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Understanding Community- Forest Relations



Technical Editor

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Abstract

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Improved understanding of the relationships between human communities and forests is necessary to understanding how alternative forest management policies and practices can affect different communities. This knowledge also enhances our ability to formulate plans that are responsive to the needs and concerns of local communities, thus reducing polarization and related social and economic costs. In December 1997, an interdisciplinary panel representing academic backgrounds in sociology, anthropology, geography, psychology, economics, and recreation gathered in Oregon to discuss relationships between human communities and forests. This collection of papers is a product of the dialogue and interactions at the gathering.

Keywords: Community, community research, integrated research, place-based community, community well-being, community attachment, natural disturbance.

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A Focus on Community-Forest Relations

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Introduction

Human societies organize themselves in a variety of ways: individuals, families, communities, nations, etc. In the natural resource and forest management fields, communities are an especially important unit of organization. Communities take form for many different reasons and serve many different purposes and roles. Failure to recognize and appreciate these different purposes and roles contributes to increasingly polarized debates centered on appropriate forest management. For example, the clash between communities historically reliant upon commodity use, such as logging, and modern-day communities catering to those interested in amenities or retirement often results in acrimony, anger, and at times, violence. Such conflicts make the search for stewardship and sustainability difficult, if not impossible, to achieve. However, such conflicts can be expected to continue as our society evolves. Failure to more thoroughly, systematically, and rigorously understand the relations among communities and between communities and the natural resource systems within which they are found will mean that efforts to develop and implement balanced, integrated, and equitable resource management programs, with honest and meaningful involvement of the public, will continue to be frustrated.

Although many different definitions of community exist, they generally represent a collection of interests and concerns that are demanding a more active, meaningful role in forest planning and management. An improved understanding of the nature of these communities and of the relation between them and forests has the potential to provide important insight about these interests and concerns; this, in turn, would enable an improved analysis of how alternative forest management policies and practices affect communities. It also would help identify the key factors in those communities that need consideration when making resource management decisions.

Further, such understanding could enhance the ability of managers to formulate plans consistent with both local needs and concerns and national and statutory directives, thereby reducing polarization and related economic and social costs.

In December 1997, an interdisciplinary panel representing academic backgrounds in sociology, anthropology, geography, psychology, economics, and recreation gathered in Oregon to discuss relations between human communities and forests. The group was asked to identify existing research and research needs and to help establish a research agenda. Participants included professors, graduate students, and researchers from the United States and Canada. During the 3-day workshop, participants explored community issues that have implications for forests and forest management, forest management issues that have implications for communities, and changes in the relations between communities and forests. This collection of papers is a result of that workshop.

The papers offer a diverse perspective on how we define community. The paper by Blahna et al. notes that the hundreds of definitions for community found in the social science literature often show little consistency with how the term is used in relation to natural resources. Although the authors suggest there is no one "correct" definition, measurement, or scale to define community, they also suggest that it is difficult, if not impossible, to talk about community-forest relations without a common, underlying conceptual understanding of the term. Sturtevant and Blahna et al. identify the three dimensions most often used to describe community: (1) geographic area, (2) social interaction, and (3) common ties. In her paper, Sturtevant defines community as designated by locale, or "community of place," in contrast to nonspatial "community of interests" such as environmentalists, senior citizens, or college students. McCool uses the concept of community to describe a spatially defined place where humans congregate and live: primarily towns and villages. He recognizes that federal policy affects other types of communities, but in his paper, he limits discussion to communities of place. McDonough differentiates between communities of place and communities based on affiliation such as professional occupation or environmental group. Blahna et al. draw similar distinctions, defining communities as places "people live, work, and interact in a common geographical area," or as communities of interest or "groups of like-minded individuals that are found across many geographic communities."

Community study can be undertaken by using a variety of methods. Sturtevant provides an historical perspective of community study by reviewing inquiry methods that have been used by social scientists. She develops a chronology of favored methods from early ecological and ethnographic studies popular in the 1920s and 1930s, through the post-World War II studies of social change, into the positivistic studies of the 1970s and 1980s that shifted focus from ethnography to comparative statistical analysis and hypothesis testing. In the 1990s, an emphasis on social impact assessment (SIA) and social assessments led to (more or less) standardized approaches.

Kruger and Sturtevant continue the discussion of community inquiry by presenting a theoretical perspective and exploring two paradigms that guide how we view the world and thus influence how we study community. They contrast an interpretive approach that recognizes the dynamic nature of reality with an empirical-analytic approach that focuses on counting and measuring. Although the authors recognize

both approaches as valid, they suggest expanding the community research “toolkit” to include interpretive inquiry and participatory methods. These approaches are more accessible to nonscience participants who desire to participate in the inquiry process. The authors contrast the concept of social knowledge with scientific knowledge. In the second half of the paper, they explore participatory action research (PAR) as an alternative research method that involves the people being studied in setting the research agenda, in collecting data, and in controlling how the data are used. They argue that PAR presents an opportunity to blend local knowledge, professional judgment, and empirical data.

Paralleling Kruger and Sturtevant’s call for participatory research, Jones and McLain develop a case for the necessity of integrative interdisciplinary approaches to the study of community-forest relations. They provide an historical overview of arguments for integrative and interdisciplinary approaches and develop a case study analysis that illustrates challenges of community forestry research. Jones and McLain note that those practicing science prior to the Enlightenment were holistic in their approaches to the study of natural phenomena. With the expansion of capitalism in the 16th century, scientists became increasingly specialized. In the late 19th and early 20th centuries, scholars, activists, and scientists rekindled an interest in integration across disciplines. The complexity of natural resource issues has led many to recognize the need for interdisciplinary, integrative approaches. However, Jones and McLain suggest that the literature of interdisciplinary research seldom offers guidance as to how to achieve integration. Much of the work that goes by the label “interdisciplinary” actually consists of a number of independent studies done by different specialists stapled together into a final report. The authors’ response is to provide an analysis of a case study as a heuristic device. Using the U.S. Man in the Biosphere mushroom study on the Olympic Peninsula in Washington, they illustrate many of the challenges faced by interdisciplinary teams and approaches.

Jones and McLain suggest that to move from multidisciplinary to interdisciplinary to integrated work requires frequent interactions across disciplinary boundaries and shared respect for other disciplines, methods, and approaches. It also requires that scientists in social and natural sciences share leadership responsibility. Jones and McLain offer a list of questions to consider in developing interdisciplinary research projects. They recognize that integrative processes are time consuming, often frustrating, and require extensive negotiation; ultimately, however, they can result in a more insightful level of research than a single disciplinary approach could achieve. A range of mechanisms for team interaction increases the odds that the final product will be integrated. Jones and McLain recommend that future work address integration between formal science and informal or civic science. Community members, including transient gatherers of nontimber forest products, have considerable local knowledge, which, when coupled with formal science, can lead to novel insights and knowledge not otherwise possible.

Blahna et al. draw attention to the lack of consistency or theoretical foundation for the measurement units used in social assessments. They make a case that this lack of consistency is reflected in inappropriate or incomplete analysis and planning and decision documents that often contain incompatible measurement units. They also highlight the differences between single-project SIA and the increasingly popular large-scale, multiresource ecosystem management assessments that require ongoing

monitoring. The paper sets the stage for continuing dialogue “aimed at improving the consistency and flexibility in the measurement units used in social assessments for multiresource conservation plans.” Blahna et al. develop eight selection criteria and provide a rationale for selecting place-based, geographic community as the measurement unit based on social science needs and practical constraints. The authors assume the measurement must (1) be adaptable to several levels of analysis, (2) be cost effective, and (3) provide results that can be monitored and are comparable to results of biophysical measurements. The authors suggest that, “If several adjacent forests use a similar unit of measurement at the community level, it is theoretically possible to combine community maps from several forests in a large, ecoregional analysis, for example, to standardize analyses and combine results across a region.”

Kusel develops a conceptual and methodological approach to assess well-being in forest-dependent communities and reviews studies of well-being and the use of social indicators. The paper begins with a review of studies that evaluate well-being, highlighting common themes and discussing social indicators. The author defines the terms community and forest dependence, grounding his paper in place-based communities. He identifies the importance of “sense of place” in forest-dependent communities and the importance of a sense of community to individual community residents. He describes community capacity as the dynamic “collective ability of residents in a community to respond to external and internal stresses; to create and take advantage of opportunities; and to meet the needs of residents, diversely defined.”

The approach he proposes adds an assessment of community capacity to evaluation of social indicators and reviews how residents develop capacity to meet needs and create opportunities. He then presents an approach to the study of well-being that incorporates the concept of community capacity and goes on to discuss assessment approaches.

Next, Beckley focuses our attention on the relations between humans and geographic places and the factors that influence and shape those attachments. His review of the community-attachment literature focuses on sociocultural determinants of attachment, whereas his review of the attachment-to-place literature is oriented around attachment to recreation settings and geophysical landscapes, including biological, ecological, or geological determinants. The paper contrasts the two literatures and argues for an integrated model that incorporates attachment to both ecological and sociocultural attributes of place. Beckley outlines a series of researchable hypotheses to guide future research. He proposes an interdisciplinary approach that incorporates multiple methods to study relations among sociocultural and biophysical attributes of places and the influence of these attributes on the meanings we assign to places and behavior based on, or influenced by, those meanings

In a timely paper, McCool explores the complex linkages between natural-disturbance policy and human communities and the implications of restoration of natural disturbance processes for these communities. Natural resource management on public lands is being transformed from a single-commodity focus to production of multiple goods and services while retaining the integrity of ecosystem structure and function. One component of this shift involves the restoration of natural disturbance processes. The restoration of natural disturbances such as fires and floods has significant

implications for human communities. In his paper, McCool explores the implications of this change in land management paradigms and policies and proposes a framework for examining the implications of new policies.

McCool reviews biological concepts and principles necessary to understand the foundation of ecosystem management and suggests a conceptual framework for understanding how disturbances can affect communities. He examines factors that influence development of community-level responses to shifting management policies, including community resilience and capacity, and cultural traditions, customs, and beliefs. He also suggests that restoring natural disturbance processes will introduce increased levels of uncertainty into our social systems, thereby requiring improved understanding of linkages between human communities and resource systems. He concludes that agencies implementing new policies have a responsibility to potentially affected communities and suggests that this responsibility has yet to be spelled out, let alone fulfilled. In addition, the relation between the goals of achieving a natural range of variability and achieving and maintaining community resiliency needs to be explored and better understood.

In the final paper, McDonough explores the evolution, knowledge, and importance of meanings and value of forests and trees. She suggests that the meaning and role of forests in the United States have been evolving from a commonly held orientation of fiber and commodity production to an emphasis on multiple-amenity and preservation values and uses. She critically examines two common views held by many in the forestry profession: first, members of the public do not care about trees, and second, they lack knowledge about trees and forests. McDonough outlines a research agenda addressing the importance of understanding the knowledge and beliefs people hold about trees and forests.

McDonough illustrates the importance of forest resources to rural communities with examples from two case studies in Michigan. She also examines the value of trees and forests in urban areas, specifically focusing on a community forestry project in Detroit. In her discussion of the benefits of trees for both physiological and psychological health, the author draws on folklore, myth, religion, and literature to illustrate the importance of trees and forests through time. Next, she discusses cultural similarities and differences in how people value trees, including attitudes among forest workers. She then shifts attention to commonly held beliefs about trees and forests. Examples include the belief that forest management is based on principles of scientific management and that nonforestry publics are not knowledgeable about trees or forests. She examines these beliefs by looking at how language is used by different groups to describe trees and forests. The belief that nonforesters are uninformed has led to a belief that members of the public are not competent to participate in decisionmaking.

McDonough makes a case for “functional scientific literacy” that recognizes that people have detailed, functional knowledge systems about topics salient to them. For example, farmers have special knowledge of soil and pests, and forest product gatherers often have knowledge related to the ecology of the materials they gather. People possessing such types of knowledge are beginning to pressure agencies for opportunities to participate in policy decisions. To engage people in meaningful and productive ways requires understanding the diverse ways forests are important to people and the knowledge and beliefs they hold.

These papers are presented to both inspire others to investigate the dynamics affecting community-forest relations and to facilitate a discussion of the importance of understanding the interface between communities and resource management decisions.

Methods of Community Inquiry

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Abstract

This paper divides contemporary research methods into periods and traditions in order to demonstrate a progression in thinking. The paper begins with a discussion of the early ethnographic studies of the Chicago School then moves through the post-World War II studies of social change and the statistical research popular in the 1970s and 1980s. Although still popular, in the 1990s statistical research gave way to social impact assessment and geographic information system mapping of social, economic, and demographic data, and participatory research. Community studies, the use of typologies, ecological models, survey research, the use of social indicators, evaluation research, and finally, collaborative methods of inquiry are discussed.

Keywords: Community inquiry, research methodology, community capacity, community studies, collaboration.

Introduction

Stripped of pretense, talk about research methods is a claim to credibility. Essentially it is an attempt to persuade an audience that what a researcher says is "true." Believability is established by suggesting that if the audience does what the researcher did they will reach the same conclusions. Understandably, then, a discussion of research methodology is an important one. If a researcher's methods are suspect so are the findings (Wellman 1993: 63).

This paper chronicles community inquiry; more specifically, social scientists' quest for both understanding of the communities they study and credibility of their findings. It outlines the evolution of community inquiry methods, briefly summarizing the limitations of these approaches, and concludes with a discussion of their promise for forest community research that is not only "true" but "believable" for both the research audience and community members. Finally, it suggests questions researchers might ask to guide their choice in methods of inquiry.

Three dimensions enter into most discussions of community: (1) geographic area, (2) social interaction, and (3) common ties (Hillery 1955). Early research described the spatial distribution of the interrelated social and ecological variables of community; later work elaborated on the dimensions of social interaction and ties with concepts such as “community field” (Wilkinson 1972) and “networks” (Barnes 1954, Galaskiewicz 1979). Others stressed that communities were “locality-relevant” social systems serving basic functions (Warren 1972). Recent work has emphasized that these processes and functions are embedded in social structures (Granovetter 1973) and enhanced by community capacity (Kusel 1996) and social capital (Putnam 1993). For this paper, community is designated by locale or “community of place” in contrast to nongeographic “communities of interests,” such as environmentalists, senior citizens, or college students.

Outline of Community Research

[Community studies are] so varied and eclectic, so determined by the object of study, that some doubt must be cast on whether there is a single community study method (Bell and Newby 1972: 54).

Community research uses a variety of methods for collecting, analyzing, and presenting data. Most community studies generate empirically grounded knowledge, but others use typologies such as Tonnies’ distinction between *gemeinschaft* and *gesellschaft* (community and society) to place communities along a continuum of change (Tonnies 1957). Others describe patterns of settlement; some use sophisticated scaling or cluster analysis techniques, whereas some collect data that can have what Merton (1957: 102) refers to as a “serendipity pattern.”¹ Some researchers never come near the community, depending for their analysis on surveys mailed to residents or secondary census data. Many contemporary studies combine methods. This paper, for heuristic reasons only, divides these various methods into evolutionary periods and traditions, yet acknowledges that the categories can be contested and that significant overlap among them can be identified. All perspectives and methods incorporate certain values and ethical standards, yet researchers strive to maintain some level of objectivity and neutrality, evaluating findings skeptically and critically.

Early Ecological and Ethnographic Studies

The Chicago School’s ethnographic descriptions of community culture and meaning (Anderson 1923, Thomas and Znaniecki 1958) and human ecological explanations of human settlement and adaptation (Park et al. 1925) heavily influenced community research in the 1920s and 1930s. Ecologically oriented rural sociologists mapped social phenomena on landforms, soils, habitats, river systems, and roads (Field and Burch 1988). Galpin (1915) analyzed farm families’ social and economic relations by the depth of the wagon ruts’ turn toward one trade center over others. Kolb (1921) mapped the location of neighborhoods and churches, and Kolb and Polson (1933) associated the growth and decline of trade centers with population changes. Early definitions of community and ethnographic accounts centered on community social systems’ functions,² explaining changes associated with industrialization and population change. Some early work used aggregate demographic measures or occupational classes to understand attitudes and behavior, yet these measures were mostly in support of typologies developed in ethnographic descriptions.

¹This refers to findings that are unanticipated but raise significant questions and justify new theories.

²Middletown’s (Lynd and Lynd 1956) table of contents lists these functions: Getting a Living, Making a Home, Training the Young, Using Leisure, Engaging in Religious Practices, Engaging in Community Activities.

Post-World War II Studies of Social Change

Rural industrialization, declining community populations, interstate transportation, shifts in extractive industries, and economic adjustments to the out-migration of rural people were the focus of analyses in the post-World War II era. Perhaps most famous is “Death by Dieselization” (Cottrell 1951), which described the demise of a community resulting from the modernization of its only industry. Ethnographic community studies predominated during this period, with the rural-urban continuum theory a central axis of analysis. Rural sociologists’ studies of human interaction with the environment addressed issues of sampling, scaling, and systematic forms of observation.³

Scientism-Positivism in the 1970s and 1980s

The concept of community, and its study, seemed to fall out of vogue in the late 1970s. Some leading social scientists argued that community, a romantic term for a way of life long since passed, should be abandoned as an analytical concept. Research on the community continued the theme of “eclipse” and “death” of community from earlier decades, and the rural-urban continuum was replaced by studies of “massification.” External impacts on communities, particularly market forces, energy development, and plant location, were studied along with population movements and urban cultural diffusion. Researchers found local decisionmaking in isolated communities to be overwhelmed by urban forces; in contrast, communities experiencing ongoing change were believed to have developed organizational and institutional capacity enabling them to cope with the changes.

During this period, the tradition of community ethnography gave way to comparative statistical analysis of specific and limited aspects of community organization. Community research was revitalized with environmental legislation in the early 1970s that required social impact assessments, i.e., studies of the social consequences of natural resource development. In addition, the “population turnaround” migration of some urbanites to rural areas drew attention to rural development and issues such as persistent rural poverty. Researchers responded to renewed state and federal policy interest in rural community development with quantitative analysis. Comparative studies of communities undergoing similar forces required more standardized methodology that could handle large samples. Linear and path analysis were adopted from biologists and economists; scaling of attitudes and behavior, from social psychology. Sociologists refined their concepts and built causal models of social change, testing hypotheses with data from social surveys and secondary census data, and classifying variables with cluster and factor analysis. Most sociological journals (including *Rural Sociology*) during this period were unwilling to publish community research that did not include quantitative methods.

Postmodern 1990s

Social impact assessments (SIAs) and survey methods continue to gather strength, enhanced by tools such as geographical information systems (GISs). Community is experiencing a resurgence of interest as urbanites seek to “reinvent” community, policymakers and rural residents hope to find the solution to rural development issues in enhanced community decisionmaking, and social scientists return to the moral community through the “communitarian agenda” (Etzioni 1993, Selznick 1992) and participatory community (Barber 1984). Postmodernist challenges to the power of science and the privileged position of theorists and methodologists has helped

³ See Field and Burch (1988), who describe Burch’s earlier observation schedule that sorted by age, gender, and activity; Love’s (1964) systematic observation to estimate campsite preference; and Lee’s (1975) observation combined with interviews to estimate social carrying capacity.

legitimate the expression of multiple voices and sources of knowledge. An emphasis on sustainability⁴ through linking environment and community is fundamental to the community-forestry movement (Kusel and Grey 1998), and environmental organizations are publishing community self-assessment handbooks in this spirit (The Nature Conservancy 1996).

Debate among contemporary community researchers focuses on the role of social scientists in these community assessments and emergent public policy. They question to what extent the needs of communities for solutions to their problems should direct their research agendas. Although some sociologists are reluctant to bend their research to such practical applications, others point out that there is a distinction between fact gathering and research, and often communities just need researchers to help them gather facts. This may not hold promise of extending sociological knowledge (Poplin 1979) or further one's own career (Nyden 1997), but perhaps researchers have some obligation to bring their expertise to bear on solution of community problems.

An additional issue is whether social science should contribute to scientific assessments based on technocratic or democratic processes (Jasanoff 1990). Technocratic processes isolate scientists and their knowledge in hopes that values and facts can be separated in policymaking. In contrast, democratic processes seek incorporation of a full range of values through more open research and decisionmaking. What are the methodology and credibility issues for community researchers moving from the more objective and detached academic research to a more inclusive, consultative process? The following sections discuss methods of community inquiry that can be adopted for research in forest communities. Although they have been divided into more conventional methods that might be more appropriate for technocratic processes and participatory methods that are more democratic, these categories overlap, and an eclectic selection is appropriate.

Conventional Methods of Community Inquiry

Community Studies

Bell and Newby write that

. . . communities, unlike organizations . . . or institutions . . . should not and cannot be objects of study for social scientists. . . . Nevertheless, some sociologists who hold this view have still produced community studies, not as *objects* in their own right, but as *samples* of culture: they have used the community study as a *method*, . . . for "getting to grips with social and psychological facts in the raw" (1972: 54) (emphasis in original).

Some have called community studies the poor sociologist's substitute for the novel. Others have labeled such work "discursive exposition" (Poplin 1979), portraying community as a totality with manifold and complex interactions and interrelations. As a body of research, community studies are not cumulative or even replicable, but somewhat idiosyncratic.

Community studies rely on ethnography and participant observation as methods. Often living in the community, the researcher participates in community life by assuming a role within the community, building and maintaining rapport with community

⁴ See Beckley (1995) for a review of indicators of sustainability in community research.

members. Observation includes attending community functions, conducting interviews, and analyzing documents. The research design is mostly unstructured, and the investigator is free to capitalize on unanticipated research opportunities.⁵ This method does not result in large amounts of statistical data, but it provides rich and contextual accounts of community life from the viewpoint of the participant.

The accuracy of community studies is marred by the effects of researchers' presence on community members and by the difficulty of remaining objective and detached. Identification with one group or informant can eclipse the perspectives of others; adherence to one theory can influence the researcher's organization of and openness to facts. Data and observations may be superfluous to some, but significant to others, and replication of community studies is difficult.

Typologies

Although not a method, per se, the dichotomous or fourfold typological theories of early community research have served as a framework for organization of data, particularly historical and ethnographic descriptions.⁶ Much like Weber's (1949) ideal types, typological constructs need not perfectly reflect existing society; instead, they provide classifications that guide investigating and theorizing. Tonnies' (1957) conceptual framework of *gemeinschaft-gesellschaft* offered insight to many sociologists at the turn of the century who were living through a social transformation similar to that which he described; Wirth's theory of urbanism (1938) 50 years later was organized according to this framework, and no alternative typology has seriously replaced it in the past 50 years.

This contrast between "perfect unity of human wills" (Tonnies 1957: 37) in rural life with the "impersonal, superficial, transitory, and segmental" (Wirth 1938: 62) urban life has been criticized as a "mystique" (Bernard 1973: 92) and as " 'essentially a reasoned moral position' rather than a plan for 'empirical research,'" (Kasarda and Janowitz 1974, quoted in Bender 1978: 27). Communities do not progress in sequential stages; social change is seldom linear. Communities are also not discrete or whole societies. They blend into, nest, and overlap with one another (see Gans 1962, for a study of "urban villagers").

Ecological Models

Human ecology was one of the contributions of the Chicago School of the 1920s and 1930s. Robert Park argued that "the plant community offers the simplest and least qualified example of the community" (Park and Burgess 1921). Plant and animal ecology served as a model for the study of human social and territorial organizations; human ecologists drew many analogies between plant, animal, and human communities, borrowing terms such as symbiosis, niche, diversity, and organized uniformity. They argued, for example, that just as biological phenomena coexist in a habitat, so different social and ethnic groups coexist in a city by sorting themselves into different "natural communities" located in particular districts.

⁵ Fitchen (1981) includes in her methodological appendix a typical day of interviewing, which includes a number of impromptu interviews and discoveries. For participant observation methodology appendices in classic community studies, see Whyte (1955) and Vidich and Bensman (1953).

⁶ Methods that rank communities (e.g., according to "risk" (FEMAT 1993) or "capacity" (Kusel 1996)) would fit in this category, as well.

This approach studies the spatial arrangements of community structures and functions, determined sometimes by features in nature, other times by human rationality. Cultural and social characteristics then are related to these ecological features. There has never been complete consensus among ecologists, because some emphasize natural processes, others, economic and market functions, and others, cultural criteria. Yet the ecological paradigm has provided a methodological framework for a large body of research, ranging from studies of the succession of immigrant group settlements (Park et al. 1925) to hobos' moral social order (Anderson 1923) to agricultural trade competition (Hassinger 1957).

Ecological models have been popular because they are easily applied, quantified, replicated, modified, and refined. However, ecological research has been criticized on a number of fronts. Some say that human ecologists, although they describe how groups of peoples are arranged in territorial areas, never relate in a convincing or causal manner the physical to the social organization. They simply aggregate social characteristics (such as the crime rate) and characteristics of social organizations (such as numbers of retail stores) as descriptive of parts of cities or arrangements on the landscape. Others are concerned about the implications of ecological analysis for broader social theory. Some see it as a biological ruse for an application of functionalist paradigms to communities (Bernard 1973); others protest that moral factors, such as adherence to traditions and norms, should not be tied to sites and situations, but rather to groups and cultures (Matza 1969). Fava (1968) notes that the POET (Population, Organization, Environment, and Technology) variables (Duncan and Schnore 1961) lose their usefulness as populations become larger and more heterogeneous, organizations become less centralized, demands made on the environment increase, and technologies change. These ecological variables are eclipsed by social, political, and economic forces. As stated by Reissman, "ecology turned out to be more time-bound and culture-bound than the ecologists or anyone else thought, a most damaging argument in an era of world-wide urban expansion" (1970: 24).

Mapping ecological arrangements and describing their correspondence to social characteristics remains an important tool (cf. Harris et al. 1995, for use of the GIS model for understanding resource user conflicts), yet it is important that the technical skill invested in this research is just that—a tool for organizing and examining facts.

Survey Research

Perhaps the most prevalent method for social research, surveys expand the number of people who can be questioned and standardize the questions asked. Respondents can be picked randomly and sampled systematically; their responses require less interpretation than ethnography or participant observation as questions can be structured to test specific hypotheses. Usually, individual people are the units of analysis; researchers understand community by either aggregating individual characteristics or surveying residents, community leaders, or informants about their attitudes or observations of community processes and structures.⁷

Survey research is the best method available to social scientists interested in collecting original data for purposes of describing a population too large to observe directly. Through probability sampling, a group of respondents' characteristics may be taken as representative of those of the larger population. Public opinion polls are an

⁷ See Young (1999) for a review of community informant survey research methodology.

example of the use of surveys to measure the attitudes and orientations prevalent in a large population. Data from surveys can be shared among researchers; the most commonly used secondary data in the United States are those collected by the U.S. Department of Labor, Bureau of the Census.

Surveys rely on carefully constructed standardized questions that procure data in a consistent manner from all respondents. Survey data are only as good as the questionnaires upon which they depend. Questionnaires must be worded in a manner that is fully comprehensible, but still there is no guarantee that the meaning conveyed by either researcher or respondent will be accurately understood. Surveys cannot define historical, social, cultural, and environmental context that shapes an individual's values. Standardization of questions may result in forcing choices upon respondents, requiring that they express perceptions, meanings, and answers they might not otherwise, "fitting round pegs into square holes." Surveys also can represent little more than the "least common denominator" of people's attitudes, situations, and experiences. Because they need to be minimally appropriate or understandable for all recipients, questions run the risk of superficiality (Babbie 1998).

Topics or attitudes also may be affected by the mere act of studying them. For instance, a survey respondent may not have given much thought to the spotted owl debate, yet when asked for an opinion, decide that it has great impact on his community's economy. Surveys, through their articulation of issues, can create or enhance conflict in a community; yet, they also can serve an educational function and suggest issues that might be addressed in an appropriate public forum.

Social Indicators

Social assessments (inventories of social conditions) and social impact assessments (analyses of social consequences of natural resource development) rely on social indicators (and often surveys, focus groups, and expert testimony). Social indicators are external, "basic" facts, ". . . absolute facts rather than substituting rationalizations which grow out of irrelevant comparisons or defensive explanations of how things have come to be as they are" (Odum 1936: 2, quoted in Force and Machlis 1997: 370). They are standardized measurements that allow for systematic comparisons across communities and over time for identification of long-term trends and changes. Policy analysts and decisionmakers often use these concise, comprehensive, and balanced data collected by objective, value-neutral scientists.⁸

Social indicators are dependent on accessible secondary information, but often these data are not collected at units of analysis or times appropriate or useful to decisionmakers. Additionally, measurements can be collected differently or redefined at various times, and debate continues over appropriate indicators. Like ecological explanations, these "social facts" (Durkheim 1964) are "abstracted empiricism" (Mills 1959); they are fixed values that represent the dynamic processes; structures; and social actors and their meanings, values, and cultural discourse. Many social indicators are economic variables that lend themselves to measurement; however, there are aspects of well-being, such as stability, satisfaction, and capacity that are not directly connected to economic indicators or easily quantified (Beckley 1995: 261-266). Researchers still make assumptions about the meaning of these indicators, yet often obscure their values and beliefs by "burying them in technical analysis" (Selznick 1992).

⁸ Philosophical debates continue within the discipline about the possibility and necessity of value neutrality and absolute knowledge.

Evaluation Research and Strategic Planning

Although these methods are not central to the community research tradition, social scientists increasingly are asked to apply their analytical skills in evaluation of specific organizations in the community. Mandated by funding agents, these external reviews are intended to examine whether stated organizational or community goals have been accomplished. These reviews are most often viewed defensively by community organizations and social service agencies that feel their performance is being measured against unrealistic goals.

Often evaluation either generates or follows strategic planning that involves community leaders and members in focus group discussions, interviews and surveys, or other exercises such as Delphi or nominal group processes. As with SIA research, public involvement in the planning process is often “a means to an end, not an end in and of itself” (Burdge 1998: 189). Evaluation and social impact researchers, most often consultants from outside the community, are interested in a specific event; they come in, collect information or data from a community, and seldom are seen again. They may not ask the right questions (from the point of view of the community), interview representative informants, or gain the trust necessary for accurate or meaningful findings. Reports are seldom written as if the community is the audience; sometimes community members never see the report, or do not see it in time for appropriate action.

Collaborative Methods of Community Inquiry

Conventional community research draws its credibility from objective knowledge and separate truth; it depends on the researcher standing outside and separate from the subject of the research (Bateson 1972). These methods, however, can leave communities and their residents feeling disempowered and alienated from the research process, goals, and outcomes, feeling that they have “had it done to them.” More communities are seeking a participatory process that facilitates a reflexive assessment process, moving from the study **of** the community to study **with** the community.

Collaborative inquiry (also called participatory, cooperative, or action research) provides both a philosophy and a methodology more compatible with the desire of communities to take part in framing the “right” research questions and to “own” the findings. Advocates of collaborative methods argue that the multiple perspectives brought to the same social issue can lead to more productive and rigorous research, and the end result is more likely to be immediately accessible to community activists, policymakers, and other organizational leaders (Nyden 1997).

Participatory research places researchers in a more active relationship with community members, “cocreating reality through participation” (Reason 1994). Advocates of participatory methods view them as more holistic, pluralistic, and egalitarian; they are said to encompass a broader understanding of a local community. Participatory action research is valued as a liberating dialogue with impoverished or oppressed peoples, creating a link between power and knowledge. These methods have been embraced by subdisciplines active in human and social transformation and liberation: humanistic psychologists, applied anthropologists, and critical sociologists. These professionals, especially applied anthropologists and rural sociologists, have had an expanding presence in nonacademic professions (Van Willigan and Finan 1991). Their objectives are to produce knowledge useful to a group of local people rather than exclusively for other researchers; their goal is to empower communities by helping them construct their own knowledge rather than extracting their data for others’ agendas.

Participatory research draws on a diverse set of methods centered on a process of collaboration and dialogue that increases the self-esteem of participants, develops community solidarity, and suggests action appropriate to the locality. Case studies and oral traditions of communication are stressed, although more orthodox survey and census data also contribute, with an emphasis on understanding from the perspective of the community.

Many applied anthropologists and rural sociologists, mostly in international settings but increasingly in rural, resource-dependent areas where research informs policy decisions or action, have adopted rapid rural appraisal (RRA). Although not strictly collaborative, RRA depends on “learning directly from and with rural people” (Cernea 1991); knowledge comes from intensive exchanges of information and ideas between outsiders and community members. The RRA is eclectic, using many methods, but most fieldwork involves two information-gathering techniques. During the first, direct observation, the researcher records visual data, usually according to categories established by the research team. These might include common land use patterns, household distribution and upkeep, or public infrastructures. The second is the informal, open-ended survey, conducted individually or in focus groups.

Rapid rural appraisal is often carried out by an interdisciplinary research team, the goal being a holistic understanding of the community or issue, about which little published or appropriate data exist. Initial fieldwork seldom lasts for more than 1 to 2 months, although continuing research may be done offsite in consultation with the research team or through return visits. This method is interactive; researchers work with information within their respective areas of specialization, continually sharing their findings with local participants and other colleagues. The group uses a consensus process to form conclusions, as well as to define gaps in findings and necessary further inquiry.

Focus group interviews⁹ are a primary source of data in RAA. A topic outline, prepared by the research team, serves as a guiding framework for the interviewing sessions and provides some systematization across interviews and communities. Sampling for informal survey and focus groups is often purposive as preestablished characteristics are sought; however, the initial groups often generate a potential list of other participants. Questions are adjusted to adopt local issues and idioms and to better elicit culturally meaningful and important categories. Dialogue allows exchanges of information; participants can correct one another and misunderstandings of the researcher, and questions can be rephrased if misunderstood or misinterpreted. Triangulation, using different forms of data and methods, enables information to contradict, complement, and confirm. In some cases, a more formal and extensive survey may follow, enhanced by the identification of issues, sampling strategies, logistic needs, and rapport generated from the focus groups.

These community-based methods have some limitations that are similar to those of more conventional methods and other limitations unique to these methods. As in participant-observer and community-studies research, researchers can lose their objectivity and critical distance, can be “sucked in” by the process, and lose sight of

⁹ The focus group process was originally formulated by sociologist Robert Merton (1990) to take analysis beyond researchers' speculations about frequency distributions and correlations in survey data.

the initial reasons for involvement. Ambiguities in role definitions also may blur the differences between researcher and participant. On occasion, legal or institutional issues with regard to accountability and responsibility constrain collaboration. Research objectives are not always compatible with those of the participant, which might range from learning and expressing values to reclaiming community or protecting property rights. Although these might be clarified by clear articulation of research goals, sometimes participants may expect followthrough and action that may not be possible, and those in authority may not have an interest in substantive interaction or the willingness or ability to change.

Some communities lack the social and human capital necessary for participation; inequality, disaffection, and quiescence may prohibit representative participation. In addition, a participatory research process may bestow legitimacy on its findings, even when it has not incorporated the full range of values and needs of the public. Local groups can “capture” both process and outcome, as can coalitions and organizations. Local interest groups can be parochial, discriminatory, and elitist. Attachment to place mobilizes people across interest groups and evokes an intensity of meaning that, while often positive, can be destructive, especially when low institutional capacity limits public input, scientific review, and monitoring. Participatory methods can assist in conflict mediation, but should not be expected to be successful in all situations or able to resolve conflicts among all stakeholders, especially when not all stakeholders are able to participate. Finally, these methods require researchers who are willing to work with and in communities, adapting to local needs, and investing time and resources in community development, sometimes at the expense of an academic research agenda.

Conclusions

The problem is not one of knowing how to do research. Neither is it one of whether we will do research. Our dilemma is, do we know enough to ask the right questions? (Presidential Address, Rural Sociological Society, quoted in Dillman and Hobbs 1982: 5, President’s name or year of address not provided.)

In deciding which method of community inquiry to adopt, a researcher does have to address some important questions. All methods encounter skeptics: qualitative, descriptive, and participatory methods find theirs among the positivists and decision-makers seeking scientific analysis; survey and social indicator researchers find theirs in local communities and colleagues distrustful of abstracted empiricism. Methods of inquiry could be selected to minimize the number of skeptics and enhance credibility, or they could be selected after asking the “right questions.” In the case of forest communities, these questions might be: What knowledge is being sought? By whom? For whose interests and toward what end?

Recent ecosystem assessments—the Forest Ecosystem Management Assessment Team (FEMAT), the Interior Columbia Basin Ecosystem Management Project and the Sierra Nevada Ecosystem Plan (SNEP)—have measured community adaptability, resiliency, and capacity, respectively. They sought to discover the factors contributing to current capacity and the implications of changing forest management for a number of communities over a large region. Partly because data were incomplete and difficult to aggregate at the appropriate level of analysis, all of these studies involved some variation of rapid rural assessment (FEMAT 1993, Harris et al. 2000, Kusel 1996).

Ecological methods, i.e., mapping of rankings of forest communities, revealed cultural geographical patterns and suggested social impacts of policy implications. Scientific researchers provided political credibility, although community participation, particularly in SNEP, contributed to interest group trust and understanding. The FEMAT recommended adaptive management areas in which communities would collaborate in planning, management, and monitoring. Accordingly, community inquiry would include local knowledge and participation.

The last question, Community research for whose interests and toward what end?, raises several other questions. Are there differences in the interests of academic researchers and communities? Federal or state agencies and communities? Communities of interest and communities of place? What are the goals of those sponsoring the research or the subjects? Research can have a basic goal of community education or development through analysis of problems at the local level to address specific or basic needs. Research also can suggest policy action by identifying social arrangements and advocating change, shaping community options from the point of view of the center of power or from a more critical perspective.

In answering this last question (Community research for whose interest and toward what end?), a policy question follows: What is the goal for communities impacted by changes in forest management? It was once stated as community stability. Is it now adaptability? Will social action and empowerment become goals? Until these questions are addressed, forest community inquiry will fall short of its quest for both scientific credibility and community accountability, and will fail to illuminate the relation between communities and forests.

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Divergent Paradigms for Community Inquiry: An Argument for Including Participatory Action Research

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Abstract

Community research employs a variety of paradigms, the choice of which has implications for research design and results. This paper compares the philosophies underlying empirical-analytic and interpretive approaches and highlights the inherent limitations in their methods. Approaches that recognize and access social knowledge are important to an enhanced understanding of community concerns and issues. Traditional research approaches may be supplemented with participatory action research approaches based on concepts of social learning. Although not appropriate in all cases, participatory methods are particularly useful in certain research situations.

Introduction

Social scientists, when embarking on community research, are faced with method choices that will determine the character and quality of their findings. This paper explores the implications of choosing a paradigm—the limits of some and the possibilities of others—in particular participatory action research (PAR), a research approach that uses multiple methods to tap into social knowledge. We do not suggest

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abandoning traditional research methods currently used in community study but suggest that attention be given to the appropriateness of methods for particular desired research processes and outcomes. We begin with a brief overview of empirical-analytic and interpretive paradigms and a discussion of the implications the choice of paradigm has for community research. Next, we introduce the concepts of social knowledge and social learning that lie at the heart of PAR. We then focus on PAR as a process that provides possibilities for advancing scientific understanding of social phenomena while simultaneously advancing citizen understanding of resource management issues. We do not suggest that PAR is the best method for all situations. Although PAR has some of the same limitations of more traditional approaches, it has particular value when researchers try to understand the interactions among social relations and natural resources while developing within all participants a greater consciousness of environmental and social conditions. It has particular value when the public wants to be involved in the process.

The world can be understood in a variety of ways. Kuhn (1970) calls these paradigms: sets of skills, attitudes, and approaches that frame how we see the world so thoroughly that we are unconscious of them. A paradigm can be described by the way it defines the essence of what we sense as real and what we can know about what we sense. Paradigms differ in their definitions of what is acceptable as evidence or data, how evidence can be gathered and analyzed, what role the investigator plays, and how interpretation is applied.

The positivist paradigm has pervaded scientific thinking over the past 500 years. It assumes that we can separate phenomena into their component parts and, through learning about the pieces, we can come to understand the whole, isolate direct cause-and-effect relations, achieve complex planning based on a predictable future, and refine methods for objectively knowing a preexisting reality (Wheatley 1992). It relies exclusively on empirical qualities—what we can actually see and explain through the results of experimentation (Slife and Williams 1995).

A positivistic study of communities and other places we live, work, and play results in examining social systems as separate from, and independent of, the nonhuman aspects of the ecosystem or nature (Wright 1992). Exploration of the symbols, meanings, and metaphors that would improve our understanding of these relations is not consistent with positivist approaches. To achieve a greater understanding of community, many people studying communities suggest an approach that values the hopes, dreams, celebrations, opportunities, challenges, and other characteristics of being human that express the experience of people and places (Merchant 1990, Orr 1992, Walter 1988).

Is it possible to complement current practices of measuring things with a more holistic approach that increases understanding of relations? In this paper, we propose an interpretive approach to studying communities. We begin by comparing the traditional positivist-based approach often used to study communities with an interpretive approach. Next we present participatory action research (PAR) as a particular type of interpretive approach that is being more frequently applied when research entails the study of communities.

An Empirical-Analytic Paradigm Within a Positivist Philosophy of Science¹

Positivism, in its truest sense, assumes that a single true reality exists and is discoverable by science; it also assumes that universal laws about this reality can be identified and used for prediction and control. This paradigm assumes that the researcher can study an object without influencing or being influenced by it. Although probably few stalwart positivists remain, these assumptions continue to influence empirical-analytic and other positivist-based approaches.

The empirical-analytic paradigm focuses on what can be observed, counted, and measured. It disengages the object(s) of study from the particulars of social, historical, and other contextual factors. This process objectifies people and places; objectification turns people into data and denies them opportunities to “act, create, and observe for themselves” (Gaventa 1993: 30). The method applied is primarily deductive-experimental. Hypotheses are tested and verified under controlled conditions to achieve replicable findings that allow prediction and control. Validity is achieved through systematic, careful observation and measurement of data.

One challenge to the empirical-analytic paradigm is the suggestion that the act of observation itself plays a role in determining what is observed.² Prigogine and Stengers (1984: 293) assert that “whatever we call reality . . . is revealed to us only through an active construction in which we participate.”

An Interpretive Paradigm

What if, instead of a single reality that is knowable, there are multiple realities—or at least multiple potential realities? What if we recognize a person’s role—scientist or layperson—in constructing reality in contrast to discovering some preexisting reality? What if we recognize that, however we define reality, it is dynamic? The interpretive paradigm helps us view the world in this way. Grounded in the German tradition of hermeneutics, the interpretive approach challenges positivism and logical empiricism (Schwandt 1994: 118). Social constructionism, a branch of the interpretive tradition, posits that, because of the nature of language, realities are socially and experientially constructed.³

A social constructionist approach asserts that the investigator cannot be disentangled from what is observed. From this perspective, findings, rather than being preexisting facts that are discovered, are actually created through the research process. Reason (1994: 324) suggests “this worldview sees human beings as co-creating their reality

¹ There are many critiques of positivist science. The following provide useful insight. Shepherd (1993) examines aspects of objectivity and reductionism and looks at what feminist theory and chaos theory bring to the discussion. Shrader-Frechette and McCoy (1993) address the role of values. Wright (1992) suggests that scientific knowledge is incoherent when based on the dualism of nature and humans. Wheatley (1992) provides a perspective based on quantum physics and new science. Denzin and Lincoln (1994) address epistemological, ontological, and methodological concerns. Allen et al. (1986) and Allen (1992) compare empirical-analytic and hermeneutical approaches.

² Wheatley (1992) provides a list of readings on quantum physics, chaos theory, holistic thinking, and other aspects of “new science” and the relations of these discoveries to organizational theory and management.

³ A construction is a coherent structure created by people to help make sense out of the complexity of the world. It is a “useful fiction” in that there is no way to know how well it corresponds to reality. Constructions consist of both objects and ideas (Simmons 1993: 165).

Table 1—Two philosophical approaches—an indepth comparison

	Empirical-analytic paradigm	Interpretive paradigm
Inquiry aim	Explanation: Prediction and control Generalizability Representativeness	Understanding: Improved relationships Partnerships Particularity
Quality criteria	Internal and external validity Reliability Objectivity, research assumed "value-free"	Clarification Generation of discourse and inquiry Recognition of values
Approach	Reductionist: Fragmenting and static Focus on things Decontextualizing Separation of theory from practice	Holistic: Dynamic Focus on relations Recognizes multiple realities Theory and action inform each other
Role of researcher, knowledge	Researcher discovers and verifies truth Privileges knowledge of researcher	Researcher facilitates participation in construction of knowledge Participants as researchers, researcher as participant
Types of knowledge	Knowledge based on empirical-analytic scientific model Instrumental Verified hypotheses	Local, indigenous, traditional, and other forms of knowledge are valued along with scientific knowledge
Communication styles	Competitive, independent, exclusive	Collaborative, cooperative inclusive
Outcomes	Product oriented Subordinates common knowledge Disenfranchises people Depreciates experiential, common-sense knowledge	Process oriented Recognizes legitimacy of local knowledge Empowers people to action Creates knowledge accountable and responsible to ordinary people affected by it

through participation; through their experience, their imagination and intuition, their thinking and their action." This perspective is supported by contemporary research in physics and chemistry and also is being adopted in management and organizational theory (Wheatley 1992).

Interpretation occurs by using techniques and dialogue grounded in day-to-day activities. Rather than attempting prediction and control, this method aims to explicate meaning and increase understanding of human action. Multiple theoretical perspectives, multiple methods, and multiple observers are used to add rigor, breadth, and depth to this approach (Denzin and Lincoln 1994).

Table 1 contrasts the empirical-analytic approach with an interpretive approach.⁴ This comparison clarifies areas of difference between an approach that is more closely modeled in the natural science tradition and one that is a more holistic, humanistic approach. Recognizing the limitations of simple dichotomies, we do not mean to

⁴ The approach presented here actually draws from complementary works: interpretive theory (Allen 1992, Allen et al. 1986, Guba and Lincoln 1994, Stewart 1994); feminist theory (Gilligan 1982, Harding 1986, Shepherd 1993); and participatory action research (Gaventa 1993, Hall 1993, Merrifield 1993, Park 1993).

Implications of Interpretive Paradigms for Community Inquiry

suggest that every study can be categorized distinctly in one column or the other or that these are the only approaches available. However, we hope the comparison is helpful in distinguishing aspects of the two approaches.

In contrast to an inquiry that uses an empirical-analytic approach, an interpretive approach asserts that no universal laws or pure truths exist. Instead, knowledge is situated in a rich, dynamic social and historical context (Slife and Williams 1995). This approach views people as directly involved in creating their lives and negotiating and interpreting meanings of the things and places around them; attitudes and beliefs are social, formed through language and interpersonal relationships (Slife and Williams 1995).

An empirical-analytic perspective judges quality through validity and reliability. Validity is how well observations reflect what they are supposed to be measuring (Pelto and Pelto 1978); it is assured through correct and careful measurement of observations. Validity is oriented around how plausible and credible an account is, whether it has relevance for theory or social policy (Hammersley 1992), or whether it generates further inquiry (Schwandt 1994). Validation comes as “one tests examples against lived experience, practical application, and the rigorous test of focused conversation” (Stewart 1994: 74). Reliability relates to replication; if a study were to be repeated, similar findings would be expected (Pelto and Pelto 1978). In interpretive research, authenticity is often of more concern than reliability (Silverman 1993); authenticity connotes arriving at an authentic understanding of people’s experiences. A researcher can gain an authentic understanding of a particular situation by paying particular attention to the analysis process (Silverman 1993). One’s interpretations can be confirmed through observing, talking and listening, referring to the literature, and analyzing the media (Schneekloth and Shibley 1995).

An interpretive approach includes the researcher’s beliefs and behaviors as part of the evidence that must be presented and considered in a research activity (Harding 1987). The disclosure of this information decreases what Harding calls “objectivism,” hiding factors that can influence findings. An interpretive approach acknowledges the researcher as a participant rather than simply an observer. It also recognizes and legitimizes the voices of others. This is particularly important in studies of community and place.

An empirical-analytic approach leaves interpretation to experts who are supposed to be neutral observers (Wheatley 1992). Recognizing that this is not possible, that no one can be neutral and value-free, Wheatley suggests confronting “the murky, fuzzy world of non-objectivity” through broad participation. By expanding participation to multiple perspectives, viewpoints, and interpretations, we can make better sense of the world. An interpretive approach enables citizens to become lay-researchers (Stanley 1988) and recognizes the researcher as a participant.

The knowledge gained through processes of social learning and conversation, or “working through” (Yankelovich 1991) often is more useful than traditional scientific or technical knowledge. This social knowledge can accommodate the complexity of relation and multiplicity of knowledge located in specific places (Korten 1981). The working-through process is concerned both with the production of knowledge and how it is used (Shepherd 1993). It recognizes that the process is as important as the product, and in certain situations, the process may be more important than the knowledge itself (Korten 1981).

Table 2—Scientific and social knowledge

Scientific knowledge	Social knowledge
Scientific methods generate knowledge; theory and knowledge are separate.	Knowledge is co-created and applied simultaneously; theory and application are joined.
Knowledge is generated by scientists, applied by technicians.	Knowledge is constructed and applied collaboratively.
Analytic, reductionist, mechanistic	Synthetic, organizational process, organic
Isolation of variables, control of influences	Engage participation of many voices, acknowledge social, cultural, historical context
Order, precision, manipulation, control	Messy, ambiguous, chaotic, uncertain, unexpected outcomes
Domination	Partnership, cooperation, collaboration
Replicability	Understanding particularity

The word “science” comes from the Latin *scientia* meaning “to learn” or “to know.” In our Western society, science has become surrounded with a mystique that has resulted in the subjugation of other ways of knowing and other forms of knowledge (Gaventa 1993). Instead of accepting knowledge gained through the scientific method and applied through technology as one form of knowledge or way of knowing, it has become the only accepted form of knowledge (Gaventa 1993). Other kinds of knowledge—common, indigenous, traditional, practical, intuitive, or local—are often discredited as less valid than scientific knowledge. Table 2 compares this social knowledge (Korten 1981) to scientific knowledge.

Social knowledge, as defined by Korten (1981) is based on social learning. It is knowledge that is co-created and applied collaboratively. Social learning “involves linking power and people in ways which simultaneously generate new knowledge, new benefits, and new action potentials as integral outcomes of a single process” (Korten 1981: 614). These outcomes lie at the heart of PAR.

Participatory action research is an interpretive approach that focuses on processes, particularly on involving people in processes. In addition to roles normally taken on by research, participatory action researchers facilitate “processes of collaboration and dialogue that empower, motivate, increase self-esteem, and develop community solidarity” (Reason 1994: 329). The approach uses multiple methods to tap into the knowledge people hold and sometimes can provide a forum for their stifled thoughts and voices. Through this process, creativity and personal capacity to understand and express issues and concerns are developed and nurtured, giving participants an outlet for expressing thoughts and feelings (Reason 1994).

The Promise of Participatory Action Research

Participatory action and other “new paradigm” research models⁵ challenge the notion that “objective” and unbiased” research methods can produce more accurate knowledge than can a collaborative or community-driven process. Drawing on the interpretive approach presented above, PAR contests not only dominant empirical-analytic research models, but existing power arrangements, which are viewed as deliberately or tacitly restricting access to knowledge and power.

Participatory action research is “a methodology for an alternate system of knowledge production based on the people’s role in setting the agendas, participating in the data gathering and analysis, and controlling the use of the outcomes” (Reason 1994: 329). Through participatory processes, people can “develop their own knowledge-production, information-gathering capacities” (Gaventa 1993: 33). The accountability of participatory research is based on three components: open participation in identification of issues, problems, and concerns by those involved or who would be affected by decisions; understandable knowledge to be used and developed through the interaction of researchers and the local group; and active researchers rather than people made into passive objects of study (Gaventa 1993, Maguire 1987).

Participatory research leads to “education and development of consciousness, and of mobilization for action” (Gaventa 1993: 34). It is a process that moves from identifying issues to setting research priorities and determining how knowledge will be used. The process never ends, cycling through action, monitoring, and evaluation. The PAR is a particularly important approach when there is a need for people to become more knowledgeable stewards of environmental and social conditions.

Ecosystem Management

Mike Dombeck’s first message as Chief to Forest Service employees included these words:

Just how do we maintain the health of the land? By working with people who use and care about the land. People are the delivery system for ensuring healthy, diverse, and productive ecosystems. . . . Assuring healthy ecosystems begins and ends by working with people on the land. As Gifford Pinchot said, “a public official is there to serve the public, not run them.” To successfully adapt to growth and change we need to engage people in dialogue (1997).⁶

Blending the needs of people and environmental values depends on accurate and appropriate needs assessment and public participation. Sustainability is predicated on balanced protection of culture, social production, and environmental integrity. For collaborative stewardship to be successful, communities must be empowered to act responsibly and deliberatively.

⁵ The writings of Foucault, Gramsci, and Freire on the connection of power and knowledge provide the philosophical roots of this paradigm. See Fals-Borda (1982) for a discussion of popular knowledge and empowerment, including Gramsci’s “spontaneous philosophy” and Foucault’s “living history,” oral traditions that are “critically recovered.”

⁶ Dombeck, M. 1997. Letter to Forest Service employees. On file with: Linda E. Kruger, USDA Forest Service, Pacific Northwest Research Station, 400 N 34th St., Suite 201, Seattle, WA 98103.

Accurate and Responsive Social Assessment and Planning

A holistic approach, PAR incorporates local knowledge, imagination, and professional judgment with empirical data. Thus it may be a more appropriate approach for both achieving improved understanding of social phenomena (Miller 1993) and gaining social acceptance of resource management plans or decisions.

In quantum logic, it is impossible to expect any plan or idea to be real to [people] if they do not have the opportunity to personally interact with it. Reality emerges from our process of observation, from decisions we the observers make about what we will see. It does not exist independent of those activities. Therefore, we cannot talk people into reality because there truly is no reality to describe if they haven't been there. People can only become aware of the reality of the plan by interacting with it, by creating different possibilities through their personal processes of observation (Wheatley 1992: 67).

Community action researchers gain an understanding of the symbolic meaning and values that emerge from everyday interaction and collective events. Meanings and dynamics emerge through negotiated interaction and exchanges within small groups and are structured by local institutions. Social psychological variables such as trust building and risk-taking are best understood through participation in interactions rather than through interviews and questionnaires. Public reactions to agency directives and planning might be better predicted and understood if information about public values were gained through reflective interviews or personal relationships rather than through attitude surveys.⁷

Social relations in rural communities are anchored to the political economy of their particular place (Fitchen 1991). Identity is maintained through memory, tradition, and reputation; this historical sense of place provides the foundation for values and commitments. Booms and busts, political confrontations, and compliance, while registered in official records, also are registered in cultural products, institutions, and everyday decisions. The sense of community well-being is related to the opportunities, capabilities, and functionings⁸ of people, not aggregate measures of individual educational or occupational achievement (Kusel 1996, Sen 1993).

Community resiliency might be the ability to rally through hard times (Kusel and Fortmann 1991), or it might be the preservation of place-based identity (Kemmis 1990). The sense of community held by loggers is found in the tradition of spirited individualism and autonomy (Carroll 1995); it might be eroded by job insecurity (Marchak 1990), moral exclusion (Carroll and Lee 1990), impotence and diffuse anxiety (Erikson 1976), and culture clash between newcomers and oldtimers (Brown 1995). Sociodemographic measures and self-report measures have obvious limitations for understanding community values and well-being; yet they can be verified and serve as a point of self-reflection in the process of participatory inquiry and critical analysis.

⁷ See Sturtevant and Lange (1995) for a discussion of "acting out" in response to a new Federal Advisory Committee Act interpretation that altered interpersonal relationships among agency personnel and public.

⁸ Sen (1993) defines capabilities as individual freedom or opportunities; functionings are individual's achievements or successes—these are relative measures dependent on contextual factors and social definitions.

Participatory research is able to define community more meaningfully than the arbitrary units of analysis presented by conventional secondary sources. Community, county, and forest boundary lines are drawn administratively, but socially and ecologically they function differently, as in neighborhoods and subwatersheds. In studies of human dynamics within ecosystems, such as the Sierra Nevada social assessment (Kusel 1996) and Applegate community assessment (Preister 1994), residents participating in the research suggested important adjustments to community boundaries and interpretations of secondary data.

Two recent participatory social assessments in Pacific Northwest forest communities (Knott and Davenport 1996, Kruger 1996) revealed information not available through secondary data sources (e.g., census and official records). For instance, Knott and Davenport (1996: vi) discovered informal informational and exchange networks providing social and economic sustenance during hard times. They report that "ignoring the 'network factor' thus leads to underestimations of the impact of job loss in timber and other natural resource dependent communities" (Knott and Davenport 1996: vi). Other important economic activity missing in census reports included undocumented workers and harvesting activities.

Kruger (1996) compared a conventional social impact assessment approach that used secondary social and economic data, which was unable to document or conclusively analyze the links between federal forests and local economies, with a participatory social assessment that traced the relation of social and economic history to natural resource changes and events. Participants in the latter study were able to discover their common concerns and links to structural conditions in a manner that contributed to resource and community development planning. By engaging in the study process as a practice of commitment, individual and group identities were strengthened and opportunities for collective action were developed. The process recognized both knowledge and values as multidimensional and facilitated the expression of and access to meanings (Kruger 1996).

Studies of planning processes involving the public in the scientific assessment of communities and ecosystems found that the public was a knowledgeable and effective participant in both planning and management (Knott and Davenport 1996, Kusel et al. 1996, White et al. 1995). During the Sierra Nevada Ecosystem Project, scientists gained valuable information from publics organized into community partnership groups. Collaborative work with these and other key contacts improved both the process and outcome of public participation. Working with project scientists also allayed public participants' fears about researchers' biases and values.

Participatory research by the Applegate Watershed Council provided crucial outreach to watershed property owners; it also compiled a wealth of environmental history, identified a range of stewardship activities and issues, and defined feasible restoration projects. Members of the research committee testified to the personal and collective value of their work. "The opportunity of interviewing people opened up a whole new world for me—insight and understanding of sides I never took the time to listen to before." (A newcomer environmentalist.) "I talked to a lot of rednecks, also environmentalists. I learned from them and hope I taught them something, as well." (An old-timer rancher and wife of millworker.) (Sturtevant and Lange 1995).

Civic Science and the Environment

Aristotle suggested that individual fulfillment could only be achieved through participation, a way to improve an individual's quality of life by working with others for the common good.⁹ Bachrach (1975: 41) describes democratic participation as "a process in which persons formulate, discuss, and decide public issues that are important to them and directly affect their lives." It is an ongoing process with participants active from start to finish, from the identification of issues through taking action on them. It involves the central meaning of "democratic": the process of working for and reaching consensus (Bellah et al. 1985).

Citizenship has been described as "getting involved with one's neighbors for the good of the community" (Bellah et al. 1985: 200). Citizens can participate as lay social scientists, "inquiring and critical citizens" instead of passive, unreflective recipients and objects of the work of a few scientists (Stanley 1988: 14). As lay social scientists, citizens reclaim access to placemaking activities, including understanding and participating in decisions about what happens to and in the places they live, work, and play.

The revival of the Sagebrush Rebellion in the West (e.g., home rule, county supremacy, and property rights movements), Federal Advisory Committee Act suits brought on by timber industry interests closed out of ecosystem assessments, and environmental assessment appeals filed by local environmental groups are desperate acts by people and interest groups who feel silenced in land management decisionmaking processes. Social research that takes a clinically value-neutral, detached view, can cause conflicts between communities of interest and appear to eclipse the interests of local communities. Forest Service planners describe their experience with traditional social assessment as follows:

Current adjustments to Forest plans generally incorporate social and economic considerations into the planning process by assessing how the forest affects people: this process identifies historical, demographic, economic, and social trends; classifies the public into affected groups; estimates each group's future wants and needs; and predicts how different segments of the public will respond to the goods, services, and uses associated with various management alternatives. Using this model, line officers often make decisions that require the community to change. This approach gives the appearance that the Forest is acting on people, rather than people acting on the Forest (Grossarth and Nygren 1994: 282).

Although PAR cannot pretend to resolve the conflict among these groups, the process can begin to address their frustration and create a local forum for action research that demonstrates respect and incorporation of a wide range of knowledge and values and provides an opportunity for people to learn together. Conflict between interest groups can be addressed by moving from a top-down regulatory model of environmental protection to community-based "civic environmentalism":

Civic environmentalism ties these themes [complexity, uncertainty, fragmentation and cost] into a single concept. It uses a variety of regulatory and nonregulatory tools. It links the divergent worlds of

⁹ This idea has resurfaced recently in the burgeoning literature on social capital (cf. Putnam 2000).

economic development and environmental policy. And it engages citizens and experts in dialogues and learning about the relationships between our environment and our economy (John 1994: 45).

Conflict is inevitable when stakeholder groups are joined with more institutionalized science, but the relation has the potential to be constructive. Lee sees collaborative or “civic science” as providing the “gyroscope” to bring balance to the conflict:

Managing large ecosystems should rely not merely on science, but on civic science; it should be irreducibly public in the way responsibilities are exercised, intrinsically technical, and open to learning from errors and profiting from successes. . . . Civic science is a political activity; its spirit and value depend upon the players, who make up, modify, implement, and perhaps subvert the rules (Lee 1993: 161-162).

Civic science allows individual resource users to analyze the ecological consequences of their actions; civic environmentalism, building on civic science, connects resource users, resource protectors, and resource managers. Civic environmentalism relies on and increases the capacity for social learning and increases local responsiveness and accountability. Civic science, social learning, and civic environmentalism work best with a diversity and equity of participants. Diversity of values and perspectives provides flexibility and openness to new information and events; equity increases access and empowerment for those put most at risk by resource management decisions.

People in communities concerned about their environments and seeking more of a say in their future want to learn more about thresholds, indicators, cumulative effects, and monitoring (cf. Willapa Bay Alliance self-assessments). They have demonstrated through watershed councils in Oregon and Washington and bioregional groups in California that they can take part in sophisticated assessments and monitoring efforts, and that they are willing to take responsibility for protecting local resources. Participatory research provides a model for agency and university researchers to join collaboratively in these efforts and to contribute in a meaningful and productive manner.

Paradigms for Integration

Ecosystems, like social systems, are not simple sums of their parts. Isolating components of the system for individual study and manipulation loses sight of the complex dynamics of the whole. “Thus the insights which can be gained from breaking a problem down into its component parts are seldom as useful as those which emerge by trying to understand the parts in terms of their relationship to the larger systemic context—a synthetic process basically the antithesis of their educationist analytic methods of conventional science” (Korten 1981: 612-613).

To integrate ecological and social systems and to truly involve the public in environmental problem-solving will require new approaches: not only holistic and systemic thinking (Bateson 1972) but also democratic and egalitarian processes (Lee 1993, Shannon and Antypas 1996). Managers and planners must take on new roles as facilitators and teachers, guiding public deliberation from below (Kruger 1996, Reich 1985, Sirmon 1993, Wellman and Tipple 1990). Analysts must be willing to support discourse and develop social and political relationships within communities (Dryzek

1990); they will need to “articulate” common meaning among the different perceptions and understandings of the natural resource issues (Murphree 1996). Articulation requires different roles and modes of action, strikingly similar to those demanded of resource planners and managers: interpretation, translation, and facilitation.

A paradigm shift is evident; the public land management “leviathan”⁹ is being contested. Whether articulated as new perspectives, adaptive management, human dimensions of ecosystem management, or collaborative sustainable development, current approaches are more holistic, recognizing that community and ecosystem integrity are one and the same.

People are discovering that such approaches are capable of providing a reliable means for balancing competing interests; taking a broad view of the problems; integrating the social, economic, and environmental aspects; moving beyond boundaries in jurisdictions and agency authorities; and reflecting community interests as well as the interests of individual citizens. Sustainability ultimately cannot be decided by the government for people—people will have to decide it for themselves (President’s Council on Sustainability 1996).

Traditionally, resource management plans have been designed by planners and scientists and delivered by technicians and managers—all professionally trained as detached and strictly objective experts. Their orientation to communities has been problem-oriented, and they responded defensively to public conflicts that reflected the competition within the agencies between timber production and species and amenities conservation. Community groups connoted conflict and controversy, stalled or stymied management plans. These interest groups were best approached and arbitrated by neutral, value-free agency personnel supported by fact-based science and regulatory mandates (Wondelleck 1988). Political response to resource management decisions was buffered by objective scientific researchers set firmly outside and separate from their subjects and controversy.

Critics of this tradition argue that technical findings cannot be separated from value-laden political questions (Henning 1987); resource management planning is inherently a political exercise (Cortner and Shannon 1993). Those involved in planning and assessment should recognize, incorporate, and learn from the multiple and conflicting values and goals for natural resource management.

The expectation that [the EIS] will cause federal agencies to produce scientific, holistic, optimizing, evaluating, mitigating and coordinating policy seems to be the latest manifestation of the rational decision-making perspective on bureaucratic behavior . . . [but] public administration behavior is not scientific management, it is politics (Friesema and Culhane 1976: 340).

⁹ Paehlke and Torgerson (1990) speak of the leviathan as born of the broader context of centralization, specialization, rationalization, depersonalization, and industrialization, which has created mutually supportive relations between public and private bureaucracies, shutting out potential participants from the decisionmaking process.

Adaptive management as a philosophy and practice has been embraced for its emphasis on continuous learning through a process of action based on planning, monitoring, evaluation, and adjustment (FEMAT 1993). In contrast to “normal” or “passive” science, adaptive management “embraces uncertainty,” gathers “noisy data,” anticipates “turbulence,” and capitalizes on conflict or “bounded rationality” (Holling 1978, Lee 1993, Walters 1986).

Adaptive management involves a continual learning process that cannot conveniently be separated into functions like “research” and “ongoing regulatory activities,” and probably never “converges to a state of blissful equilibrium involving full knowledge and optimum productivity” (Walters 1986: 8). More than just a sophisticated monitoring process, adaptive management capitalizes on local knowledge; views the public as an active, creative participant; and increases management’s responsiveness to local communities.

The overall objective for Adaptive Management Areas [places designated to practice Adaptive Management] is to learn how to manage on an ecosystem basis in terms of both technical and social challenges. . . . It is hoped that localized, idiosyncratic approaches that may achieve the conservation objectives of these standards and guidelines can be pursued. These approaches rely on the experience and ingenuity of resource managers and communities rather than traditionally driven and tightly prescriptive approaches that are generally applied in management of forests (USDA and USDI 1994: D-1).

Adaptive management requires a large measure of humility. This notion is shared by writers such as Burkey (1993) who notes the importance of scientists’ humility in acknowledging their ignorance of local issues and concerns compared to those who live in the community. Participatory approaches have the purpose of “creating knowledge to be shared by both the people and the investigator, knowledge that leads to action and, through reflection, to new knowledge and new action” (Burkey 1993: 61). The object is not only to generate new knowledge—the traditional role of science—but also to facilitate an ongoing process of action and reflection whereby the community will become empowered in dealing with new issues as they arise (Burkey 1993, Park 1993, Park et al. 1993).

There is an increasing call for local participation throughout the research-practice continuum, involving appreciation, understanding, explanation, policy, planning, design, action, implementation, monitoring, and management. In all these endeavors, the importance of active and reflective local participants is emphasized (Sancar 1994: 327). Once initiated, participation should have no visible end. People become aware of their opinions, values, and attitudes, and continue to develop these, through reflection and participation with others (Bachrach 1975, Reich 1985, Stanley 1988).

Limitations and Concerns

As with the traditional community methods outlined above, PAR has its limitations; with awareness, these potential problems can be avoided. Participatory action research, however, may not be appropriate for all research goals or settings.

Going native and romanticizing—As with participant-observation and community studies research, researchers risk losing their objectivity and critical distance. They may succumb to a nostalgic desire to preserve the past rather than allow for change when necessary. This is particularly true in our society, which venerates its rural heritage, and among rural citizens whose resource-related livelihoods reach back generations.

Credibility—The dominant research paradigms rely on positivist methodology. Participatory action research may join other qualitative, descriptive approaches that may lack credibility with some decisionmakers and their analysts.

Ambiguities over researcher, manager, and citizen participant roles—Differences or similarities among these roles can be blurred or overemphasized. Citizens are providers of information and social values, but also learners. There may be legal issues or institutional constraints regarding accountability and responsibility.

Cooptation—A participatory research process may bestow legitimacy on its findings, even when the full range of values and needs of the public have not been incorporated. Local groups can “capture” both process and outcome, as can coalitions and organizations. Agencies can use the results of participatory research to make marginal changes in management or planning, or use them to rationalize preferred alternatives.

Limited community capacity—Participatory research, action, and evaluation require basic levels of social and individual capital. The sense of community may not be strong enough for collective action; inequality, disaffection, and quiescence may prohibit representative participation.

Multiple constituencies and stakeholders—Participatory action research cannot resolve conflicts among some stakeholders, particularly when local interests conflict with those of national constituencies. Although PAR often can assist in conflict mediation, it should not be expected to be successful in all situations, especially when all stakeholders are unable to participate.

Goals not clearly stated and expectations raised—People participate for a variety of reasons: to learn, to express values, to share expertise, to reclaim community, to protect property or landscapes, and to gain political power. These goals may not all be compatible with the planned research. Researchers need to articulate their objectives as clearly as possible. Unclear objectives hamper development of appropriate approaches and findings. Participants may expect followthrough and action that may not be possible; those in authority may not have an interest in substantive interaction and willingness (or ability) to change. If people invest in a process, they need to perceive that they will have an impact on the outcome and see the results of their work.

Participatory research can result in a number of actions, ranging from education (providing information and creating new knowledge), to development (analyzing problems at the local level in order to address specific or basic needs), to political action (identifying power arrangements and advocating change), to devolution (providing local power through ownership of knowledge). In ecosystem assessment, research, and management, goals for affected communities—which can range from maintaining

community stability to assisting community adaptability to empowering local citizens—must be discussed and agreed on by all parties, and the intended purpose of collaborative research in communities should guide decisions about research approaches.

Conclusions

Botkin et al. (1979) refer to the “human gap”—the gap between the growing complexity of human society and our ability to cope with it. As often is remarked, “ecosystems are more complex than we can comprehend.” Given these limits to our knowledge, what can be done? Participatory action research and the new paradigm of action research more generally provide an ideological challenge and methodological alternative to conventional ways of knowing. When should PAR be used? It can be helpful whenever there is a need for citizens to become more knowledgeable about environmental or social conditions. It can be useful when there is a lack of trust between the public and the land management agency or the agency conducting the research. Community involvement in scientific assessment and consequent planning and monitoring of resource management can help bridge the gap between science and activity, agency and community. It can contribute popular ecological and cultural knowledge, diversity of potential solutions, acceptance of and commitment to chosen solutions, community empowerment, and accountability of planning and management to community needs. It can be an integral component of adaptive management as described earlier in this paper.

Participatory research, with its ideology of linking knowledge and action with methods of inclusion and liberation through analysis and reflection, assists local people in the struggle to retain control over the landscape that serves as a source of their livelihood and identity. Participatory action can improve the methods and conditions of debate, discussion, and persuasion so necessary for social and ecological sustainability.

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The Importance of an Integrated Research Approach

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Abstract

U.S. Department of Agriculture, Forest Service scientists are considering the importance to forest management of researching relations between human communities and forests, and the methods for doing so. An emerging theme is that greater integration in the agency is needed for understanding and taking action with complex matters like community forestry. Examples of integration include tailoring inquiry to a broader range of stakeholder needs, fostering greater understanding between management and science, and integrating natural and social sciences through interdisciplinary work. The focus of this paper is on this last example, interdisciplinary science as a necessary component to studying problems like community forestry that are characterized by a pattern of social and ecological complexity. We provide a short historical overview of key arguments for integration and interdisciplinary approaches in science followed by a case study analysis of an interdisciplinary project on sustainable resource use that illustrates challenges likely to be faced in community forestry research. A summary includes lessons learned and a list of points for participants in future interdisciplinary projects to consider.

Overview of Interdisciplinary Science

Most of the issues that vex humanity daily—ethnic conflict, arms escalation, overpopulation, abortion, environmental destruction, and endemic poverty, to cite several of the most persistent—can be solved only by integrating knowledge from the natural sciences with that from the social sciences and humanities (Wilson 1998: 62).

In his piece for the Atlantic Monthly, "Back from Chaos," Wilson argues the need for the "consilience" of disciplinary specialization in order to overcome today's fragmentation of knowledge and solve social crises. Consilience, a term first used in 1840 by William Whewell in the *Philosophy of Inductive Sciences*, according to Wilson means linking facts and theories across disciplines by using natural science methods to create a common groundwork of explanation (Wilson 1998). Although solely relying on natural science methods is no doubt controversial, the consilience argument revives the need for greater disciplinary integration in the sciences to understand complex problems with many disparate parts.

The idea of collaboration in science is hardly a new idea. Klein (1986) suggests that "interdisciplinarity . . . is based on such long-expressed values as integration, synthesis, the unity of knowledge and a community of scholars." Scientific practitioners¹ in the Enlightenment era and before in Western science generally strove for broad-based knowledge that resulted in holistic approaches to the study of natural phenomenon. This approach coincided with the prevailing organic worldview of Earth as a living organism and nurturing mother; an image, Merchant (1992) argues, that served as a cultural constraint restricting the actions of human beings. The rapid expansion of a merchant economy in 16th-century Europe replaced economies based largely on renewable energy sources with capitalist economies characterized by an ever-expanding quest and the consumption of renewable and nonrenewable raw materials. Developments in science paralleled these economic shifts. Such philosophers as Francis Bacon argued "the inquisition of nature is (not) in any part interdicted or forbidden" (quoted in Merchant 1992: 46). Rene Descartes stated we could "render ourselves the masters and possessors of nature" (quoted in Merchant 1992: 47). While science and capitalism became increasingly intertwined, much of the old science, including holism, became increasingly difficult to conduct. The ability of scientists to draw from many areas of scientific knowledge to analyze a problem holistically was being lost as scientists drifted toward in-depth investigation of phenomena.²

By the late 19th and early 20th centuries, debate on the merits and weakness of specialization and issues of integration had become widespread among scholars, scientists, and activists (e.g., Thoreau, Dewey). As Klein (1986) points out, from the 1920s through the 1950s many movements and formal interdisciplinary programs emerged:³

- The Social Science Research Council was established to promote integration of specialized scientific disciplines (including the natural sciences).
- The Chicago School sought integration of scientific inquiry.
- The Unity of Science movement attempted to unify rational and empirical science through logical positivism.

¹ The term "scientific practitioners" is used here in a general sense and is not meant to obscure the fact that the use of the terms "science" and "scientist" was not commonplace until after the Renaissance.

² An in-depth discussion of holism in science should not overlook the persistence of a holistic approach in many Asian scientific approaches (Chinese and Indian notably).

³ Klein's paper, "The Broad Scope of Interdisciplinarity," indicates that between World War I and World War II the nature of "integrative" versus "interdisciplinarity" was heavily debated.

- The Foundation for Integrative Education sought to overcome the divisiveness in education through integrative models. They viewed the goal of integration to be a conceptual synthesis of disciplinary knowledge.

Using simplified generalization about the history of interdisciplinary science, we can divide it into two main approaches. One is primarily instrumental and empirical. It brings disciplines together to share data and expertise to solve specific problems or carry out specific missions (e.g., Manhattan Project, space race). Scientists may not have contact or join the project at the same time. The other and far more challenging approach attempts conceptual integration. Conceptual integration attempts a unification of the disciplines; it requires close interaction by participants throughout a project in order to transcend linguistic, theoretical, and methodological boundaries. For some, as in Wilson's consilience, conceptual integration might mean the total unification of the sciences. For others it is a process for harnessing the depth of disciplinary diversity; a bridge for understanding between disciplines.

Some of the questions and research issues related to conceptual integration of interdisciplinary research are listed below:⁴

- How can theoretical diversity within interdisciplinary teams affect problem definition and research design? Janssen and Goldsworthy (1996), Leff (1986), Luszki (1958), Sherif and Sherif (1969).
- How can epistemological differences (cognitive, disciplinary, institutional background, and cultural) be reconciled in interdisciplinary research? Bärmark and Wallén (1986), Cassell (1977), Clark et al. (1999), Klein (1986), Luszki (1958), MacLeod (1969), Petrie (1976), Rosenfield (1992).
- How do the ethics of scientists, purpose of the research, and the power to influence affect the research process? Chubin et al. (1986a), Luszki (1958), Rosenfield (1992).
- What are the methods, processes, and models for carrying out interdisciplinary work? Chubin et al. (1986b), Friedman and Friedman (1990), Klein (1986), Luszki (1958), Rosenfield (1992), Wilbanks (1979), Wilpert (1979).
- How do team dynamics and various styles of management (leaders, facilitators, independent operatives) affect integration? Anbar (1986), Bella and Williamson (1986), Klein and Porter (1990), MacDonald (1986), Rossini et al. (1986).
- How do publishing issues (peer review, style, credit, funding) across disciplines get reconciled? Birnbaum-More et al. (1990), Janssen and Goldsworthy (1996), Rosenfield (1992).

Among natural resource managers, realization that the problems they are facing cannot be addressed through a single research discipline is growing (Janssen and Goldsworthy 1996). Some have argued for interdisciplinary work (Clark et al. 1999) as necessary to the understanding of complex natural resource issues (e.g., ecosystem

⁴ Authors listed may have worked on all or part of the question or a directly related subject.

management, sustainability, community forestry) involving natural and social science issues (Clark et al. 1999,⁵ McLain et al. 1996⁶). For example, one argument is that members of communities living in, near, or identifying with forest resources have an essential role in the sustainable management of the ecosystem. The hidden complexities of such a claim might transcend issues of biology, ethnoecology, economics, politics, time, and place. In fact, such complex issues historically are the catalysts that give rise to new disciplines.

As Klein (1986) points out, "interdisciplinarity is part of a general evolution of knowledge. It emerges through the processes of both differentiation—a visioning of subjects into new and smaller specialties and subspecialties, and integration—a fusion of separate perspectives into a common and sometimes new relation." Janssen and Goldsworthy (1996) suggest that the latter, such as soil fertility science, can start out as **intradisciplinary**, or as **interdisciplinary** programs formed to deal with specific problems, and eventually emerge as a discipline, or quasi-discipline. However, the emergence of new disciplines is a lengthy and gradual occurrence intertwined in political, social, and economic dynamics, and it is likely that for problem types that transcend natural and social issues, a temporary interdisciplinary approach will usually be sufficient.

With a few notable exceptions (e.g., Klein and Rosenfield), the literature on interdisciplinary research and integration of science seldom offers methods, techniques, or formulas in explicit detail that show us how to fuse disciplinary expertise. Luszki (1958) pointed out methodological incongruencies as early as 1959 in her landmark book, "Interdisciplinary Team Research." Part of the problem is that the fluid nature and diversity of styles typically associated with interdisciplinary research are at odds with a universal formula or set of methods. More useful are the techniques or guidelines found in the literature (partial list below). Future teams should review case studies of interdisciplinary research projects investigating generally similar areas.

The next part of this paper presents part of a case study analysis done by the authors of a 3-year study on the sustainability of wild mushroom harvesting (chanterelle—*Cantharellus formosus*) that involved social and natural scientists as well as land managers, harvesters, and other stakeholders. The project is an appropriate example for illustrating many of the difficulties that future interdisciplinary research on ecosystem management problems (like community forestry) would likely encounter in terms of

⁵ Clark et al. (1999) place interdisciplinary work within a larger view of scientific agency integration, similar to the Social Science Research Council in the 1920s and the Foundation for Integrative Education in the 1950s through the 1970s. This larger view of integration sees the ability for understanding and collaboration across all social aspects of forest management (management, scientists, departments, stakeholders, communities, etc.). Epistemological congruency, theoretical synthesis, and methodological compatibility would result in more efficient, higher quality, and broadly appealing management of forest ecosystems.

⁶ McLain, R.J.; Jones, E.T.; Liegel, L. 1996. A teaching case study integrating the biological, socio-economic, and managerial concerns of sustainable chanterelle mushroom harvests on the Olympic Peninsula. Corvallis, OR: Oregon State University. Written for the Sustainable Forestry Partnership and the MacArthur Foundation. Available from Oregon State University Sustainable Forestry Partnership at <http://sfp.cas.psu.edu>.

Case Study Analysis of an Interdisciplinary Research Project

Background

both instrumental/empirical and conceptual approaches. The case study helps illustrate how assumptions about what interdisciplinary work means in theory, and the processes for actually carrying it out, were barriers to team efficiency and success.

The 3-year U.S. Man and the Biosphere (MAB) Mushroom Study (called the MAB mushroom study hereafter) was designed to promote sustainable natural and human communities within and around the Olympic Biosphere Reserve. Its major objective was to carry out research that would allow stakeholders in the area's forest to develop a better understanding of the biological, socioeconomic, and managerial concerns of chanterelle mushroom harvesting in particular, and of nontimber forest product harvesting in general. The project emphasized interdisciplinary and collaborative research based on the assumption that sustainable forestry requires developing and maintaining strong links among scientists from several disciplines, land managers, and forest users. The main disciplinary backgrounds included biology, mycology, forestry, sociocultural anthropology, and economics. The interdisciplinary focus was compatible with the prevailing view that biological and human factors are inseparable in ecological problems and thus necessitate research approaches that integrate expertise from the natural and social sciences.

The MAB mushroom study began when a senior forester and soil scientist for a government science lab in the Northwest received a request for proposals from the MAB Program. The USMAB Temperate Ecosystems Directorate's theme of "management of the temperate landscape for diversity, resilience, productivity, and sustainability for the long-term" (Federal Register 1991) seemed to dovetail nicely with recent discussions with colleagues on temperate nontimber forest product (NTFP) issues. Many Northwest researchers were beginning to notice the growing economic importance of NTFPs locally⁷ and internationally and speculate on their role in forest sustainability, but had serious concerns about the lack of scientific research. Some of the questions regional scientists were beginning to ask were (Liegel 1995):

How much of which species are being harvested? Who harvests these plants and how does it fit into their household economies? What is the productivity of plots in different habitats of different age classes? Are any nontimber ecosystem species potential indicators of overall forest health? What are the possible biological nutrient cycling and storage consequences for plants and animals of unlimited product harvests?

Each of their questions probably could have been addressed by a single disciplinary approach. Several of the eventual team members, however, thought that addressing several such questions under a single research enterprise might help overcome the difficulty forest scientists were having in integrating their disparate knowledge to speak about ecosystem processes. An interdisciplinary approach would be compatible with MAB funding requirements.⁸

⁷ In addition to existing and newly expanding commercial markets, it is important to note that many NTFPs have a long history of use by Native Americans, settlers, and local people in general.

⁸ The MAB also promoted multistakeholder approaches. Thus, in addition to the interdisciplinary aspects of the MAB mushroom study, a variety of cooperators including federal and state agencies, private and public timber companies, citizens, and others were involved.

Issues of Integration in Research Design and Methods

Some interdisciplinary teams form around a specific problem where expertise is recruited to fill a role in a preconceived research design. In the case of the MAB mushroom study, the forester began approaching scientists with a general idea for an NTFP project funded by the MAB Program. In this way, a team formed that attempted to develop the project from its earliest phase based on their areas of expertise.⁹ The initial team that formed included a lab colleague of the forester who wanted to link the project to mycological studies he was already doing for the Forest Service, a cultural anthropologist at a nearby college who saw the project as an opportunity to extend his previous ethnographic work with Brazil nut gatherers in the Amazon to similar questions in the Northwest (two more anthropologists were added during the project), a microbiologist, a botanist, and two economists.

Over a 3-month period, the project proposal began to take shape. An important issue that surfaced early in the team's discussions was whether to narrow its focus to one species or set of species. The biologists on the team were concerned that a focus too broad would be logistically and practically difficult to implement on a \$50,000 research budget. The anthropologists, however, argued that a household economy, multiple-species approach was more appropriate for sustainability research than a single-species approach, as exploratory research showed people rarely harvest just a single product. The division between units or scales of analysis is characteristic of natural and social science approaches and is a crucial area for the interdisciplinary research design to negotiate. This will be explored further in the following sections.

The funder's influence on research questions is a critical consideration in any research proposal but can be particularly complicated when researchers are negotiating among different disciplinary approaches. Reviewers were also uneasy about the multiple-species approach,¹⁰ so the team reframed a second proposal using a single-species approach. After the first proposal reviews came back, it was apparent that the reviewers' backgrounds were strongly anchored in the natural sciences and any resubmitted proposal would have to contend with possible bias or lack of understanding of social science approaches.

A single-species approach raised yet another dilemma. Among the hundreds of NTFP species, on which should the team focus? Given MAB's interest in linking preservation and development, the mycologist suggested the team choose an economically valuable species where expanding harvesting was causing ecological concern. Two candidates for the study's focus came quickly to mind: decorative plants and wild edible mushrooms. Decorative plants have long been harvested commercially in the Pacific Northwest, and their markets were expanding rapidly, raising questions about long-term ecological impacts.

From the social science viewpoint, decorative plants fit well with their area of expertise. The anthropologist had already begun research on floral greens harvesters in coastal Oregon, and the economist had organized decorative plants marketing and

⁹ Some of the initial team members did leave and new ones were recruited, but the extensive review processes built into the project provided a point where new members could contribute and reshape aspects of the research design.

¹⁰ No other funding had been lined up at the time, so reviewers did not feel a multiple-species approach could be done on the \$50,000 maximum offered in the MAB grants.

buyer surveys. However, the natural scientists who had taken part in developing the proposal did not have much expertise in these plant species. One option was to reconfigure the team, but with funding from MAB not assured, the difficulty and time needed to acquire biologists was not deemed worthwhile.

For the natural scientists, wild edible mushrooms seemed a more logical choice given their training and areas of expertise—two mycologists, a soil scientist, and a microbiologist. Moreover, the Olympic Peninsula is one of the major sources of wild edible mushrooms in the Pacific Northwest (although it is also one of the major sources of floral greens). A chanterelle project also would complement ongoing matsutake studies of one team member in southern and central Oregon. It was thought that the sociologic and economic methods would be the same regardless of the focal species, so a study centered around chanterelle productivity and harvesting seemed the most logical and efficient choice given the constraints of funding and the biological approach. Thus, the final proposal agreed to by the team and ultimately accepted by MAB examined the biological, socioeconomic, and managerial concerns of harvesting edible mushrooms (chanterelles) on the Olympic Peninsula.

Developing a research approach that would allow integrating data across several disciplines was a difficult task. The team initially decided that the sociological team would collect general information about the chanterelle harvesters as well as document the harvesting techniques used. The economics team would use the biological production data to calculate net present value of chanterelles harvested on the study plots. It was thought that, when combined, data drawn from the study sites and from the harvesters would provide an understanding of the relation between certain ecological parameters, chanterelle productivity, harvesting techniques, and economic values. Theoretically, this design linked social, economic, and biological considerations, as well as micro and macro scales. A variety of factors, however, including limited funds, the timing of the funding cycle, and limitations on involvement by some key stakeholders affected the actual outcome.

Importance of Strong Leadership and Interaction During Fieldwork

After the first proposal with the multispecies approach was rejected by reviewers, the team that reassembled to redesign and submit a second proposal the next year brought in an additional economist. The first economist had become busy with several additional projects and had to play a decreasing role in the redesigned study, especially after it was approved. The new economist was asked to assist in the economic analysis of the biological data but was not a part of the field teams. Her role was to determine the costs involved with marketing chanterelles and then use an appropriate discount rate to calculate their net present value. In the second proposal, the first economist shifted from the role of principal investigator to that of technical advisor. The new economist assumed the role of technical assistant. This left the team without an economist as a principal investigator, and the economic component was subsumed structurally within the sociological component headed by an anthropologist. As it turned out, neither economist had much contact with the biological team during the data collection phase.

In contrast, the sociological and biological components were each headed by principal investigators. The culture of the team was such that a principal investigator was expected to devote a considerable amount of time and energy to ensure that project goals were met, whereas an advisor would not normally take a lead role. The lack of

a principal investigator for the economic component blurred the lines of responsibility for monitoring the data that would be generated for the economic analysis. Moreover, by not being in the field themselves and by not being in close communication with the other team members, the economists had fewer opportunities to observe phenomena emerging from the study and adapt their analysis to reflect unexpected or unpredicted information.

Integration at All Levels

In interdisciplinary work, the more integrated a team is at all levels, the more likely the disciplines represented will integrate their collective expertise. The MAB mushroom study provides an example of how lack of integration can decrease research effectiveness. During the 1995 end-of-season peer review meeting when the biological field work had been completed, the assistant economist felt that the data that had been gathered by the biologists were probably not going to meet the needs of the economists. If the team wanted to answer questions about the relative value of chanterelles to timber, the small plots used for the biological work were not the right scale. The economic evaluation would work better with data from a landscape scale. If greater collaboration had occurred at the data-collection stage (including joint fieldwork), this mismatch between desirable scales of analysis could probably have been rectified at an earlier date.

Another problem with the economic component was that the design did not leave the economists room to directly incorporate the ethnographic data. Indeed, as part of their ethnographic approach, the three anthropologists were able to gather ethnographic data that addressed a number of critical economic questions surrounding chanterelle harvesting and NTFPs on the Olympic Peninsula. For example, they were able to establish a general idea of the amount of money that chanterelle harvesting brings to local economies and a better understanding of the importance of economic diversification in NTFPs at the household level. It provided information about factors that influence harvester and buyer decisions to expand into new areas or new markets, or avoid some areas and abandon markets. Moreover, the ethnographic work indicated that using averages of chanterelle prices or harvester and buyer incomes is not a reliable data source for economic extrapolations on chanterelle value given the complex forces (climate, global markets, nonequilibrium nature of mushroom fruiting, etc.) that cause wide variability in selling prices within and across harvest seasons. They had difficulty, however, in integrating this data with biological data because of scale differences.

Timing and Consequences of Disconnection

Initially, the biological and social teams were scheduled to begin operating at the same time, but funding for the project arrived later than planned toward the end of the chanterelle fruiting season in 1993. Thus, the sociological team decided to postpone their research until summer 1994, when harvesters would again be out to pick chanterelles. The biologists, however, needed to begin locating and setting up their test plots in winter or spring so that the field plots would be ready for the harvest season. As a result, the biologists and anthropologists did not begin their fieldwork at the same time (and only had minor contact in the field). Thus, they may have missed potential opportunities for examining phenomena perhaps only recognizable through a close, interactive, interdisciplinary lens.

The disadvantages of the separate schedules and research designs became apparent in the second season when anthropologists learned that some experimental plots had unknowingly been put in popular chanterelle gathering grounds. During ethnographic interviews, some harvesters expressed anger at science on the peninsula indicating that the placement of mushroom plots without their input demonstrated that the scientists did not respect the local culture. In fact, one biologist on the MAB team had spent significant time in the field searching for plots that he thought would not be in areas where harvesters went or that were compatible with existing uses. Later, one of the anthropologists discovered that another group of mycologists doing a chanterelle study had placed their plots in the contested area. Despite the best intentions of the MAB study, the local harvesters did not have information to differentiate between the two studies. This situation had two immediate repercussions: (1) harvesters intentionally disavowed off-limits signs and picked in areas where there were plots, and (2) there was suspicion and antagonism toward the anthropologists, those who most closely interacted with the harvesters.

What the MAB mushroom study may have lacked in field integration was made up for in part by the use of a multitude of other integration techniques. Team members communicated with each other regularly by e-mail, regular mail, phone, and in person. Two annual review meetings provided a chance for members to present preliminary results and discuss research design changes with team members, peer reviewers, and project cooperators. The team presented its findings in a variety of public meeting formats including trying to create a forum appropriate for reaching chanterelle harvesters themselves. Some of the team also helped write an extensive teaching case study analysis of the project involving interviews with team members. All these efforts could be described as feedback loops in which the project continually solicited internal and external critique in order to improve the final product.¹¹

In the past, much of the work called "interdisciplinary" in natural resource research has consisted primarily of parallel studies by different specialists, with relatively minimal integration of work prior to the final write-up (and sometimes not even then). "In the final analysis, reports from interdisciplinary teams are often composed of a series of individual disciplinary contributions, whose integration into some type of seamless whole is problematic" (Clark et al. 1999). Historically, many scholars have viewed this as a multidisciplinary approach (Rosenfield 1992). Cultural differences between the various disciplines and, particularly the huge gap that exists between the worldviews, language, and modes of operation between natural sciences and social sciences are major forces behind these nonintegrative interdisciplinary projects.

These cultural differences were present in the MAB mushroom study and may have played a role in the project being less integrative than it might have been. However, many techniques were used in the MAB mushroom study to move it away from a multidisciplinary approach and toward an integrated interdisciplinary effort. One of the great strengths of the project was the frequent meetings and interactions (with some notable exceptions previously discussed) that helped team members learn from their mistakes and adapt to a research environment that went through many changes. Learning and adaptation by the MAB mushroom study team can be attributed to:

¹¹ The MAB not only permitted but required such "outreach" and integration.

- Acknowledgment by team members of cultural differences, and respect for the methods and approaches of other disciplines (and in some cases, a willingness to learn more about those methods and approaches).
- Existence of communication lines to discuss differences (especially later in the project) in ways that allowed participants to move toward shared understandings of how to approach this interdisciplinary project.
- Presence of multiple representatives from both the natural and social sciences, with at least one person from each having a position of "leadership" within the project. This created a situation where no single person was likely to feel completely isolated in terms of their concerns; it also created a sense that differences in worldview could be expressed and had a chance of being seriously considered. This created a level playing field among the researchers.

Some specific lessons that can be taken from the MAB study:

- Strive for balance across disciplinary types so that one person or group does not feel isolated.
- Strive for equality in terms of disciplinary representation within team/project hierarchy (i.e., leadership needs to be drawn from diverse fields).
- Create a research management process such that differences can be identified and discussed openly and respectfully between all levels of project hierarchy.
- Maintain a commitment to resolving differences, even if the research process is slowed. (Ideally one would expect such differences to occur, and incorporate time for working them out at various stages in the project.)

Questions to Consider in Developing Interdisciplinary Research Projects

Interdisciplinary research is about being able to work together to solve problems beyond a single discipline's scope. Success hinges on how the team communicates and what they communicate. The following list of questions is drawn from the MAB mushroom study experience and the literature to help alert future interdisciplinary research efforts on complex social and ecological problems to points of discussion.

Views on interdisciplinary research:

- What does interdisciplinary mean to each participant?
- Why does the problem require multiple disciplines?
- To what degree can each participant represent their discipline?
- How does each participant benefit from participating in the study?
- Have interdisciplinary teams successfully worked on similar problems?
- Why is each participant interested in the study?
- Do participants feel they have research domains in which other scientists should not work?

Management issues:

- What is the specialty of each participant within their discipline and what skills pertain to the project?
- What is the role of a facilitator? manager?

What are the forms of communication (e.g., e-mail, phone conferences, meetings)?
When are individual products expected?
What cross-disciplinary training or understanding do participants have?
What is the role (division of labor) of each participant?
Are there nonteam contributions?

Interpersonal issues:

How will differences be aired by members?
How might cultural differences (e.g., language, epistemology) of participants affect the project?
How can team members learn from each other?
How does each member view the other participants' disciplines?
What are the power differences between members?
Do team members have different ethical concerns and views about the research?

Reporting and publication issues:

How do the funding dynamics (e.g., amount, timing) affect each discipline?
What publishing and presentation dynamics (e.g., outlets, stylistic differences) need to be considered?
What are the possibilities for external critique and individual and team reflexivity and self-examination?
How does each participant envision the final product?
How will the analyses be synthesized?
How will the writing take place?

Miscellaneous:

How can theory, methods, and data production be linked across disciplines?
How can the project and members adjust to changes?
How will terminology be defined, taught, and agreed on?
How much time can each participant commit?

Conclusions

The role of communities in forestry is one of many complex problems that transcend the knowledge, theories, and methods of any one discipline. In the United States, community forestry ideals and practices are becoming increasingly commonplace, but with high variability of what community forestry means. For example, a community boundary is often contested across space and time by many interests, which could make user or management rights unclear. Another example is the potential that community forestry may use usufruct patterns as a potential door to ownership claims. Natural resource scientists have a key role to play in helping managers, policymakers, and communities understand the linkages between communities and sustainable forest ecosystems through indepth articulation of the underlying complexity of issues.

Today, disciplinary separation within science is now fully institutionalized by political, economic, and social processes. Academic departments exist with redundant missions (e.g., sociology and cultural anthropology), yet claim uniqueness on theoretical and methodological grounds. The breakdown of a common scientific language into unique disciplinary discourses (jargon) has hampered science's ability to integrate specialized knowledge. Yet, as Wilson (1998), Stankey (1996), and Clark et al. (1999) argue, we must develop processes of integration if science is to speak to complex problems. As Rosenfield (1992) states, "The rewards for those who venture out of

their disciplinary nest to work on cooperative teams . . . are found in the satisfaction of (potentially) contributing directly to solving real world problems and improving human well-being while at the same time developing new ways of thinking about and analyzing the human condition."

In the MAB mushroom study experience, the interdisciplinary process was time consuming, often frustrating, and required much negotiation, but ultimately produced a level of research well beyond what a single discipline could accomplish. The forester who initiated the project assumed the diversity of the team would result in a pool of complementary data that would paint a rich picture of wild harvesting on the Olympic Peninsula and answer the question of chanterelle harvest sustainability. Lacking explicit models or case studies, he was not sure how integration would happen, but by providing a large range of mechanisms to create team interaction, he greatly increased the odds of an integrated final product. In the end, the exploratory research project resulted in a multitude of quality products (e.g., publications, public meetings, case studies) well beyond the means of their small budget. The diversity of skills in the team helped create products in forms that would go beyond the MAB mushroom study and benefit the multitude of stakeholders (including community groups) that fell within the scope of the study.

Future work on interdisciplinary research needs to address integration between formal and informal science. Wilson's grand unification of scientific knowledge fails to mention the diversity of scientific discovery outside formal scientific realms, yet scientists exploring the role of communities in forest management will find that community members generate their own understandings and knowledge relevant to sustainable forestry. Anthropologists have been documenting for over a century the often highly sophisticated understandings of ecological phenomena that indigenous and other community groups develop. These groups were traditionally local, but increasingly spread over large geographic distances (e.g., urban mycology clubs that regularly frequent distant forests). Regardless of the origin of these communities, no forest in the United States is void of communities with local knowledge about them. Without the direct participation of these stakeholders in forest science, management, and policy, sustainable ecosystem management of forests will probably elude us (Love and Jones 1997). The lessons learned through interdisciplinary work may be the key to discovering areas of compatibility in which participation by diverse stakeholders can occur, and to forming epistemological bridges between formal and informal science. The value of informal science is that interdisciplinarity—broadly conceived to include informal science—could be better at generating new knowledge and novel insights than either formal or informal science alone.¹²

We suggest future research in this area should examine participatory action research (see Kruger and Sturtevant in this publication), transdisciplinary research, biocultural anthropology, and other existing interdisciplinary approaches for examples of methods and techniques that could forge an informal and formal interdisciplinary scientific approach.

¹² Love, T. 1998. Personal communication. Professor of anthropology, Linfield College, McMinnville, OR 97128, tlove@linfield.edu (10 August).

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Using Social Community as a Measurement Unit in Conservation Planning and Ecosystem Management

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Abstract

Lack of consistency in the measurement units used in social assessments is a fundamental problem for those attempting to incorporate social science into resource planning. Such inconsistency makes it difficult to compare effects of management options across social units or to compare data across planning documents. The paper is aimed at improving consistency in the measurement units that are used in social assessment. The authors develop a set of criteria and a rationale for using geographically bounded communities as a measurement unit.

Introduction to the Problem

Keywords: Social assessments, communities, place-based planning, measurement units, forest management.

The use of social science information in natural resource planning and ecosystem management lags far behind the use of the biophysical sciences (Endter-Wada et al. 1998). Although efforts to incorporate social science in resource planning are increasing, the lack of consistency in the measurement units used in social assessments is a fundamental problem. Selected measurement units often are not relevant for the planning task and result in incomplete social analyses that have little bearing on final planning and management decisions (Blahna and Yonts-Shepard 1989). Biophysical scientists have been struggling with ecosystem hierarchies and analysis units for decades (cf., Allen and Hoekstra 1992, Kaufmann et al. 1994), but the discussion is relatively new in natural resource social science (Beckley 1998).

Lack of attention to the measurement unit exists for both sociocultural and socioeconomic assessment. Manuals containing specific direction for conducting a social impact assessment (SIA) assume a basic measurement unit exists (usually the county) and provide little or no guidance for analysts to help identify appropriate measurement units. These manuals focus almost entirely on the variables, data sources, and data-collection methods for describing many different types of social populations (cf., Burdge 1987, 1990; Connor 1995; Interorganizational Committee on Guidelines and Principles for SIA 1993; Rasker et al. 1994). For example, Forest Service direction for conducting social analysis (Forest Service Manual 1973.2) contains guidelines for measuring variables related to lifestyles, sociocultural organization, attitudes and values, population, land use patterns, and civil rights, but provides little direction for identifying the measurement units for these impact variables (Blahna et al. 1994, Machlis and Force 1988).

This lack of direction has resulted in the use of inappropriate and incomplete social analyses, which can miss important categories of effects or misjudge the type or extent of social impacts (Beckley 1998, Blahna and Yonts-Shepard 1989, Doak and Kusel 1996, Endter-Wada et al. 1998, Machlis and Force 1988). The social measurement units used in resource planning and decision documents are often based on convenience rather than conceptual relevance, and vastly different and incompatible units are sometimes combined within a single assessment or between different assessments that have identical objectives (e.g., forest plans). These problems make it difficult to compare the effects of management alternatives across social units, to use the results in decisionmaking, and to compare social data across different planning documents. The cumulative effect is the lack of advancement in the scientific underpinnings and the management applications of SIA.

These problems are especially troubling in light of current natural resource policy directions. Most SIAs are undertaken for specific development projects such as dams, power plants, and waste facilities (Geisler 1993). For a resource agency, this is analogous to analyzing the effects of a site- or program-specific project, such as a timber sale, grazing lease program, or recreation development. For these types of decisions, it is possible to identify a few specific planning alternatives and to project the effects of those alternatives for relevant social groups (Burdge 1994, Geisler 1993).

The current policy emphasis in natural resources, however, is on ecosystem management. Ecosystem management requires large-scale, multiresource conservation plans designed to meet broad objectives such as ecological sustainability and social acceptability (Agee and Johnson 1988, Carr 1995, Gilmore 1997, Gordon 1993, Lee 1993). In contrast to site or program planning, multiresource conservation plans require long-term management strategies that often have complex and unpredictable social effects (Geisler 1993). Social analysis for such programs must go beyond using a single preproject (or “ex-ante”) analysis to an adaptive-management strategy where the results of decisions are reviewed and evaluated, and problems are addressed over time (Geisler 1993: 327; Lee 1993). This requires ongoing monitoring of the social effects of project decisions and the ability to adapt social analyses to various scales ranging from site- or issue-specific decisions to ecoregional projects (Burdge 1987, Geisler 1993, Grumbine 1994). The need for both spatial and temporal flexibility in multiresource planning tremendously complicates the already cloudy picture of identifying appropriate social measurement units.

This paper begins a dialogue aimed at increasing both consistency and flexibility in measurement units used in social assessments for multiresource conservation plans. We provide criteria and theoretical underpinnings that argue for the use of communities as the basic measurement unit in social assessments, and a rationale for using geographically bounded (or place-based) communities as a starting point. Several examples are provided for each of three planning scales: ecosystem management regional assessments, national forest plans, and watershed-level projects. Last, we will discuss future research needs.

Our goal is not to identify a “correct” definition or methodological approach for community analysis, but to illustrate the need to increase consideration of the measurement unit and to summarize some of the existing literature related to the use of communities in resource planning. Also, we focus on social **assessment**, not **impact analysis**. Obviously, the quality of the measurement unit affects both the assessment and impact analysis tasks.

Although the term “community” is often used in conjunction with natural resource social assessments, it is rarely defined or described. For example, in natural resource planning, a community can be anything from a small town to a major metropolitan area, a multicounty or state region, a small grassroots group, or a national interest group. This reflects both the vernacular use of the word “community” (i.e., very broad) and the large variety of definitions in the research literature. Like ecological communities, social communities are “nested” and no one definition or measurement scale is “correct” (Beckley 1998).

The social science literature contains literally hundreds of definitions of “community” (Hillery 1955, Roloff 1995), but no consensus on the meaning of the term “community” in general (Fitchen 1991), or its use in conservation planning in particular. In a review of timber-dependent community studies, Machlis and Force (1988: 221) found that “the definition of community has been inconsistent and atheoretical.” Although they acknowledge that no “supra-definition” of community exists, they also recognize it is impossible to develop linkages between communities and forest resources without some conceptual orientation. And Beckley (1998) found that the type and scale of forest dependency are directly related to the scale of the measurement unit.

Considerations for Using Community as a Social Measurement Unit

We identify eight criteria for selecting a social measurement unit for conservation planning. These criteria are based on both social science needs and practical constraints analysts face owing to limited budgets and the current directions in resource management discussed above. Thus, we assume the social measurement unit should (1) be adaptable to many potential levels of analysis, depending on different project and planning scales; (2) be cost effective in terms of the time, money, and expertise needed to conduct the assessment; and (3) provide results that are comparable to biophysical assessments and across various planning and monitoring documents.

1. Geographic communities and interest-based communities are both important measurement units for conservation planning.

Effrat (1973) has argued that, in the United States, most conceptions of community focus on one or more of the following elements: residential location, common ties, and social interaction. Natural resource planning documents tend to reflect a similar organization by using two broad types of social communities: “local communities” and “stakeholders.” Local communities are geographically identifiable areas that are usually based on political units—such as towns and counties—or geographic regions with multiple combined political units, such as South Florida (cf., Harwell et al. 1996). Thus, local communities tend to reflect Effrat’s “residential location” criterion.

Stakeholders, on the other hand, may be local communities or interest groups such as ranchers, environmentalists, recreation visitors, or Native Americans. Stakeholders are people or groups with similar ties to the land, but individuals may or may not live within a particular geographic area. For example, the Forest Ecosystem Management Assessment Team (FEMAT) used forest-dependent communities and Native Americans as the primary units of analysis, but also looked at social effects of alternatives for “recreation, scenery, amenities, and subsistence” uses of the Northwestern forests (FEMAT 1993: VII-85 to VII-93). It is also important to point out that Effrat’s (1973) “common ties” as used in FEMAT and other social assessments, can mean common ties to each other (e.g., Native Americans) or commonly held natural resource interests that may or may not include social interaction (e.g., amenity interests).

Thus, two very general types of communities are critical for resource social assessment: **local geographic communities**—where people live, work, and interact in a common geographical area—and **communities of interest**—groups of like-minded individuals that are found across many geographic communities. Communities of interest may exist at the local, state, regional, or even national levels. Recent work by Brandenburg and Carroll (1995) illustrates that interest communities also include subgroups or stakeholders within particular geographic areas. Again, FEMAT (1993: VII-40 to VII-42) reflected this conception by looking at several subgroups within “forest communities,” including loggers, sawmill workers, shake and shingle workers, women, ethnic groups, and “others within the community.”

2. A social assessment should start with local geographic or place-based communities rather than interest communities as the basic measurement unit.

Although geographic and interest-based conceptions of community are both vitally important for social assessment, several social theorists argue that the geographic locality is the first consideration for delineating communities. For example, Flora et al.

(1992: 14-15) argue that while a “shared sense of identity” is needed for community, the key characteristic is the physical locality where interactions and identities are formed and maintained.

. . . [W]e use *community* to mean place or location. A community may or may not provide the social system through which its members’ needs are met. It may or may not provide a sense of identity for its members. What a community does provide is what some sociologists now call *locality*, a geographically defined place where people interact. How people interact shapes the structures and institutions of the locality. Those structures and institutions in turn shape the activities of the people who interact (Lobao 1990).

This indicates that geographically bounded communities can provide a scientifically sound measurement unit for social assessment. Some analysts have argued that geographically bounded communities are becoming less important owing to changes in technology, communication, transportation, and the like, and have described communities only in terms of social interaction (cf., Wellman et al. 1988). Most theorists, however, continue to argue for a place-based conception of community.

In fact, Wilkinson (1991: 111) has argued that modern mobility may have actually increased the importance of locality, because people are freer to choose residential locales than in the past. “Choice has increased, but attachment to place has not necessarily declined as a result. What has declined . . . is the extent to which people are restricted to a particular place.” Greider and Krannich (1985), for example, found that locality-based interactions did not decline as a result of rapid growth in energy “boom-towns” (Greider and Krannich 1985: 67).

Focusing a social assessment on interest-based communities, on the other hand, may lead to an incomplete analysis and reduce the generalizability of results. For example, in addition to the interest groups identified in FEMAT, many other stakeholders (perhaps hundreds) could have been included. By necessity, some interests were lumped into broad categories (e.g., amenity interests), some were not included (e.g., national environmental interests), and the traditional social and economic interests (e.g., loggers) were emphasized. These decisions were the result of the scope and purpose of FEMAT in general and the time and finances available for analysis.

For multiresource planning in general, interest communities are innumerable. Also, interested stakeholders will depend on the type or scope of critical issues, and these can and will change over time (Geisler 1993). New interest groups will enter and some will drop out as issues change throughout various stages of planning, implementation, and monitoring. The selection and analysis of interest communities are based on resource- and issue-related behavior and political action. Geographic communities, on the other hand, should be based on generalizable criteria of social organization and interaction that are external to specific conservation planning issues. Interest-based communities are still important, but they should be used to complement rather than precede or supplant geographic communities. And because some interest communities are found within geographic communities (Brandenburg and Carroll 1995), an understanding of the local community is needed before one can evaluate the relevance and social dynamics of some interest-based communities.

An additional benefit of focusing first on geographic communities in planning is that community areas can be mapped. This can help increase the comparability of social and biophysical data, increase the value of social data for planning, and improve the ability to display information for public involvement and conflict management purposes.

3. Geographic communities are regions where residents interact and meet some of their needs on a daily basis.

Despite the general consensus that no single definition can describe what a human community is, there are some common theoretical conceptions of community in both rural sociology and human ecology. In addition to a place or geographic referent, most definitions provide social structural or organizational elements and certain forms of social interaction (Machlis and Force 1988).

Hillery (1955: 111) conducted a content analysis of 94 definitions of community and found that the only area of agreement among scholars at that time was that community “consists of persons in social interaction within the geographic area and having one or more additional common ties” (cited in Roloff 1995: 43). Likewise, Kaufman (1959: 9) proposed an “interactional” conception of community that consists of three parts: a local unit of space, a characteristic way of life that includes collective goals, and collective action regarding common concerns of the community. These conceptions mirror the perspectives of human ecologists, who view communities as territories having spatial boundaries, a social hierarchy or “system of authority” (which determines how communities will react to change), and social norms (which sanction shared expectations and reactions to change) (Burch and DeLuca 1984: 112-120).

One of the most detailed delineations of community is that of Wilkinson (1991: 2), who combines the perspectives of rural sociologists and human ecologists. He identifies three primary elements of rural communities: (1) a “locality” or territory where people live and meet their daily needs; (2) a “local society,” which is the network of associations for “meeting common needs and expressing common interests”; and (3) a “community field” where residents meet and express issues of shared concern related to the locality.¹

Thus, the dominant sociological conceptions of community contain both a spatial element and certain forms of social interaction. For the purposes of conservation planning, in order for the specific **types** of social interaction to be made useful, decisions regarding the size and scope of the geographic region forming the community measurement unit must be made. The advantage of Wilkinson’s community definition is the addition of an approximate scale for a measurement unit—the region where people interact and meet needs on a daily basis, and the region where they participate in locality-based actions (1991). For example, the “locality” is the region where one finds friends, job, church, shopping, and school; participates in regular entertainment or activities; and would vote on or attend public meetings related to place-based issues.

¹ This definition extends the conception of community provided by Flora et al. (1992), in that it adds the element of meeting daily needs in addition to reciprocal interaction. Although there is debate over what or how much of one’s daily needs must be met within the boundaries of a locality, or even what actually constitutes a “need,” Wilkinson argues that meeting at least some daily needs is an important element of one’s community. In fact, one could argue that reciprocal interaction is a daily need for people.

Such interaction factors are still variable (e.g., one may work outside of the area considered to be his or her local geographic community), but it suggests a general scale for a measurement unit that is relevant for conservation planning.

4. In general, counties and towns are not relevant communities for conservation planning.

As noted above, the use of communities in both social and economic assessment has been atheoretical, and most analysts simply use counties or individual towns as communities (Doak and Kusel 1996, Machlis and Force 1988). Counties are convenient to use as a unit of measurement because of the widespread availability of existing data, especially census and economic data (Holland et al. 1997; Machlis et al. 1995; cf., Rasker et al. 1994; Stynes et al. 1997).

Using counties for analysis units has been criticized by sociologists, because they are based on political boundaries that rarely reflect characteristics of social interaction that are necessary for a sense of community (Doak and Kusel 1996, Perry 1986). Significant variation in social and economic variables often exists within a given county (Sullivan 1997). Several towns being located in the same county does not mean they are similar enough to one another to be lumped into one measurement unit. Depending on social interaction patterns, there may actually be several communities within one county, and conversely, community-based activities may cross county boundaries.

Individual towns are also political rather than sociological units. Large metropolitan areas may contain many different social communities, and social communities in rural areas may consist of several small towns (Wilkinson 1991). Wilkinson's criterion of meeting daily needs is valuable for estimating community boundaries, especially for small, rural towns with relatively few economic or service opportunities and organizational infrastructure. Residents of small towns may commute to work or travel regularly to other towns for shopping, entertainment, socializing, schools, churches, public meetings, and the like.

For practical social assessment purposes, small towns may be too numerous for individual analysis in comprehensive planning. And although social data are readily available at the town and county levels, it is difficult to determine the relevance of the data for conservation planning.

5. The size and scale of the social measurement unit should result in a reasonable number of communities for use in NEPA-style analysis and adaptive management.

National Environmental Policy Act (NEPA) requires identifying social effects of management alternatives for all "interested and affected" groups in impact analysis. In multi-resource planning, this could mean a huge number of effect analyses are needed. Several different categories of effects—both positive and negative—should be identified for all social subgroups identified in the social assessment. This step is often ignored in SIA, however, because of the poor designation of measurement units (Blahna and Yonts-Shepard 1989, Doak and Kusel 1996, Endter-Wada et al. 1998).

As noted above, for small-scale or issue-specific projects (e.g., forest-level grazing lease program, a district timber harvest plan, or reservoir construction) where the issues are primarily local or regional in scope, it is practical to evaluate the effects of alternatives for individual towns. But for larger scale multiresource plans (e.g., forest planning), using the “town” as a unit of analysis would require analyzing impacts for many, sometimes hundreds, of cities or towns. For example, there are more than 540 towns within the boundaries of the Interior Columbia Basin Ecosystem Management Project (Haynes et al. 1998). Harris et al. (1998: 12) identified 387 of these as “small rural communities . . . defined as incorporated towns with fewer than 10,000 people.” Owing to this large number, the authors collected data for a random sample of half of the relevant communities, which included towns with as few as 20 residents. Likewise, FEMAT (1993) analysts estimated there were over 300 towns that would be “affected in some way by forest management issues” related to spotted owl management, but they could only analyze this large number of communities categorically (e.g., low vs. high “capacity” to respond to change). In essence, this approach results in an interest-based analysis rather than a locality-based analysis. Also, owing to the large number of towns, they could hold only two workshops and analyze the effects of 3 of the 10 management alternatives. Even this level of analysis would be impossible for forest planners who have smaller budgets and less social science expertise available than those of FEMAT and the interior Columbia River basin regional assessment.

Thus, in addition to conceptual relevance, the practicality of the measurement unit for NEPA-style analysis is critical. Like biophysical ecosystems, however, social systems are “nested” and can be arrayed on a continuum from individual persons to the world (Beckley 1998), and even the “community” as a point on such a continuum can range from neighborhoods to nations. For most types of conservation planning, a geographic unit that is larger than most small rural towns but smaller (or at least more conceptually relevant) than a county would meet the geographic scale for the interactional community as discussed above. For example, Wilkinson’s (1991) criterion as the region where people meet most of their daily needs would include the location of work, school, church, regular recreation and socializing, and shopping for groceries and small-ticket items. Most small or medium-size cities would each be one community, but several small towns and adjacent rural areas would combine to make a community.² Based on the scale of a forest plan, this would generally result in fewer than 20 community areas containing most of the local residents, rather the 100+ towns found near most national forests.

6. Community boundaries and key elements of social interaction should be identified, or at least verified, by area residents.

Just as no one set of objective criteria can explicitly define community boundaries for all purposes, the relevant types of social interaction that determine community are also varied and context dependent (Flora et al. 1992). There are as many potential measures of organization and interaction in social communities as there are ecological

² This generalization based on Wilkinson’s analysis of rural communities entails most of the local communities influenced by forest resource management. But in recent years, urban areas have become increasingly relevant for resource management (e.g., the “urban-wildland interface”). For these areas, a medium-size or large city can be considered one or more community areas. More research is needed to identify the extent of linkage between urban areas and national forest resources and to determine the specific criteria needed for identifying and describing the measurement units.

interactions in biophysical systems. Some measures that are used in conservation planning include population change, attitude change, resource dependence, community sustainability, and community capacity, resilience, and stability (Doak and Kusel 1996; FEMAT 1993; Harris et al. 1998; cf., Machlis and Force 1988). These measures are most appropriate for describing the effects or potential effects of change after a logical measurement unit is identified. Characteristics that are important for actually delineating community units, such as social networks, interaction patterns, or economic or organizational structure, are rarely used in conservation planning.

Despite the complexity of potential approaches for community identification, however, social analysts have one major advantage over their biophysical science counterparts: we can ask the observational element—the residents themselves—for their conception of community boundaries (MacIntyre 1981, cited in Borrie and Roggenbuck 1995). People are members of many different communities, but as Flora et al. (1992: 14) point out, “shared sense of identity” is needed for community to exist. Thus, if given a relevant context and purpose, community members should be qualified to identify their community areas.

This would be similar to Bryan’s (1996: 148-149) general approach to SIA as a participatory-planning activity rather than the technocratic-research orientation currently dominating SIA. The technocratic-research approach views SIA as an expert-driven model that applies scientific data and collection methods and quantitative impact projection techniques (cf., Burdge 1994). The participatory approach views SIA as collaboration between analysts and the public to identify types of impacts, relevant data, and preferred futures. The participatory model is becoming more common (e.g., participatory appraisal), and some analysts argue it is more valuable for understanding social phenomena and more applicable to agency planning than are technocratic approaches (Bryan 1996, Umans 1998).³ Thus, having impact-area residents identify relevant communities for social assessment would be an extension of the participatory SIA. But as residents are not trained analysts, multiple methods should be used for community identification, and the results should be verified with objective data like census block and place data (Jakes et al. 1998a; cf., Kusel 1996).

After community units are identified, the particular forms of organization and social interaction that are important for impact analysis should be identified. Here the need is to identify variables that describe linkages between the communities and community subgroups and the land and resources (Blahna et al. 1994, Carr 1995). The identification of these measures, as well as the analysis scope and relevant stakeholders, also should be a collaborative effort of community residents and other stakeholders, agency staff, and social science professionals (Blahna et al. 1994, Bryan 1996, Driver et al. 1995).

7. Map geographic communities in relation to the physical resources, and use “coarse filter” data to describe the communities and changing social conditions.

As with biophysical data, mapping social communities and “conditions” can be a valuable way to display social assessment data, but it is rarely done (Blahna et al. 1994, Driver et al. 1995, Kaufman et al. 1994). To facilitate the collection of mappable data, community boundaries need to be drawn so that community data can be quantified.

³ Unfortunately, these analysts also tend to focus on descriptive variables and impact analysis methods rather than on using participatory methods to help identify relevant measurement units.

For example, because communities are “fluid” rather than fixed entities, boundaries can be drawn so that census data that exist at the subcounty level can be used (cf., Doak and Kusel 1996; Jakes et al. 1998a).

Mapping of communities and related data also will require that relatively “coarse filter” data are used.⁴ There are several reasons for this. First, only certain types of basic social data are collected consistently at the subcounty level, and funding will rarely exist for collecting large amounts of primary data for social assessment purposes. Second, the data must be standardized within the specific boundaries being used to delineate community areas (cf., Sullivan 1997). For example, to be meaningful, the number of seasonal housing units in a community must be presented as a percentage of the total number of housing units in a community. This standardization process is relatively straightforward with existing data units (e.g., county), but can be cumbersome when combining several different census units or types of units. Third, to meet the goals of adaptive management, the data will need to be updated periodically, which can be a difficult task for agency staff with limited expertise, time, and budget.

And finally, a need for both social and biophysical scientists to avoid what Kaufmann calls “analysis paralysis” (Blahna 1995: 510). This is where, in an effort to collect all potentially relevant information, vast amounts of data are collected, and most of it ends up being useless because of the amount of data, lack of applicability of the data, or both (Driver et al. 1995, Kaufmann et al. 1994). This problem has plagued biophysical scientists, and evidence from recent ecosystem management regional assessments and large-scale forest plans indicates analysis paralysis continues today and influences social scientists as well. Thus, social scientists debate the amount of data that needs to be collected up front in planning, and the importance of not repeating the mistakes of biophysical scientists by collecting large amounts of marginally valuable data in early planning stages (Blahna 1995, Driver et al. 1995). Furthermore, time and resources available for monitoring will likely never live up to expectations needed for the front-end-loaded, data-driven planning models. Therefore, fine-filter data needs should be issue or decision dependent and carefully tied to specific assessment objectives. Many fine-filter data needs will emerge during plan implementation and are difficult to predict during the planning process (Geisler 1993).

8. The size and scope of geographic communities must be flexible and serve as a basis for both smaller (e.g., project) and larger (e.g., regional) analyses.

Because conservation planning and ecosystem management take place at several analysis scales (site, watershed, landscape, ecoregion, etc.), it is important that the social measurement unit can be adapted to various levels of analysis (Carr 1995). Like ecological units, the boundaries of social communities should not be treated as final or fixed, but rather as starting points for understanding social dynamics at different levels of analysis as needed for specific decision situations. One advantage of using community as a measurement unit is that it can be flexible to different levels of analysis.

⁴ The “coarse filter” and “fine filter” distinctions are terms used in biophysical sciences to refer to broader vs. specific-level data and analysis. Kaufmann et al. (1994: 16-17) define coarse-filter analysis as “an analysis of aggregates of elements such as cover type or plant community,” and fine-filter analysis as “an analysis of components of aggregates such as plant communities in a cover type or species in a plant community.”

Recent studies have shown that the scale of the community measurement unit can dramatically impact the potential results and implications of results of social analysis (Beckley 1998, Driver et al. 1995, Sullivan 1997). For example, Sullivan (1997) compared census and forest permit data summarized for three different units of analysis: counties, communities (as defined in Wilkinson (1991) above), and towns. He found that the county level of analysis masked most of the social variability that was useful for forest planning on the Dixie National Forest in Utah. In one county, 17.4 percent of the households use firewood as the primary heating fuel, but in one community in the county, 54.4 percent of the households relied on firewood (Sullivan 1997: 46). For some other issues, one needed to look at individual towns to understand the social effects of certain types of decisions. For example, even within agricultural communities, ranchers in some towns rely heavily on Forest Service grazing permits, but in other towns within the community, ranchers graze cattle on Bureau of Land Management or private land.

Thus, another advantage of using community as described in no. 5 above as a basic measurement unit is its relevance for U.S. Forest Service planning, which is specifically mandated for all national forests. If a solid community assessment exists for a forest plan, a lower level of analysis (town, neighborhood, household, interest group, etc.) can be adapted for district, watershed, or other subforest-level decisionmaking purpose depending on the type and scale of issues that emerge after the initial planning process. If several adjacent forests use a similar community measurement unit, it is theoretically possible to combine community maps from the different forests in a large, ecoregional assessment.

Unfortunately, current forest plans and ecoregional assessments use many different social measurement units, and the different assessments are not comparable (Endter-Wada et al. 1998: 896). Likewise, the relation between the ecoregional social assessments and existing smaller scale assessments (such as existing Forest Service plans) is unclear.

Community Measures Used in Assessments

The community level of analysis should be a focus in conservation planning for several reasons. First, using individuals as the analysis unit is a large and complex task; it would require major social science expertise, time, and money dedicated to the social assessment, the planning implications are often unclear, and ultimately it would miss important social information above the individual analysis level. Second, social groups (such as fishermen, environmentalists, ranchers) are increasingly being considered interest-based communities. Although communities of interest are important units for a social assessment, they should be considered supplemental to a more conceptually based analysis of geographical or place-based communities. Towns and counties, however, often do not possess the requisite characteristics of shared identity, social interaction and organization, and locality-based action found in scientific conceptions of community.

Third, the issue of scale and relevant analysis variables must be considered in relation to practical considerations for application and for NEPA-type documentation: the size of the analysis area, adaptability to various analysis scales, and long-term monitoring. The most relevant scale for conservation planning approximates mid-sized towns, clusters of small rural towns, or subgroups of large metropolitan areas. Coarse-filter data should be the focus of an initial assessment; fine-filter data needs will emerge

from the types of issues and concerns that arise throughout planning and implementation. Fourth, geographically based social units may be incorporated into ecosystem-based analyses, which are, by definition, geographically bounded.

Sample Planning Assessments and Studies Using Social Communities

Next we review selected studies that use social interaction criteria for defining geographic boundaries for social communities. In particular, we focus on studies with measurement units that approximate the scale of analysis suggested by the criteria discussed above. The review is divided into three parts: ecosystem management regional assessments, forest plans, and watershed-level studies. This is not an exhaustive review; the purpose is to identify and categorize some studies that use measurement units that seem to be relevant for multiresource conservation planning and that may help analysts develop and evaluate social assessments in conservation planning and ecosystem management.

Ecosystem Management Regional Assessments

As a result of the recent policy emphasis on ecosystem management, a number of interagency ecosystem management “regional assessments” have been completed. These large-scale assessments include physical and social characteristics in and around multistate ecological regions. Although these assessments are not decision-making documents, per se, they do include indicators of social adaptation to general changes in resource management scenarios. Unlike earlier resource agency planning efforts, these assessments contain a wealth of social and economic information. The ecosystem-level projects reviewed for this paper include the Sierra Nevada Ecosystem Project (Doak and Kusel 1996, Kusel 1996) and the Interior Columbia Basin Ecosystem Management Project (ICBEMP) (Harris et al. 1998, USDA FS 1996). Other social assessments conducted on a similar scale are the FEMAT (1993) report (discussed above), the Southern Appalachian Assessment (Cordell et al. 1996), and an ecosystem sustainability study for South Florida conducted by the U.S. Man and Biosphere Directorate (Harwell et al. 1996).

Like past social assessments, most regional assessments use measurement units based on standard census county and subcounty data. For example, the ICBEMP team conducted a community economic assessment based on 100 counties, 9 aggregations of counties (based on the Bureau of Economic Analysis “functional economic units”), and 476 individual towns and other census designated places (Quigley et al. 1998, USDA FS 1996). This approach provides a large and valuable social science database, but the measurement units are based primarily on existing economic criteria and political boundaries rather than social interaction and shared identity. The counties and county aggregations are generally larger than a community, and many of the census places are too small (e.g., one town has only 22 residents). Also, the adaptability of the measurement units for smaller levels of analysis is unclear, although the census place data could be valuable for site- and project-specific planning and decisionmaking, and possibly for watershed-level planning. The data also can be valuable for long-term monitoring at the ecoregional level.

This general approach is a reflection of the size and scope of a regional assessment. Only one ecoregional project, the Sierra Nevada project, specifically developed a measurement unit based on social interaction criteria (Doak and Kusel 1996, Kusel 1996). They provide a critical analysis of the literature, and identify community “aggregations” based on combinations of existing census block groups (the smallest geographically based census unit) to “form meaningful social units that more closely represent locally defined communities” (Doak and Kusel 1996: 377). From 720 census

blocks, they identified 182 community aggregates ranging in population from just over 100 people up to 34,000 persons. Discussions with community planners and community capacity workshops were used to develop the final aggregations, which were based on seven qualitative and quantitative criteria such as geographic proximity, common service centers and schools, and similar demographic characteristics. After identifying community units, the analysts used quantitative and qualitative (local expert judgments) data to estimate socioeconomic status and community capacity indicators that were used for ecoregional assessment.

The social assessment for the Sierra Nevada project may directly form the basis for forest- and watershed-level measurement units. The Sierra Nevada communities also were based on conceptually relevant social criteria in that community aggregations were all “locality based with a shared identity” (Doak and Kusel 1996: 366). The drawbacks of the method are that the community units are based on fairly technical criteria and require social science expertise to develop, describe, and map. However, if ecosystem management is to become a reality in resource management agencies, the ecoregional level of analysis will probably require larger budgets and more active participation of social science professionals than do smaller scale plans.

Forest Planning Social Assessments

National forest plans also provide a large source of social assessment information, but measurement units that have been used are even more diverse than those used for the ecoregional assessments. During the first round of forest planning in the late 1970s to mid 1980s, and more recently for forest plan amendments, most analysts simply identified certain towns, aggregates of towns, or interest groups for analysis by using no social or economic criteria other than proximity to the forest and past participation in management activities. For forests that documented the development of the measurement unit, many used a process, or variation of a process, developed for the Forest Service by the Foundation for Urban and Neighborhood Development (FUND 1978) in the late 1970s.

Social resource unit approach—The FUND method included two levels of analysis: social resource units (SRUs) and human resource units (HRUs). First, SRUs are a identified and described for each forest.

A Social Resource Unit is the identification of social, cultural and economic realities of a geographic setting and the physical resources which sustain them. The Units are drawn according to natural boundaries that define the way people live in their environments. Mountain valleys, river basins, settlement patterns, agricultural activity, cultural values and many other characteristics combine to shape distinctive ways of life. A Social Resource Unit displays a population’s interaction with its specific environment (FUND 1978: 27).

From these SRUs, smaller HRUs are identified to meet forest or district-specific needs. These HRUs are based on seven cultural and four economic indicators: (1) existing and future publics (persons that can be grouped by some common interest or purpose), (2) settlement patterns, (3) work routines (area stability, work options, and cultural identity), (4) communication networks, (5) social support services, (6) recreational activities, (7) geographic boundaries, (8) population change, (9) employment mix, (10) wage structure, and (11) labor supply. The geographic boundaries for both

SRUs and HRUs are based on characteristics of the natural environment, such as mountains or plateaus, river basins, or major roads. After mapping HRU boundaries, planners describe the relation of each HRU to the forest resources.

Among the forests that applied the FUND method were the Chequamegon (WI), Dixie (UT), and Hiawatha (MI) National Forests. In many ways, the method directly addresses several of the criteria identified above for using community as a measurement unit. The process is based on social information but results in geographically identifiable areas, and a manageable number of social units for comprehensive planning. For example, the Chequamegon National Forest ended up with 12 HRUs for a seven-county region in northern Wisconsin, and the Hiawatha ended up with 13 geographic subunits for the eastern two-thirds of Michigan's Upper Peninsula (FUND 1978).

The FUND method has drawbacks, however. It does not provide a specific conceptual basis for identifying HRUs, and the criteria for identifying the social units are relatively vague. As a result, considerable diversity and inconsistency were seen in the application of the method. Some forests included a great deal of useful information about the social subunits, key interest groups within the subunits, and critical economic and social issues related to forest management. Others simply listed key contacts and used a short paragraph characterizing the population of an area and never referred to the units in the forest plan again. Additionally, using landscape boundaries to define HRUs did not allow for the summarization of census, economic, or even Forest Service permit data. As a result, forest planners were uncertain how to use the resulting information, and there was no way to update and analyze trend data on a regular basis. More recent applications of the SRU method have begun to address some of these limitations (cf., Preston 1999).

Functional community approach—More recently, a place-based community identification method was developed to help support forest plan revision for the joint plan being produced by the Chequamegon and Nicolet National Forests. Jakes et al. (1998a, 1998b) used a process based on the group ecology method of Flynn (1985) to identify “functional communities” based on categorical (social, economic, and demographic) and functional characteristics of residents. Functional groups are based on qualitative indicators of similar behavior and interaction related to a particular social function, in this case, “economic, political, community, and cultural ties to the area’s natural resources” (Jakes et al. 1998a: 34). Functional communities were identified through interviews with Forest Service staff and 46 community key informants. Interview subjects were asked to draw functional community boundaries on mylar sheets overlaying a regional map. Areas of agreement resulted in 15 community areas in the north-central and northeastern one-third of Wisconsin. These community areas were checked with the use of census and other categorical data to be sure that areas with very different demographic and economic characteristics were not being combined into one functional community.

The goal of the Chequamegon-Nicolet assessment was to identify and describe socio-logically relevant communities relatively quickly (to meet a tight planning timeframe). The method is easy to use for regular Forest Service staff, and community units are based on socially defined criteria related specifically to the use of natural resources. The final community areas, however, did not include many of the area’s residents, especially in large rural areas. Also the quantitative data used to describe the

communities were extrapolated based on the percentage of the census-designated places contained within the boundary of each community area identified. The potential for extrapolation errors is unknown.

Interactional community approach—A similar key-informant mapping approach is currently being tested on the Dixie and Hiawatha National Forests. Rather than using Flynn's (1985) functional communities, however, this approach uses "interactional communities" based on Wilkinson's (1991) criteria (Sullivan 1997; Blahna, et al., n.d.). To aid the mapping exercise, the key informants were presented with a summary version of Wilkinson's (1991) community definition:

Communities: localized areas or "localities," without fixed boundaries . . . where residents meet their daily needs. Besides providing basic goods and services, communities have the social organization and infrastructure which provide opportunities for residents to interact, participate, and express issues of common concern.

Because even this definition was laden with jargon, a list of the typical daily and weekly social activities was included for reference: church, school, work, destinations for regular entertainment, socializing, shopping, and areas where people tend to have similar economic characteristics, interests, and attitudes. In short, the goal was to identify regions where people meet most of their daily and weekly social and economic needs, which can include a "single city, several nearby small towns, a large rural area and a town . . . or any combination of these."

The resulting community maps were combined to identify areas of agreement approximating community boundaries. Then, community boundaries were expanded or contracted to coincide with the nearest census or ZIP Code boundaries. In the six-county region of the Dixie National Forest in southern Utah, 12 community areas were identified; for the Hiawatha National Forest, 10 communities were identified for the eastern two-thirds of the Upper Peninsula of Michigan. This method has the same advantages as the functional community technique discussed above, but has the added advantage of using a definition of community based more on complete social interaction than are the functional communities. Drawing community boundaries to coincide with census and ZIP Code boundaries improved data quality, but added the potential for error owing to the inclusion of areas that may or may not meet the definition.

Watershed-Level Social Assessments

A small but growing number of studies provide a social assessment for watershed-level projects in which the community designations are based on clusters of adjacent towns. For example, Brandenburg and Carroll (1995) identified three "community clusters" of two towns each that had similar geographic and use patterns related to the Siouxon Creek River Drainage on the Gifford Pinchot National Forest in southern Washington. The towns within the community clusters were aggregated based on geographic proximity, general similarity of social and economic characteristics, and the fact that clusters were separated from each other by natural or human-made barriers. Most of the data collected came from Forest Service sponsored public involvement, community archival records, and indepth interviews with community residents. The purpose of the study was to understand the role that the Siouxon watershed played in community residents' perception of their "place."

Shindler et al. (1996) conducted a survey of residents near the Central Cascades Adaptive Management Area (AMA) in Oregon. In addition to attitudes toward adaptive-management concepts, the survey was used to assess the background characteristics of the residents, and a quantitative analysis of “key variables” was used to divide the entire region into three geographic communities based on ZIP Code groupings. Two of the communities were combinations of small towns located in each of the two river drainages of the AMA: the South Santiam River (comprising the towns of Albany, Lebanon, and Sweet Home), and the McKenzie River communities (comprising Springfield, Blue River, McKenzie Bridge, and other unincorporated communities). The third community was the city of Eugene, Oregon. Although towns within these clusters had some similarities that were relevant for combining towns into communities, differences between the towns also were discussed as part of the full data analysis.

These two studies used place-based local communities that resulted from combining smaller towns into a larger measurement unit based on both the resource of interest and important elements of social interaction. They were valuable analysis units for the purposes of the individual studies, but the authors did not use a generalizable community definition. Thus, it is difficult to say how adaptable the measurement units would be for larger scale comprehensive planning tasks. Also, all the data presented were primary data; there is no indication if broader, coarse-filter data could be used to describe the social units for larger planning scales or for monitoring.

Future Research Needs

The small sample of studies reviewed provides support for the general conceptual validity and practical relevance of using geographic communities based on social interaction rather than standard economic indices or political boundaries as a measurement unit for conservation planning. However, many unanswered questions about the generalizability and adaptability of these methods remain that would benefit from replication and additional research. Four topics of future research are listed.

Research Topics

Understanding the practical implications of applying different theoretical approaches to community—Community as a sociological concept has many definitions based on different theoretical approaches and methods of operationalization. Only a handful of possibilities are represented in the sampling of studies that have applied community to the problem of conservation planning. With this small group of studies, it is not possible to understand how the choice of theoretical orientation influences outcomes. Research is needed to explore whether and how different theoretical approaches influence the characterization of communities and their value for conservation planning. For example, it would be valuable to apply different methods to the same region to compare the results.

Evaluating the effectiveness of aggregating up and subdividing down communities for various land management and planning purposes—Although it is scientifically valid to use communities as described here as a basis for constructing a hierarchy, little is known about the practicality and usefulness of doing this for specific land management objectives. Research that focuses on whether aggregating communities upward for larger scale analysis or disaggregating communities for more focused analysis provides useful information to land managers would greatly benefit the adoption of a specific approach.

Place attachment—Social science research is just beginning to recognize the broader role of natural resources in defining “place” and its importance to individuals and social communities. The review of studies above indicates that a better link between SIA and the literature on sense of place and place attachment is needed. The measurement unit will play a critical role because place attachment is much more than simple economic or commodity related uses of the resources (Carr 1995, Williams et al. 1992, Williams and Stewart 1998). To date, most research regarding the role of natural resources in place attachment is theoretical or descriptive; little research exists on the value of place attachment and related concepts for resource planning.

Changing community dynamics over time—Over time, the communities identified in conservation planning processes will change. Their boundaries may shift, their social structure may evolve, or new issues may develop. Tracking changes within and between communities is needed to investigate the dynamics of the relations among these changes and the influence of these changes on land management. Long-term research on selected communities would enhance understanding of community dynamics and linkages to public land management and could provide insights into the theoretical conception and structure of social communities. This will require the use of selected fine-filter measures—such as adaptiveness and resiliency—in a longitudinal design along with changes in the biophysical environment.

Conclusions

To date, the measurement unit for most social assessment studies in natural resource planning has been inconsistent, atheoretical, and often of marginal value for conservation planning. One way to standardize the measurement unit is to start with geographic localities that are based on social interaction criteria rather than defaulting to existing political boundaries.

By arguing that identifying local geographic communities is the first step in a social assessment, however, we are not suggesting that local community interests are more important for conservation planning than local, state, or national communities of interest. The role of interest-based communities will depend on the planning goals and issues that emerge during social assessment and will change during plan implementation. Community as a locality-based phenomenon, on the other hand, is more basic and theoretically relevant, and, for multiresource conservation planning, it is more practical and flexible. The specific size of communities, variables of concern, and assessment methods will differ depending on planning objectives, but this is a topic for future research. Using more consistent social measurement units is an important first step in improving social assessments and advancing this research agenda.

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Assessing Well-Being in Forest-Dependent Communities

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Abstract

This paper presents a new approach to the concept and assessment of well-being in forest-dependent communities. Studies of well-being in agrarian communities, boom-towns (communities undergoing rapid growth), and forest-dependent communities, are examined to highlight common themes in natural-resource-dependent community studies. Social indicators are discussed, and a summary of weaknesses is presented. The county, a commonly used unit of analysis, is rejected in favor of a more socially relevant unit. Discussion of a new approach to well-being in forest communities begins with definitions of the terms **community** and **forest dependence**. The work of Amartya Sen, whose concept of well-being focuses on the real opportunities people have and their achievements in light of their opportunities, forms the foundation of the new approach proposed here. Sen's conceptualization is broadened by focusing on the community and acknowledging the importance of a sense of place. Methodologically, this new approach adds to evaluation of social indicators an assessment of community capacity, which consists of three components—physical capital, human capital, and social capital—and involves evaluating how residents draw on and develop these aspects of their community to meet local needs and create opportunities for residents. This results in well-being assessment that includes static as well as dynamic measures of how communities respond and create opportunities to improve local well-being.

Introduction

Forest ecosystems in North America have become the focus of comprehensive and broad-scale ecosystem studies. Many of these studies have adopted an "ecosystem management" approach (see, e.g., Bormann et al. 1994, FEMAT 1993, Ministry of Environment 1994, Quigley and Arbelbide 1997, Sierra Nevada Ecosystem Project

1996, among others). Ecosystem management has been defined in diverse ways, but these definitions generally agree that humans and human communities are a part of ecosystems and an important area of study (Grumbine 1994, Manley et al. 1995, World Commission on Environment and Development 1987).

This paper presents a new conceptual and methodological approach to assessing community well-being in communities that are dependent on natural resources, with a focus on forest-dependent communities. This focus stems primarily from the recent emphasis on forest ecosystem studies and secondarily because the well-being of communities in forested areas has long been too narrowly discussed in the context of extractive forest management activities. Studies involving other kinds of natural-resource-dependent communities and studies using social indicators are examined to highlight the diversity and complexity of approaches to understanding human well-being.

The paper is divided into two parts. The first part begins with a review of studies evaluating well-being and the lives of individuals living in natural-resource-dependent communities. The majority of such studies have narrowly defined dependence in terms of commodity production, spending considerable energy analyzing and generally overemphasizing the connection between resources and human well-being. Common themes of these studies are highlighted. The first part of the paper concludes with a discussion of social indicators that address the more basic issues of what well-being is and how it should be assessed, the limitations of social indicators, and the use of counties as the unit of analysis for understanding well-being.

The second part of this paper presents a new approach to the study of well-being in forest-dependent communities. The paper concludes with a discussion of how this new focus informs a new approach to community well-being assessment in the context of ecosystem management studies.

The inclusion of humans and the study of community well-being in ecosystem studies is in its infancy. It is therefore useful to briefly examine empirical studies of resource dependency and human well-being in natural-resource-dependent communities (NRDCs). The objective of this brief review is to offer a glimpse of the diverse ways in which researchers have grappled with the linkage of resource dependency and human and community well-being.

An often implicit and underlying aspect of resource-dependent community studies is the attempt to understand the relation (more often than not described as dependence) between resources and well-being. Ignoring for the moment the difficulty in making a causal connection between resource use and well-being, the more basic questions are what constitutes well-being and how well-being might best be evaluated. Other research, such as the work on social indicators, has addressed these questions more directly, although still not without difficulties.

Two classic studies—Two of the best known studies linking resource use and community well-being took place in the mid-1940s in California and Montana. Walter Goldschmidt (1947) investigated agriculture communities in California, and Harold and

Studies of Well-Being in Natural-Resource-Dependent Communities and the Use of Social Indicators

Resource Dependency and Well-Being

Lois Kaufman (1946) examined forest communities in Montana. The way these researchers conceptualized the connection between resource use and well-being laid the groundwork for studies that followed, even those 50 years later.

Goldschmidt (1947) evaluated the structure of agriculture and its relation to community well-being in California. The variables Goldschmidt examined include wages of owner-operators, industrial workers, and basic laborers; employment turnover; security in labor; social isolation of workers; labor participation in important community decisions; and the strength and diversity of community institutions and infrastructure. Goldschmidt (1947) found that an increase in the concentration of the farm sector (i.e., fewer landowners) led to a decline in rural economic and social well-being. In contrast to a community surrounded by large farms, Goldschmidt (1947) found that a community surrounded by small farms had a higher percentage of self-employed and white-collar workers; a lower percentage of farm wage laborers; more business and retail trade; more schools, parks, civic and social organizations, newspapers, and churches; a better developed infrastructure; and a more local decisionmaking structure. The dimensions of well-being most affected were living conditions and income.

Subsequent studies have shown that the inverse relation between large-scale industrialized agriculture and well-being still generally holds true for California and nearby states in which large-scale industrial agriculture is dominant (MacCannell 1988, Swanson 1988), but regional and historical settings must be taken into account (Lobao et al. 1990). In raising the impact of land tenure on the well-being of agrarian communities as an issue, Goldschmidt's (1947) study also raised the possibility that concentration of control of other resources, particularly in the hands of essentially absentee owners, might have similar adverse effects in other kinds of resource-dependent communities.

A cornerstone of Goldschmidt's (1947) study is the Jeffersonian ideal of the small, agrarian rural community. This is the model against which agriculture and other resource-dependent communities have been evaluated (Bealer et al. 1965, Drielsma 1984, Swanson 1988). The community in this model is typically stable, small, and offers the opportunity for healthy family life, independence, and entrepreneurial activity (Drielsma 1984).

The best-known study of forest community well-being was carried out by Kaufman and Kaufman (1946) in the Libby-Troy area of Montana. In addressing well-being, the Kaufmans (1946) used the then-popular term "stability." But because their use of "stability" encompasses much more than employment stability, the term "well-being" is substituted for it in this discussion of their work.¹

The Kaufmans believed that creation of a prosperous economy is essential to well-being, but in addition to a concern about "what people do for a living" is a concern about "how well they live." They state, "A characteristic of the good life is that

¹ The commonly held misconception of community stability calls for a steady flow of timber products, primarily logs, to ensure stable employment in the timber industry, which, in turn, leads to community well-being. Community stability, however, was once conceived in much broader terms (see Dana 1918, Kaufman and Kaufman 1946). Beginning in the late 1920s, however, the term became inextricably linked to timber industry employment in U.S. Forest Service discussions of sustained-yield forest management (Fortmann et al. 1989).

experiences in the community and of the forest are not only regarded as means but as ends in themselves—they are appreciated and enjoyed for their intrinsic worth. Also, the good life has a depth and variety of experience” (Kaufman and Kaufman 1946: 23). They point out that attainment of “the highest standard of living” can be realized only by maintaining a balance between population and natural resources. They link this concern to the limits of “timber supply, production costs and markets” (Kaufman and Kaufman 1946: 15). Like more conventional analysts, they agree that maintenance of community well-being involves the development of a stable timber industry, a diversified economy, and the practice of sustained-yield forestry. But in addition to the contribution of land use and industry to well-being, they describe five other “approaches” toward maintaining community well-being: organizing the greater community, strengthening the rural home, making religion a part of life and the church more community centered, promoting public participation in the determination of forest policy, and creating a forest-centered tradition. In these suggestions there is evidence of both the Jeffersonian tradition and a sense that the promotion of well-being involves process as well as products.

Kaufman and Kaufman (1946) question the wisdom of the Sustained-Yield Forest Management Act passed at the time of the study. They argue that it favored timber operators with large holdings, thereby concentrating economic power in the hands of a few while being “silent concerning controls that might be needed to safeguard the public interests” (Kaufman and Kaufman 1946: 71). In one of the first calls for public involvement, the Kaufmans suggest the Forest Service involve the public in formulation of forest policy to ensure that the concentration of economic power does not result in the abrogation of public interests and concerns. They maintain such involvement should be “extensive” (Kaufman and Kaufman 1946: 85). The Kaufmans’ study is rare in its attention to these issues.

Boomtown studies—Studies of rapid resource-related growth in small communities, commonly known as boomtown studies, focus on the impact of natural resource development. Well-being is generally discussed in terms of social disruption—primarily increased crime—resulting from rapid population increases. Population growth, as the independent variable, is associated with extractive energy projects such as oil or gas or mining development. Dependent variables have included measures of income and various aspects of employment, but the variables most commonly used by far are measures of crime (Albrecht 1982, Finsterbusch 1982, Freudenburg and Jones 1991, Gold 1982, Krannich et al. 1989, Seydlitz et al. 1993, Wilkenson et al. 1982).

Some researchers have drawn broad conclusions suggesting that rapid development leads to the loss of integrative functions and is accompanied by a loss of local control, caused primarily by the rapid influx of outsiders overwhelming existing social services and networks (Gold 1985; Jobes 1984a, 1984b; Kennedy and Mehra 1985; Krannich et al. 1989). Gold (1985) believes disruption is caused by contrasts in lifeways and involves the replacement of close friendships and kin networks (*gemeinschaft* characteristics) with a less integrated social organization.

Freudenburg and Jones (1991), in an exhaustive review of boomtown studies, found that crime increased by a factor of three, on average. This is in contrast to earlier studies that, as Freudenburg and Jones point out, overstate the benefits of development activities. Yet, while lending support to the social disruption thesis (Finsterbusch 1982),

the authors take issue with those who use grand theories and draw broad conclusions. They adopt what they term a middle-range perspective and suggest that the increase in crime associated with rapid development is due to reduced density of acquaintances. Unlike Goldschmidt's (1947) findings, however, decisionmaking controlled by extralocal organizations was not examined or did not surface as a significant issue for researchers in these studies.

Forest dependence—Building on the theme of outsider control raised in both Goldschmidt's (1947) and the Kaufmans' (1946) work, Marchak (1990), in her study of forest-dependent towns in British Columbia, explored the adverse effects of uncertainty about future employment (reflected in high rates of population turnover) stemming from control of the resource base by outside firms that make decisions "without reference to the needs of workers in these communities" (Marchak 1990: 99). Marchak noted that high turnover rates reflect the structure of the industry rather than the personal choices of workers. Marchak was the first researcher to note that women are particularly demoralized by the conditions in single-industry forest towns.

Kusel and Fortmann (1991) and Kusel (1991) studied forest counties and communities in California, focusing on general well-being and the capacity of forest communities to maintain and enhance local well-being. Capacity is described as "what enables communities to pull through hard times" (Kusel and Fortmann 1991: 84). Kusel and Fortmann (1991) determined that communities are deeply affected by forces outside of their control, including outside employers, natural resource decisionmakers, and outside money. They found that concentration of private forest land in the hands of fewer owners is associated with lower median income, and high percentages of public timberland are associated with higher poverty rates (at the county level). They also found pockets of high poverty rates in low-poverty forest counties. In contrast to studies characterizing the "inevitable" culture clash between newcomers and long-standing residents (see, for example, Price and Clay 1980, Schnaiberg 1986), Kusel and Fortmann (1991) note that recent in-migrants and women play crucial roles in mobilizing community action and increasing local capacity.

In an ethnographic study of several communities, Kusel (1991) found that extensive job loss in rural forest communities was devastating in both the short and long term. Economic and social turmoil led to short-term difficulties for families and communities and resulted in a long-term reduction in community capacity. Kusel also found that local, family-run mills contribute more to community well-being than mills owned by large, nonlocal owners.

Forest communities in the Pacific Northwest were the focus of a social assessment conducted by the Forest Ecosystem Management Assessment Team (FEMAT 1993).² The FEMAT study is one of the first large-scale American ecosystem studies to explicitly include and assess human communities. Objectives of the social assessment were focused primarily on identifying the consequences of forest management alternatives for communities and individuals, and describing how these alternatives affect social values and constituencies (FEMAT 1993, VII-45). Although there was insufficient time

² This was one of three teams created by President Clinton to "identify management alternatives that attain the greatest economic and social contribution from the forests of the region and meet all requirements of applicable laws and regulations" (FEMAT 1993, ii).

available for a comprehensive assessment, this was the first large ecosystem study to use the concept of community capacity and to convene panels of experts to assess it. The concept of community capacity was defined in the workshops as an independent variable that influences community response to, and the consequences of, land-management alternatives. Higher capacity communities were considered more adaptable and therefore less affected by changes in forest management. The concept of capacity, advanced in the Sierra Nevada Ecosystem Project (1996), plays a key role in the new approach to well-being and is described later.

Social Indicators of Well-Being

Social indicators are used in (1) social impact assessment (SIA), which predicts and assesses the consequences of technical projects (e.g., hydroelectric projects, waste-dump siting, etc.) and policy actions (Interorganizational Committee on Guidelines and Principles 1994); and (2) research that evaluates well-being or life conditions generally (e.g., Allardt 1993, Campbell 1981). This portion of the paper examines the philosophical and conceptual underpinnings of well-being (see, for example, Nussbaum and Sen 1993). These two broad areas of research offer important insights to the study of the relation of resource dependence to community well-being, and much of this discussion relies on them.

Terms such as standard of living, quality of life, welfare, happiness, life satisfaction, and others have all been used in studies to characterize a good and healthy life or the critical components of one. But they often have different meanings to different people and consequently have led to confusion about what well-being is and how it might best be measured. The numerous approaches to the study of well-being, such as measurement of utility, income, personal satisfaction, and happiness, to mention just a few, have yielded incommensurable and, at times, contradictory results that have muddied the waters of well-being assessment further. Burdge (1994: 3) states, "The field of impact assessment does not have a series of agreed upon concepts or list of variables around which to accumulate research knowledge," and this same lack of agreement applies to how environmental planning and social assessment might be effectively linked.

In addition to conceptual concerns, social indicator researchers have wrestled with the problem of whether to study well-being by using subjective self-report measures or sociodemographic measures, considered by many to be more "objective" measures of external conditions (Allardt 1993, Erikson 1993). Implicit in the debate over appropriate measures are the questions, What variables should be evaluated? and, Who should do the evaluating? Sociodemographic measures of crime, income, employment, and poverty are frequently the measures of choice because they are easily gathered (or have already been gathered, in the case of U.S. Census Bureau data), and such measures have more direct policy relevance for governments than other measures (De Neufville 1975; see Burdge 1994 and Interorganizational Committee on Guidelines and Principles 1994 for discussions of categories and indices). Yet, despite widespread use and limited researcher reflection, both sociodemographic measures and subjective self-report measures have significant limitations. Sen (1985b), in particular, and others have provided powerful critiques. A five-point summary of the limitations of social indicators is presented here, followed by a brief discussion of the problems associated with the common unit of analysis used in studies of NRDC well-being.

First, social indicators, which consist of aggregate individual data, ignore the variability of structural conditions at the level of a county or region and such institutional arrangements as the concentration of capital, land ownership, and power that influence well-being in a community (Kennedy and Mehra 1985, Kim 1973). Communities with greater disparities in wealth often have lower community well-being than communities with more equal distribution of wealth even though average measures such as income may be the same. Goldschmidt's (1947) evaluation of the structure of agriculture and its relation to community well-being is a good example of why this consideration of institutional arrangements is important.

Second, Sen (1985b) points out that measures of opulence such as income confuse well-being with being wealthy in terms of material possessions. Measures of real income provide an indication of what an individual can buy, or one's "commodity command," but they provide no indication of how an individual may improve his or her life with purchased commodities. Sen (1987: 16) states that commodities provide only a means to an end and that the issue is more a "matter of the life one leads rather than of the resources and means one has to lead a life." In their research, Kaufman and Kaufman (1946) express a similar concern with how well individuals live.

Third, and related to the previous point, is the issue of what constitutes well-being for whom. Sociodemographic measures of opulence do not take into account the distribution of resources within a family (Sen 1985b). For example, a male head of household may purchase luxury items for himself while other family members are inadequately clothed and fed. Similarly, females may have different concerns than males. Nussbaum and Sen (1993) question whether the quality of female life has similar constituents as the quality of male life. Feminist research was launched out of a concern that women's perspectives and their life circumstances were not recognized. Oakley (1975) points out that women have been reduced "to a side issue from the start." And the concerns of adolescents may differ from those of adults. Freudenburg (1984) reports that adolescents in rapidly growing communities were more likely to be dissatisfied with locality and less satisfied with overall quality of life than adolescents in similar towns that were not rapidly growing, whereas the same relation did not hold for adults.

Fourth, the distinction between ill-being and well-being is measured subjectively. Subjective well-being is commonly measured with scales indicating satisfaction with the self as a person, personal freedom, personal happiness, and sense of personal control (Campbell 1981, Chamberlain 1985). Yet, Headey et al. (1985) point out that well-being may be a different dimension than ill-being. They found that more objective measures of health and material standard of living, while contributing little to one's well-being, significantly contributed to measures of ill-being. Bradburn and Caplovitz (1965) and Wilson (1967) found the same to be true for measures of happiness—positive and negative dimensions exist and are independent of one another. In addition to requiring measurement of positive and negative dimensions, this suggests that people may adjust their perceptions of well-being (or happiness) to the conditions they face.

Sen (1985b), studying the same issue from an economic and philosophical perspective, states that subjective measures of well-being, such as pleasure and desire fulfillment, are incomplete for two reasons: (1) they are fully based on the mental states of an individual, and (2) they lack a personal metric of value ("the mental activity of

valuing one kind of life rather than another”). Sen terms these reasons “physical condition neglect” and “valuational neglect,” respectively. An example illustrates the incompleteness. One who is poor, without the comfort of a home, out of work, and ill-fed but happy has obviously adjusted her expectations and taken solace in small pleasures. But fulfillment of limited desires, no matter how happy this person might be, is not suggestive of a high level of well-being. Moreover, this psychological state cannot be compared to that of another individual whose desires are greater. Sen (1984: 309) states, “Quiet acceptance of deprivation and bad fate affects the scale of dissatisfaction generated, and the utilitarian calculus gives sanctity to that distortion. This is especially so in interpersonal comparisons.”

Fifth, researchers who have examined the relation between objective and subjective measures have shown that sociodemographic indicators have little relation to subjective measures of well-being (Barlett and Brown 1985, Campbell 1981, Gans 1962, Mastekaasa and Moum 1984, Oppong et al. 1988, Suttles 1969). Moum (1988) finds that only 10 percent of the variance in quality-of-life scales is explained by sociodemographic variables. Gans (1962), in his study of West Enders in Boston, reports high satisfaction among residents of the area. Yet, because of measures (by upper middle-class professionals) of low physical condition and low income, the area was declared a slum and was completely cleared for redevelopment. The difference between the West Enders' satisfaction with the area and the measures of the “professionals” provides a warning that not only may measures differ, but they may do so because some measures reflect the values (and power) of those who are doing the measuring more than the values of those whose well-being is being evaluated.

Given gender, class, and ethnic differences and the importance of local salience, it is not surprising that numerous measures of well-being have been developed, but no standard metric has emerged (Burdge 1994, Johnson 1988, Oppong et al. 1988). The arguments just expressed suggest that the “holy grail” of complete well-being assessment may indeed be unobtainable. They also demonstrate that considerable humility is necessary in any assessment and interpretation of human and community well-being, and suggest a need for engagement with those who are the subject of evaluation.

The Social Unit of Analysis

In the debates over the use of self-report measures versus sociodemographic measures and over appropriate metrics of well-being, insufficient attention has been paid to the unit of analysis or level of data aggregation used for assessment. This oversight has led to additional confusion about whose well-being one is discussing and about causal and associational relations. The county has been the most common unit of analysis in studies of forest-dependent community studies (Machlis and Force 1988), and its exclusive use is inadequate for several reasons (for a contrasting view, see Lobao 1990).

Perry (1986) has criticized the use of counties because they are not a unit with real social meaning. People do not generally identify with counties, and, indeed, numerous NRDCs are alienated from their parent county. Relationships and life take place in communities, not counties or larger regions.

Important for NRDC assessment is that often only a small percentage of communities (and subpopulations within those communities) are resource dependent in a traditional sense, and aggregate county or regional data often obscure these relations. In one of the most traditionally resource-dependent counties in the Sierra Nevada, median

family income is slightly more than \$24,000. The four largest communities in the county are more dependent on traditional natural resource industries than the county as a whole, and all their median incomes are lower than the county average: one community is almost \$9,000 lower and another \$5,000 lower than the county mean. The interior Columbia River basin ecosystem assessment states that resource-related jobs total only 4 percent in the region (Reyna 1998), yet this total is considerably higher in numerous individual communities. These examples are offered not to suggest that the linkage between resource dependency and well-being at a county or regional level is unimportant, but are provided to show how aggregating data beyond a community can mislead, and whatever resource dependence exists will more often than not be misstated.

If one desires to understand community well-being, then, the unit of analysis must focus on and isolate community. County or regional data alone encompass too broad and diverse an area to be used for examination of well-being for most NRDCs. Moreover, the larger the aggregation, the less likely measures, regardless of whether they are median income, poverty, or unemployment, will have a relation to community resource activities. A determination of causal or associational factors influencing community well-being often requires a specificity and detail unobtainable with county-level data, particularly when counties are large and heterogeneous.

A New Approach to Forest Community Well-Being

The concept of community has engendered considerable debate, a debate that will not be resolved here but that nonetheless must be addressed. In sharp contrast, the concept of forest dependence has been uncritically accepted as employment generated from timber harvesting. This section begins with a definition of community, and a clarification and expansion of the term “forest dependence.” A discussion of Sen’s (1985a) novel “capabilities and functioning” approach to individual well-being follows. The approach is expanded through the inclusion of culture and community in consideration of well-being and leads to the “capacity” approach. The paper concludes with a discussion of how the concept of capacity can be used in an assessment of community well-being.

Conceptual Clarity

The concept of community—Community, in this paper, is defined in terms of a place-based shared identity. This definition is primarily based on Gusfield’s (1975) discussion of community, which includes the intersection of two components: relational and territorial. The relational component involves “the quality or character of human relationships,” which includes a sense of belonging. Selznick (1992) states that this includes shared beliefs, interests, and commitments among individuals that unite diverse groups and activities. The relational component of community is a vital part of individual well-being and is discussed further later in the paper.

Gusfield’s territorial component involves what people have in common and share at their locale. This includes diverse institutional components: governments and law, school districts, churches, and families, among other things (Selznick 1992). Gusfield’s conception of community roughly encompasses the three areas for which Hillery (1955), in a survey of the literature, found definitional agreement: social interaction, area, and common ties.³ Although Gusfield does not limit his discussion to place-based communities, the emphasis here is primarily on geographical place-based, forest-dependent communities.

³ See Lee et al. (1990) for a discussion of these concepts for forest communities.

Despite this focus on locale, it is important to recognize that forest communities are part of the larger society, with extensive vertical links, to use Warren's (1978) terminology.⁴ These links, or lack of them, may profoundly affect a community and the opportunities available to residents. A small rural community that is home to a mill owned by a multinational corporation may have additional mill-related employment and other opportunities. Yet, this same community also will be quite sensitive to the actions of this company, which may have no local ties beyond the mill. Institutional and social relations extend beyond the formal administrative and informal boundaries of a community (Selznick 1992, Strathern 1984). Individuals may hold multiple "community" identities as a result of associations at their work and through other organizations and institutions that are outside of their community of residence. Small NRDCs include overlapping sets of social groups, and these groups are important to local community well-being and how local communities are influenced by resource policy. The focus on place-based communities suggested here provides a clear starting point, and a critical one, for assessing well-being.

Broadening the concept of resource dependence and recognizing the importance of sense of place—Forest-dependent communities are those immediately adjacent to forest land or those with a high economic dependence on forest-based industries, including tourism as well as timber and nontimber forest products. This broader definition is necessary to acknowledge that well-being involves more than a dependence on the timber products.

First, forest dependence suggests that a community's primary relation is to a biological forest, and, as the concept is commonly used, to wood products.⁵ Forest-dependent communities rely on the biological forest resource, but communities in which a number of residents work in the wood and nontimber forest product industries are dependent on the economic and social structure that permits and demands particular uses of the forest resource. This structure mediates the terms of a resident's access to the economic and social benefits of this resource. Thus, in a community with many workers employed in forest product industries, the ability of residents to gain economically from the forest, as well as to create new jobs, is a function not only of the biological condition of the forest but also of (1) the extent to which controllers of the forest permit and promote commercial activities, (2) the extent to which those who create forest-related jobs make them available in or near the community as well as the extent to which those who control the jobs maintain them, and (3) the terms on which these jobs become available.

Second, the commodity production perspective ignores forest-dependent communities that do not produce timber. Communities can be economically dependent through nontimber forest products or without any forest-commodity production whatsoever.

⁴ Warren's (1978) observation that horizontal links (ties between organizations within a community) have been overwhelmed by vertical links (ties to organizations and institutions outside the community) is relevant here. Warren argued that the rising influence of an increasingly urban society frequently results in a decline of a community's distinctiveness, self-sufficiency, and individual interactions.

⁵ Machlis and Force (1988) point out that forest or timber dependency is generally determined by forest commodity production or economic measures (e.g., measures of sales by forest industries, percentage of total income from the forestry sector, and forest industry employment).

Communities whose *raison d'être* is forest tourism or retirement living are economically dependent on the forest for its amenity value, and they are increasing in number and size throughout the United States.

Third, and related to point two, forest dependence may occur with no economic relation whatsoever to the resource, based on an aesthetic, symbolic, and locality-based importance (Hester 1985, Hiss 1990, Tuan 1993, Walter 1988). As such, the forest is a landscape and part of a human sense of place. As a landscape, Relph (1976: 34) suggests, it represents "an expression of communally held beliefs and values and of interpersonal involvements." Meinig (1979: 46) observes, "a well-cultivated sense of place is an important dimension of human well-being. Carried further, one may discover an implicit ideology that the individuality of places is a fundamental characteristic of subtle and immense importance to life on earth, that all human events *take place*, all problems are anchored in place, and ultimately can only be understood in such terms" (emphasis in original).

For example, Wendel (1987) found that a majority of residents of a forest community in California chose the response "the trees/the forest" to a question asking what was the most important place in the community. The trees and the forest represent a link with residents' past tradition of logging, and a connection to their present and future economic base of tourism and to aesthetic values. Hester (1985) calls places that reinforce and help define the community's living tradition "sacred" places. Kaufman and Kaufman (1946: 30), using the term stability rather than well-being, state, "A meaningful tradition is always an important part of the life of a stable community. A tradition is needed . . . which magnifies the significance of the forest and portrays the relationship of forest and people." Berry (1987), in a somewhat similar vein, believes community to be inseparable from its place, with community and place mutually supportive. They represent the human and natural economies, each offering the other the possibility of a lasting and livable life.

As a playground, sacred place, or resource, the forest supports local residents and contributes to the definition they have of themselves and their understanding of who they are. The lifeways of community members and the landscape are intertwined. Thus, when discussing dependence, one must recognize that the forest provides not only the means of production, diversely defined, but sustenance to the local living tradition, economically, socially, and spiritually.

Individual Capabilities and Functionings

Sen (1984, 1985a, 1985b, 1987, 1993) offers what he calls the capabilities and functionings approach as an alternative way of evaluating well-being. Sen's approach to well-being counters the limitation of sociodemographic measures, such as measures of opulence, by evaluating not just the goods at one's disposal or one's wealth, but how these factors contribute to what one can do. Sen points out that an individual's capabilities are composed of his freedom or the opportunities from which he can choose. An individual's functionings consist of his or her achievements, or what he or she "succeeds in doing with the commodities and characteristics at his or her command" (Sen 1985b: 10). Functionings range from the basic, which include survival and escaping malnourishment, to the more complex, such as achieving self-respect (Sen 1993). Sen argues that these elements are part of an individual's being and must be part of a well-being assessment.

For example, an individual who owns a bicycle, other things being equal, would be considered better off than one who does not. But if the same individual lives in a war-torn country where roads are predominantly unridable and bicycle riders are targeted by snipers, bicycle ownership contributes little to one's transportation functioning and may negatively affect well-being. In the case of a forest community, a mill job that provides an adequate income may be essential to one's well-being, but if an individual is unable to obtain medical benefits, cannot advance in his or her job, or if creative opportunities are desired but unavailable, diminished well-being through reduced opportunity and achievement results. A job that provides adequate pay contributes to one's well-being, but the pay alone constitutes only a portion of one's achievement. These examples highlight what Sen (1984: 317) refers to as the "capability to function."

The capabilities and functionings approach addresses the subjective-indicator problem by dividing the evaluation into two parts: "(i) *specification* of the functioning achievements, and (ii) the *valuation* of the functioning achievements" (Sen 1985b: 30, emphasis in original). Specification requires identifying achievements for which a valuation is made. To return to the example of a poor, unemployed, ill-fed, homeless person, the specification of her functionings would clearly indicate a low level of well-being, regardless of her own valuation of her well-being.

What is unique about Sen's capabilities and functionings approach is that it requires an analysis of the opportunities or freedom individuals have (capabilities), **and** their achievements or successes (functionings) in light of their opportunities. For someone to have a high level of well-being, she or he not only must feel well but also must have opportunities available and be able to take advantage of them. Sen, however, restricts the analysis of well-being to the individual and avoids the sticky problem of a contextually based valuation of various capabilities and functionings, which must be included for a more complete evaluation of well-being.

The importance of community—To allow for a complete discussion of individual opportunity, as well as to more effectively value functioning achievements and well-being, requires a focus on the individual and community. Motivations for human action spring from internalized values. Sen (1993: 49-50, emphasis in original) maintains these flow from "traditions of behavior" which do not reflect "*individually conceived* goals, but reflect those of our culture and communities." Selznick (1987: 447) offers the perspective of the "implicated self," which holds that humans are dependent on others for personality development and "psychological sustenance." He states, "A morality of the implicated self builds on the understanding that our deepest and most important obligations flow from identity and relatedness, rather than consent" (Selznick 1987: 451). Bellah et al. (1985) and MacIntyre (1984) maintain that human identity is found in community, as a collective living tradition.

Acceptance of the perspectives of "traditions of behavior" and the "implicated self," requires that a well-being assessment examine how communities define success (functionings) which provides individuals with a referent against which to view and assess their own success. Native American or Latino communities may define success differently than Anglo communities. Ethnically similar communities also may have different definitions of success for any number of reasons. Hence, proper assessment

must recognize differences and how they are reconciled in the context of community. A community, its traditions, and the opportunities it creates for residents, must inform well-being evaluation.

A community of shared values does not equal a community of conformity. Lasch states that social solidarity is not “an identity of interests; it rests on public conversation. It rests on social and political arrangements that serve to **encourage** debate instead of foreclosing it” (Lasch 1988: 178; emphasis added). Communal relationships, with the associated responsibilities they bring, and freedom to choose are both coveted values. Selznick (1992: 363) points out, there must be “freedom **in** associations as well as freedom **of** association.” He adds, a concern for personal autonomy “. . . assume[s] that the worth of community is measured by the contribution it makes to the flourishing of unique and responsible persons. As an attribute of selfhood and of self-affirmation, autonomy requires commitment as well as choice.”

The perspective of the implicated self also recognizes that taking part in the life of a community contributes to individual well-being. Humans are constituted by social relationships found in community. A reciprocal and interdependent relationship exists between an individual and others in her or his community. Implicit in this perspective is that a collective good exists; well-being may be improved by residents working on community projects, which, narrowly conceived, are of no benefit to them personally. Selznick (1992: 364), discussing communities as places where people grow and flourish, notes that a “flourishing community has high levels of participation: people are appropriately present, and expected to be present, on many different occasions and in many different roles and aspects.”

Individual well-being is increased as a result of being a part of a community and by making the community a better place to live. This is part of the “relatedness” component of community discussed above, and involves a category of individual behaviors termed “commitments.” More broadly, this behavior may be termed civic responsiveness. Sen (1993) would disagree with the extension of well-being analysis to include “commitment” behaviors. Because of the importance of his work for the approach developed here, a brief review of this disagreement and a response to it are presented in the appendix.

Well-Being Assessment

Sen's (1993) approach to well-being requires assessment of individual opportunities (capacities) and achievements or successes (functionings) in light of available opportunities. For large-scale ecosystem studies, or evaluation of well-being in a moderately sized forest community, it is not possible to evaluate opportunities and successes for each individual. Diverse secondary data combined with primary data about communities (including things such as support services) can be used to develop rudimentary understanding of conditions. Useful secondary measures to assess condition and rudimentary functioning include but are not limited to the following: measures of poverty that indicate those who have not secured an adequate income (escaping poverty being a very basic functioning); poverty intensity (i.e., the farther below a poverty threshold, the greater the intensity) suggestive of a lower level of functioning and greater need; and higher education levels and home ownership, which are suggestive of increased opportunities and higher functioning. Equally important, individuals with high levels of education may lead to increased community capacity for reasons that

are discussed below. Measures of crime, drug dependency, and children in families receiving public assistance are additional measures of conditions that may affect functioning and are reflective of well-being of residents.

Community Capacity

Because individual opportunities and functioning are shaped by conditions individuals face within a community, well-being analysis must focus not only on the static condition of a community's residents, but should include a focus on the dynamic capability of residents to create local opportunities and respond to local needs. A more complete analysis of well-being, therefore, includes an assessment of the capability of residents to collectively affect community opportunities. This dynamic capability is community capacity.

Community capacity is the collective ability of residents in a community to respond to external and internal stresses; to create and take advantage of opportunities; and to meet the needs of residents, diversely defined. It refers also to the ability of a community to adapt and respond to a variety of circumstances. Community capacity comprises three broad areas: (1) **physical capital**, which includes physical elements and resources in a community (e.g., sewer systems, open space, business parks, housing stock, schools, etc.), and accessible financial capital; (2) **human capital**, which includes the skills, education, experiences, and general abilities of residents; and (3) **social capital**, which includes the ability and willingness of residents to work together toward community goals. While physical and human capital are commonsense foundations of capacity, social capital appears to be one of the most important determinants.

Putnam's (1993b) empirical work makes clear the importance of social capital and how it is a critical determinant of economic development and community capacity.⁶ Putnam (1993a), examining the modern-day rise of regional governments in Italy from the 11th century, states:

The historical roots of the civic community are astonishingly deep. . . . communities did not become civic because they were rich. The historical record strongly suggests precisely the opposite: They have become rich because they were civic. The social capital embodied in norms and networks of civic engagement seems to be a precondition for economic development, as well as for effective government.

An example is offered to explain the role and importance of social capital and to show the relation between social capital and financial capital. A community may have a number of residents who are quite wealthy, but if they are uninvolved in the community, their financial capital does little for the community beyond the residents' own self-interested concerns. Conversely, a community with little financial capital and high social capital may conduct numerous fund raisers as well as reach outside the community to raise money to address local needs, thereby improving local well-being.

Assessing capacity—Assessing community capacity is complex and involves evaluation of residents' ability to meet needs and create local opportunities. It involves assessment of individual "commitment" actions at the level of a community that, when combined with physical and human capital, determine community capacity. To assess social capital alone, Putnam (1993b) noted, requires diverse slices of data examined over time.

⁶ See Wall et al. (1998) for exposition of alternative conceptions of social capital.

Doak and Kusel, in their assessment of communities for the Sierra Nevada Ecosystem Project (1996), in addition to collecting socioeconomic data, assessed community capacity through workshops with experts knowledgeable about local communities. Individually and collectively, local experts assessed physical, human, and social capital and the interplay of the three to arrive at a measure of capacity for a community. Selection of experts to participate in workshops proved critical, as it determined the accuracy and quality of information obtained. In their selection of workshop participants, Doak and Kusel learned that experts must understand community issues, institutions, and resources, and they cannot be community boosters or overly partisan about issues.

Assessment of community capacity facilitates understanding of opportunities for productive and rewarding involvement in community and the potential for increased opportunity for individuals. Although such assessment does not allow specification of how any single individual's well-being is affected, high community capacity itself is suggestive of higher levels of well-being for residents. High capacity suggests, too, that expansion of opportunities to meet community needs (and local well-being) is not only possible but likely.

With continued shifting of responsibilities from state and federal entities to localities, and increased responsibility placed on locals for self-development and self-improvement—including those communities that have long relied on federal and state subsidies for infrastructure development and maintenance—examining the capacity of communities is an important area of community well-being research.

Summary

In this review of the studies of well-being, it should be clear that there is room for considerable improvement in well-being assessment of forest- and natural-resource-dependent communities. Future studies of well-being cannot rely only on subjective reports of well-being because of their incompleteness; exclusive reliance on measures of opulence such as income are equally limiting because such measures do not address distribution or control of resources. Additionally, if researchers are to discuss resource dependency and well-being, they must be clear about what “dependency” means and the diverse ways resources may be valued. The forest as a “place” embodies a diverse array of values. If a local forest, long used for the production of wood products, is reserved exclusively for recreational use or is overcut, local well-being will decline through the diminution of socially important forest values as well as jobs.

Researchers need to recognize that the linkage between resource dependency and well-being is not straightforward nor can it be assumed; it requires empirical examination. Resource harvesting and extraction, whether involving minerals, timber, or agricultural products, have social consequences. The manner in which these activities are organized and carried out, including who controls the resources, who manages the benefits and determines when and how locals participate in resource management, and the conditions of the resources that remain have significant implications for community well-being in the short and long term.

Researchers also must be clear about the unit of analysis. Assessment of community well-being cannot be limited to county-level or regional analyses. Counties are too heterogeneous, and too often jobs associated with resources comprise a small proportion of a county economy. Communities are a logical unit of study but pose methodological

problems: clear identification of boundaries is often difficult, and data availability within these boundaries may be limited. Well-being analysis must often strike a balance between socially meaningful units of analysis and units for which good data are available.

Communities must not only be thought of as a unit of analysis but also included as part of well-being assessment. Inclusion of the category of behavior termed “commitments” broadens the conception of well-being in two significant ways. First, it acknowledges that capabilities and functionings are in part defined by the community. Communities are composed of and sustained by individuals, and individuals are shaped by their community. Viewed in this light, how community—defined here as a locality-based collection of individuals—fosters or inhibits individual thinking about capabilities and individual ability to function must be considered. Hence local conditions are viewed as an influence on individual conceptualizations of well-being. A second implication of a broadened conception of well-being is that relationships within a community involve a component of responsibility and commitment to the community. These practices profoundly affect well-being.

In broad-scale ecosystem studies, it is simply not possible to assess the resources of each individual and determine how they contribute to her or his functioning. An assessment of community capacity allows researchers to assess in some measure the opportunities available to residents today as well as their potential for creating additional opportunities and improving well-being. A basic assumption is that the greater the capacity of a community, the more likely opportunities exist or will be created to expand individual capabilities and functioning. The very act of community capacity building is not only opportunity enhancing but itself leads to improved social well-being.

The emphasis on individuals, local community, and capacity does not mean that social and political arrangements beyond community boundaries should be ignored. They are an important—and in many cases a critical—component of capacity and local well-being. This is particularly true of forest communities in which local and nearby land is owned and local jobs are controlled by outsiders. Actions originating outside of a community may contribute to or severely restrict capabilities and functionings of local residents. For example, local capabilities may be reduced by forest management decisions that do not involve local residents nor take into account local needs. Good capacity assessment will identify these arrangements. Improving the ability of a community to respond to and influence decisions that affect them reflects on the capacity of a community and is another way of improving the well-being of community residents.

What is unique about this approach to the study of community well-being is that it involves an analysis of factors that reduce local well-being, **and** an analysis of how individuals and their communities respond to these factors. Examination of capacity encompasses as well an examination of how individuals and communities create opportunities, or to use Sen’s (1984) terminology, capabilities, that expand the possible functionings or achievements of community members and improve well-being. In so doing, in addition to identifying general levels of individual and community well-being, one of the significant benefits of this approach is its identification of areas with limited capacities and a reduced ability to self-develop and improve local well-being.

It is these areas that require the most attention and will provide the most difficult challenges for those serious about improving the health of the ecosystem and the well-being of humans and human communities.

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Appendix

Sen (1987: 28) ignores “commitments” in the calculus of personal well-being. He does so by making a distinction between actions based on “sympathy,” which are included in calculations of well-being, and actions based on “commitment,” which are not. Sen includes “commitments” in a category called “agency achievement” (1987: 28) or “agency freedom” (1985a, 1985b: 203). According to Sen (1985a, 1985b: 203), “agency achievement” is a more inclusive category than personal well-being and includes “what a person is free to do and achieve in pursuit of whatever goals or values he or she regards as important.” He points out (1987: 28) that by expanding the focus of attention and including “commitments,” we move from “personal well-being” to “agency achievement.”

Help provided to an individual that has the effect of making the helper “feel—and indeed be—better off” is “sympathy.” This increases one’s personal well-being. The behavior category of “commitments,” on the other hand, involves personal action (it may be help provided to another), which Sen states, “*in the net*, [is not] beneficial to the agent himself.” (emphasis in original). Sen adds, “This would put action outside the range of promoting one’s own well-being.”

Sen’s rejection of an action because it is “in the net” not “beneficial to the agent himself” involves an evaluation of action (and its consequences) after the fact, or a prediction of its outcomes. Sen states (1987: 28) he is concerned with effects. He, however, does not discuss at what point this calculation should take place nor what measures should be made to determine whether a behavior is beneficial or not. Given the nature of his decision rule, Sen ignores the motivation for individual action. Both categories of behavior, “commitments” and “sympathies,” may involve action for which the motivation stems from the desire to help another person. Actions to improve one’s community that do not have the “effect” of contributing to one’s well-being therefore are not included in Sen’s well-being calculations. In this manner, Sen ignores historical, social, and societal forces that not only influence action (and motivations for action) but also influence value decisions implicit in the evaluation of well-being.

Etzioni (1988: 40-45) states that the category of action called “commitments” is moral behavior. This is because such action is based on intentions, not consequences or effects. Intentions also may be considered the “intrinsic character” of action and are taken here to be the primary criteria by which to evaluate it, because the consequences of action may not be predictable. This valuational approach is central to a deontological social philosophy (Etzioni 1988, Hazard 1988).

The Relative Importance of Sociocultural and Ecological Factors in Attachment to Place

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Abstract

Places have long served as the backdrop for the study of social relations. Yet, studying the relations and interactions between people and places themselves expands our perspective on this basic concept. Although some studies have explored the complexity of place attachment, few have attempted to discern to what qualities or attributes of place people become attached. Researchers need to move beyond describing place attachment to modeling specific place attributes to which people are attached and the mechanisms through which attachments are formed. Two sets of literature, community attachment and recreation-site attachment literature are examined. It is argued that the approaches presented in each are too narrowly defined to clarify the roles played by sociocultural and ecological aspects of place. Such a clarification, and subsequent understanding of the role of place highlights the need for survey of the broad spectrum of users who live, work, and play in a geographical place about their levels and types of attachment. The geographical place, itself, is offered as the unit of analysis. Improving understanding of the human values associated with attachment to place may have implications for policy ranging from regional economic development to wilderness preservation and public land management. It may reveal underlying causes of conflict over land management and how to better predict potential areas of conflict. A series of research hypotheses that address this issue are presented.

Introduction

For as long as the discipline of sociology has existed, sociologists have been studying places. Middletown (the name the authors used for a study of Muncie, Indiana) (Lynd and Lynd 1956) and Springdale, New York (Vidich and Bensmen 1968), and hundreds of other communities have been the settings for sociological analyses. As far back as

1915, C.J. Galpin was mapping the distribution of farm families on the landscape and examining the spatial distribution of social activities (trading, church affiliation, etc.) (Field and Burch 1991). Despite this early and long-standing interest in places, sociologists have rarely turned their attention explicitly to the relation between humans and places themselves. Rather, places have merely served as the stage upon which social relations take place. Sociologists have always been more concerned with the interactions between humans that occur in a defined place, and less concerned with the relations between people and the geographical places themselves. When sociologists have turned their attention to environmental variables or ecological, biophysical processes that occur in rural landscapes, they have focused on elements that still have a decidedly anthropocentric flavor. Sociological attention on land has centered around land ownership, while studies of farms, forests, and fisheries have focused on commodity chains and social relations of production.

Other disciplines, such as geography (Relph 1976, Tuan 1977), environmental psychology (Low and Altman 1992), and landscape architecture (Riley 1992), have looked more explicitly at human-place interactions. Although much of this literature eloquently articulates the complexity of place attachment, there have been few empirical attempts to model various component parts of what exactly it is to which people are attached. In contrast, in sociology there exists a long tradition of attempting to dissect the phenomenon of community attachment into various component parts. This work has focussed on identifying factors that attach people to the communities in which they live. This literature is rather narrowly focused on sociocultural determinants of community attachment. There have been few attempts to build any environmental variables into these quantitative modeling efforts.

A relatively recent literature on attachment to place examines (mostly) visitors' attachments to recreational settings and geophysical landscapes. This literature focuses predominantly on visitors' attachment to, and values for, biological, ecological, or geological attributes of places. Both the community attachment and ecological-site-attribute attachment literatures represent pieces of an integrated model of place attachment, but neither alone attempts to look at the big picture—to the multitude of sociocultural and ecological or landscape features that simultaneously and in varying degrees attach people to places. The early innovators in the place attachment literature eloquently described the “why” of attachment, and how places help to forge self-identity and social meaning. This work is more focused on the community attachment literature and the recreation research tradition of place attachment because scholars in these traditions are trying to move beyond description to modeling the “hows” and “whats” of attachment. That is, what specific attributes of places are people attached to, and how are such attachments formed (through attitudes, relationships, etc.).

The main premise of this paper is simple. In contrast to what the two disparate community attachment and recreational-site attachment literatures would suggest, I argue that rural residents' attachments to their communities include some attachment to the geological, biophysical, landscape attributes of their regional ecosystems. Conversely, I maintain that the attachments held by visitors to rural areas also include attachments to sociocultural phenomena in addition to biophysical or geological landscape attributes. Both of these literatures focus first and foremost on narrowly defined human groups, rural community residents, cottage owners, or recreational land users. The key

to establishing an integrated model of place attachment is to treat a given geographical place as the unit of analysis, and to question the broadest possible spectrum of users of that land base about their levels and types of attachments to it.

On the surface, this interest in attachment to place may seem trivial. However, unpacking this concept, and the human values inherent in attachments to place, may have tremendous consequences for policy issues ranging from regional economic development, to town planning, to wilderness preservation. If we can understand individuals' attachments to place, we might learn a lot about why people make "irrational" decisions to stay in regions with failing economies. We may come to recognize valuable differences in how some people are attracted to places, and are attached in a positive sense to a community or landscape, as well as how others are "stuck" in place, or attached in a negative sense because they lack the social networks, specialized ecological knowledge, or labor market skills to survive anywhere else. We may learn more about the ways in which attachments to place involve complicated combinations of feelings toward both ecological and sociocultural attachments to landscapes. This type of information could prove instrumental in both development of community (social cohesion, shared norms, etc.) or in development in community (infrastructure) (Kruger 1996, Wilkinson 1986). And we may come to discover that the roots and origins of many conflicts over land use have much to do with different ways in which people are attached to places. It also may be the case that the sustainability of a community or place has much more to do with persons' attachment to it than with standard empirical indicators of social sustainability or well-being.

This paper outlines a series of researchable hypotheses related to these questions that I hope may inform my own future research, as well as that of others. Much of what I propose in this paper hinges on the assumption that it is theoretically possible to separate and differentiate individuals' attachments to ecological versus sociocultural attributes of places. When I raised this possibility in a workshop with a diverse group of forest social scientists, many were skeptical. Those workshop participants who are more inclined toward ethnographic methods, and who have done considerable primary research in rural communities, were particularly dubious. Nevertheless, any number of social psychologists would likely welcome the challenge and would maintain that, with the proper instrument, one could separate a persons' attachment to place into socio-cultural and ecological factors.

Addressing this problem with a diverse methodological "toolkit" might make for an interesting experiment in and of itself. One could set up an experiment whereby three teams of researchers were charged with the same task: to document, measure, catalogue, and model attachment to place differentiating between sociocultural and ecological factors. The first team would consist entirely of qualitatively oriented ethnographers (equipped with tape recorders and transcription machines). The second team would consist entirely of quantitatively oriented social psychologists (equipped with Likert scale-laden survey instruments). The third team would consist of both ethnographers and social psychologists (and perhaps a referee).

My guess is that the first team would say that they could not create an index, but that they could articulate a very strong argument about what factors attach people to place owing to the richness of their qualitative, ethnographic, narrative data. The quantitative, social psychologists would challenge the reliability of group one's results and

raise questions related to replicability and generalizability. The second team would claim to have created an index that could explain differences in sociocultural and ecological variables in attachment to place, but the ethnographers from team one would challenge the validity of their results. The results from team three might yield some interesting insights if the team's "modellers" were able to construct a survey instrument that effectively dealt with the host of complicating factors that the ethnographers would bring to the table.

However interesting and amusing it is to speculate about future work to be done, we should spend some effort discussing work that has been done to date. This literature review will focus on a range of social science research, but will largely look at sociologists' attempts to model community attachment and recreation researchers attempts to explain visitors' attachments to recreational sites.

Place Attachment

The literature on place attachment is diverse, multidisciplinary, and spans at least a couple of decades. Tuan (1977) is one of the more famous and frequently cited works on place and place attachment. Tuan discusses several important dimensions of place, including the issue of scale. Both the Earth and an armchair represent places, but Tuan (1977) spends considerable time discussing the concept of homeland as a meaningful intermediate scale to discuss place and place attachment. Tuan also describes the complex process of space becoming place through experience, cultural transmission of meanings, and other evolutionary or revolutionary defining events or moments. Proshansky et al. (1983) describe in detail the role of places in the complex process of self-identity formation. They lament the lack of attention paid in the psychological literature on nonsocial determinants of self-identity. Relph (1976: 63) suggests that a key component in the study of place and place attachment is the notion that there is a broad continuum that ranges "from simple recognition . . . to a profound association with places as cornerstones of human existence and individual identity."

Much of the early work on place and place attachment discusses place in rather abstract terms. Authors were concerned with the phenomenological aspects of the experience of place, and most discussions of environmental influences on place attachment focused on the built environment, as opposed to the "natural" environment. A more recent vein of the place attachment literature is rooted in outdoor recreation studies. Many of these studies attempt to understand visitors' emotional ties to, and the symbolic meanings that persons attach to, specific geographic locales. This focus on visitors to places stands in direct contrast to the community attachment literature (to be discussed shortly), which focuses exclusively on residents of places. Recently, there has been more work done on second-home owners' attachment to place. This work represents a partial closure in the gap between visitor attachment and community attachment as recreational homeowners spend an intermediate amount of time in place, and likely form complex attachments that involve both ecological-environmental and sociocultural attachments (Kaltenborn 1997).

The recent literature on place attachment has undergone a gradual evolution from an initial focus on preferences for various attributes based merely on visual perception to broader conceptions of landscapes that involve emotional, psychological bonds such as a sense of belonging and attachment (Jones 1996). The portion of this literature that is rooted in recreation research also acknowledges the central role that place takes in the recreational experience. The attributes of such places have frequently

been treated as commodities, although some criticize the limitations of this approach (Williams et al. 1992). Cheng and Daniels (1996) argue that attachments to place emerge as groups come together to share common definitions and through the use of common symbols. It is very possible that the most important symbols in many places are landscape features—a mountain, an old-growth grove, a wetland, or a river. Mining the mountain, cutting the old growth, draining the wetland, or damming the river, strikes at the heart of some individuals' or groups' attachment to place.

Other authors have been critical of the lack of specificity in the use of the term "place attachment." Hammit and Stewart (1996) argue that "sense of place" is universally used to mean things as diverse as familiarity with place, a sense of belongingness to place, rootedness to place, and attachment. This work follows in their footsteps by trying to suggest ways that more clarity and precision could be brought to the issues of "place attachment" and "sense of place."

Community Attachment

Most sociological definitions of community agree that the term implies a defined geographical space. There is increasing awareness of "communities of interest." That is, communities of people bound by shared values or interests rather than shared space. However, particularly when referring to a unit of analysis, sociologists still use the generic term "community" to refer to communities of place. Geographical space is only one facet of the sociological definition of community, other facets being shared social space (and formal and informal networks, institutions), and shared or common values (Wilkinson 1986). Oddly enough, most work on community attachment focuses almost solely on the latter two dimensions of community. With rare exception (Brandenburg and Carroll 1995, Fitchen 1991) have sociologists turned their focus to the way that community residents are attached to the physical, ecological attributes of the landscapes that encompass or are adjacent to their communities. A brief survey of nonacademic, nonfiction literature about rural life reveals that landscape characteristics are certainly critical factors that attach people to the rural places in which they live (Berry 1969, Erlich 1985, Leopold 1949). Yet sociologists have neglected this aspect of community attachment.

The aspects of community attachment that sociologists have devoted a great deal of attention to are what are described in this paper as sociocultural attachments to place. Kasarda and Janowitz (1974) were pioneers in the community attachment literature, and many have followed in their footsteps, replicating and modifying their community attachment model. The Kasarda and Janowitz model posits a systemic interaction between the following variables: length of residence, position in the social structure, and stage in the life cycle. These were hypothesized to be the most powerful predictors of community attachment. Goudy (1990) replicated Kasarda and Janowitz's work. He looked at income, age, length of residence, as well as density and size of communities (to test for a competing linear development model of attachment). Dependent variables included such things as friends and relatives in the community, people known, organizational memberships, sense of community, sorrow on leaving, and interest in the community. No ecological, environmental, or landscape variables were included in the model. Length of residence was the most significant variable and was highly correlated with friends, relatives, and people known in the community. It is quite possible that length of residence is highly correlated with knowledge of local ecological and environmental processes, and that knowledge of local ecological attributes or processes may lead to increased attachment to place. These issues will be developed further later in the paper.

Brown (1993) and Beggs et al. (1996) also have made significant contributions to the community attachment literature. Beggs et al. (1996) raise the point that social position and social context may have much to do with one's attachment. Attachments to places with particularly hierarchical power structures, or places fraught with racial or ethnic strife may be weaker than attachments to more democratic or more tranquil places. Brown (1993) also builds on the Kasarda and Janowitz (1974) model. He situates "community" in a larger socioeconomic context, however, and notes that attachments to community must be viewed in relation to consumer and work activities. Brown et al. (1998) are developing some interesting ideas related to attachment and subsistence activities, but to date, the sociological literature on community attachment has failed to satisfactorily treat environmental variables. This is due, in part, to the fact that this literature has emerged from a dialogue between urban and rural scholars that was solely interested in differentiating sociocultural attachments in urban and rural communities.

McCool and Martin (1994) reported findings that surprised them from a study of community attachment in Montana. The surprising aspect of their work had to do with the fact that newcomers were more highly attached to the community than oldtimers. McCool and Martin speculated that this might be due to the fact that newcomers are attached to biophysical or landscape features of place, as opposed to local relationships or social attachments. They suggested that the traditional community attachment measures may be deficient in their explanatory power, their lack of ability to incorporate environmental or ecological sources of attachment.

The next section of the paper builds on this assertion of McCool and Martin (1994) and sets out potential research themes that could bring clarity to the concept of place attachment. Some may find the format and even the overall goal to disaggregate elements of complex psychological processes of place attachment to be overly positivistic. I recognize that the research that will actually investigate these ideas and concepts will need to be flexible and fluid. The interrelations and interactions between elements of attachment are complex and likely reciprocal. Further discussion of these relations should be undertaken before the following "hypotheses" are taken to the field. I therefore present the following hypotheses more for discussion than for immediate testing.

An Index of Attachment to Place

Hypothesis 1: People's different degrees of attachment to given places can be quantitatively measured in an index.

In the attempt to create a meaningful index of attachment to place there are at least two aspects to consider. The first is the degree of attachment. Clearly, some people are more strongly attached to some places than are others. Figure 1 is a simple illustration of this point. Assume we asked five people to describe their attachment to a given place through a series of survey questions and we were able to quantify or index their degree of attachment. Clearly, in any sample there will be differences, but there also may be instances where several people have similar or the same degree of attachment (as do imaginary respondents Ann, Ned, and Kevin in fig. 1).

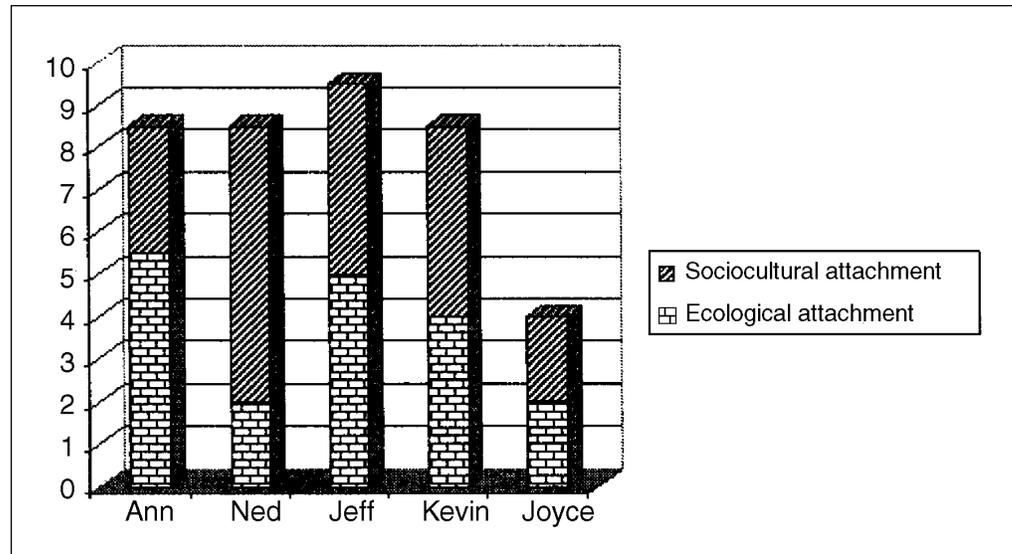


Figure 1—Hypothetical place attachment index.

Hypothesis 2: It is possible to demonstrate the degree to which a person's overall attachment to place is composed of attachments to sociocultural attributes of the place versus biological, geological, or ecological attributes of the place.

This second hypothesis has to do with different attributes or factors that exist in places or are associated with a given place. It assumes that in a taxonomy of these attributes, one could divide such factors between things that are associated with human occupation of the landscape (social networks, institutions, kinship ties, etc.) versus things that are the result of geological (landforms) or ecological processes (cover type). The fact that place attachment is systemic, and made up of component parts, is well accepted in both the community attachment literature and the place attachment literature. The latter literature focuses almost exclusively on ecological or landscape attributes, whereas the former focuses exclusively on sociocultural factors as predictors of people's attachments. The challenge presented here is to determine whether these component parts may be isolated from one another.

Figure 1 also represents the possibility that people may have the same level of overall attachment to a place, but that one may be so attached owing largely to sociocultural attachments, whereas the other may be attached owing to ecological factors. Our imaginary survey respondents, Ann, Kevin, and Ned all scored an "8" in their overall level of attachment in our survey; however, 80 percent of Ann's attachment is due to sociocultural variables, whereas only 20 percent is attributable to ecological factors. Ned, conversely, has few social attachments to this place. So few, in fact, that 90 percent of his attachment is due to ecological factors.

It is not difficult to imagine real people who would fit these profiles. Ann might be a lifelong resident of the place in question: someone who grew up there, went to school there, perhaps went away for some years, but returned to be near family and friends. She is deeply embedded in the social relations and various social networks in the community, and she holds detailed knowledge of local folkways and history. The

Changes in Places Produce Changes in Place Attachment

landscape, in her case, primarily serves as a backdrop for these social relations. Changes in the landscape might have little effect on her overall attachments to the place. Ned, on the other hand, could be an avid birdwatcher who lives 100 miles from the place in question. This place contains a marsh that he frequents quite often in fall and spring to observe migratory waterfowl. He has been coming to this place for 30 years, and in doing so, has become very attached to it. His father and uncle used to bring him here when he was a child, and he often brings his own children on his birding trips. Thus his attachments to this place are bound up with social relations, both contemporary and historical. Nonetheless, his primary attachments are to the ecological attributes of this particular place.

These first two hypotheses represent the essence of the proposed project. The remaining seven hypotheses flow from these and really depend on (1) being able to measure degrees of attachment to place and (2) being able to disentangle attachments to sociocultural phenomena versus bioecological or geological phenomena.

Hypothesis 3: A person's attachments to place will increase or decrease in accordance with both positive and negative ecological changes and sociocultural changes in that place.

Places that are undergoing, or will undergo, dramatic change, to either ecological attributes in the landscape or sociocultural characteristics represent excellent potential laboratories for the study of place attachment. Social impact assessment (SIA) has historically dealt with objective changes in the local economy and social relations associated with major developments. An SIA focuses on objective indicators, or person's subjective assessments of those indicators. The siting of a large processing facility, a new mine, or the construction of a military base can dramatically change a persons' attachment to place. Research has shown that such developments have changed densities of acquaintanceship (Freudenburg 1986), increased crime and divorce rates, created new social classes, and heightened economic inequality (Burdge 1994). Such developments also may change patterns of use or rights of access to resources.

Once again, sociologists usually focus on how developments affect social relations, the local power structure, or property rights, with less attention paid to how attachments to landscape or ecological factors change. Clearly, the siting of a highway through a former wetland, widespread clearcutting of forests, the disappearance of beaches through erosion, species extirpation, and other natural or human-induced landscape changes also may change a person's attachment to places. Some of these changes may be more related to ecological factors or specific site attributes of places. Others may be more related to sociocultural dimensions of such developments. There may be profound differences between residents and visitors as to what factors affect their attachment, but the assertion remains—large-scale landscape or sociocultural changes in a place will affect persons' attachments to it.

All the above examples represent factors thought to decrease attachments to place. However, Higgs' has suggested that participation in ecological restoration activities can dramatically increase a person's attachment to a place. Local residents' and visitors' attachments to a mountain will change when that mountain is reduced to a tailings pile, and those attachments will likely change again if the people help raise funds,

bring political pressure to bear, or actively participate in the ecological restoration of that tailings pile back into something resembling a mountain. Clearly, there are complex interactions between the development of social capital and attachments to place through environmental action and activism.

To return to our imaginary survey respondents, it is not difficult to develop hypotheses regarding how attachments might change in the face of environmental or social changes. If a highway were routed through Ned's marsh, this event might have a significant effect on his identity. Nonetheless, he might react by seeking substitutes for that place. The ecological or environmental change in that place could reduce his attachment to it to nearly zero. If the waterfowl that he was interested in no longer frequent the place, and traffic noise eliminates the possibility of introspection, and roadside litter destroys his enjoyment of the place, he may decide not to visit it again, and his only attachments would be to memories of the place. On the other hand, one can imagine a waste incinerator being located in Ann's community. With the incinerator comes 50 new families. Vandalism increases, and problems erupt in the schools, so Ann decides to home school her children. This change in the local economy, and subsequent changes in the community make Ann more suspicious and cautious and cause her to withdraw in some degree from the community to which she was previously highly attached.

The Issue of Scale

Hypothesis 4: People's degree of attachment and the nature of their attachment to place vary with the size of the unit of analysis.

A critical variable that must be considered in studying attachments to place is that of geographic scale. Beckley (1998) discusses the importance of scale for studying the phenomenon of human dependence on forests. As one measures forest dependence in progressively larger, hierarchically related sociocultural or spatial units of analysis (individuals, households, communities, counties, states, etc.), both the level and type of forest dependence will change. Hypothesis 4 suggests that spatial units of analysis matter in the study of place attachment as well. As one queries a respondent about nested spatial units of analysis (her house, her land, her neighborhood, her community, her commuting or retail shopping area, her county, etc.), one would expect to find different degrees of attachment and a different mix of causal factors (between sociocultural and ecological variables) composing that attachment.

It is easy to imagine a local resident's strong attachment to a single piece of property. Pride and satisfaction of ownership are known to increase attachment to place. Many of the nonfiction writers who write prose on human-landscape interactions eloquently describe such attachments (Berry 1969, Leopold 1949). It is difficult to anticipate the proportion sociocultural versus ecological attributes would contribute in the smallest units of analysis. Some people may be deeply attached to their home and land owing to family history and multigenerational ownership. The social events, relationships, and activities that have occurred in that narrowly defined place are what give the place meaning for some. For others, particularly those who intimately work or intensively recreate on their land, landscape attributes (a grove of trees, a patch of rare wildflowers, a pond or stream) may be the more important factors.

¹ Higgs, E. 1998. Personal communication. Associate professor, Department of Anthropology, University of Alberta; Environmental Studies, University of Victoria, P.O. Box 1700 STN CSC, Victoria, BC V8W 2Y2 Canada.

As one examines increasingly larger scales of geography, a given respondent's attachments will change. That is, both the degree of overall attachment will change, and the relative importance of sociocultural versus ecological variables in that attachment also will change. As one reaches geographic scales that extend beyond the individuals' social networks, people's attachments may be more heavily influenced by ecological factors, but overall attachment likely will decline. Again, nonfiction writers provide some clues here. Erlich (1985) describes strong attachments to very large landscapes (in Wyoming) in addition to human communities that exist within that landscape. People from outside the region, visitors (frequent or occasional) may hold strong attachments to the region, or perhaps to certain counties or parishes within a region, but perhaps not to a specific locale or piece of property. Again, this may depend on whether people are cottage owners, occasional tourists, or first-time visitors.

Length of Residence or Time Spent Visiting

Hypothesis 5: The length of time a person spends in a place (as a resident or visitor) is positively associated with affirmative affective attachments to that place.

The community attachment literature posits "length of residence" as a key variable in people's attachment to community. In most studies, this variable is simply measured in numbers of years. This measure is usually only applied to full-time residents and not to visitors, summer people, and perhaps not to transient workers. One can certainly imagine instances where length of residence or time spent in a place could result in negative associations or feelings. At the extreme, incarcerated persons may rate high in "time spent" and low on attachment. Less dramatic, but nonetheless counter to the assumed trend are persons who are forced to migrate, owing to economic or political circumstances, from places for which they have positive affective attachments to places where they have no such attachments. Northern Alberta and British Columbia are populated with thousands of "economic refugees" from Newfoundland, many of whom still hold stronger attachments (both sociocultural and ecological) to their beloved island than for their adopted western homelands.

Figure 2 presents a typology of different groups of people and how attachment to place may or may not be related to time spent in the place. The above stated hypothesis and the commonly assumed relation between time spent in and attachment to a place are represented in the linear pattern that extends from low time in place in the lower left corner. The categories are somewhat arbitrary, but they illustrate the point that intentionality and commitment (through return visits or property ownership) are likely positively associated with attachment to place. Passive users, temporary workers, and nonintegrated residents represent outliers or violations of the assumption that length of residence and affirmative attachments are positively related. Passive users are persons who hold a particular place in high esteem even though they may never have visited that place. The mere existence of these places, and a person's knowledge of attributes of such places through secondary sources versus direct experience, are the basis upon which positive affective attachments are formed. Conversely, the bottom right portion of the figure depicts economic refugees and nonintegrated community residents who may nonetheless be full-time residents. This latter classification might apply to rural youth who plan to migrate to urban centers as soon as possible after graduation from high school. Nonintegrated residents would also include recent, poor, immigrants such as those described by Fitchen (1991) who are attracted to rural places because they offer low-cost housing. These people may be full-time residents while possessing few social or ecological attachments to place.

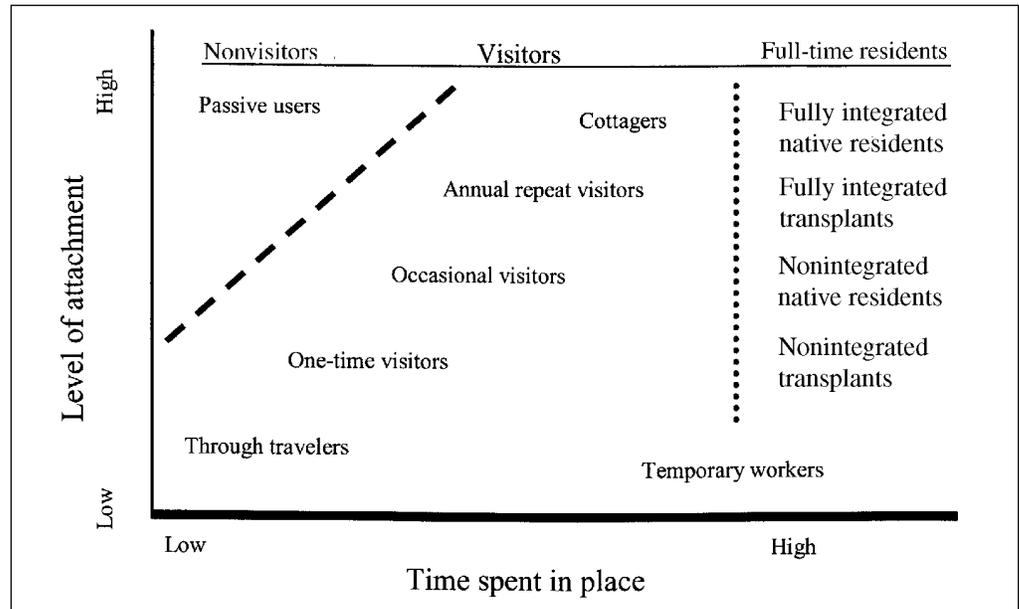


Figure 2—Time spent in place by different types of users.

Passive users—People who value a place without having direct experience or contact with that place.

Through travelers—Inadvertent visitors who only happen to be in a place because it exists on the traveler's route from point X to point Y.

One-time visitors—People who intentionally visit a place, but who do not return for repeat visits.

Occasional visitors—People who return visit, but not on an annual or regular basis.

Annual visitors—People who make an annual trip to a given locale (cottage, cabin, or ski chalet renters).

Cottagers—Second-home owners who make extended stays or multiple trips to a place in a given year.

Temporary workers—People who work seasonal jobs, but whose primary or permanent residence is somewhere else, or more transient workers (such as construction workers).

Fully integrated native residents—Full-time, long-term residents with deep and wide social connections.

Fully integrated transplants—Full-time, nonnative residents with deep and wide social connections.

Nonintegrated native residents—Full-time, long-term residents that are socially isolated.

Nonintegrated transplants—Recent transplants that are socially isolated or who have not yet developed extensive social networks.

The dotted line in figure 2 between those with high levels of time spent in place and the rest of the categories represents the disciplinary divide between community sociologists, who do not often acknowledge temporary residents or visitors to places in studies of community attachment, and recreation researchers, who focus nearly all of their attention on visitors of places and almost none on residents of places. The dashed line that separates passive users from the other categories represents another disciplinary divide. Passive users have been studied largely by economists, but this work has focused on their valuation of the places rather than the social psychological mechanisms that underlay these valuations.

Cultural Differences in Attachments to Place

Hypothesis 6: Cultural background is associated with attachment to place and will influence the relative importance of sociocultural versus ecological factors in a person's attachment to a given place.

If people are attached to places in different degrees and for different reasons, it is not unreasonable to expect that culture will be a "variable that varies"² with respect to attachment to place. Social histories, historical land use traditions and patterns, and different aesthetic sensibilities are cultural factors that might lead to differences in attachment to place. Prior discussion of culture in this paper has treated it as a dependent variable, but in this instance, culture is considered as an independent variable. Difference between two distinct cultures is hypothesized to influence both the source or nature and the degree of attachment. Hypothesis 6 suggests that one would find systematic differences in attachments between persons of different cultures, even for the same land base. It would be relatively easy to do empirical work specifically on this aspect of place attachment in areas where multiple cultural groups inhabit or frequent a common land base.

Some of the questions that emerge related to this hypothesis are as follows: Are there different mechanisms (cognitive or otherwise) and different reasons for attachments based on cultural origins? How do sacredness and cultural interpretations of sacred objects or places affect attachment to place? Are cultural differences between urban and rural residents distinct enough to produce significantly different attachments to place?

An obvious comparison might be made between indigenous people and nonindigenous people, especially given the common perception of deep connections (cultural, spiritual, historical) between indigenous people and their traditional homelands. There would be any number of natural "laboratories" where such a study could be conducted where indigenous and nonindigenous persons share a common landscape.

Adamowicz et al. (1998) speculate that there may be differences between indigenous and nonindigenous values for forests, and also have questioned whether data derived from certain tools for measuring values (contingent valuation) would be comparable in a cross-cultural context. They also recognize that some cultural groups consider certain places or attributes of places to be "sacred." Urban and rural differences, including differences in attitudes, have long been a subject of sociological work, and some of this past work could undoubtedly inform an attempt to look at such differences in light of attachments to place.

Knowledge of Place and Attachment to Place

Hypothesis 7: The breadth and depth of a person's knowledge of a place is positively associated with affirmative, affective attachment to that place.

Hypothesis 8: The nature of a person's knowledge of a place will affect the relative importance of sociocultural and ecological factors in that person's attachment to place.

² Freudenburg, W.R. 1997. Panel presentation at "The study of natural resource dependent communities: where we've come from, where we are, and where should we be going." August 13, 1997, meeting of the Natural Resource Research Group of the Rural Sociological Society. Toronto, Canada.

Time spent and length of residence		
	Low	High
Knowledge		
Low	<p>A</p> <p>Low knowledge, low time [H₁ = low attachment]</p>	<p>B</p> <p>High time, low knowledge [H₂ = moderate attachment]</p>
High	<p>C</p> <p>High knowledge, low time [H₃ = moderate attachment]</p>	<p>D</p> <p>High time, high knowledge [H₄ = high attachment]</p>

Figure 3—Relation between knowledge of, time spent in, and attachment to place.

Hypotheses 7 and 8 suggest that familiarity enhances attachment to place. Both of these hypotheses are intricately related to the issues of length of residence (hypothesis 5) and to cultural differences (hypothesis 6) in attachment to place. In attempting to build a quantitatively based model of place attachment, one might expect to find a high degree of colinearity between time spent in a place and knowledge of a place. The challenge here is to attempt to separate these elements. One could presumably include knowledge-testing questions in a survey instrument to test whether degrees of local sociocultural and or ecological knowledge are related to attachment, as well as whether a relation exists between time spent in and the level of knowledge of a place. One would expect the relation for respondents from cells A and D in figure 3 to be clear with respect to place attachment. Low knowledge of a place, and little time spent there, will likely be limiting factors on attachment. Conversely, high knowledge of a place and high time spent there would likely lead to higher levels of attachment. For persons who fall in cells B and C, it is harder to predict the outcome. The type of knowledge or the type of time spent could influence these differences. For example, a recreationist or a vacationer might fall into cell B, where they are focused on relaxing or focused on a specific activity. Such persons may not be interested in acquiring knowledge about a place, but they may be very attached to it because it provides the material conditions they need for either relaxing or participating in an activity such as white-water kayaking. A scientist, an outfitter, or an environmental advocate could fall into cell C, if such persons developed intimate expert knowledge of a place even though they only spend small amounts of concentrated time in such a place. Their knowledge of the place may enhance their attachment to it, despite the fact that they spend little time there.

Different "ways of knowing" or different knowledge bases for certain places may be largely culturally determined. Not only are there different levels or degrees of knowing a place, there are fundamentally different ways of knowing a place. Are indigenous holders of traditional ecological knowledge more attached to places than persons whose knowledge of a place is based on scientific knowledge? Once again, empirical work that includes indigenous-nonindigenous comparisons may serve to shed light on culturally specific knowledge bases and the degree to which these affect attachment to place. One could also attempt to measure whether those who are more familiar with either the written or oral history are more attached to place.

Anchors and Magnets in Attachment to Place

Hypothesis 9: Attachments to place may comprise both positive, affective attachments that draw a person to a place (magnets), and neutral or negative contextual factors that root a person in a place (anchors).

Most of the literature on attachment to place deals with positive, affective feelings. A unique sociological contribution to the place attachment literature might be to describe and analyze how people are not only "drawn" to a place, in a positive sense, but how some are "rooted" in place in a negative or perhaps neutral sense. These dimensions of attachment may be thought of as anchors and magnets. Magnets are attributes that draw people to a place, and these are well documented on both the sociocultural and biophysical sides of the ledger. Sociocultural magnets include kinship ties, social networks, institutional affiliations, vernacular architecture, and other human-caused landscape attributes. Ecological magnets may include mountains, old-growth forests, natural recreation sites, or other desirable landscape or ecological attributes.

Anchors³ are factors that keep people in place, even though remaining in that place may keep them in poverty, or may keep them unemployed, or in abusive, destructive relationships. Anchors are more related to social structural factors, such as economic conditions, class positions, power structure, family dynamics, and the like. Anchors may be more critical than magnets for understanding why people remain in the Mississippi Delta, or in Newfoundland outports, or on poverty-stricken Indian reserves and reservations in both Canada and the United States.

Interestingly, these anchors also can be discussed in terms of ecological and sociocultural dimensions. Those in dire economic circumstances use their social networks to survive. Lacking cash, they barter or rely on relatives and friends for things such as childcare, auto repairs, firewood cutting, accommodation, and other forms of labor sharing or sharing of basic physical means of subsistence. Ecological anchors that attach people to place include subsistence goods and, in particular, knowledge of where and how to obtain them. The meat, berries, fish, building materials, medicines, and other goods that people derive directly from the land may be important factors for survival, especially in regions where the market economy is sluggish or inaccessible to certain segments of the population. Knowledge of that land base may be critical to an individual's or household's survival. Therefore, expert local ecological knowledge of the land may contribute to a person's "rootedness" in place. In either case, there may be some risk associated with leaving a place in which one is rooted, even if one is leaving for a place with better economic prospects. Detached from one's social network, and removed from any means of direct subsistence, one could easily find oneself in worse economic circumstances while being surrounded by prosperity (Beckley and Hirsch 1997, Brown et al. 1998).

The Potential Contribution of Place-Attachment Research to Resource Management

Whereas place-attachment research might be of academic interest in its own right, it also has tremendous potential to inform and improve resource management, planning, and policy. Most veteran resource managers would agree that they work in a more contentious sociopolitical environment today as compared to 10 or 20 years ago. More people are demanding recognition of their values in natural resource decisionmaking, and more resource management decisions are ending up in court when values of one group or another are compromised. Resource managers and planners are frustrated

³ Although he does not use the term "anchor," this concept developed through discussion with Ralph Brown, Brigham Young University, Provo, UT 84602, who is duly acknowledged.

with the inability of the rational, scientific policymaking process to account for or mediate intense, emotional expressions of values for natural resources. Extensive experiments in alternative dispute resolution have been undertaken in the United States to address the increase in conflict over the management of public land (Schumaker et al. 1997). In Canada, there is widespread and still-growing recognition of the "many voices" that have a legitimate right to be heard in resource management, planning, and policy (Anonymous 1998).

Although there exists greater awareness and recognition of the diversity of human values for certain landscapes and places, and there are significant resources being applied to mitigating or mediating conflict over resource use scenarios, there have been few attempts to delve deeper into the nature of place attachment with the hope of clarifying the distributional effects of policy actions. Clearly, if different groups of users are attached to a given place for different reasons, changes to places are going to affect those groups differently. Some groups might be quite immune to landscape change, if their primary attachments to place are due to sociocultural factors. Other groups will be more severely affected by landscape change, but would be indifferent or only marginally affected by major sociodemographic or cultural change in a place. Perhaps the best way to illustrate these potential differential distributional effects is through an example.

I am familiar with an area in Maine where (at least) three cultural groups inhabit a shared landscape. For lack of a more rigorous taxonomy, and bowing somewhat to the vernacular of the region, I will call these groups "locals," "transplants," and "summer people." Locals are long-time, multigenerational residents that usually have wide and deep social networks. Transplants are year-round residents, retirees, or people who initially went "back-to-the-land" or were otherwise drawn to the place owing to both the pleasing aesthetics of the natural environment and a desire for a slower paced, or alternative lifestyle. Summer people, in this definition, are those with second homes in the area, or those who rent the same cottage for a period of time year after year. Each group spends considerable time in this place, each group is connected to the environment and physical attributes of the place, and each group is enmeshed in social relations in the place.

Although these groups share a landscape, they have widely divergent views and values toward that landscape. Locals predominantly hold utilitarian values for natural resources and the environment. Forest and marine resources are the traditional economic backbone of the region and, therefore, clearcut forests, gravel pits, and "working" harbors are not disturbing to these people. Transplants hold environmental integrity in high esteem. The craftspeople, organic farmers, retirees, or other equity migrants who make up this group were largely drawn to the area by its environmental amenities. Dramatic changes to the landscape, or even small incremental changes to the landscape (increased numbers of signs or traffic), can produce strong negative feelings in this group. Summer people are primarily "consumers" of this landscape. Their work life is not connected to it. They come to the region to rest, relax, and recreate on the lake or ocean shore lots.

These three groups have very different ways of interacting with the land. Their attachments to place are bound up in their relation to the land. Locals are more likely to be anchored to the land, whereas summer people are more likely to be drawn to it. Locals are also intricately attached to this place through a web of social relations.

Summer people are usually quite detached from the local social web, but over time many develop their own sociocultural connections with fellow cottage owners or local merchants and tradespeople. Transplants fall somewhere in between. Whereas they are drawn to the place for environmental reasons, they develop wide and deep sociocultural connections. Many transplants make connections to locals, whereas others make business or social connections with summer people. As well, there is a thriving “community within a community” comprising the transplants themselves.

The purpose of this example is to demonstrate that connections to the land, rivers, forests, mountains, and other ecological attributes of a place differ depending on who you are and how you use the land. If your livelihood is based on transforming local natural resources into commodities, your relation to the place will be different than that of someone whose livelihood depends on selling services to people who wish to “consume” a pristine landscape. Changes to the land, through policies, laws, or even natural change, will affect these groups differently. Oftentimes, identity with a place is a core element in a person’s self-identity. Land use change or proposed land use change, therefore, often meets with heated, emotional resistance, at least from some segment of society. Understanding attachments to places is critical for understanding what elements or attributes of a place matter to certain groups and why. Research into such matters should be at the forefront of any strategy to mitigate the negative effects of various developments or policies. Making fair and informed land use decisions depends on knowing who will be affected, and to what degree.

Understanding place attachment also may help us to understand why people make “irrational” economic choices, such as remaining in economically depressed regions. Increased knowledge in this area could provide a tremendous boon to local economic development. The hope is that this research could probe deeper into the nature of attachments to illustrate how attachments contribute or detract from local human capital development. In an extreme case, place attachments may retard local human capital development if young people are so attached to a place that they are unwilling to leave it for even 2 or 4 years of technical training or a university degree. On the other hand, the tremendous social capital associated with sociocultural attachments to place may be the most underused resource for local community development in many places. Understanding attachments to place also may help society assess what communities are sustainable in the long term, and those that are not. Some communities that appear marginal on the basis of secondary indicators (high unemployment, low wages, stagnant or declining real estate values, low education attainment) may have residents and or visitors that are highly attached to it and therefore highly committed to the long-term survival of the place. The example that comes to mind is fishing out-ports in Newfoundland. Conversely, some communities may perform well on the basis of secondary indicators of community well-being, but they may prove unsustainable in the long run owing to low levels of commitment or attachment. An example here would be mining communities in extremely remote regions that cease to exist when the resource is played out.

Confounding Factors in Disassociating Elements of Place Attachment

There are many reasons to doubt that experiments in dissecting sociocultural and ecological determinants of place attachment will work. The ethnographers that critiqued my initial thoughts on this subject may be correct that this is an impossible task. Many writers in the geography tradition have concluded that place attachment is a complex, systemic phenomenon with intricate connections. Places have multiple

meanings to people. Quantifying degrees of attachment may be challenging enough, but breaking down such measures into component parts may prove impossible. An underlying assumption to this proposed experiment is that attachment to place is, to some degree, an attitude that can be scaled like other attitudes. Treating attachment to place as an attitude toward a complex "spatial object" that is imbued with cultural meaning may be a gross oversimplification. Place attachments may be much more context specific, more wrapped up in personal identity, and more relational than attitudinal. Survey instruments that attempt to break places down into sociocultural or biophysical component parts may be more effective for individuals with fairly superficial or one-dimensional attachments to place. They are more likely to fail where attachments to multiple attributes are high. Nonetheless, I believe the experiment to be worthwhile for the simple reason that we need this information. To simply say that attachments to place are complicated, interrelated, context-specific, and therefore fundamentally unknowable is defeatist.

If attachment to place is at least in part an attitude, at least part of it should be measurable through traditional attitude measurement techniques. To the extent it is more relational, other methods will need to be used, or could perhaps be used in association with attitudinal measurement instruments. Place is one phenomenon that contributes to a person's identity and is therefore likely to produce strong attachments. Some people are only slightly attached to place and identify very strongly with their work and careers. For others, class position or culture are prime determinants of self-identity. The roles of these other determinants of self-identity have been the focus of positivist attitudinal research, so there is no reason to exempt place from similar scrutiny despite the inherent complexities associated with such an undertaking.

There may be very specific factors that confound the proposed project outlined here. One such challenge is posed by the fact that nearly all landscapes in North America are, at least partly, the product of some human intervention. The aesthetically pleasing mix of farm and forest land in the northern Midwest is as much the product of human activity as it is of natural processes. The forests of the Northeastern United States are second- and third-growth forests, not "natural" forests or "old-growth" forests. The quaint fishing harbors in the Maritime provinces derive as much of their aesthetic value from the vernacular architecture, the fleet in the harbor, and the lighthouse as they do from the rugged, rocky coastline. Even in the most northerly reaches of Canada, the mark of humans is apparent in oil and gas exploration, overflights by aircraft, and diamond mines.

Another complicating factor is that many human activities that enhance place attachment simultaneously involve both other humans (sociocultural) and landscape or ecological elements. Perhaps the most obvious example is hunting. Hunting involves direct human interaction with the landscape, and direct interaction with certain species that reside in that landscape. Hunters generally hunt in places that they know well. They develop a relation with a land base or a landscape, and through knowing it, they become attached to it. Yet, for many, hunting is inherently a social activity. Practitioners were likely socialized into the activity by their father or other relative or friend. Many hunters hunt in groups, and the success of the hunt is measured more by the quality of time spent with friends than by how many animals were harvested. It might be very difficult, or even impossible, for a hunter to cognitively divorce his or her social attachment to that activity from the physical landscape in which it occurs (Stedman 1996).

Biophysical, ecological, and geomorphological sources of place attachment	Interface sources of place attachment	Sociocultural sources of place attachment
Relief (degree of slope)	Presence of agriculture	Kinship network
Planted forests	Vernacular architecture	Friendship network
Natural forests	Presence of game species	Local conservation organization membership
Forest age	Dependence on subsistence goods	Local social service group membership
Presence of water	Undeveloped recreation sites	School involvement
Biodiversity	Developed recreation sites	Sports teams
Wilderness	Archeological and historical sites	Population density
Tree height/diameter		
Geological formations		

Figure 4—Continuum of bioecological and sociocultural sources of place attachment.

Ecological restoration is another example where social relations deepen and meaning in a place is created simultaneously through interaction with other people and with the place itself. In such instances, it may be difficult to disaggregate attachments to the people, the place, or even the collective action and the social capital that flows from voluntary, cooperative ventures. Others have argued that not only community culture, but local political culture is intimately wrapped up in issues of landscape, land use, and human interactions with the natural world and natural processes (Kemmis 1990).

For these reasons, perhaps the line of questioning will have to allow for a third category of causal variables that attach one to place (fig. 4). This intermediate category of variables could be the socioecological interface and would include such things as landscape elements that have a decidedly human origin (Amish farms and church spires rising above autumn foliage in New England villages). As well, interface variables could include human activities that enhance attachments to place, but that involve direct contact with ecological attributes in the landscape. Activities such as hunting; jobs in agriculture, forestry, or fishing; or recreational activities occur in human-altered environments. Few landscapes exist today that are not altered, in some way, by human contact. And as Greider and Garkovich (1994) point out, landscapes, and the symbols contained therein, are largely human constructions. I recognize that place attributes are not purely dichotomously biophysical or sociocultural. The degree to which place attributes may be categorized as such will influence the success of this endeavor.

The proposed project is essentially a positivist one, and one that might not hold up well against a postmodernist critique. However, in order to undertake an experiment such as the one proposed, it would not be necessary to assume that places are static “facts.” Rather, one could acknowledge that places are socially constructed, and that meanings are conferred to places differently by different subjects. In theory, even with such a conceptualization of place, one could attempt to determine whether socio-cultural or biophysical attributes of places are more central to a given subject’s social constructions of place.

Summary

The questions and issues outlined previously in this paper are merely the beginning of what could, and what I believe, should be a major research initiative. A host of other questions also could be examined, including:

- Do strengths of attachment differ across regions?
- Do causes for attachment differ across regions? (e.g., Are cultural attributes more important causal factors in Kansas but ecological and landscape attributes more important causal factors in the Pacific Northwest?)
- How much time does it take to develop bonds that are sociocultural (e.g., Do equity migrants have enough time to develop deep sociocultural bonds if they only move to an area in their 60s or late 50s?)
- Do forms of social organization related to natural resources (e.g., community forests, forest tenant farmers, community partnerships, etc.) increase attachment to place? If so, are such attachments due to social ties, or ecological ties, or both?
- Are there “universal” ecological factors that make all people rate a given landscape favorably, such as relief (mountains or hills), tree size, the presence of water, or certain types of water (running or clean)?
- Are urban visitors attached to rural places, in part, because of their projections of what these places are like in response to their myths about such places as opposed to actual social relations?

Again, this is essentially a positivist attempt to deconstruct and better understand a complex phenomenon. The experiment is contingent upon being able to create effective measures of attachment, and on creating questions or instruments that allow respondents to clearly articulate their attachment and sources of attachment. I believe that an interdisciplinary approach and the use of multiple methods would be the best strategy for undertaking such a study. There is a tremendous amount of new work occurring in this area. To date, however, it has remained polarized between studies of visitors’ responses to landscape, ecological, or heritage and cultural resources, and those that look exclusively at sociocultural predictors of community attachment. Many landscapes have multiple layers of users. Some users come and go, some come and stay, some have been “in place” for generations. Each is attached to place in different ways and for different reasons. I believe that we could make some real contributions to our understanding of place attachment if we treat a defined land base as the unit of analysis and survey the entire population of human users of that land base. A larger, more encompassing model of place attachment would emerge that would include both visitor and resident attachments owing to both sociocultural and ecological factors.

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Managing Natural Disturbances and Sustaining Human Communities: Implications of Ecosystem-Based Management of Public Lands

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Abstract

Ecosystem-based management represents a new paradigm for managing publicly administered natural resources. One of the key tenets underlying ecosystem-based management is recognition of the important role of naturally occurring disturbance processes in the development of a particular landscape. This tenet implies that such processes should be allowed to operate to maintain biological integrity and dynamic equilibrium. Such notions are antithetical to long-term federal land policy, in that natural disturbance processes (such as fire and insect outbreaks) have traditionally been mitigated through active management and attempts at suppression and control. Human communities are impacted by such a change in policy because they have evolved over time with a policy that emphasized stability in intent, if not fact. The extent of impacts, however, is influenced by the nature of the linkage between communities and natural resources; the type, intensity, and frequency of disturbance; and institutional policies toward natural disturbances. Communities employ adaptive strategies as they strive to persist in the face of disturbances. Such strategies are influenced by the community's resiliency, cultural mores, beliefs, and institutional arrangements.

Introduction

Ecosystem-based management has become the incantation of new-age conservation biology, forestry, and landscape ecology. Governmental programs oriented toward production of wood fiber, ore, and grass have been all but replaced in a few short years with goals focusing on sustaining the integrity of ecosystem structure and functioning. Such policies have led to significantly different activities for land managers. The language of timber harvesting is fast being challenged by a new jargon of restoration ecology. Biltmore sticks, long used by foresters to measure tree height, volume, and diameter, have been traded for geographic information systems. And foresters, who once carried diameter tapes during their daily outings, now shoulder global positioning system receivers.

This paradigm shift represents a transformation from natural resource management emphasizing commodity production to one adapted to producing a broader range of goods and services; a movement away from management of vegetation for commodities to management of natural processes to maintain a semblance of biological integrity; a shift from a “faith-based” management approach¹ to a scientific-based system; and a move to greater incorporation of human values and preferences in management decisions.^{2,3} Caplan and Kessler (see footnote 2) note that this newer perspective “views the land not so much in terms of the products to be removed as in the condition of the ecological systems that must be sustained” (1991: 3). A particularly important component of this change is restoration of natural disturbance processes to forest and range ecosystems. The recent interior Columbia River basin ecosystem assessment and management project stated that as a goal “Vegetation management is designed to mimic natural disturbances . . .” (Interior Columbia Basin Ecosystem Management Project 1997: 2).

Such changes in land management policy carry potentially significant, and perhaps irreversible, consequences, not only to the environment, but also to the human communities⁴ that depend on the environment for sustenance, security, shelter, spirituality, and leisure. Although communities have always evolved in the context of economic change (the ore played out, the railroad moved on, the technology changed, markets came and went) and natural disturbances (hurricanes, forest fires, floods, disease and insect epidemics, volcanic eruptions), federal policy has ceaselessly emphasized control, suppression, or reduction of natural disturbances, not restoration of them. For example, federal land management agencies maintain a large bureaucracy focused on

¹ By a “faith-based” approach, I mean management that proceeds with little scientific understanding of consequences and uses assumptions about the “intrinsic goodness” of the management activity. My first inclination was to term this type of management “belief-based,” but science is itself a particular belief system.

² Caplan, J.A.; Kessler, W.B. 1991. Multiple-use and ecosystem management: a comparison of two paradigms. Paper read at Ecosystem management in a dynamic society, 1991, at West Lafayette, IN. On file with the author.

³ Roberts, D.W. 1991. Management of ecosystem structure and function: problem and process in understanding. Paper read at Ecosystem management in a dynamic society, at West Lafayette, IN. On file with the author.

⁴ Community in the sense used in this paper is a spatially defined place where humans congregate and live: towns and villages, primarily. Other types of communities may be affected by federal policy, but this paper is limited to a discussion of communities of place.

suppression of both human-caused and natural fires. And for decades, other federal agencies spent billions of dollars on flood control through the construction of dams and levees.

The recent change in land management paradigms has increased the anxiety of many long-term rural residents who feel increasingly alienated by an apparently remote and insensitive federal government, overwhelmed by growing global economic complexity (that challenges even the most competent economist to understand), antagonized by an enlarging environmental elite (that is often perceived to be at odds with the values of rural America), and alarmed by vacillating (and frequently gridlocked) land management policies on resource commodities and endangered species. A rapidly growing rural population fueled by high rates of immigration leading to a wider diversity of values also serves to amplify anxieties about the future. In general, rural areas have had difficulty adapting to new economic realities (Barkley 1995). How well will they adapt to a new, and unclear, resource management policy arena?

The paradigm shift in natural resource management comes at a time when economic, cultural, and political relations affecting rural communities can be described as full of apparent chaos and uncertainty. While the residents of these communities often complain of the pace, scale, and complexity of change, they “have never been insulated from [the] change” occurring in the broader social and political context (Flora et al. 1992). Janet Fitchen echoes these concerns when she states: “The cumulative effect of this quickening pace challenges not only what goes on in rural communities, but what people think about their communities and about their lives” (1991: 2).

The predictability that many residents desire stands in distinct opposition to the character of change rural communities now experience. The change communities experience or probably will experience, differs from the change of the past in terms of its scale, pace, and complexity. Difficulty may come in managing the transition from one state or condition to another. As Bridges (1991) observed, a transition means, “letting go of something.” What the something is may be loosely described as a utopian rural lifestyle that was strongly linked to abundant and accessible natural resources, largely administered by the federal government.

Rural communities, particularly in the intermountain and Pacific Northwest regions, have a long history of relations to natural resource commodity processing. The viability of these communities has long depended on stable flows of commodities from natural resources on federal lands as the mainstay of their economies whether ore, oil, timber, or forage. Yet, Caplan and Kessler (see footnote 2) argue that when the government “. . . makes radical changes in people’s use of public lands, disasters result. . . . We are literally watching communities die as a result of sudden changes in permitted uses” (1991: 4).

The literature is largely silent on how restoration of natural disturbances through federal policy likely will affect communities. This paper proposes a framework for examining the implications of restoring natural disturbance processes as a fundamental tenet of federal land management in the Pacific Northwest. I briefly review essential biological concepts and principles dealing with ecosystem-based management and the goal of restoring a more natural disturbance regime. This discussion is needed to understand what landscape ecologists intend. I then suggest a framework for examining how

Relevant Ecosystem Concepts

natural and cultural disturbances may affect communities. Because a major goal of at least one ecosystem-based management proposal is to encourage social and community resiliency (Haynes et al. 1996), I follow this section with an overview of factors that influence development of community-level actions in the face of increased uncertainty about the effects of natural disturbance policies.

Management of publicly administered wildlands has shifted from a paradigm emphasizing "sustained yield" of natural resource commodities to one based on "the long term sustainability, diversity, and productivity of the ecosystem" (Overbay 1992: 5). Other ecologists state the objective as maintaining "sustained ecosystem structure and function" (Roberts 1991: 73-74, see footnote 3).

A major purpose of this change is to reestablish or restore ecological processes that are fundamental to maintain or, where necessary, reclaim ecosystem integrity.

Ecosystem integrity is viewed as essential to human survival by many ecologists (e.g., Odum 1993, Salwasser and Pfister 1994). Traditional resource management activities have emphasized proliferation of the earlier and more productive stages of ecological succession, reducing the diversity of successional stages across landscapes. The focus of resource management activities in the past accentuated species and populations rather than landscapes and ecosystems, resulting in degradation of ecosystem integrity. Landscape ecology, one of the new disciplines forming the foundation for ecosystem-based management, emphasizes preserving the spatial pattern of landscape processes and vegetational stages (Urban 1993). Landscape-level processes and vegetation interact, producing distinctive characteristics such as patch size and composition.

Landscape patterns are the result of patterns of biophysical environments and disturbances at multiple scales (Bourgeren and Jensen 1994, Hann et al. 1997). They "result from both enduring, slow-changing features of nature (e.g., soils, climate, and topography) and more dynamic patterns of biotic communities, ecological processes, and disturbances that shape short-term temporal and spatial change" (Salwasser and Pfister 1994: 151).

Understanding the role of these factors in generating pattern is fundamental to ecosystem-based management. A variety of biotic and abiotic factors influence pattern development and distribution (Urban 1993). One mechanism that has received increasing attention is the presence of disturbances. A disturbance has been defined as "any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment" (White and Pickett 1985: 3). Thus, a fire, insect or disease outbreak, flood, avalanche, or even a severe weather event may be termed a disturbance. As they occur naturally, disturbances create a patchy appearance across the landscape that eventually leads to a characteristic pattern. Disturbances differ in terms of their frequency (temporal interval), intensity (e.g., energy release from a fire), scale or amount (extent of coverage across the landscape), distribution (patch size and density), and duration.

Closely allied with the concept of disturbance is the notion of natural variability, which some propose as a management goal. "Some ecologists have suggested that we can best achieve ecological objectives by retaining modern landscapes within the 'natural

range of variation' (NRV) in landscape pattern" (Hansen et al. 1996). "Returning to a specified historic **condition** [emphasis added] may not be possible; rather, a more sensible goal may be to restore natural disturbance regimes . . . that maintain biological elements of interest (Christensen et al. 1996).

By allowing natural disturbance processes to operate with a minimum of control or suppression, it is assumed that this natural range of variation can be achieved⁵ and ecosystem integrity maintained. The NRV may be very wide, however, such as in the Yellowstone Ecosystem, where large conflagrations occur every 200 to 300 years (Hansen et al. 1996). Allowing large variations in disturbance processes, because they occurred naturally or historically, rather than attempting to control or suppress them introduces an element of uncertainty into the social systems that have evolved in these environments coincident with a control policy: ". . . it is likely socially unacceptable to maintain large disturbances in modern landscapes" (Hansen et al. 1996). The NRV goal is important for achieving ecosystem sustainability by restoring a semblance of natural ecosystems. Ludwig et al. (1997) assert that systems in their natural state (when they are managed to be within their NRV) are resilient; i.e., they maintain the capacity for self-organization when subjected to a disturbance. Resilient systems can be characterized as stable and sustainable.

A fundamental rationale for reinstating these disturbance processes is to avoid "surprise events," such as the Yellowstone fires of 1988. Surprises occur because we have limited knowledge about natural processes and because land management policies in the past have been built upon implicit assumptions concerning the "controllability" of nature. For a while, management that attempted to control nature provided a fairly stable and predictable context within which communities could be established, grow, and evolve into the utopian settings so many in the Pacific Northwest cherish. Given considerable inputs by the federal government, communities developed strong and widespread links with natural resource commodities, but these links were constructed on a set of assumptions not valid in the long run.

The extent to which the NRV goal intersects human needs is not known with any greater certainty than for prior paradigms of management. Disturbance processes are important to these goals, as naturally occurring systems ". . . tend to maintain their integrity when subject to disturbance" (Ludwig et al. 1997). Ecologists (e.g., Everett et al. 1994, Jensen and Bourgeron 1994) propose that where natural disturbances cannot be allowed to operate freely, management should "mimic" them. Mimicking principally involves manipulating vegetation through prescribed burning, cutting, or grazing in such a way as to create the same spatial and temporal pattern of living and dead structures as a natural process would. The "mimicking" process is expected to help retain or restore ecosystems to their natural range of variability.⁶

⁵ It should be noted that there is some dispute among landscape ecologists about the appropriateness of a goal of natural range of variation. Some ecologists suggest returning landscapes to the historical range of variability, presumably a period prior to Euro-American settlement, with a variety of proposals for an historical "base period." This difference is significant in that the "natural" range would presumably include the ice age.

⁶ The author notes that the idea of mimicking requires a level of knowledge about ecological processes not yet available in the literature of ecology.

For the interior Columbia River basin, this proposal is nothing less than dramatic. Public land accounts for fully half of all the land in the basin. This land has historically been managed to control, reduce, prevent, or suppress natural disturbances. Changing this paradigm creates a great deal of uncertainty in a variety of ways, including its impact on resource commodity flows. It is not so much that the new policy will change the predictability of commodity flows, it is that we simply don't know if "mimicking" natural processes will achieve either the biological or social goals identified in ecosystem-based management. This uncertainty is particularly dramatic among communities whose economic structure has historically depended on predictable flows of resource commodities.

A program of reintroducing natural disturbances will challenge communities to develop adaptive strategies that address this increased uncertainty. Allowing disturbance processes on public land may introduce another in a line of destabilizing policies and changes. These policies, such as the Northwest Forest Plan, rangeland reform, and endangered species management, are destabilizing in the sense of the uncertainty about the meaning, potential actions, and consequences they bring with them. This results in heightened anxiety among rural residents because effects on economies and cultures have rarely been comprehensively studied and are poorly understood. People express concerns that the funds needed for restoration of natural disturbance processes will not be appropriated, that the expected commodity production will not occur, and that standards for land management proposed in large-scale regional assessments will prevent implementation of on-the-ground management. Communities will be challenged to develop adaptive responses in the face of this uncertainty. At the same time, land management continuing in the tradition of the past carries its own, often hidden and poorly understood uncertainties for the same people.

A Conceptual Model Linking Human Communities to Their Social and Natural Context

Communities are embedded in a larger context characterized by social, political, and economic variability and perturbations taking place at a variety of scales (county, regional, international) and biophysical environments with their associated natural disturbances occurring at more-or-less unpredictable frequencies and amplitudes (floods, fires, insects, pathogens, avalanches, extreme weather, solar flares, El Niño).⁷ Such natural disturbances occur within a larger context of human-induced social and political stresses such as international treaties on trade and natural resources management, global economic patterns and exchange rates, informal agreements on treatment and mitigation of environmental pollution, and relatively high rates of immigration. Links between communities and natural resources occur at different scales and intensities, and can change over time. Restoration of natural disturbance processes (either through management of disturbances or mimicking actions) will differentially

⁷ It can be argued, as one reviewer did, that such events are predictable under a "natural" regime, and less predictable under an "unnatural" regime. The point here is that policy changes themselves lead to great uncertainty, both biologically and socially. Understanding the effects in the social setting requires the type of framework suggested here.

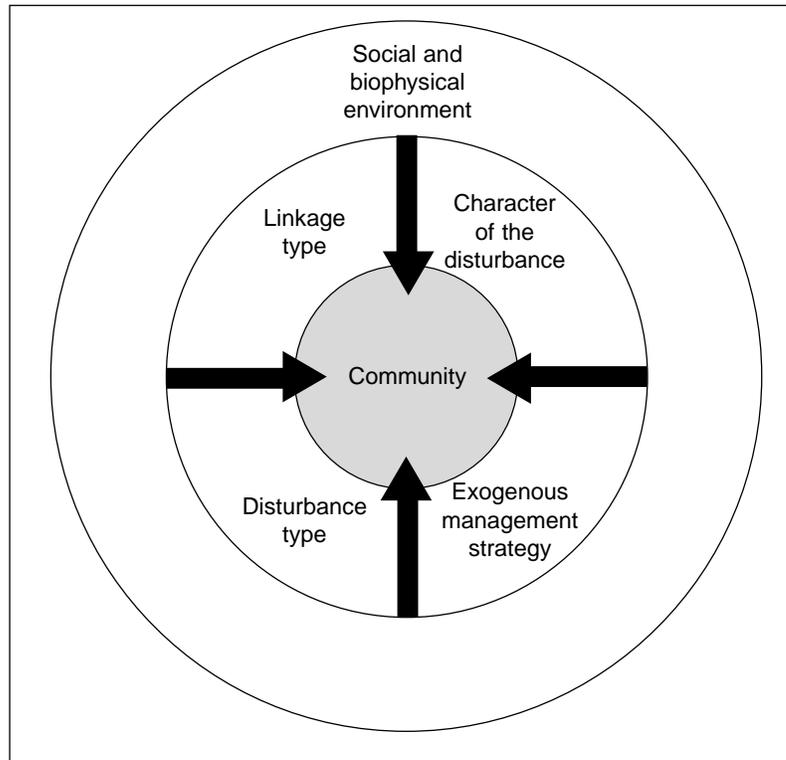


Figure 1—Communities do not exist in isolation from their environment or a broader political and economic context. Such contexts and natural environments exhibit a wide variety of perturbations and distortions. The impacts of these disturbances are filtered by several defining characteristics.

affect these links, enhancing some, disabling others. The impact of these disturbances and perturbations on the community is affected by four major factors external to the community (shown schematically in fig. 1).

The first factor is the type of link or dependency that exists between a community and its embedding environment. Several typologies have been proposed (section by Beckley, this publication; Gale 1991). Beckley proposes three dimensions to this dependency: the type of link, the scale at which it occurs, and the degree (or intensity). Beckley's typology forms the foundation of the classification here, which is a functionally based system. Communities may form one or more links with their embedding social and natural environment: (1) an instrumental dependency, which may be an economic, subsistence, or recreational link; (2) a cultural-spiritual link, where environmental symbols are a critical component of social interaction and identity; and (3) an ecological connection, where the environment is the source of resources essential for survival—such as pure water and clean air. Links may be very simple, such as a unidimensional economic dependency on resource commodities, or complex and involve a variety of linkage types, intensities, and scales.

Economic dependencies have received a plethora of attention in the scientific and polemical literature, with much of this discussion focused on the relation between community stability and resource commodities (Overdevest and Green 1995). The

relations studied most commonly deal with timber and range, but tourism based on public lands is also important in some states (Yuan and Moisey 1992). Economic dependencies may take different forms (Gale 1991, Johnson and Rasker 1993), however. Johnson and Rasker argue that recreation opportunities, scenic beauty, and proximity to public lands are themselves important factors in business location decisions. Natural resources are used, not in the sense of a commodity for value-added processing, but as an aesthetic backdrop for businesses and their employees.

Communities differ in the number, type, and degree of linkages with the environment. For example, a community located in a mountainous, forested region may be linked instrumentally with the vicinity because of the wood fiber and recreational opportunities located there. The region may be the source for the community water supply. The community's cultural identity may be tied up in the physiographic character of the region. These links differ in degree or intensity. For example, wood fiber processing may be a large part of the local economy. An important question may concern the effects of the number and type of linkages of community dependency on the environment. A large summative dependency may result in the community being especially vulnerable to surprises and disturbances, whether these are the result of current land management approaches or ecosystem-based management. One could argue that the presence of a complex set of links of different types and intensities may reduce a community's vulnerability.

A second factor concerns the type of disturbance that affects the links. Floods, for example, lead to different effects than do wildfires. These effects are unlike those resulting from windstorms and avalanches. Each type of disturbance may have a culturally defined response. For example, a community may be well organized to deal with a flood, but poorly prepared for a wildfire.

A third factor deals with the character of the disturbance regime. This character is described in three ways: (1) intensity or amplitude, (2) scale, and (3) periodicity. In general, as disturbances increase in amplitude, they are much more likely to impact a community. An intense insect outbreak will have greater effects than endemic infestation levels. Scale concerns the spatial and temporal (duration) extent of a disturbance. Disturbances—such as fire—occurring over a wide area are more likely to impact a community than small fires. Disturbances occurring over long periods such as the Midwest floods of 1996 or the El Niño climactic patterns of 1997 to 1998 are likely to have greater effects.

Periodicity refers to the return interval. Infrequent disturbances that are large in scale and intensity, such as the eruption of Mount St. Helens in 1980 or the fires in Yellowstone National Park in 1988, may have considerable effects on communities. Conversely, frequent disturbances that are low in intensity and small in scale may have few lasting effects on the community. Communities experiencing frequent disturbances may have developed strategies that deal effectively with them just as ecosystems have evolved and adapted to many disturbances.

Community Responses to Natural Disturbances

A fourth factor concerns policies developed by larger and exogenous political units to deal with disturbances, in this case primarily federal land management agencies. These agencies may adopt one or a combination of several policies that address disturbances. A policy of prevention attempts to forestall or eliminate the disturbance, as when the Corps of Engineers develops levees and dams to control floods. A suppression policy is intended to control or restrict a disturbance once it occurs. This policy is often implemented to address insect outbreaks and wildfires. Mitigation policies deal with the effects of the disturbance, such as initiating job-training programs for millworkers who have lost their jobs because of a new natural fire policy. Preparedness (Karwan and Wallace 1984) is another manifestation of a mitigation policy. Finally, an agency may adopt an accommodation policy with respect to natural disturbances: the disturbance is allowed to occur within a prescribed set of bounds. The important point about these policies is that although local communities may have input into their development, they are designed and implemented by federal agencies to achieve national objectives. In this sense, then, these policies are exogenous but do influence how disturbances affect communities.

A generally accepted goal of community governance is survival in the face of adversity. However, communities, as the following authors argue, must take more than a passive approach to achieve this goal; they cannot rely on exogenous policies alone.

Communities at the rural-urban interface struggling with change must do more than simply react to what is occurring in their community; they must become actively involved in the process of change itself. They need to be able to anticipate the changes confronting them, understand the policy tools they have available to guide change, and learn how to manage those changes as they occur. A proactive approach to managing change, combining these elements, is essential because it gives the community some power and control over its own destiny (Abdalla and Kelsey 1996: 464).

Yet, communities have a high degree of variability concerning their capability to be proactive. Some communities are simply better equipped than others to develop strategies that will assist them in adapting to disturbances. Community adaptive responses are a function of three major variables: resiliency, institutional capacity, and cultural norms (fig. 2). These variables are not necessarily independent; they often interact with each other. For example, a community that feels it is okay to "fool with mother nature" may develop a more aggressive position with respect to adaptive strategies, while another community with a more fatalistic outlook may simply ignore development of capacity to respond to disturbances.

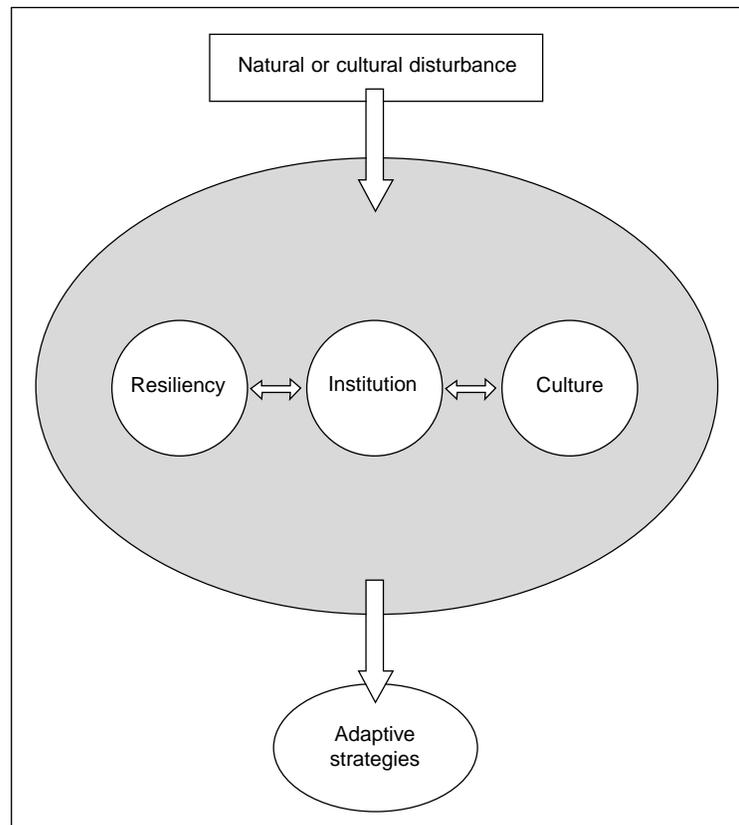


Figure 2—Several key characteristics affect a community’s development of adaptive strategies in response to disturbances, whether natural or human caused.

Community resiliency and capacity to adapt to change are two concepts that suggest how well equipped a community may be to respond to any uncertainties introduced by a natural disturbance policy. Resiliency is defined as “the capacity of a community to adapt to exogenous forces in retaining desirable patterns of community environmental, economic, and social interactions into the future” (McCool 1996: 148). The concept of resiliency is similar to the concept of “community capacity” adopted in the report of the Forest Ecosystem Management Assessment Team and Sierra Nevada Ecosystem Project ecosystem assessments. Kusel and Fortmann (1991) define community capacity as “what enables communities to pull through hard times.” More recently, capacity has been described as “the collective ability of residents in a community to respond (the communal response) to external and internal stresses; to create and take advantage of opportunities; and to meet the needs of residents, diversely defined” (Kusel 1996: 369).

These concepts deal with the capability of returning not to a preexisting static community condition, but to a desired trajectory toward a hoped-for future. This is an important proposal, one that recognizes that communities are not static entities, but continually evolving as they adapt and respond to the variety of events that affect them. I will use the term resiliency here simply because it is consistent with the ecosystem literature and appears to be more useful for the purpose of this paper. The concept of

resiliency is also closely linked to that of sustainability, permitting our discussion to encompass broader issues of intragenerational equity, preservation of natural and social capital, and intergenerational justice (Pearce et al. 1989).

As resiliency is used here, it is not entirely unlike the ecosystem science use of the term. For example, Ludwig and others (1997) define ecological resiliency as the ability to return to a state of integrity after a disturbance. A similar definition has been proposed by Kay (1993). In our sense, community resiliency deals with a community's capacity to adapt and respond constructively to perturbations and stresses induced by its embedding social and natural environment. Resiliency is composed of a number of variables. These may be broadly defined as the community's human and social capital (which includes skills, expertise, and leadership), physical infrastructure (roads, water, sewer, telecommunications capacity), diversity of its economic base, amenities and physical attractiveness, and actions taken to prepare for the future (Harris et al. 2000). Kusel (1996) adds socioeconomic status. A community that has prepared for the future, has good leadership well diffused throughout the community, contains a physical infrastructure adequate for economic diversity and treatment of sewage, and is aesthetically attractive will be more resilient than one that does not have all or some of these characteristics. Thus, when faced with an exogenous disturbance, such as a fire or weather event, a resilient community will be able to develop and implement adaptive strategies.

Institutional capacity is a second major factor affecting the community's ability to develop adaptive strategies. Institutional capacity is considered to be different from resiliency because institutions generally are slow to change and are often slow to unfold as a result of political forces and trends external to the community. For example, the Forest Service implements policy to achieve national goals. Its legislative mandate does not necessarily differ from community to community. The important consideration here is the social and political environment created by existing laws, agencies, and agreements. Is this setting rigid and territorial, or is it characterized by flexibility and cooperation?

Institutions are often seen as a weak link in ecosystem-based management and are not particularly well suited to implementation of adaptive management or restoration of natural disturbances policies. For example, the notion of fire management rather than fire suppression is still a difficult concept for many to accept. Wildland fire suppression agencies are generally poorly equipped to deal with situations where disturbances get out of hand and threaten structures and neighborhoods. Institutions have been designed to prevent, suppress, or mitigate the effects of natural disturbances. Institutions often embrace rigid organizational cultures that include attitudes toward control and management of the natural processes. Policies to accommodate disturbances must be innovative, and may require significant changes in institutions to implement. Innovation may be difficult to encourage and achieve in some institutional cultures.

The cultural traditions, customs, and beliefs operative in the community concerning the environment and natural disturbances are the third factor affecting its adaptive response. To what extent do these sanction adaptive strategies? Are belief systems and norms of behavior held in common and widely shared, or are they narrow in subscription and competing? Are they secretive and sacred, or are they public and

shared? These questions are significant because their answers suggest whether adaptive strategies will be acceptable, and they indicate the extent to which conflict over alternative adaptive strategies may occur. Although conflict may serve several socially useful purposes, conflict also may inhibit discussion and implementation of strategies needed to adapt to the disturbance.

The adaptive strategies that communities develop feed back into the three components. For example, a strategy of accommodation to a flood may result in changing institutions, such as availability of flood insurance, zoning, and so on. Although it once may have been acceptable to build wherever one desired, cultural norms may no longer sanction such behavior. Development of new institutions and policies (such as an economic development corporation or community leadership training) may lead to increased community resiliency.

It also should be noted that some disturbances might overwhelm a community, regardless of its resiliency, institutional capacity, or cultural norms. For example, a large flood may inundate a community causing so much damage and social disruption that it is unable to recover. Although the community may survive such an event, it may be so demoralized and discouraged that it languishes for a long time. The closure of a sawmill in a community heavily dependent on wood fiber may engulf a community in such a morass of infighting and defeatism that the community withers away.

The repertoire of adaptive strategies available to communities is similar to those already implemented in the external policy environment. Communities have several additional strategies, however, including preparedness, evacuation or abandonment, and technical and financial assistance from institutions outside the community. Each strategy, of course, must be linked appropriately to the type of disturbance, its character, and nature of the linkage between the environment and the community.

What Does All This Mean?

It should be clear from the preceding discussion that implementation of a natural disturbance policy—a keystone of ecosystem-based management—could have potentially destabilizing effects on small rural communities. A natural disturbance policy is a reversal of traditional land management direction, and could lead to significant new effects on communities. The extent to which this might happen is influenced by many variables, and thus leads to considerable uncertainty and increased anxiety about the future; this may lead, in turn, to a focus on potentially negative impacts.

The discussion leads to three fundamental conclusions. First, implementation of a natural disturbance regime policy will be accompanied by a high level of uncertainty in terms of its social effects. Such disturbance regimes may be very well described over large spatial and long temporal scales but more unpredictable in the short term for a specific locale, particularly for ecosystems that have been highly altered. This uncertainty means that increased understanding of the links between communities and natural resources is critical to implementation of a natural disturbance regime policy that is designed, most fundamentally, to improve the human condition and ensure human survival. This understanding can only be based on research and scholarly work identifying the nature of these links and how they relate to internal community conditions and processes.

Policies and actions that mimic natural disturbance processes would bring less uncertainty than those that do not mimic natural disturbances because, at the minimum, the timing and intensity of the mimicking process would be known in advance. The consequences, at the site level, would also be more predictable, but at all scales, surprises would still occur.

Second, the roles of the federal government (and other collective entities as needed) require further identification and discussion. If the federal government engages in implementation of a natural disturbance policy, what responsibility does it have to potentially affected communities? How would the role differ in relation to different communities based on the major factors discussed in this paper? For example, highly resilient communities with an ecological linkage to natural resources may require a different kind of federal role than communities with little resilience and a high economic dependence on wood fiber.

A variety of roles could be envisioned. For example, the federal government could adopt a mitigation strategy involving training of workers if natural disturbances lead to reduced flows of wood fiber for processing. A diversification strategy also might be used in this situation to expand the community's economic base. Communities with inadequate leadership might receive educational or training assistance. Grants or technical assistance for planning would help communities prepare for future changes and disturbances. Planning grants also would encourage affected communities to deal directly with their vision for the town, thereby forcing explicit discussion of goals, values, and links with natural resources (Abdalla and Kelsey 1996). What is important is that communities going through an externally induced change may need assistance in managing the transition. Such assistance would be tailored to the character of the disturbance, the type of link with the natural environment, and the nature of the community.

These responses are, of course, tempered by the capability of the federal government⁹ to provide needed technical and financial assistance. It is unlikely the adaptive strategies will be developed through the largess of the federal government over the next decade (Kraybill and Weber 1995). Communities will be especially challenged in developing innovative ways to initiate the "adaptive learning" required in an era of reduced federal support and changing federal natural resource mandates. Institutions will play an important role in responding to change:

The development of an institutional matrix that generates creative responses to the forces of change will be enhanced by organizations with a broad perspective, a strong knowledge base, productive skills, and a desire to build credible commitment among key actors in the rural economy (Kraybill and Weber 1995: 1271).

Third, it is unclear how the goal of achieving a natural range of variability relates to goals of community resiliency. The history of federal policy has been to sustain resource-dependent communities through reductions in this variability. Reversal in this

⁹ The federal government is emphasized here because this paper deals primarily with federal policy toward natural resource management.

policy may have dramatic effects on the anxiety level of people living in those communities, reinforcing beliefs about the credibility of federal actions, even though the new policy may enhance community resiliency in the long term. It is clear that natural resource managers and scientists need to examine how a policy of allowing or mimicking natural disturbances might affect communities. This exploration would deal with a variety of questions, such as: (1) What types of disturbances would occur with what frequencies, scales, and durations? (2) Under what conditions would disturbances be mimicked? (3) How might disturbances affect the different types of community-natural resource linkages? (4) How might economic, political, and social structures and processes be affected by a natural disturbance policy? (5) What are the distributional consequences of natural disturbance policies? A thorough examination of these and other similar questions is justified given the intensity of social concern over federal land management policy, and would assist in attainment of a federal ecosystem-based policy of encouraging social and economic resiliency (Haynes et al. 1996).

Although the focus of this paper has been natural disturbances, similar concepts would apply to perturbations emanating from global political and economic forces buffeting communities today. Communities exist, not in economic isolation, but in a growing complexity of globalization that may make decisions affecting their destiny appear more distant as well as more difficult to comprehend. Social- and economic-based disturbances, such as the recent turbulence in Asian markets, may make natural disturbance policy pale in comparison.

Geographers have a long history of examining natural disasters and human responses or adjustments to them. This history might be useful in developing a more expansive set of adaptive strategies as well as understanding the fundamental social dynamics of risk management (White and Haas 1975).

The relation between communities and natural disturbance policy on federal lands can be characterized as quite tangled and messy, in the sense that it consists of a series of problems linked with each other at a variety of scales and intensities (Ackoff 1974). Such problems cannot be resolved in isolation from each other. This suggests that scientists, policymakers, and community members must not be tempted to oversimplify these relations. Understanding the complexity and how various linkages and community characteristics are related is an important aspect of problem resolution. Sustaining small communities over time in an increasingly variable and uncertain context may challenge the most talented planner, the most competent scientist, the most charismatic leader, and the most committed citizen.

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Understanding the Meaning and Value of Forests and Trees

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Abstract

Trees and forests surround our communities. We often take them for granted. We also forget, or fail to recognize, that others see, experience, understand, and value trees and forests differently. In this paper, the value and importance of trees and forests are explored through descriptions of cultural and historical perspectives and beliefs held by forestry professionals and members of the public who are nonforestry professionals. Specifically, two common views held by forestry professionals, that the public does not really care about trees and forests, and that they are not knowledgeable about trees and forests, are examined. Findings from studies that explore the importance of trees and forests to people and the beliefs and belief systems held by people form a foundation for a research agenda based on understanding such phenomena.

Keywords: Forest values, meanings of trees, meanings of forests, beliefs about forests.

Introduction

Trees and forests are important to Americans. The biological and ecological contributions of forests are well documented (McPherson et al. 1994). The value of wood and paper products to the U.S. economy is estimated to be more than \$200 billion each year (AFPA 1995). The importance of forests to Americans has led to an intense controversy on how they should be managed (Hays 1998). The basis for this controversy is fundamental and lies in the multiple ways people understand and value forests.

Because trees and forests are everywhere in our daily lives, we take for granted that our understandings are commonly accepted and widely shared (Kaplan 1995). But not everyone understands a forest the same way despite our assumptions of shared perceptions (Kaplan 1995). Hays (1998) argues that although the forestry profession is dominated by a commodity view of forests, the meaning and role of forests in the United States has evolved during the 20th century from the commodity perspective to an emphasis on aesthetics, other noncommodity uses, and the right to exist independent of human functioning. This evolution parallels other trends in the United States relative to environmentalism.

Several studies have demonstrated that Americans generally are moving away from a set of beliefs and values about the environment based on technology to a set that is more ecological and focused on human relations with the environment (Olsen et al. 1992). Milbrath's classic study of Americans and the environment completed in 1984 found that 75 percent of Americans considered themselves environmentalists. Other studies since that time also have demonstrated the broad environmental concerns of Americans (Dunlap et al. 1992, Kempton et al. 1995, Olsen et al. 1992). Hays (1998) suggests that rather than an environmental movement in the United States, we have a pervasive environmental culture concerned with the aesthetic quality of the human environment, pollution and its impacts on human health, and sustainability of the quality of life. This is reflected in the dichotomy between commodity-based forestry and other types of forest management such as environmental and restoration forestry (Hays 1998, Maser 1994).

The discussion of appropriate forest management is often clouded by two common views espoused by the forestry profession: that nonforestry publics do not care about trees and forests and that these same publics are not knowledgeable about trees and forests. This paper will critically examine these two views. First, the issue of how Americans value trees and forests will be discussed by reviewing the literature on the importance of trees and forests. Importance has been chosen as a representation of value based on the decision science and choice literature. People make choices or reflect their preferences based on what is important to them (Kleindorfer et al. 1993). Second, knowledge about trees and forests will be examined in the context of beliefs and belief systems as defined in the cognition literature. In this approach, beliefs are seen as those things that people believe to be true (Gilovich 1991). The paper concludes with a suggested research agenda regarding the importance of and beliefs about trees and forests.

The Importance of Trees and Forests

Among the many definitions of value, most generally agree that we can understand value by understanding what people prefer or what is important to people. This paper purposively sets aside an examination of the commodity values of trees and forests and focuses on reviewing what we know about other ways in which the importance of trees and forests are reflected.

Communities

Rural communities—A significant amount of work has been done on the importance of forest resources to communities (Humphrey et al. 1993, Peluso et al. 1994). Whereas much of the resource-dependent community literature focuses on both the direct and indirect impacts of changes in resource (e.g., timber) availability on rural communities, other research identifies shared meanings surrounding forests that hold these communities together. Carroll and Lee's (1990) study of the occupational

community of loggers is a clear example of these shared meanings about forests. They found that shared meanings strongly influence the ability of community members to adapt to externally imposed changes. Other evidence of the fundamental importance of forest resources to rural communities is illustrated by two recent case studies in Michigan.

As part of the joint U.S. Department of Agriculture, Forest Service (FS) and Michigan Department of Natural Resources (MDNR) Ecosystem Management Project in northern Michigan, 53 focus groups were held; a wide variety of citizen groups representing economic and business interests, nonresident landowners, recreation interests, local government officials, and residents of the area participated. One question focused on the reasons people lived, recreated, or owned property in the region, and another asked about visions and concerns for the future. The forests of northern Michigan were mentioned second only to water resources as a characteristic of the region that was important to people. Seventy-eight percent of the focus groups with permanent residents cited the presence of forests as important. People's visions for the future also included forests as an important feature of the region. Concerns for the future included frequent reference to potential loss of forests, forest fragmentation, continued logging, and the need for reforestation (Smith et al. 1999). ". . . I live here because of the natural resources we have. Not only the rivers . . . but also because of the forest as well. It's an area where you can gain solitude and be with nature and bring up your children and grandchildren."

A recently completed study of residents of the eastern Upper Peninsula of Michigan found results similar to those in the northern Lower Peninsula. In this study, oral history interviews were conducted with 63 long-term permanent and seasonal residents. Ten focus groups also were conducted with members of community organizations. When asked to talk about their favorite characteristics of their county, people once again mentioned forests second only to water (McDonough et al. 1998). ". . . our life is out in the water and the woods and the beaches. Oh, God, this is heaven."

Urban communities—The assumption that all forests are located in rural areas is one factor that has contributed to our incomplete knowledge of the importance of trees and forests. The debate over management of our forests tends to focus on national and in some cases state forests located outside urban areas. This has resulted in a focus on rural communities interacting with the traditional forest in traditional ways (e.g., timber dependency and outdoor recreation). Eighty percent of Americans, however, live in urban areas. In addition, Dwyer et al. (2000) report that the average tree cover in U.S. urban areas is 27.3 percent and in metropolitan areas 33.4 percent. There are extensive studies that document the value of trees and forests in their immediate communities and neighborhoods.

Trees contribute to residential satisfaction. Studies of people's satisfaction with their neighborhoods indicate that satisfaction is strongly affected by views of woods and trees as well as the number of trees near their residence (Kaplan and Kaplan 1989, Kaplan et al. 1998). In addition, people prefer large older trees. This is true across income levels, as people's evaluations of trees in their neighborhoods are positive even where the housing stock is deteriorating. Large open spaces and designated parks do not contribute to satisfaction as much as trees near people's homes.

Studies of neighborhoods and crime indicate that crime is reduced in communities with a high level of social cohesion among neighbors combined with the will and ability to act on behalf of the common good (Sampson et al. 1997). An experiment with community-driven forestry projects in Detroit demonstrated that tree planting projects can serve as a focal point for developing cohesion among neighbors (Vachta 1998). In addition, these projects contribute to increased neighborhood satisfaction through improving the appearance of the neighborhood, providing proximity to trees, and increasing people's sense of control over their neighborhoods. Trees also can contribute to people's feelings of safety in their neighborhoods. In the same study, Vachta (1998) found that those who reclaimed vacant lots reported feeling that their neighborhoods were safer than before the tree planting project began.

As part of the community forestry project in Detroit (Vachta 1998), community groups were asked to discuss their needs for their neighborhoods. Aesthetics and safety were the most frequent needs given across groups. After tree planting projects were implemented by these neighborhoods, focus groups were conducted every 6 months with the groups to determine what impacts if any, these tree planting projects had on their neighborhood. Although trees were not mentioned in any groups during the needs assessment, during the evaluation phase of the project, each group talked about trees and how they felt about them in their neighborhood (Vachta 1998):

. . . for instance, with the trees, with the planting of the trees and the curbs and even with our fruit trees, in this neighborhood the property values have just about doubled. I found out today, the house next-door here, two years ago it was on the market for \$10,000. It's for \$32,000 now.

. . . they don't know what all these trees can do for our community, for the soil, for the air. Few people understand. You don't have to have a huge tree, but it can do all sorts of things.

. . . it's a miracle. She did not want any trees on that lot and she's grown somewhat affectionate toward them, so I said, would you like us to leave one or two and she stopped and thought about it for a second or two and said, "Yeah, could I have a couple of the red ones?"

Health

Physiological health—Multiple studies demonstrate the health benefits associated with access to trees and forests. Workers with a view of trees out their windows reported their jobs were less stressful and reported less headaches (Kaplan 1993). Ulrich's (1993) experiment with gall bladder patients recovering from surgery demonstrated that patients with a view from their window of a stand of trees had shorter postoperative stays, fewer negative comments in nurses' notes, fewer postsurgical complications like nausea and headaches and required fewer injections of painkillers than patients with a view of a brown brick wall. In a study of prison health services, Moore (1982) found that inmates with a view from their cells of nearby forests and farms were less likely to report for sick call than those who looked out on the prison yard. In another study, West (1985) found that cell window views of nature were associated with lower incidences of health-related stress symptoms such as headaches when compared with views of prison walls, buildings, or other cells.

Psychological health—In a clinical study with breast cancer patients, Cimprich (1992) discovered that participation in everyday experiences with the natural environment reduced the increased attentional fatigue associated with the stress of having cancer. Nature-based experiences enhanced patients' attentional capacity allowing them to think more clearly and focus on all the new information they needed to absorb. These restorative experiences included ordinary activities like gardening, bird watching, or a stroll through the woods.

Other evidence for the value of trees and forests (or woods) in the everyday lives of people comes from studies of attachment to places, particularly children's place attachment and adult memories of childhood place attachment. When children are asked about their favorite places through interviews, drawings, and observation, natural landscapes, particularly those with trees, are listed most frequently even though they only spend about 15 percent of their time in these places (Sobel 1990).

When adults are asked to remember their favorite childhood places, outdoor environments are remembered significantly out of proportion to the actual amount of time spent there. Two of the three most frequently cited places are molded out of the natural landscape such as leaves raked into a pile and tree houses and tree forts (Dovey 1990). Additional work demonstrates that people then try to reproduce these childhood memories in the landscapes of their adult homes. In her study of over 100 gardens in the San Francisco area for example, Marcus (1992) concluded that people "weren't interested in discovering which plants were best suited to their gardens. They planted gardens which made them feel at home."

Jung used trees in his psychological assessment of his patients. In *The Philosophical Tree* (1967: 253), he wrote: "An image which frequently appears among the archetypal configurations of the unconscious is that of the tree." He had patients under treatment draw trees so he could understand their psychological state, as he believed that individuals attached symbolic meanings associated with growth, life, development, maternal features (such as protection, shelter, source of life), old age, personality, and death to trees.

Religion and Literature

The importance of trees is also evidenced by their prominent place in folklore, myth, religion, and literature, more so than any other plant (Lehner and Lehner 1960, Rupp 1990). Trees are found in many religious traditions both historical and current. For example, trees are often depicted as gods and goddesses, which, in turn, are often depicted as trees (Wassink 1976). Trees such as the Tree of Life are also prominent in the holy books, writings, and records of many religions: the Bible, the Koran, and various Buddhist, Hindu, and Hebraic writings, just to name a few (Wassink 1976). In her book on nature religions in America, Calbanese (1990: 160) discusses the continuing significance of trees in a variety of religious traditions. She gives as one example the New Age religion focused on Sun Bear which states, "Hug a tree to begin your healing. Trees are conductors of energy between the heavens and earth. When you hold and hug a tree, you feel the energy and it can be like a blood transfusion."

Writers have always used analogies and metaphors that relate the human experience to trees. People use images of trees and forests to create backdrops for human events and to create moods. Tree images are used to scare as well as comfort. We plant trees to commemorate special events and special people. We name subdivisions after

trees even if there are no trees in them. People grieve over the loss of trees. Perlman (1994) reports that people interviewed after hurricanes Andrew and Hugo commonly discussed trees and the impact of their loss on both the community and individual lives.

Cultural Differences

The work discussed above focuses on similarities in the ways people value trees and forests. However, differences in how individual cultures interact with the environment (e.g., which features they prioritize) are well documented. These studies go back more than 40 years and include classics such as Spoehr (1956) and Bennett (1969). There are studies that specifically look at or identify how different cultural groups value certain tree species over others. Chavingi's (1988) study of fuelwood shortages in Kenya is a good example of these types of studies. In this study, certain species considered trees by researchers were not considered to be trees by villagers and were, therefore, not subject to cultural taboos associated with tree planting by women. Other studies of women and forest resources in international development indicate a clear pattern of valuation of tree species by men and women, as women focus on species appropriate for fuelwood and men focus on species appropriate for timber and cash generation (Wilde and Vainio-Mattila 1995). The majority of studies that examine differential cultural understandings of trees and forests, however, do so in the context of international development. There is not a clear pattern of research identifying cultural differences in the United States, although several studies of environmentalism offer clues that these differences exist.

Taylor (1990) reported differences between mainstream environmental organizations and minority groups on priority environmental issues. The national environmental organizations focus on issues such as public land management, private land stewardship, wilderness, endangered species, and national parks and preserves, whereas minority and working class interests are in toxins, pesticides, pollution, waste reduction, recycling, and environmental health issues.

In contrast, Parker and McDonough's (1999) study of the environmentalism of urban African Americans found few differences between White and Black urban residents in terms of the importance of specific environmental issues. Issues such as noise pollution and air pollution were rated as more urgent by both groups than overuse of natural resources and endangered wildlife. These results suggest an urban environmental agenda rather than one based on race. This conclusion is supported by Hays (1998) who suggests that changing environmental values had their origin in urbanizing areas and have spread as urban areas and their influence have spread.

One cultural group that often has been discussed with respect to views of the environment is Native Americans. Lewis' (1995) review of 20th-century environmental issues discusses Native American relations with various natural resources, including forests, in the context of problems and issues such as mismanagement through federal government intervention. He concludes with a discussion of the common stereotype of Native Americans as "the original conservationists." He argues that the true relation of Native Americans to resources such as forests is not understood.

A discussion of the different ways Americans value forests needs to include people who work directly with the forest resource including both foresters and forest workers. A common view is that woods workers have a utilitarian (or economic) view toward

forests (Carroll and Lee 1990, Dunk 1994). A study of forest workers in Ontario demonstrated that, in fact, these workers were concerned about a variety of environmental issues related to the management of the forest including logging practices and use of herbicides. These workers expressed a "widespread nostalgia for a more natural forest" (Dunk 1994: 21). In addition, both Dunk (1994) and Carroll and Lee (1990) identified a variety of cultural meanings associated with the forest among loggers and other woods workers.

Many authors have written about the importance foresters place on the forests as commodities (Cramer et al. 1993, Fortmann 1990, Hays 1998). Several studies have documented the long-standing and persistent timber orientation of the FS, for example (Cramer et al. 1993, Hays 1998, Twilight and Lyden 1989). Hays' (1998) analysis of the changing meanings of American forests suggests that the values of foresters in general and the Forest Service as an agency relative to forests differ from those of society. Evidence exists, however, for a shift in priorities or values of FS employees to non-commodity uses of forest resources (Bullis and Tompkins 1989, Cramer et al. 1993).

Beliefs About Trees and Forests

Belief is a term that is widely used to mean a variety of things. The following discussion uses a construction of "belief" from cognitive and social psychology to mean "what people think is true" (Gilovich 1991). Beliefs are knowledge-based but are not necessarily true or accurate. People construct beliefs from information and hold tightly to them even in the face of conflicting evidence (Gilovich 1991).

One commonly held belief is that forest management decisions are based primarily on principles of scientific management. However, these decisions are actually made in a socioscientific context that involves the integration of scientific knowledge (often characterized by conflict within the scientific community) with other forms of knowledge, values, and societal priorities (Bingle and Gaskell 1994). The belief that nonforestry publics are not knowledgeable about trees and forests leads to the question of what nonforestry publics really need to know to participate in decisions about forest management. Belief systems of specialists about forests are very focused (Kempton et al. 1995) in contrast with more general or different belief systems of publics or communities of publics. The first step is to identify existing beliefs about forests.

Beliefs of Forestry Professionals

Trees and forests—The language people use reveals their beliefs. It is therefore instructive to begin the discussion of beliefs about trees and forests by looking at the terminology used by the forestry profession (Hays 1998).

Most foresters would give a definition for the word "tree" that includes the terms woody, perennial, long lived, and single stemmed, such as the following: "A woody plant characterized by one main trunk, bearing a more or less distinct and elevated crown of branches" (Dunster and Dunster 1996: 319), or "A woody perennial plant typically large and with a single well-defined stem carrying a more or less definite crown" (Helms 1998: 189).

When do trees become a forest? The answer to this question can be unclear, as definitions of the word "forest" are diverse. In *The Dictionary of Natural Resource Management*, Dunster and Dunster (1996: 135) define a forest as "a vegetation community dominated by trees and other woody shrubs, growing close enough together that the tree tops touch or overlap creating various degrees of shade on the forest

floor." Young and Giese (1990: 2) state, "The forest is a biological community of plants and animals existing in a complex interaction with the nonliving environment which includes such factors as the soil, climate and physiography." The Society of American Foresters defines a forest as an "ecosystem characterized by more or less dense and extensive tree cover" (Helms 1998: 70).

Other current definitions of forests are clearly dominated by a timber production emphasis. Forest Inventory and Analysis (FIA) documents define forests as: "land at least 16.7 percent stocked by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest use." (Leatherberry et al. 1998: 20; Schmidt et al. 1997: 43). In the FIA definitions, forests are subdivided into timberland (forest land that is producing or is capable of producing more than 20 cubic feet per acre per year of industrial wood crops) and other forest land (forest land not capable of producing 20 cubic feet per acre per year of industrial wood crops). In both cases, urban development is specifically excluded from these classifications, and the definition of urban areas is specifically "nonforest" land. Schmidt et al. (1997) specifically list residential areas and city parks under nonforest land, although they do acknowledge the existence of urban forest land as "land that would otherwise meet the criteria for timberland but that is in an urban or suburban area" (1997: 48).

Beliefs About Nonforestry Publics

Forestry professionals also share a set of beliefs regarding their role in forest management. One important piece of this belief system is that those who are not forestry professionals (in particular, urban and exurban residents) are uninformed about trees, forests, and forestry. This belief has been labeled in various ways including the "assumption of lack of competence" (Kaplan 1995: 64) or the "cult of expertise" (Brunson 1992: 293). The basic premise is that publics are not competent to participate in natural resource decisionmaking because they do not have the appropriate knowledge. Fortmann (1990) contends that a belief in the public's lack of information is a professional tenet of forestry.

A second piece of the belief system of the forestry profession that is used to argue for the role of foresters as experts is the concept of the objectivity of scientific management (Maser 1994). Forestry is a profession that is grounded in a belief system that emphasizes efficient, multiple-use, scientific management (Cramer et al. 1993, Hays 1998, Maser 1994). This belief is based on the premise that science is value neutral (Stevenson 1993). Many argue that as a human activity that involves choices, science cannot be value free (Stevenson 1993, Tourney 1996). Science is just one way to generate knowledge and it is a belief system in and of itself. An important feature of this belief system is the valuing of information collected through the scientific method above all other forms of knowledge (Brown 1993). Indeed, rationality is often equated with science (Brown 1993). Hays (1998) argues that the profession of forestry has used this argument of a "rational" approach to management versus an "emotional" public to dismiss as irrelevant the changing values for American forests.

Using Yellowstone National Park as an example, Rolston (1993) argues that the term "scientific management" is problematic. Science can help us understand the dynamics of the ecosystem but the question of whether to "manage" it and what that means is really a question of values not knowledge. In Yellowstone, for example, do we value a hands-off, let-nature-take-her-course approach (natural regulation) or human

intervention in order to "manage" for human goals? It can be said that the importance placed on the objectivity of science is a value at the expense of other ways of knowing about and valuing knowledge.

Beliefs of Nonforestry Publics

A search of the literature reveals only a few studies of beliefs of nonforestry publics about trees and forests. Nelson's (1988) review of this literature reported few studies of knowledge of trees and forests although there was a sizeable body of work about people's evaluations of forest management activities.

Children—In a study of what first graders knew about forests and the animals that lived there, Strommen (1995) found that children possessed a significant amount of information particularly about animal-environment relations in forests (a focus of this study). The information was generally unstructured and unorganized, which is to be expected in first grade. In addition, the forest appeared to be a general setting for all kinds of animals to live, as children also stated that sharks, whales, and dolphins could be found there. Children in New Jersey and Nebraska were contrasted based on the lack of forest in Nebraska (defined by the author as large tracts of native forests). Children in Nebraska, however, were familiar with forests and were equally as likely to report having visited forests as children in New Jersey. These results are supported by work that suggests that young children's (4 to 6 years old) knowledge of biological phenomena is fairly sophisticated (Siegler 1989). A review of studies of secondary science students suggests otherwise, at least with respect to plants. For example, a majority of secondary science students believed that plants get their food from the soil and that photosynthesis is something that plants do for people (Driver et al. 1994). A review of other studies indicated that biological knowledge among children differs across cultures and can be partially explained by differences in language and religious beliefs (Siegler 1989).

In an evaluation of an environmental education project in Chicago where children were involved in prairie restoration activities and where the children came from both Montessori schools and schools that primarily served children from public housing, pronounced differences were seen between the two groups. The Montessori children had many previous positive experiences with forests both in school and in families, which was reflected in the amount of information they retained from the program. The children from the other school also had visited forest preserves before. However, their beliefs about these places were quite different. These children expressed concerns about perceived threats in the forest, which was reinforced by the teachers warning them not to go into the forest because it was dangerous.¹

Adults—Nelson (1988) studied knowledge of forest management practices among Michigan anglers, deer hunters, people who had participated in state forest planning activities, and people who had sent unsolicited comments to the state regarding state forest management. He found that although people were quite knowledgeable about the characteristics of various tree species, their knowledge level dropped as the questions moved to forest management practices, regeneration characteristics of trees, and the relations between tree species and specific management practices. Knowledge levels varied among groups. Publics who had participated in state forest

¹ McDonough, M.H. 1996. Mighty acorns initial program evaluation. Report to The Nature Conservancy, Chicago, IL. 16 p. On file with the author.

planning were very knowledgeable about the outcomes of forest management practices. Fewer than half of all groups, however, believed that the growth in Michigan's timber supply exceeded yearly harvest, although this fact is the basis for increased harvest in the state forest management plan.

Kempton et al. (1995) proposed that people's beliefs about the environment should be conceptualized as "cultural models" rather than knowledge of facts. Data supporting the existence and development of these cultural models come from their anthropological study of how Americans view global warming and other environmental changes. Results suggest that beliefs about the seriousness of worldwide deforestation and the need to conserve forests to protect medicinal plants are widespread among Americans. They also found that people believed the world will run out of oxygen owing to deforestation and found an exaggerated attribution of global warming to deforestation. Their analysis of cultural models of photosynthesis and respiration suggest that these beliefs about the impacts of deforestation are quite logical. The widespread model of photosynthesis held by many Americans (people inhale oxygen and exhale carbon dioxide; plants take in carbon dioxide and give off oxygen) leads to the conclusion that if you cut down forests, the supply of oxygen will decrease. This cultural model is widely taught in early science curricula and is reinforced later by popular science and the media.

The literature on scientific literacy for years has suggested that the scientific literacy of Americans is low (Hively 1988). In recent years, however, there is considerable debate about what low scientific literacy actually means. Many of the studies assessing scientific literacy have focused on knowledge of specific scientific facts (e.g., the sun is a star). Questions are being raised, however, about how to define scientific literacy and how to measure it. The set of factual information or data generated by scientific research is so large that it is not possible for any person (including scientists themselves) to know all the facts. Some are arguing for the concept of functional scientific literacy supporting this with the evidence that most Americans engage in hobbies and avocations such as gardening, birdwatching, or fixing cars that make them literate in certain aspects of science that are salient to them (Bingle and Gaskell 1994, Hively 1988). In addition, there is evidence that those active in the environmental movement are well educated about science (Hays 1998).

It is now commonly accepted in international development efforts that farmers and others have indigenous or local knowledge systems relative to trees and forests (Alcorn 1997). These knowledge systems can be very simple or quite sophisticated. Indigenous or local knowledge develops over time and is based partially on practical experience and everyday life and partially on information gleaned from a variety of sources including family, neighbors, and extension workers. The literature on local knowledge is voluminous, and it would be the rare development professional who would not attempt to identify existing local knowledge about trees and forests before beginning a forestry project (FAO 1989). Irwin (1995) argues that indigenous or local knowledge systems also exist in the United States. He documents these "local understandings" for pesticide applications, toxic waste disposal, and health issues such as Down's syndrome, heart disease, and HIV. Emery's (1998) study of gathering of non-timber forest products in Michigan's Upper Peninsula suggests that gatherers have highly developed systems of ecological knowledge relative to the materials they gather and that this knowledge is translated into an indigenous management system based

on rules and norms for gathering behavior. There is no reason to believe that similar belief systems about trees and forests do not exist in other groups in the United States, although these belief systems have not yet been identified.

A persistent argument for the need for more public education about forests and forestry is that if people knew more, their support for forest management would increase. Several studies suggest that the emphasis on what people actually believe is inconsequential, as people's choices and priorities are often based on other factors. Doble and Richardson (1992) found that publics (not just those who pay attention to science) can quickly learn the critical aspects of very complex issues such as solid waste disposal and global warming. In their study, policy recommendations of citizens were often very similar to those of scientists. When they disagreed with scientists about policy, it was not a matter of science literacy but of differing priorities and values. Fischhoff (1993) reports similar findings in his study of risk assessment by the public. Differences between experts and the public were based on priorities rather than knowledge. Hansis' (1995) study of the social acceptability of clearcutting in the Pacific Northwest indicated that as people's knowledge about forests increases their support for clearcutting drops. Increased knowledge of forest ecology increased opposition to clearcutting as values regarding biodiversity were reinforced. Nelson's (1988) study of the relation between knowledge of forest management practices and support for increased timber harvest on state forest lands found that factual knowledge of silvicultural practices was not related to support for increased harvest. However, beliefs about long-term and annual timber surpluses were significantly related to support for harvest as were beliefs about the impact of timber harvest on personal recreation activities.

Nelson's results suggest that certain beliefs may be more important than others in influencing people's priorities. The results of Fortmann's (1990) study of the professional norms of foresters support this conclusion. She examined a conflict between the California Department of Forestry and people who were protesting a timber harvesting plan. The agency believed that the protesters were generally uninformed about the issue and that the information they had came from "misinformation supplied by environmental activists." Fortmann concluded that the protesters, who were local people, were actually well informed about specifics of the issue as it related to them.

Conclusions

In the United States, public pressure to participate in science policy decisions is increasing (Chubin and Chu 1989, Irwin 1995). Forest management is clearly not exempt from this trend. The future holds more, not less, participation by a wider variety of publics in forest management decisions. To engage in productive discussions with publics about appropriate and acceptable management of our forests, we must first understand the various ways that forests are important to people. Second, we must understand the beliefs underlying "citizen models" of science as it relates to forests (Irwin 1995).

Our understandings of the importance of forests to people and their beliefs about forests must be more inclusive. Moll (1995) suggests that attempts to separate forests into a dichotomous categorization of rural versus urban has prevented us from understanding relations between people and the forests in which they live and has allowed a continuing emphasis on rural forests and commodity production. Bradley (1995) recommends reconceptualizing these relations as a gradient from city centers to exurban

development to wildlands where trees, forests, and people relate to each other all along the continuum. These relations occur both in communities based on place (e.g., urban, suburban, or rural) and communities based on affiliation (e.g., nonindustrial landowners, membership in environmental groups or professions).

The consequence of not understanding the diverse ways that people think forests are important will be more conflict. Forests must be managed to meet the diverse demands of society, and as the relative importance of those demands shifts, so forest management needs to shift. The same can be said for not understanding beliefs or for underestimating the influence on people's behavior of their own belief systems (Irwin 1995). More research is needed, however, before we have a complete understanding of the diversity of either how forests are important to people or their existing beliefs about forests.

Research Agenda

Proposition: The ways forests are important to people differ by who they are, where they live, and groups to which they belong.

Research could examine more closely the importance of trees and the forest to diverse groups of people. How widespread are the importance factors identified in the literature and for which groups? Given the increasing importance of urban and community forestry, the numbers of people that live in urban areas, and the fact that people's contacts with trees and forests increasingly occurs on a gradient from rural to urban groups, studies of the importance of trees and forests should occur in communities across the urban-rural spectrum and should examine a wide range of definitions of forest including the urban or community forest. Because urban areas are so diverse culturally, racially, and ethnically, research on importance of forests should occur in diverse racial, ethnic, and cultural groups. The ways forests are important to the professional forestry community also should be examined.

Proposition: Beliefs about trees and forests held by nonforestry publics are different from those held by forestry professionals.

Research could identify belief systems about trees and forests (e.g., cultural models). What kinds of knowledge do people have about trees and forests? What do they believe to be true? Where do these beliefs come from? How does this differ across the groups defined in the proposition above including the professional forestry community? How are knowledge and beliefs related to forest policy priorities and behavior relative to forests? What do people need to know?

Proposition: What people believe about forests influences what they think is important about forests.

Research could identify the relations between belief systems about forests and what is important to people about forests across diverse groups including the professional forestry community.

The relations between communities and forests are based on shared values and beliefs within communities. Conflicts over forest management are in many ways conflicts between those values and beliefs. Our understanding of community differences with respect to values and beliefs about forests is incomplete, at best. The result of

this lack of understanding is an inability to either predict or ameliorate these conflicts. The combination of increased diversity in the U.S. population and increased demands for public participation in forest decisionmaking makes it critical that we systematically uncover the diversity of these values and beliefs. The process of examining these questions also will have the benefit of bringing more people into the discussion. The research methods appropriate for identifying belief systems include many qualitative and participatory approaches, such as oral histories and focus groups. These methods will provide an opportunity for a dialogue that will enlighten all sides. Although the focus of this paper has been on diversity of values and beliefs, the process of uncovering this diversity also holds promise for uncovering common ground.

Metric Equivalents

1 foot = 0.305 meter

1 acre = 0.405 hectare

1 cubic foot per acre = 0.070 cubic meter per hectare

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