

Chapter 12: Integrating Social, Ecological, and Economic Factors in Sustainable Recreation Planning and Decisionmaking

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Ecosystems are not only more complex than we think, they are more complex than we can think.

—Frank Egler, ecologist

Purpose

Sustainability science “transcends the concerns of its foundational disciplines and focuses instead on understanding the complex dynamics that arise from interactions between human and environmental systems” (Clark 2007: 1737). This is reflected by McCool and Kline (2019), who stated that “...a systems thinking approach views problems within a context of interacting social and ecological systems...,” and that implementing systems thinking requires that we “explicitly recognize connections and relationships between people and their natural heritage.” Thus, systems thinking requires integrating multidisciplinary information. However, Egler’s observation cautions us about the challenge of shifting into systems thinking from the current “normal science” paradigm that dominates land management agency culture (Williams 2017). Agencies rarely have the time, budget, or expertise available for collecting and analyzing comprehensive landscape-level data. We propose that an important consideration for applying systems thinking in practice is identifying and integrating issue-specific social, ecological, and economic data while focusing on key analyses and relationships that provide enough information to help evaluate outcomes of specific management or policy actions (Ackoff 1967).

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Forest Service guidelines suggest that “to sustain the benefits of outdoor recreation for present and future generations, the recreation program must address and work toward a sustainable balance among the three spheres of environmental, social, and economic conditions.”

This is more of a “bottom up,” issue-driven approach to integration, which focuses on concrete problems and place-based issues (Blahna et al. 2017a, 2017b; Williams 2017), as opposed to “top down,” standardized or metric-driven approaches that are common in systems analysis (Hoos 1983).

Problem Statement

After Rachel Carson (1962) documented the detrimental effects of chemical pesticides on birds, it has been widely recognized that using cross-disciplinary data is critical for making sound environmental decisions. Today, most environmental legislation (e.g., the National Environmental Policy Act (NEPA) and the Endangered Species Act) and protected area conservation models (e.g., International Union for Conservation of Nature, Resilience Institute) call for collecting and considering data across a range of disciplines. The need for integration is also a key aspect in outdoor recreation and tourism. For example, one of the principles of recreation resource planning espoused by the National Association of Resource Planners is that “recreation resource planning requires the consideration of many inputs such as ... visitor and stakeholder preferences, economic impact of recreation participation, best available science, environmental conditions, and available information from recreation and resource monitoring.” Moreover, U.S. Forest Service guidelines suggest that “to sustain the benefits of outdoor recreation for present and future generations, the recreation program must address and work toward a sustainable balance among the three spheres of environmental, social, and economic conditions” (USDA FS 2010: 4). It is also important to note that integration requires recreation to be considered in other natural resource program decisions while the objectives of these programs are also considered in recreation program decisions.

Integrating social and ecological data is difficult in conservation (Reed et al. 2017), and federal agencies have often been criticized for conducting analyses and making decisions based on simple or selective sources of data. Examples include the U.S. Fish and Wildlife Service’s focus on single species biology, the Forest Service’s focus on timber production, and the National Park Service’s focus on recreation use. An important goal of NEPA was to mandate a process to determine if proposed federal actions (including management or programmatic plans as well as land-modifying projects) would affect the quality of the human environment by determining environmental impacts and considering related social and economic effects (CEQ 2007.) But integrated analysis is more than just accessing and summarizing data from different sources and multiple disciplines. Rather, integration requires developing analyses that synthesize social and environmental data so that they contribute equitably to improving the general understanding of the outcomes of management projects.

How should agency planners and scientists identify, collect, and integrate social, economic, and ecological knowledge in practical, relevant, and adequate ways to address specific sustainable recreation management needs? Even in simple systems, with only a few principal linkages or components, integration across disciplines can be difficult (Ostrom 2009). Although there is a large body of literature and case studies on the need and methods for integrating data in sustainable landscape conservation (e.g., Berkes and Folke 2000, Kline et al. 2017, NRC 2002, Reed et al. 2017), and models for integrating multidisciplinary data in recreation management (e.g., Limits of Acceptable Change, Visitor Impact Management), these methods are rarely applied in the field (Cervený et al. 2011). Few case studies evaluate social and ecological outcomes of recreation management within a systems context, and there exist virtually no evaluation criteria, metrics, and monitoring strategies to help public land managers understand how to integrate data from diverse fields of study (Plottu and Plottu 2012).

This chapter proposes that data and analysis, though not the sole factors used in planning and decisionmaking, must play a key role. This reflects many agency requirements for using “best available science,” leadership preferences for having data to support decisions, and recommendations of the Interagency Visitor Use Management Framework (a collaborative effort of six federal agencies). We are not just referring to quantitative social and ecological data and analytic formulas; we are also referring to the systematic collection and display of stakeholder values and perspectives. Because it is increasingly difficult to meet science requirements in this era of constrained budgets (Cervený et al. 2020, Ryan et al. 2018) and data complexity, we argue that new approaches are needed to identify the most relevant data sources and **practical** methods for collecting and analyzing the data, based on the specific decision context. Learning from past successes and failures can pave the way for better and more efficient integration methods.

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Barriers and Challenges

The traditional approach for analyzing complex systems is to collect detailed and diverse datasets and develop tightly coupled data interaction models to explain causal relationships in the system (Hoos 1983). As Williams (2017) pointed out, this reflects a “normal science” mindset to address practical problems, with an underlying assumption that quantitative data and scientific analysis can answer most practical management questions.

Many of the barriers to integrative thinking and analysis are related to agency capacity and the complexity inherent in blending multidiscipline and multiscale information relevant to ecosystems (Kline and Mazzotta 2012, Kline et al. 2013,

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Reed et al. 2017). Other barriers are attributed to a lack of consensus on how the planning problem is framed and agreement on what the principal objective or outcome of the planning problem is. Traditionally, most technical staff in land management agencies are trained in natural sciences, because they served as the foundational disciplines for natural resource management (Fischer 2000). However, “landscapes provide the setting over which wicked problems unfold” (Sayer et al. 2013: 8350), and environmental sustainability problems have social, political, and economic components that cannot be handled in the classic paradigm of science and engineering (Rittel and Webber 1973). The inertia built into land management agencies from decades of dominance by natural sciences still exists and is reflected in agency regulations as well as planning and management practices, tools, methods, and criteria for professional advancement (Cortner and Moote 1999).

In addition to the dominance of natural sciences in landscape systems frameworks, there is a challenge of upscaling those frameworks to include social dynamics of systems. As Sayer et al. (2013: 8350) pointed out, “‘people’ and ‘society’ [have been] notably absent from such considerations, and, as a result, conservation has been beset by disappointments and failures...and [now] recognition of the need to address the priorities of people who live and work within, and ultimately shape, these landscapes.” However, social systems are as complex as natural systems. A conceptual diagram of how people are linked in a hypothetical landscape is shown in figure 12.1.² Based on a systems “assessment” criterion that drives many planning processes, all inputs, social as well as biophysical, ought to be collected up front, and interactions for each landscape decision should be assessed in a systems analysis framework. Although such comprehensive systems frameworks may be useful for identifying various factors and processes that influence human-ecosystem interactions, comprehensive measurement of detailed systems components often is not feasible in practice, owing to budget and time constraints, and declining capacity and investment in social science in public land agencies.

Besides complexity, there are several other direct barriers to integration using assumptions of normal science, such as data availability and comparability, computational limitations, cost and expertise limitations, and barriers to cross-disciplinary collaboration (Daniel et al. 2012, Ewert et al. 2006, Failing and Gregory 2003, Guerrero and Wilson 2016, McCool 2013, Ostrom 2009). Computational barriers are confounded because key system factors may be unknown or “loosely coupled,” meaning that they may be indirectly or nonlinearly related to outcomes. Key

² Kline, J. 2018. Unpublished presentation to U.S. Forest Service, Pacific Northwest Research Station, Station Management Team, Portland, Oregon. February 14.

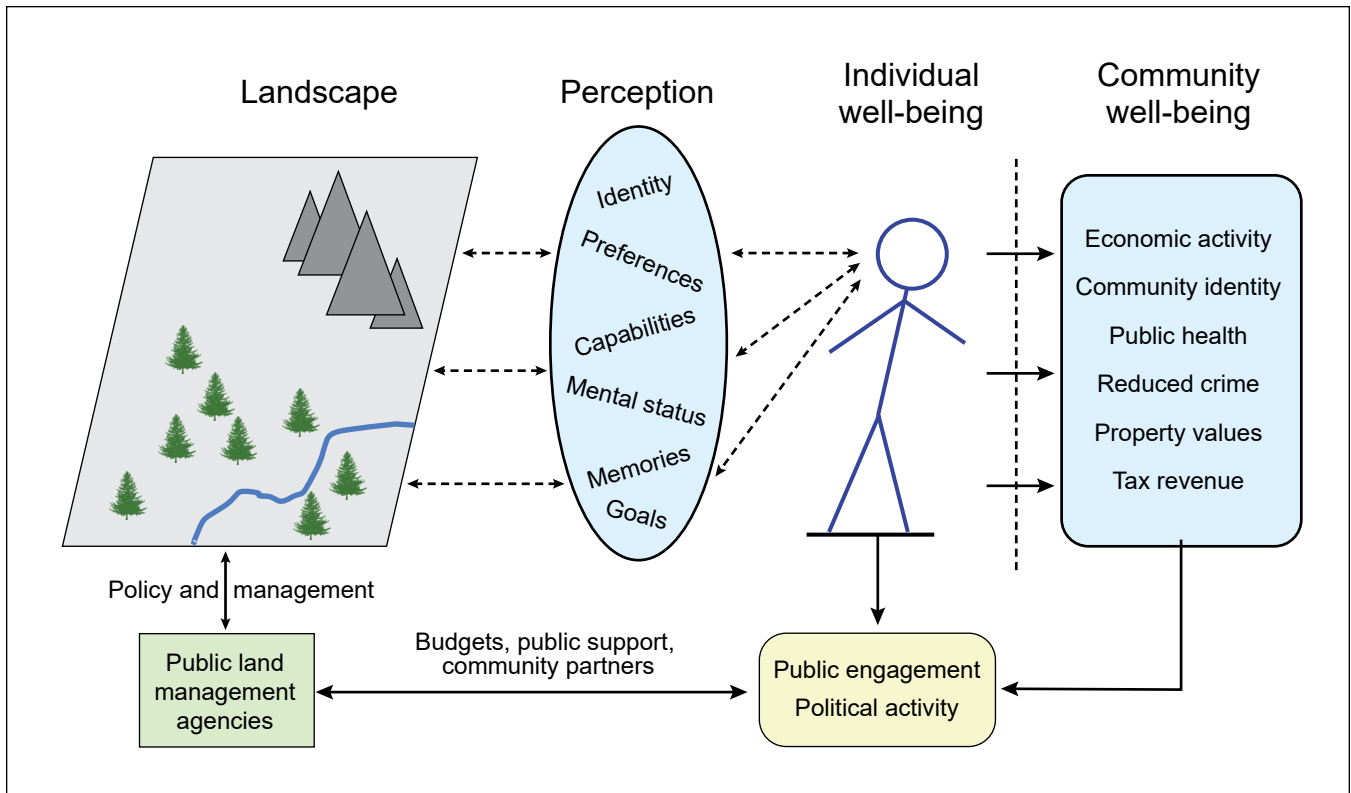


Figure 12.1—Sample socioeconomic interactions between people and a landscape (Kline 2018).

processes and interactions may also manifest differently at varying spatial and temporal scales. These problems can lead to “paralysis by analysis” (Kaufmann et al. 1994, Rittel and Webber 1973), in which planning teams spend vast resources and effort collecting data in the abstract, trying to anticipate all combinations and permutations of potential data needs.

The literature is full of systems analysis and integration frameworks that are too complex for most practical applications. Many start with an “assessment” process with long standardized lists of system characteristics, variables, and relationships that are hypothesized to be generalizable metrics and universal system components (e.g., Guerrero and Wilson 2016, Ostrom 2009). To be inclusive and consistent across many landscapes and planning units, much effort may be spent on data summaries that are detailed and cumbersome, with little thought to integrating across the many sources of data as they apply to specific local issues, problems, or concerns. However, land management decisions are context dependent; no single social-ecological framework or set of analysis metrics is directly transferable from one landscape analysis to another (Blahna et al. 2017a, Faludi 1998, Williams 2017). There are also several smaller scale management tools that can be used to integrate social and environmental information, such as Limits of Acceptable Change (LAC),

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Visitor Experience and Resource Protection (VERP), and Visitor Impact Management (VIM) frameworks in recreation. These tools are rarely used in practice, however, because they are often viewed as too complex and difficult to apply (Cervený et al. 2011). Additionally, they were designed to address relatively specific social or environmental impact problems and never intended for analyzing broader systems concerns that may include goals like increasing visitor access and diversity or local community economic development (Blahna et al. 2020). There is evidence that these tools can be modified to meet broader system integration needs (McCool 1994), but more research is needed.

New Conceptual Approaches

There is now extensive literature on cross-disciplinary integration for managing sustainable uses of public lands (e.g., Brown et al. 2010, Campbell and Sayer 2003, NRC 2002, Ostrom 2009). The sheer size and complexity of the cases and literature can be confusing and serve as a barrier to the implementation of integration principles. Therefore, we recommend taking a step back and using a more pragmatic approach as a first step (Nonaka and Zhu 2012). Because complexity and novelty are characteristics of all systems, including recreation and tourism systems (McCool 2013), it is important to take a bottom-up approach to sustainable recreation management in conservation planning that is place-based and issue specific. Future research of the success or effectiveness of such approaches can be evaluated by way of case study analysis.

Issue-based planning and decisionmaking—

Issue identification and framing must serve as the first and foundational step for any planning or decision situation, not data collection or assessment as many landscape planning processes are structured (Bardwell 1991, Clark and Stankey 2006). Issues are explicit statements of environmental or social problems or conflicts related to the plan or management decision context (Blahna et al. 2017a). Although coarse-filter landscape and social data and expert judgment can be used to help identify and frame the issues, the issues provide the structure and focus for selecting the key social and environmental data needs, analysis and integration methods, and public engagement and governance processes (Blahna et al. 2017a, Williams 2017).

An issue-based planning process was recently used in the development of an “implementation strategy” for the Prince William Sound (PWS) Human Use Framework in south-central Alaska (Blahna et al. 2017b, Poe and Gimblett 2017). At the outset, the PWS framework was a “framework” in name only. Thirty years of social and environmental data, public engagement, and stakeholder meetings and

introspective essays, collected since the Exxon Valdez oil spill occurred in 1986, were uploaded to a PWS framework website. Thousands of pages of studies were cataloged on the website, but there was little synthesis across the studies. Five key issues were identified as human use sustainability threats to PWS (e.g., visitor use conflicts with Alaska Native heritage sites), and existing social and ecological data were integrated to help frame each issue and to identify management objectives and practical management actions and monitoring strategies for each issue. Sustainable recreation was defined as maintaining or increasing existing recreational uses while protecting resources and social experiences. “Keystone” recreation activities that are central to the tourism and recreation in PWS were also identified and protected in the implementation strategies for each issue (Blahna et al. 2017b: 188). Conducting issue-based analyses helped address many of the traditional systems analysis problems; the selection and integration of data, the appropriate scale of analysis, stakeholder engagement processes, and adaptive management strategies were determined by the issues, not by a predefined, top-down set of descriptive system characteristics or principles.

Place-based learning and governance—

A powerful way to implement an issue-oriented approach to sustainable recreation is using place-based social learning and governance (Williams 2017, 2018). In terms of social learning, a spatial or place-based perspective helps to avoid “analysis paralysis” and integrate different sources of knowledge and ways of knowing, valuing, and acting by drawing out the local knowledge and values of place-embedded practitioners and stakeholders. For example, Collins (2014) applied a spatial approach to social learning (referred to as learning catchments), in which learning processes build around the shared geographic context of place-embedded stakeholders as well as the ecological and social conditions associated with a specific water catchment. Collins argued that place-based social learning helps transcend systems complexity, uncertainty, and controversy by focusing on the coproduction of catchment-specific knowledge that explicitly recognizes and makes sense of the partial understandings and varying norms and values of the various stakeholders embedded in a given situation or context. In Collins’ view, system-level **social** learning involves (1) the co-creation of knowledge; (2) a convergence of goals, purposes, criteria, and knowledge that contributes to awareness of mutual expectations and relational capital; and (3) changes in behavior and understanding gained through doing, that leads to concerted action. In other words, place-based social learning is as an emergent “process of multiple stakeholders socially constructing an issue in which their understandings and practices change so as to transform a situation or concern” (Collins 2014: 238).

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Similar to social learning, the idea of adaptive environmental governance has been used to describe a shift away from the traditional approach to governance as a top-down system of rule-based, formal, and fixed institutions with clear boundaries and toward less formal and more flexible bottom-up approaches that can deal with highly contextualized landscape-scale problems (Koontz et al. 2015). Despite differences among stakeholders regarding local knowledge, uses, and values for a landscape, their codependence or shared habitation of a given geographic space promote greater collaboration because decisions matter at a local level that is understandable to local actors in ways that at a larger (e.g., state or national) scale are often too remote and obscure to engage any but the most organized interest groups. As the thinking goes, managing complexity necessitates locally oriented governance practices in which emergent networks of individuals, organizations, agencies, and institutions come together into learning communities and bring together various forms of knowledge, expertise, and experience to produce shared understandings, policies, and plans (Williams 2018). Sustainable recreation in this context is not so much a matter of getting policies and plans correct, but the capacity for continuous learning in a given place or landscape.

Case study analysis—

Lee (1993) and Williams (2017) contend that case study analysis can be a valuable tool for encouraging social learning and evaluating place-based conservation efforts. Case study research is the detailed examination of the histories of many individual cases (e.g., projects, treatments, policies) that have similar goals to evaluate the effectiveness of the outcomes of the cases (Thomas 2016). The goal of case study research is to examine enough cases to develop general principles or practices for meeting the desired goals. In medicine, for example, different drug regimens are reviewed for health outcomes. In business management, different leave policies can be reviewed for meeting employee health or productivity goals. Comparative case study research is used as a formal analytic approach in other professional practice disciplines like medicine, law, and business, but is used only sporadically to evaluate outcomes of conservation efforts (Berkes and Folke 2000, Lee 1993, NRC 2002).

We believe that systematic case study research with a well-focused learning strategy can be used for evaluating sustainable recreation projects within the broader context of landscape conservation. For example, Keough and Blahna (2006) identified four successful cases of sustainable recreation management projects that sustained (or increased) recreation use levels while **simultaneously** reducing environmental impacts. The case histories were compared to eight different

ecosystem management (EM) criteria from the literature that were hypothesized to lead to sustainable recreation outcomes, including use of “multidisciplinary data” and addressing “integrated and balanced goals” (meaning that project goals were designed to meet social, ecological, and economic outcomes simultaneously, and those outcomes were maintained over time) (Keough and Blahna 2006: 1375). Each successful project included between six and eight EM criteria, and each case met all the criteria that were relevant depending on the context. Blahna (2007) also described two case studies of landscape-level recreation projects in Utah national forests: the development of an all-terrain vehicle trail on the Cedar City Ranger District (Dixie National Forest), and implementation of a rock climbing zoning strategy in Logan Canyon (Wasatch Cache National Forest). Both projects were opposed by environmental groups that wanted recreation use restrictions because they believed that high recreation use levels caused the biophysical impacts. However, by implementing better visitor management practices, rather than reducing the number of users, the projects did reduce environmental impacts, thus simultaneously sustaining recreation and environmental conditions. Rather than focusing on protecting recreation use **or** environmental protection, management practices were designed that met integrated decisionmaking goals of EM (fig. 12.2).



Figure 12.2—Ecosystem management decision criteria.

Coarse-filter, top-down data, and system characteristics are needed for understanding general system characteristics and sustainability problems, but individual issues are used to determine specific analytic, learning, and even governance needs.

Conclusions

If a primary objective of sustainable recreation is sustaining **both** recreation experiences **and** environmental conditions while encouraging increasing recreation use and visitor diversity, we know little about how to integrate with broader system resilience objectives. And goals conceived in this way will require newer and more integrated sets of principles and practices than are currently available to managers. Existing recreation management tools are limited, and existing large-scale planning and decision frameworks tend to be very complex and based on generic systems characteristics and standardized metrics, rather than context and place-specific issues (Blahna et al. 2017a). Different research approaches are needed to develop a new generation of integrated principles and practices.

We contend that it is more effective to take a bottom-up, context-specific approach that is driven by key sustainability issues, rather than a top-down, large-scale systems- or metrics-driven approach. Coarse-filter, top-down data, and system characteristics are needed for understanding general system characteristics and sustainability problems, but individual issues are used to determine specific analytic, learning, and even governance needs. This requires a place-based orientation that serves to focus the system analysis, as well as to use shared learning and governance that are critical for practical decisionmaking, implementing management actions, and ensuring the long-term success of any social-ecological sustainability plan. With this orientation, system components as described by McCool and Kline (2020) can be viewed as heuristics or conceptual aids for scoping data needs and integrative analyses, rather than a detailed map or explicit descriptive model of every landscape element and interaction analysis.

Compelling Questions

1. How can we reorient or adjust agency culture from a “normal science” or data-driven way of thinking, to a more issue-focused and system-oriented approach that is equally rigorous but more decision relevant?
2. How are sustainable recreation issues defined and used to identify relevant social, economic, and ecological data, as well as the expertise and interdisciplinary team composition needed for planning and decisionmaking?
3. What are key criteria for understanding how to integrate social, ecological, and economic factors and link them to sustainable recreation outcomes and goals?
4. How can case study analysis be used to address questions 2 and 3?
5. What are effective evaluation criteria for measuring long-term outcomes of integrated systems analysis in decisionmaking and planning for sustainable

recreation (e.g., shared and bottom-up learning, place-based, transdisciplinary, integrative).

6. How can research and case studies be designed so that results can help public land managers leverage people's enjoyment and fundamental interactions with natural places to build resiliency in social-ecological systems and to restore and sustain these natural places and the communities that are affected by them?
7. How can we build management models of social-ecological systems that allow for self-organization, structural change, resiliency, and desired emergent properties?
8. What kind of data integration opportunities are available and practical for mid-level managers to use given their governance structures and decision contexts?

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