocentric views are documented in a number of studies and surveys of Northern Forest communities. Results from a 2010 telephone survey demonstrated that county residents placed high value on the forest intrinsically, not because they believed it supported their economic livelihoods (Cox et al. 2010). The same report also found that approximately 80 percent of respondents supported funding for environmental protection (Cox et al. 2010). Similarly, in a survey conducted by Cornell University, a larger portion of respondents cited “intangible benefits” (intrinsic) versus “tangible benefits” (instrumental) (Enck and Brown 2006). In another study, 70 percent of respondents in the White River watershed in Vermont stated that they appreciate the forest for the intrinsic value of the wildlife. Intrinsic value is also recognized by local governments. The town of Colebrook, NH, includes the protection of areas of natural beauty in its Master Plan (Town of Colebrook 2010). Northern Forest communities consistently placed high value on feeling connected to the natural land around them. This includes prioritizing outdoor work (Leon and Benjamin 2012) and the cultural identity of rural peoples (Packer et al. 2006, Cox et al. 2010, Harper et al. 1990).

Intrinsic value of the Northern Forest is related to tourism and recreation. Many visitors choose the Northern Forest as a destination for scenic beauty, invoking emotion, and in some cases spiritual connection. Additionally, forests provide instrumental value for visitors in the form of recreation. Tourism and recreation represent a new economic area in a region that was traditionally driven by natural-resource extraction (Wildlands and Woodlands 2013). Tourism has the potential to significantly contribute to the economy of the Northern Forest. A survey in Vermont found that visitors spend an average of \$529 per trip (National Survey of the Vermont Visitor 2002). The creation of the Northern Forest Canoe Trail is one example of the importance of recreation in the area, drawing tourists and new revenue streams to the region every year (Pollock et al. 2007). Use of snowmobiles and ATVs are popular recreation activities, and the extensive trails in the region attract tourists year round (Anderson et al. 2005). Hiking is also a popular recreation activity. One Vermont survey found that 70 percent of respondents used forests for hiking (Hermans 2006). Northern Forest residents recognize that tourism represents a valuable resource for the area. The Northern Forest Tourism Network was established to “create models that attract, serve, and sustain visitor interest in rural locales.” Though the region has a long history of forestry as its main economic activity, Northern Forest residents recognize the importance of a balanced, multi-use approach to forests. Tourism is a viable industry and provides economic diversity to the region. Northern Forest residents recognize the need for their home to be a place where they can “live, work, and play” (Klein and Wolf 2007).

Summary/Conclusions/Recommendations

Conducting a systematic review of the primary social science data available in the Northern Forest Region around the topics of citizen and stakeholder values and concerns was an important first step to better understanding the social system of the region. While by no means an exhaustive summary of the existing data, we feel confident that the following themes characterize the region:

1. Sense of place/rural identity
2. Land use development, including forest management practices
3. Local agriculture and farming
4. Water quality
5. Forest management, logging, forest services, wood products, maple syrup
6. Intrinsic value & tourism

This investigation of the attitudes of Northern Forest communities has identified common themes across the region. Intrinsic value, though difficult to measure, was a recurring motif in the surveys analyzed for this report. It is evident that the intrinsic value of the Northern Forest is appreciated by its inhabitants and visitors. Future research could concentrate on locating data that explicitly quantifies the support of forest preservation for its intrinsic worth across the four Northern Forest states. Many studies have investigated the difference in attitudes between rural and non-rural people toward forest management. Greater emphasis on the values of Northern Forest residents would yield information pertinent to those communities in terms of future development. Additionally, studies have indicated inconsistent sentiments across the four states. A deeper look into the varying cultures could be beneficial, since attitudes common within Northern Forest communities in Maine might not be shared in New York.

There are several gaps in the research related to tourism. Tourism surveys and reports focused on the economic potential of a number of activities to draw visitors to the region. Data focusing on the support of tourism by community members would be valuable in assessing whether the region should promote tourism in earnest. There are small differences among states, especially concerning the impacts of “outsiders.” A deeper look at how communities respond to increased visitation would provide insight into the level at which Northern Forest residents value tourism compared to other potential economic development. Other significant gaps in the literature include the lack of data on agro-tourism, silvi-tourism, or other eco-tourism activities. Ecotourism is a growing trend around the world. This report has demonstrated that Northern Forest communities care about maintaining a balance between extractive industry and environmental preservation. Ecotourism capitalizes on the scenic landscape while conserving and maintaining ecosystems. Investigation into the attitudes of Northern Forest communities on ecotourism would provide valuable insight into whether or not this is something the region could actively pursue.

It has been nearly 15 years since the Northern Forest Wealth Index was completed. It may be time to update this important report, perhaps in collaboration with researchers from the Hubbard Brook Ecosystem Study and other ecological study sites across the Northern Forest.

In addition, these research questions should be considered in future social science studies regarding the region:

- In light of the New England-wide effort to grow more local produce, what is the potential impact of small-scale land cover change from forest to agriculture? Are there recommended site qualifications involving soils, slopes, proximity to water?
- How might climate change specifically affect the health and abundance of maples in the Northern Forest? Studies show that species composition may change over time, but can this information be applied specifically to the maple industry? Can sugar bush owners encourage the growth of strong, healthy maple trees while climate is slowly changing?
- Which timber harvest systems leave more nutrients in an ecosystem, and how important is this over the long term? Based on initial watershed studies at Hubbard Brook, as well as new climate-related research, can communities and loggers determine which logging techniques are least detrimental to ecosystems?
- How can we apply and study forest management from a utilitarian approach in order to maximize the greatest good for the greatest number of people? This would combine social science research with knowledge about forest management. How can we take information about ecology, recreation, and small and large industry into account when making key management decisions in the Northern Forest?
- How can volunteer citizen scientists, including members of LoVoTECS and other networks, be tapped to contribute to social science? Can other stakeholder groups who operate across the Northern Forest landscape (e.g., snowmobile clubs) participate in a similar manner?

This paper is just the beginning of a concerted research and engagement effort to better understand the community needs, values, and priorities in the Hubbard Brook region and greater Northern Forest. It is our hope that by gaining a better understanding of existing data, we can plan future data collection and engagement activities that will inspire social science data collection along with ecological data collection to better inform the social-ecological systems we call home. Data collection will continue, and we welcome any insights on existing or proposed data sets that are available in the region.

Please contact Dr. Rogers, shrogers@plymouth.edu, for additional information or to share information we may have missed.

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