Conceptual Frameworks for Human Interactions with Public Lands in the Western United States

Submitted by

Robert G. Sullivan
Environmental Scientist
Environmental Science Division
Argonne National Laboratory
Argonne, Illinois

Michael F. Dwyer
Environmental Scientist
Environmental Science Division
Argonne National Laboratory
Argonne, Illinois

Karla N. Rogers
Natural Resource Specialist
National Operations Center
U.S. Department of the Interior, Bureau of Land Management
Denver, Colorado

CONCEPTUAL FRAMEWORKS FOR HUMAN INTERACTIONS WITH PUBLIC LANDS IN THE WESTERN UNITED STATES

ABSTRACT

The U.S. Department of the Interior Bureau of Land Management (BLM) manages 248 million acres of public lands, primarily in the western United States. These public lands encompass diverse social, political, and economic contexts. By law, the BLM manages public lands for multiple uses and sustained yield while protecting socioecological qualities and values. The challenges for managing public lands in the context of growing and changing demographics and climate change are increasing, and transcend traditional geo-political boundaries. In response, the BLM is incorporating concepts and principles that define a landscape approach for the planning and management of the public lands.

As part of the landscape approach, the BLM seeks to better incorporate "human dimensions," that is, human values associated with cultural, socioeconomic, recreation, scenic, wilderness, and related public land resources, into its decision making. Traditionally, the BLM has concentrated on developing data, assessment methods, and models to understand ecological systems from a natural resource perspective, but seeks to improve understanding of ecological systems in the context of human systems—political, regulatory, social, cultural, and economic. An overarching understanding about how human systems interact with ecological systems (human-land interaction) is important for predicting responses to management interventions and identifying intervention options.

With assistance from Argonne National Laboratory, the BLM has launched an interdisciplinary effort to increase cross-program understanding of human dimensions in public land planning and management. An initial exploratory project included the development of a human-land interaction typology specific to public lands, and the evaluation of existing frameworks or constructs for describing human values and behavior with respect to land. The purpose of the evaluation was to assess the relevance and utility of the frameworks for understanding and describing human-land interactions and for providing a suitable framework for incorporating human dimensions into BLM land use planning and management decisions, as well as the potential suitability of the frameworks/constructs for geospatial analysis.

Results of the analysis suggest that while all of the evaluated frameworks have relevance, certain frameworks are better at explaining the behaviors of individuals, while others better explain the behavior of groups and organizations, such as non-governmental organizations, agencies, and corporations. Overall, the framework that best met the evaluation criteria for applicability to BLM land use planning and management decision making was Ecosystem Services, which is suggested as the basis for future efforts to deepen understanding of human dimensions in the context of BLM decision making.

1 INTRODUCTION

The U.S. Department of the Interior Bureau of Land Management (BLM) manages 248 million acres of public lands, primarily in the western United States. These public lands encompass diverse social, political, and economic contexts. By law, the BLM manages public lands for multiple uses and sustained yield while protecting socioecological qualities and values. The challenges for managing public lands in the context of growing and changing demographics and climate change are increasing, and transcend traditional geo-political boundaries.

The BLM has traditionally followed geo-political or administrative lines for framing management plans and actions, typically defined by BLM field office boundaries, which have little to do with regional boundaries defined by ecoregions, physiographic provinces, or other resource-based spatial attributes. Historically, agency programs and disciplines have developed information and standards of practices appropriate at sub-regional scales. Planning based on administrative boundaries and small scales often fails to incorporate important phenomena or considerations that are important at a larger regional scale, including those defined by socioecological interactions. This may sometimes result in narrowly focused and non-comprehensive or "piecemeal" planning and management efforts that do not realize opportunities for a wider range of solutions. Larger-scale and more comprehensive planning and management is particularly important when facing large-scale and complex challenges to public land management, such as climate change, invasive species, and demographic shifts. The agency is moving to incorporate a broader regional land extent—a landscape-scale approach—for planning and managing the public lands. For example, the BLM is attempting large-scale planning and management actions like conservation of the Greater Sage-Grouse and the sagebrush ecosystem. Agency programs and disciplines are currently developing standard practices to achieve agency mandates and support planning and management activities at a regional scale.

Work is underway to develop broad-scale understanding about biophysical structures, functions, and compositions across ecoregions. As the BLM shifts to apply management actions at a landscape-scale, a complementary understanding of social hierarchies' structure, functions, and compositions related to public interests and values is needed. A coupled understanding of ecological systems and social systems will provide the best opportunity to address the public's current and future interests, and to protect values as part of the landscape and in accordance with the multi-use mandate set forth in the Federal Land Policy and Management Act (FLPMA) (U.S. Department of the Interior 2001). Equally, the BLM needs this level of understanding to be able to identify how federal actions made at a landscape-scale will affect the quality of the human environment in accordance with the National Environmental Policy Act (Title 42, Sections 4321–4327 of the *United States Code* [42 USC 4321–4327]).

The U.S. Department of the Interior encourages protection of both natural and cultural resources in its strategies to advance taking a landscape-scale approach to managing America's public lands (U.S. Department of the Interior 2014). As part of the landscape approach, the BLM seeks to better incorporate "human dimensions," that is, human values, into its decision making. Traditionally, the BLM has concentrated on developing data, assessment methods, and models to understand ecological systems from a natural resource perspective, but seeks to improve

understanding of ecological systems in the context of human systems—political, regulatory, social, cultural, and economic. Having an overarching understanding about the relationship between human systems and ecological systems (human-landscape interaction) is important for predicting responses to management interventions and also for identifying more innovative intervention options.

Of central importance to developing an understanding about the relationship between people and landscapes is the question of human values that are realized by interactions with the landscape. A variety of human values are realized through these interactions. The values are partly activity dependent; for example, birdwatching provides very different values to birdwatchers than coal mining provides to a corporation, but different values may also be realized as a result of a particular interaction when different people engage in it, because people bring different motives, experiences, needs, and expectations to the interaction. And of course, the values realized in human-landscape interactions are dependent on the qualities of the landscape itself, and both the landscape and the people change over time. Thus, the human-land interaction in the context of BLM-administered lands can be thought of as a dynamic engagement of *people*—agencies (BLM and other agencies), the public, and other stakeholders—engaged in *activities*—recreational, economic, social, and so forth—and *places*—specific places on BLM-administered lands with physical and ecological characteristics that support these activities. These interactions generate values, with the specific values realized being highly dependent on the characteristics of the particular stakeholders, activities, places, time, and other specific circumstances of the interactions.

While values are often dependent on the specific activities in which people are engaged, repeated interactions with a place can lead to the realization of values that are not associated with a particular activity. This value is often referred to as "sense of place" a (usually positive) emotional attachment or connection to a place, and a perception that one has a relationship with that place (Eisenhauer et al. 2000; Tuan 1974). These attachments are "based on an appreciation for the land that goes beyond its use value," and "beyond value judgments based purely on the utility of these areas for activities" (Eisenhauer et al. 2000). These feelings may be deeply felt, involving very strong sentiments about places that result in feelings of ownership that lead to heightened concerns about land management, and sometimes to conflict (Schroeder 1996; Mitchell et al. 1993; Jacob and Schreyer 1980).

The differing values derived by different stakeholders from human-landscape interactions on BLM-administered lands can sometimes lead to conflicts among stakeholders, and between stakeholders and the BLM. For example, conflicts may arise when a particular area supports multiple activities, and multiple stakeholders seek to realize values in the area from activities that are incompatible. Conflicts may arise where the realization of one set of stakeholder values in a particular area necessarily involves the loss or degradation of the values (or the opportunity to realize values) of other stakeholders. By law the BLM must manage lands to realize a variety of values for the public and other stakeholders. The BLM's management decisions that prioritize land uses to satisfy certain public interests and not others may lead to conflicts that arise from the desire of stakeholders to realize different and sometimes incompatible values from the same land. These conflicts may reduce stakeholders' satisfaction with their public lands and can lead

to opposition to proposed land use and management activities. A better understanding of the motives and drivers underlying values might allow the BLM to better resolve these conflicts.

Within the context of the BLM organization, "human dimensions" includes the following BLM focal areas: cultural, scenic, and socioeconomic resources; recreation and leisure services; and the National Conservation Lands (because of the social values behind designations of some conservation lands, such as solitude and wilderness values). These areas house specialists in academic disciplines that focus on human-land interactions, including anthropology, archeology, history, heritage, landscape architecture, recreation planning, psychology, sociology, and economics.

With assistance from Argonne National Laboratory, the BLM undertook an interdisciplinary effort to increase cross-program understanding of human dimensions in public land planning and management. The purpose of the research effort was to enhance the BLM's ability to consistently consider human dimensions at regional scales. The study developed a human-land interaction typology specific to BLM-administered lands and used the typology as a basis for developing a high-level conceptual model for human-land interactions on BLM-administered lands. The study also explored a range of existing frameworks that either described human values and needs generally, or described human-landscape interactions. The purpose of the evaluation was to assess the relevance and utility of the frameworks for understanding and describing human-land interactions and for providing a suitable framework for incorporating human dimensions into BLM land use planning and management decisions. Considering the BLM-specific human-landscape interaction typology and the human-landscape interaction model, the study examined key frameworks that provide insights into the values that humans derive from their interaction with BLM-administered lands and the mechanisms by which those values are realized. Several key frameworks were then evaluated for application to BLM land use planning and management decision making.

2 HUMAN-LANDSCAPE INTERACTION TYPOLOGY AND CONCEPTUAL MODEL

The human-landscape interaction typology developed for this study is a comprehensive list of the types of major activities (and associated attributes) involving BLM stakeholders that take place on BLM-administered lands, and which can be thought of as interactions with the landscape. The interactions recorded in the typology include the full range of recreation, sociocultural, subsistence, economic, utilitarian (e.g., transportation), educational, and other activities that take place on BLM-administered lands. For each human-landscape interaction, the typology identifies the stakeholders that are primarily engaged in the interaction (sometimes referred to as "actors" in this paper because they are participants in activities), and various human values derived from the interactions. The values in the typology are based on different value systems associated with selected human values frameworks identified for use in the study, including Maslow's Hierarchy of Human Needs (Maslow 1943, 1954, 1968, 1970a, 1970b), the Reiss Theory of 16 Basic Desires (Reiss 2000, 2004), the Triple Bottom Line (Elkington 1997; Savitz 2006; Slaper 2011), the Daly Triangle (Daly 1973; Meadows 1998), and Ecosystem Services (MEA 2003, 2005), which are described further below.

2.1 HUMAN-LANDSCAPE INTERACTIONS MATRIX

The typology was adapted from a similar typology developed by Besser et al.'s (2014) landscape values mapping study, which employed a forest values typology modified by Brown and Reed (2000), based on an original concept of Rouston and Coufal (1991). Besser et al.'s study collected landscape values data from various users of U.S. Forest Service lands to compile an atlas of the Olympic Peninsula in the State of Washington that showed human–landscape connections. The study used a landscape values typology that identified 14 values that study participants derived from their activities in national forest lands, including aesthetic, economic, environmental quality, future, health, heritage, home, intrinsic, learning, recreation, social, spiritual, subsistence, and wilderness values. The study also identified 33 activities taking place on lands within the study, which were grouped into eight activity clusters, and then, based on participants' answers to survey questions, assigned participants' reported landscape values to the activities, and mapped them to particular locations within the study lands.

For the current study, both Besser et al.'s (2014) land values typology and activities list were adapted to BLM-administered lands and the human-landscape interactions that take place on BLM-administered lands. Besser et al.'s typology was focused primarily on the activities and values of individuals. However, a number of activities that take place on BLM-administered lands cannot be regarded as individual activities and for which individual's values would be inappropriate (e.g., mining, energy development, flood control, and fire management). The modified list used for the current study incorporated 47 types of activities clustered into 13 activity clusters (shown in Table 2.2), and 15 types of landscape values (shown in Table 2.1). The current study further modified Besser et al.'s approach by adding a primary "actor," that is, the primary person, group, or other entity undertaking each activity in the list, and also by mapping other value types to each activity, as noted above. The Human-Landscape Interactions Matrix is presented in Table 2.2. It should be noted that the information in the table is

TABLE 2.1 Typology of Landscape Values[a]

Landscape Value	Description
Aesthetic	I value this place for the scenery, sights, smells, or sounds.
Economic	I value this place because it provides income and employment opportunities through industries such as forest products, mining, tourism, agriculture, shellfish, or other commercial activity.
Environmental Quality	I value this place because it helps produce, preserve, and renew air, soil, and water or contributes to healthy habitats for plants and animals.
Future	I value this place because it allows future generations to know and experience it as it is now.
Health	I value this place because it provides a place where I or others can feel better physically and/or mentally.
Heritage	I value this place because it has natural and human history that matters to me and it allows me to pass down the wisdom, knowledge, traditions, or way of life of my ancestors.
Home	I value this place because it is my home and/or I live here.
Intrinsic	I value this place just because it exists, no matter what I or others think about it or how it is used.
Learning	I value this place because it provides a place to learn about, teach, or research the natural environment.
Recreation	I value this place because it provides outdoor recreational opportunities or a place for my favorite recreational activities.
Social	I value this place because it provides opportunities for getting together with my friends and family or is part of my family's traditional activities.
Spiritual	I value this place because it is sacred, religious, or spiritually special to me.
Subsistence	I value this place because it provides food and other products to sustain my life and that of my family.
Wilderness	I value this place because it is wild.
Utilitarian	I value this place because it provides a space for some essential non-recreational (utilitarian) activity.

[a] From Besser et al. 2014, with the *Utilitarian* landscape value and description added by the current authors.

TABLE 2.2 Human-Landscape Interactions Matrix for BLM-Administered Lands

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
Motorized Recreation	All-terrain vehicles (ATVs) and other off-road vehicles (casual use – no permit required)	Recreationists	Recreation, Social	Esteem, Belongingness and Love, Aesthetic	Social contact – "feel good happiness"	Cultural (recreation, social relations, aesthetic, sense of place)
	ATVs and other off-road vehicles (permit required – events)	Recreationists	Recreation, Social	Esteem, Belongingness and Love	Vengeance (competition), Status, Social contact, "feel good happiness"	Cultural (recreation, social relations)
	Scenic driving	Recreationists	Recreation, Aesthetic, Social	Aesthetic, Belongingness and Love	Romance, Social contact	Cultural (recreation, social relations, aesthetic, sense of place)
	Motorized boating, water skiing, and jet skiing	Recreationists	Recreation, Aesthetic, Social	Belongingness and Love, Esteem, Aesthetic	Social contact, "feel good happiness"	Cultural (recreation, social relations, aesthetic)
	Winter sports (snowmobiling)	Recreationists	Recreation, Social	Belongingness and Love, Esteem, Aesthetic	Social contact, "feel good happiness"	Cultural (recreation, social relations)
Non-motorized Recreation	Backpacking, hiking, running, walking	Recreationists	Recreation, Aesthetic, Wilderness, Health, Social	Aesthetic, Belongingness and Love, Esteem	Physical activity, Romance, "feel good happiness"	Cultural (recreation, social relations, aesthetic, sense of place, inspiration, spiritual/ religious values)
	Birdwatching, wildlife viewing	Recreationists	Recreation, Aesthetic, Wilderness, Environmental Quality, Social	Aesthetic, Cognitive, Esteem, Belongingness and Love	Romance, Saving	Cultural (recreation, social relations, aesthetic, sense of place, educational values)
	Camping (developed)	Recreationists	Recreation, Social	Belongingness and Love, Esteem	Social contact	Cultural (recreation, social relations, sense of place, educational values)

TABLE 2.2 (Cont.)

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
	Camping (backcountry)	Recreationists	Recreation, Aesthetic, Wilderness, Social	Esteem, Belongingness and Love, Aesthetic, Cognitive	Independence, Social contact	Cultural (recreation, social relations, aesthetic, sense of place, inspiration, spiritual/ religious values)
	Golfing	Recreationists	Recreation, Health, Social	Esteem, Belongingness and Love	Vengeance (competition), Physical activity, Social contact	Cultural (recreation, social relations)
	Horseback riding	Recreationists	Recreation, Aesthetic, Wilderness, Social	Esteem, Belongingness and Love, Aesthetic	Social contact, Romance	Cultural (recreation, social relations, aesthetic, sense of place, inspiration, spiritual/ religious values)
	Mountaineering and technical climbing	Recreationists	Recreation, Social	Esteem, Belongingness and Love	Physical activity	Cultural (recreation, social relations)
	Organized play (playgrounds/parks)	Recreationists	Recreation, Social	Belongingness and Love	Physical activity, Social contact	Cultural (recreation, social relations)
	Orienteering and geocaching	Recreationists	Recreation, Social	Esteem, Belongingness and Love	Curiosity, Social contact, "feel good happiness"	Cultural (recreation, social relations)
	Outdoor team sports	Recreationists	Recreation, Health, Social	Esteem, Belongingness and Love	Physical activity, Social contact, Acceptance, "feel good happiness"	Cultural (recreation, social relations)
	Photography	Recreationists	Recreation, Aesthetic, Wilderness	Aesthetic, Esteem	Romance	Cultural (recreation, social relations, aesthetic, sense of place, inspiration)

TABLE 2.2 (Cont.)

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
	Picnicking, relaxing, and resort use	Recreationists	Recreation, Social	Belongingness and Love	Social contact, Tranquility	Cultural (recreation, social relations, aesthetic, sense of place, inspiration, spiritual/ religious values)
	Road or mountain biking	Recreationists	Recreation, Health, Social	Esteem, Belongingness and Love, Aesthetic	Physical activity, "feel good happiness"	Cultural (recreation, social relations, aesthetic, sense of place, inspiration, spiritual/ religious values)
	Swimming	Recreationists	Recreation, Health, Social	Esteem, Belongingness and Love	Physical activity, "feel good happiness"	Cultural (recreation, social relations)
	Non-motorized boating (sailboat/canoe/kayak/ rafting/tubing)	Recreationists	Recreation, Social	Esteem, Belongingness and Love, Aesthetic	Romance, social contact, "feel good happiness"	Cultural (recreation, social relations, aesthetic, sense of place, inspiration, spiritual/ religious values)
	Astronomy/Night Sky	Recreationists	Recreation, Social	Esteem, Belongingness and Love, Aesthetic	Romance, Social contact	Cultural (recreation, social relations, aesthetic, sense of place, educational, inspiration, spiritual/ religious values)
	Winter sports (skiing, snowshoeing)	Recreationists/ subsistence	Recreation, Aesthetic, Wilderness, Health, Social	Esteem, Belongingness and Love, Aesthetic	Physical activity	Cultural (recreation, social relations, aesthetic, sense of place, inspiration, spiritual/ religious values)

TABLE 2.2 (Cont.)

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
Hunting	Hunting and trapping	Recreationists/ subsistence	Recreation, Subsistence, Environmental Quality, Social	Physiological, Esteem, Belongingness and Love	Eating, Social contact	Cultural (recreation, social relations, cultural heritage, sense of place, spiritual/ religious values, knowledge systems – traditional and formal, educational), Economic
Fishing/ Shellfishing	Fishing (river and coastal)	Recreationists/ subsistence	Recreation, Subsistence, Environmental Quality, Social	Physiological, Esteem, Belongingness and Love	Eating, Social contact	Cultural (recreation, social relations, cultural heritage, sense of place, spiritual/ religious values, knowledge systems – traditional and formal, educational), Provisioning
Foraging	Foraging and gathering (e.g. mushrooms, berries, florals, firewood)	Recreationists	Recreation, Subsistence, Environmental Quality, Social	Physiological, Esteem, Belongingness and Love, Cognitive	Eating, Social contact	Cultural (recreation, social relations, cultural heritage, sense of place, spiritual/ religious values, knowledge systems – traditional and formal, educational), Provisioning
	Rock, fossil, or shell collecting	Recreationists	Recreation, Social	Esteem, Belongingness and Love, Aesthetic, Cognitive	Saving, Curiosity	Cultural (recreation, social relations, aesthetic, sense of place, educational), Provisioning

TABLE 2.2 (Cont.)

11

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
Economic	Farming and ranching	Farmers/ ranchers – individuals/ corporations	Economic	Esteem, Belongingness and Love, Security, Self-Actualization (individuals)	Independence, Honor, Family, Status	Provisioning, Cultural (cultural heritage, sense of place, spiritual/religious values, knowledge systems – traditional and formal, educational)
	Logging, firewood cutting, Christmas trees cutting	Individuals/ corporations/ agencies	Economic	NA[g]	NA	Provisioning
	Mining (including oil and gas extraction, transportation, storage, refining)	Corporations	Economic	NA	NA	Provisioning
	Energy generation and transmission	Corporations	Economic	NA	NA	Provisioning
	Filming for commercial purposes (e.g., movies, TV, commercials, commercial photography)	Corporations	Economic	NA	NA	Provisioning
Cultural/Social/ Heritage	Visiting cultural/historical sites	Recreationists/ tribes/ communities	Recreation, Heritage, Spiritual, Social, Historic	Cognitive, Belongingness and Love, Esteem	Curiosity, Honor, Social contact	Cultural (social relations, cultural heritage, sense of place, aesthetics, spiritual/ religious values, knowledge systems – traditional and formal, inspiration, educational)

TABLE 2.2 (Cont.)

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
	Viewing/contemplating wild horses and burros	Wild horse enthusiasts, public at large	Recreation, Heritage, Cultural, Spiritual	Aesthetic, Cognitive	Romance, Social contact	Cultural (social relations, cultural heritage, sense of place, aesthetics, spiritual/ religious values, knowledge systems – traditional and formal)
	Maintain areas in their natural condition	Wilderness enthusiasts/ conservationists/ agencies	Wilderness, Environmental Quality, Scenic values	Aesthetic, Self-Actualization, Self-Transcendence	Idealism, Romance	Ecological, Cultural (cultural heritage, sense of place, spiritual/religious values, knowledge systems – traditional and formal, inspiration, educational)
	Ceremonies and traditions	Recreationists/ tribes/ communities	Heritage, Spiritual, Social	Belongingness and Love, Esteem, Self-Actualization, Self-Transcendence	Honor, Social contact, Status	Cultural (social relations, cultural heritage, sense of place, aesthetics, spiritual/ religious values, knowledge systems – traditional and formal, inspiration, educational)
	Religious and spiritual (vision quests)	Recreationists/ tribes/ communities	Spiritual, Health, Social	Esteem, Self-Actualization	Independence, Status, Honor	Cultural (social relations, cultural heritage, sense of place, aesthetics, spiritual/ religious values, knowledge systems – traditional and formal, inspiration,)
	Meditation	Recreationists/ tribes	Spiritual, Health	Self-Actualization	Tranquility	Cultural (sense of place, aesthetics, spiritual/ religious values)

TABLE 2.2 (Cont.)

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
Education/ Science/ Observation	Environmental monitoring and scientific research	Agencies/ academic Institutions/ non-governmental organizations (NGOs)	Learning, Environmental Quality	NA	NA	Cultural (educational) – activity supports environmental services.
	Restoration and stewardship, eradication of invasive species, fire rehabilitation	Agencies/NGOs	Learning, Environmental Quality	NA	NA	Activity supports environmental services.
	Guiding and interpretation	Agencies/NGOs	Learning, Environmental Quality, Social	NA	NA	Cultural (educational, social relations)
Transportation	Highways, roads, railroads, airports	Agencies/ corporations/ communities	Utilitarian	NA	NA	Provisioning
Communications	Telephone lines, radio and cell towers, etc.	Agencies/ corporations/ communities	Utilitarian	NA	NA	Provisioning
Urbanization	Housing, commercial uses, supporting infrastructure	Agencies/ corporations/ communities	Home, economic, utilitarian	NA	NA	Provisioning
Public Safety	Flood control structures, landfills, prisons, military uses, border fences	Agencies/ corporations/ communities	Utilitarian	NA	NA	Regulating

TABLE 2.2 (Cont.)

Assigned Activities Cluster[a]	Interaction/Activity	Actors[b]	Primary Landscape Values (Besser et al.)[c]	Primary Maslow Needs[d]	Primary Reiss Desires[e]	Ecosystem Service Type[f]
	Wildfire prevention and suppression	Agencies/communities	Environmental Quality, Economic, Utilitarian	NA	NA	Activity supports environmental services.
Water Extraction, Storage, and Transport	Reservoirs, wells, dams, tanks, pipelines, canals, ditches	Agencies/corporations/communities	Utilitarian	NA	NA	Regulating, Provisioning

[a] Assigned activities cluster and interaction/activity adapted from Besser et al. (2014).

[b] Primary participant(s) in the activity.

[c] Primary value for participants, as per "Landscape values" from Table 1 in Besser et al. (2014), pg. 141.

[d] Primary need(s) satisfied by interaction/activity as per Maslow Expanded Hierarchy (Maslow 1970a, 1970b).

[e] Primary desire(s) satisfied interaction/activity as per Reis Theory of 16 Basic Desires (Reis 2000, 2004).

[f] Potential ecosystem service type (with cultural service subtype in parentheses where applicable, as per Millennium Ecosystem Assessment (MEA 2003, Chapter 3).

[g] NA = not applicable.

preliminary in nature, represents a first attempt at assigning values to the human-landscape interactions on BLM-administered lands based on professional judgement of the authors, and is in need of further refinement.

Review of the interactions matrix indicates the remarkable range of human-landscape interactions that take place on BLM-administered lands, the diverse set of "actors," that is, individuals, groups, and organizations that are involved in these interactions and derive value from them, and the myriad values that the various actors derive from these interactions. Most human-landscape interactions generate multiple values for the parties involved, particularly the interactions of individuals who may be engaged in what seems to be a focused and straightforward recreational activity, but from which a variety of values beyond the simple but transient enjoyment of engaging in the activity (Reis's "feel good happiness") are obtained. On the other hand, some interactions that involve very practical "uses" of BLM-administered lands are much more narrowly focused on realizing economic or utilitarian values.

2.2 ACTOR TYPES

The actors that are important on BLM human-land interactions can be classified as follows:

- *Individuals*, such as individual recreationists;

- *Groups*, such as families, hunting groups, and outing clubs;

- *Communities*, such as tribes, housing developments, small towns, and cities;

- *Organizations*, including corporations, agencies (e.g., BLM), and non-governmental organizations (NGOs, such as the Wilderness Society).

The matrix reveals that while these different actors may often be engaged in very different activities, there is sometimes overlap between actors for particular activities. For example, both recreationists and subsistence harvesters may hunt and fish on BLM-administered lands, and all actors may utilize and benefit from transportation routes and communications towers on BLM-administered lands.

2.3 INTERACTION TYPES

The interactions that take place on BLM-administered lands can be classified by the degree to which they affect land resources. Some activities are clearly *extractive* in nature, and involve removing some non-renewable resource from BLM-administered lands. Examples of extractive activities include oil and gas development or hardrock mining. Other activities are *renewable* in the sense that they involve the consumption of resources that are replaced, at least when they are harvested sustainably. Examples include hunting and fishing, grazing, and timber harvesting. Other activities are *non-consumptive*, such as stargazing, birdwatching, and scenic

driving. A fourth category of activities are *restorative*, for example, environmental restoration and certain other land management activities. It should be noted that these are "loose" classifications, with many exceptions and "gray areas." For example, many activities that are primarily non-consumptive, such as hiking, may in fact damage or destroy resources that in a sense are consumed by that activity. Also, some activities that are considered renewable, such as the generation of solar energy may affect land and vegetation resources for many years, if not permanently, and these activities might also be considered to be consumptive, though not technically extractive.

2.4 VALUE TYPES

The values derived from human-landscape interactions can be classified as either *tangible*, for example, oil, minerals, food, or fiber; or *intangible*, for example, aesthetic appreciation, recreational pleasure, inspiration, or feelings of connectedness to community, culture, or place. It is worth noting that many values derived from human-land interactions by individuals, groups, and communities, tend to be intangible in nature and are often harder to articulate or measure, while the values derived from economic and utilitarian activities driven by organizations tend to be tangible and measurable, though there are exceptions.

It is evident that the values derived from human-landscape interactions fulfill needs and desires that the various actors have. These range from the emotional needs of individuals, such as the need for social connectivity and the desire for solitude, to the economic desires of corporations, and the transportation and flood control needs of communities. There are many ways to conceptualize and classify human needs and values, and frameworks for doing so are the focus of Section 3 of this paper.

2.5 A SIMPLIFIED MODEL OF HUMAN-LANDSCAPE INTERACTION

From analysis of the Human-Landscape Interactions Matrix and by using the categories of interactions, actors, values, and needs, it is possible to develop a simple conceptual model of human-landscape interactions specific to BLM-administered lands. This simplified model is shown in Figure 2.1.

In this model, *people* (actors) interact with *places* (BLM and other lands) in order to derive *values* which meet their *needs*. The people are a diverse mix of individuals and groups engaged in a wide variety of activities, some of which permanently reduce resource availability, and many others that have little or no effect on resource availability. Many values are derived from these interactions, with different people focused on differing activities and values, driven by different needs. In Figure 2.1, a specific list of needs is presented, but the needs list presented in the figure is just one example of an approach for categorizing needs, and as will be shown in Section 3, other needs categories could be used. Many needs that are fulfilled by BLM-administered lands could also be fulfilled by other types of land, such as state or private land; however, in some cases, resources on BLM-administered lands cannot easily be found
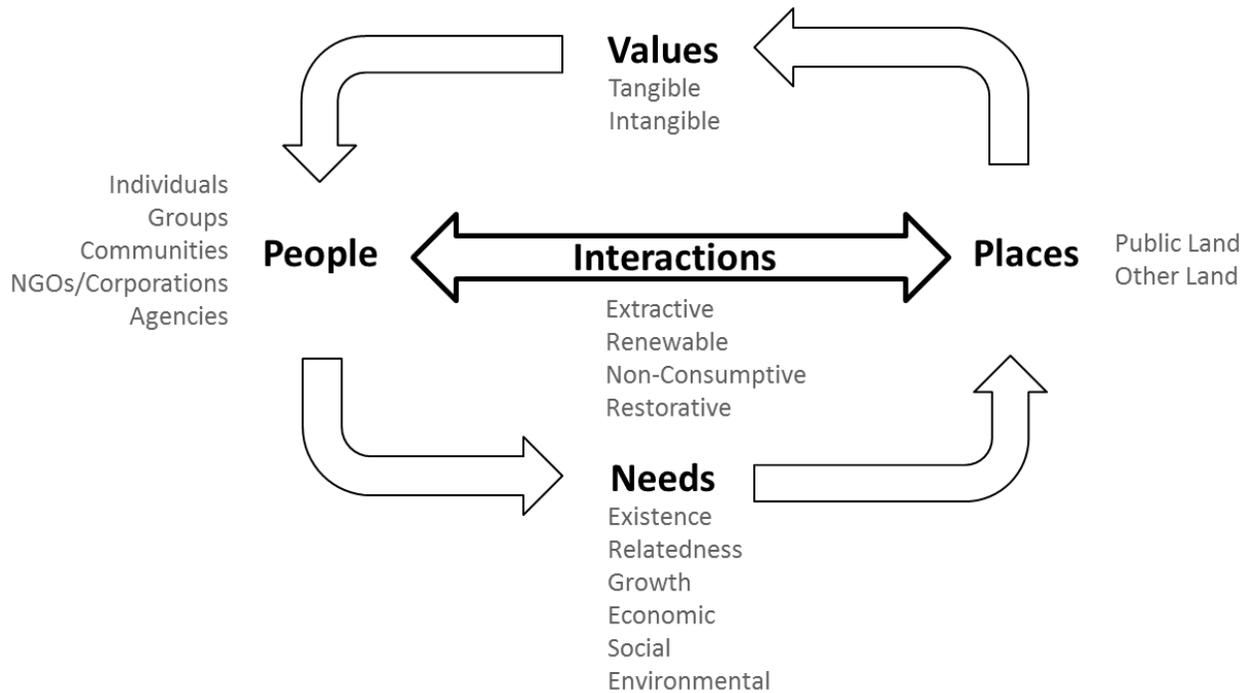
FIGURE 2.1 Simplified Model of Human-Landscape Interaction

elsewhere, which may lead to conflicts between competing non-compatible uses for the same area.

2.6 APPLICATIONS OF THE INTERACTIONS MATRIX AND CONCEPTUAL MODEL

Consideration of the matrix and the model also suggests why stakeholders may come into conflict with each other and with the BLM regarding proposed land uses and management activities. There may be a simple lack of awareness between stakeholders and/or the BLM about the amount and types of value derived from a particular interaction on BLM-administered lands. For example, parties proposing to develop a certain area for extractive purposes may not understand the variety of stakeholders concerned about the area and the differing values other stakeholders associate with the area. Those proposing to develop the area may tend to view the area through their own value "lens," which often is economic and tangible. The proposing entity may not be aware of or fully appreciate that other stakeholders derive a range of values from the same land, based on renewable or non-consumptive activities. In some cases, these may be deeply held cultural heritage, aesthetic, or spiritual or religious values, but because they are intangible, they are difficult to articulate or to quantify.

Similarly, environmental organizations may tend to see areas in terms of tangible ecological values, such as animal habitat, and propose to exclude an area from other uses, without fully appreciating the area's recreational and other cultural values to other stakeholders,

who may be relatively unconcerned about ecological values. The organizations may believe that simply moving other uses to another similar location is acceptable. They find it difficult to accept that their positively focused restorative activities are regarded as essentially consumptive by others, who may have formed an emotional attachment to the location (often described as "sense of place") that borders on a sense of ownership (Mitchell et al. 1993).. For them, another area cannot be substituted, even if it is very similar to the area proposed for protection.

While both the Human-Landscape Interactions Matrix and the conceptual model need refinement, they can potentially be useful to the BLM and other stakeholders in several ways. First, they can be used to raise awareness of various stakeholders' needs and values, and the connection of those needs and values to specific activities that are taking place or are proposed for BLM-administered lands. The BLM and/or activity proponents who know the variety of activities taking place within an area proposed for a land use activity can use the matrix to identify potential stakeholders that would be affected by the activity, and also gain insight into the needs and values that may be positively or negatively affected by the proposed activity. This information can be valuable for proactively identifying and addressing concerns that stakeholders may have with proposed activities, instead of reacting after conflicts have arisen.

More fundamentally, wider and more accurate consideration of the full range of actors, values, and needs associated with particular areas of BLM-administered lands will result in better decisions by the BLM, as the agency is charged by FLPMA with considering the future needs of all Americans when making land use planning and management decisions. A better understanding of the full range of actors, values, and needs affected by a proposed activity may lead to modifications to the activity that avoid, reduce, diminish, or compensate for (mitigate) the potential impacts of the proposed activity.

3 HUMAN NEEDS AND HUMAN-LAND INTERACTION FRAMEWORKS

As part of the current study, a variety of information sources identified by the BLM were evaluated for their potential application to the effort to enhance BLM's ability to incorporate human dimensions into its decision making. Five of these sources are considered here, and these can loosely be described as frameworks for describing and classifying human needs and desires in general, or specifically in the context of interactions with the environment. These frameworks include:

- Maslow's Hierarchy of Human Needs,
- Reis's Theory of 16 Basic Desires,
- The Triple Bottom Line,
- The Daly Triangle (as modified by Meadows), and
- Ecosystem Services.

Maslow's Hierarchy and Reis's Theory of 16 Basic Desires are frameworks for describing and classifying the needs and desires of individuals, generally, while the Daly Triangle, Triple Bottom Line, and Ecosystem Services are frameworks for describing human interactions with the environment. Short summaries of each framework follow.

3.1 MASLOW'S HIERARCHY OF HUMAN NEEDS

Maslow's Hierarchy is a theory for identifying, describing, and classifying the basic critical needs humans share (Maslow 1943, 1954, 1968, 1970a, 1970b), which psychologist Abraham Maslow developed and refined over the course of several decades. The expanded version of the Hierarchy (Maslow 1970a, 1970b) groups basic human needs into eight categories and is typically graphically represented as a pyramid or triangle, as shown in Figure 3.1.

Maslow's expanded hierarchy is structured as follows:

1. *Biological and Physiological Needs*: These are the survival/existence needs for such things as food, warmth, shelter, sex, water, and other bodily needs.

2. *Safety Needs*: When physical needs are satisfied, the individual's safety needs dominate behavior. These needs have to do with physical safety, but also the desire for a predictable, orderly world.

3. *Belongingness and Love Needs*: After biological/physiological and safety needs have been met, social needs predominate. These needs concern emotional relationships with others, such as friendship, sexual intimacy, and family relationships.
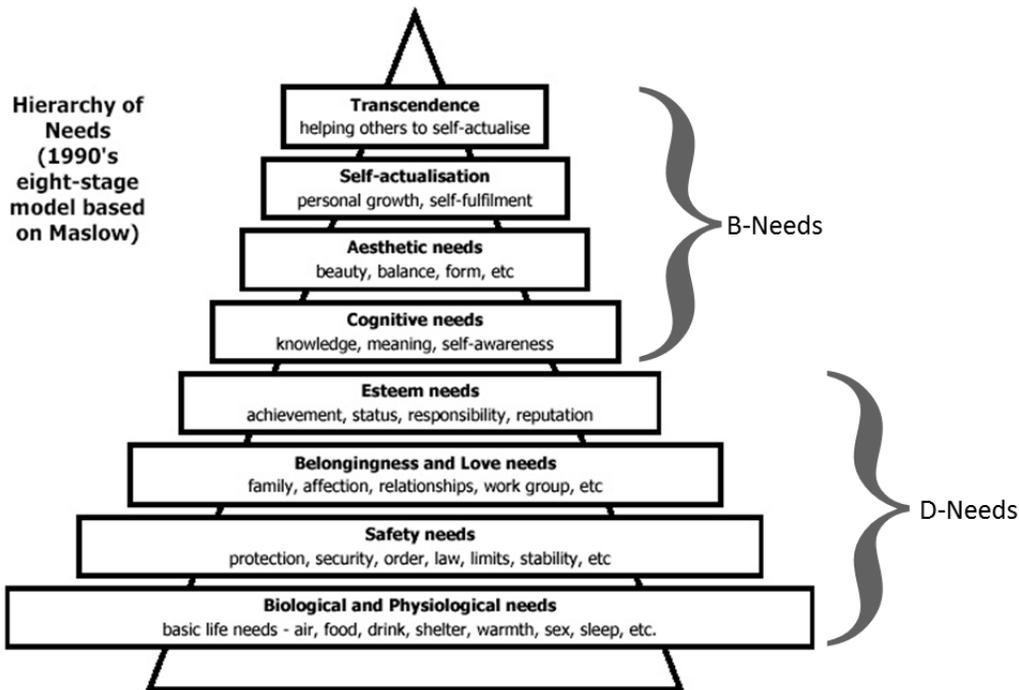
FIGURE 3.1 Maslow's Hierarchy of Human Needs (Expanded)

4. *Esteem Needs*: Maslow believed that humans need to be respected by themselves and by others, based on their achievements, status, and so forth. People need to gain recognition and/or engage in activities that make them feel competent, accepted, and valued.

5. *Cognitive Needs*: Maslow believed that there is a natural human need to learn and acquire knowledge. Cognitive needs include the need to learn, explore, discover, and create to get a better understanding of the world and of the self.

6. *Aesthetic Needs*: Maslow believed that humans need aesthetic experiences; that is, they need to experience beauty in one or more of its manifestations.

7. *Self-actualization Needs*: Self-actualization is the fulfillment of the individual's need to reach his/her full potential, and to be the best they can be. At this stage, the individual is more readily capable of *peak experiences* (see below).

8. *Self-transcendence Needs*: At the top of the Hierarchy is transcendence, a state in which certain persons who are fully self-actualized, in essence, lose the focus on self and concentrate on the welfare of others. Examples Maslow provides of persons reaching this level of the Hierarchy include Mother Theresa and Gandhi.

Maslow identified the needs at the first four levels of the Hierarchy (Biological/Physiological, Safety, Belongingness/Love, and Esteem needs) as *Deficit Needs* (*D-Needs*). A failure to fulfill these needs will result in awareness of the lack of fulfillment and will motivate the individual to take actions to fulfill the needs. When the needs are met, the feeling of deficit goes away, and the need is no longer felt.

Maslow referred to the higher-order needs in the Hierarchy (Cognitive, Aesthetic, Self-Actualization, and Self-Transcendence) as *Belonging Needs* (*B-Needs*). Meeting these needs is necessary for spiritual growth. In contrast to D-Needs, B-Needs are not lessened by fulfillment. In fact, according to Maslow, fulfillment may lead to increasing need. For example, people with a driving need to learn do not cease to want to learn more, no matter how much they learn. B-needs include truth, goodness, and beauty.

Maslow (1968) described peak experiences as revelations or mystical illuminations that involve both emotion and cognition. As noted by MacDonald et al. (2009), "They are moments of highest happiness and fulfillment, and generally carry with them some important meaning and/or insight for the individual." Maslow (1970b) suggested that particular settings and activities trigger peak experiences, including being in nature. The concept of aesthetic needs and peak experiences clearly ties to wilderness values (MacDonald et al. 2009).

Maslow's Hierarchy is widely known, is relatively easy to understand, and intuitively makes sense. It "maps" well to some individual human needs for, and values derived from, their activities on public lands, as shown in the Human-Landscape Interactions Matrix (Table 2.2). The concept of D-Needs and B-Needs may provide insights into how people respond to BLM actions that facilitate or frustrate the satisfaction of their needs, and "maps" to the Daly Triangle's *intermediate ends* and *ultimate ends* concepts (see below).

However, various researchers have questioned the validity of Maslow's Hierarchy. Another limitation of Maslow's Hierarchy is that while it *may* be useful for looking at the needs/motives/values of groups, Maslow clearly limits the framework to individuals. Other possible concerns with using Maslow's Hierarchy include a lack of precision (and sometimes oversimplification) in much of the terminology used, and various assertions made without evidence or citations to back them up.

3.2 REIS'S THEORY OF 16 BASIC DESIRES

Psychologists Steven Reiss and Susan Havercamp surveyed more than 6,000 adolescents and adults in the United States and Canada to derive and validate a list of 16 basic desires and values that motivate humans (Reis 2000, 2004). They started with a list of more than 400 possible desires, narrowed it down by various means to 328 desires, then used factor analysis based on responses from 401 individuals to derive 16 basic desires (presumed to be genetic in origin but affected by culture and environment). They then designed a survey to elicit the desires and administered the profile to several thousand people in order to validate the instrument.

The 16 basic desires include the following:

- *Power* – the desire to influence others
- *Independence* – the desire for self-reliance
- *Curiosity* – the desire for knowledge
- *Acceptance* – the desire for inclusion
- *Order* – the desire for organization
- *Saving* – the desire to collect things
- *Honor* – the desire to be loyal to one's parents and heritage
- *Idealism* – the desire for social justice
- *Social Contact* – the desire for companionship
- *Family* – the desire to raise one's own children
- *Status* – the desire for social standing
- *Vengeance* – the desire for revenge
- *Romance* – the desire for sex and beauty
- *Eating* – the desire to consume food
- *Physical Activity* – the desire for exercise
- *Tranquility* – the desire for emotional calm

Many of the 16 basic desires appear to map well to individuals' activities on public lands, as shown in the Human-Landscape Interactions Matrix (Table 2.2), including a number of needs/values not addressed by Maslow (e.g., saving, physical activity, and tranquility). Reis also describes a type of pleasure that he labels "feel good happiness," a short-term pleasure derived from certain activities that does not, however, engender deep satisfaction of important desires. "Feel good happiness" is very likely associated with a number of activities that take place on BLM-administered lands, for example, certain kinds of recreational activities (which of course may provide other meaningful benefits), and this type of benefit is not addressed meaningfully by Maslow.

Despite its utility and purported validity, Reis's Theory of 16 Basic Desires is not as widely known or as widely cited as Maslow's Hierarchy. Similarly to Maslow's Hierarchy, Reis's theory only addresses the needs and desires of individuals, not groups or organizations.

3.3 TRIPLE BOTTOM LINE

The Triple Bottom Line (TBL) is an accounting framework for organizational activities that incorporates three dimensions of performance: social, environmental, and financial (Elkington 1997; Savitz 2006; Slaper 2011). The TBL dimensions are also commonly called the three Ps: *people*, *planet*, and *profits*. The framework is often depicted as three overlapping circles representing each of the three dimensions (see Figure 3.2). The area representing the intersection of all three dimensions is often labeled "sustainability," implying that if viability and resilience can be achieved in each of the three dimensions, the greater system (business) can be sustained indefinitely.
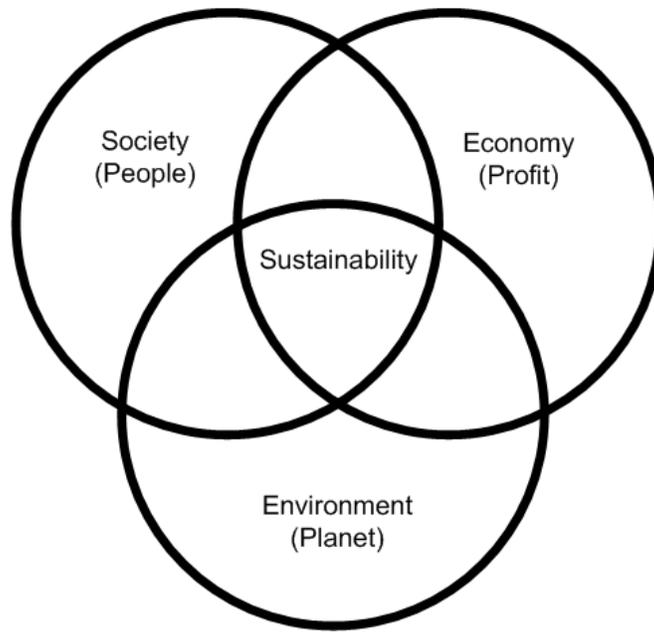
FIGURE 3.2 The Triple Bottom Line

The TBL framework has been applied by businesses, nonprofits, and government entities as a decision-making and performance-monitoring tool used to help identify which actions they should or should not take to make society more sustainable. The advantage of TBL over traditional accounting measures is that it "captures the essence of sustainability by measuring the impact of an organization's activities on the world ... including both its profitability and shareholder values and its social, human and environmental capital" (Slaper 2013).

A variety of methods and measures are used for calculating the TBL. Measures used include economic variables that deal with the bottom line and the flow of money; environmental variables that represent measurements of natural resources and reflect potential influences to its viability; and social variables that refer to social dimensions of a community or region and could include measurements of education, equity and access to social resources, health and well-being, quality of life, and social capital.

The TBL is a useful construct for understanding organizations' motives for actions with respect to the environment. For example, FLPMA shows that the BLM clearly has a responsibility to balance "people, planet, and profit" in the fulfillment of its sustainable multi-use mandate, and practically speaking, the BLM is constantly weighing "people" values against both environmental concerns and the profit motives associated with various economic activities proposed on BLM administered lands. Environmental NGOs can be thought of as leaning primarily toward the "planet," while presumably, on average, corporations would lean more toward profit. For each actor, straying from the preferred dimension of the TBL may involve trade-offs and compromises.

While it is a useful construct, a significant challenge in implementing the TBL is the lack of a common unit of measure for weighing the three dimensions when deciding on a course of action. For example, it is difficult to develop a common metric for such disparate items as "personal income," "concentration of nitrogen oxides," and "violent crimes per capita" to generate a meaningful overall measure of corporate (or human) well-being. Attempts have been made to overcome this challenge by reducing all values to a single unit (dollars), by developing and applying an index, and by simply allowing the measures in each category to stand alone. Another challenge to implementing the TBL is the dynamic nature of each of the dimensions.

3.4 DALY TRIANGLE (WITH MEADOWS MODIFICATION)

The Daly Triangle is a high-level explanatory framework that describes socioeconomic activities in terms of ends and means. Economist Herman Daly, in the book *Toward a Steady State Economy* (1973), used the so-called Daly Triangle (See Figure 3.3) to explain sustainable development. The Daly Triangle (with additions by Donnella Meadows [1998]) posits that socioeconomics can be thought of as consisting of ends (individual and societal goals) and means (methods and materials used to achieve goals). In the Daly Triangle, natural capital, including natural resources and ecosystem services, constitute the *ultimate means* of development. Economic activity (and the material goods it brings) is not an end in itself but is an *intermediate means* to *intermediate ends* (including human and social capital). The *ultimate end* is human well-being, described using terms such as "happiness, harmony, identity, fulfillment, enlightenment, and transcendence," which are analogous to the higher order needs in Maslow's Hierarchy, and which cannot be achieved directly through economic activities.

For the current study, the Daly Triangle (as examined in Meadows' excellent discussion of sustainability and indicators (Meadows 1998) was very useful for establishing a holistic framework for human activities with respect to BLM lands, and for revealing connections between the other major frameworks.

3.5 ECOSYSTEM SERVICES

At the most basic level, ecosystem services are simply the benefits (both goods and services) provided by ecosystems to humans, or more technically, the flows of value to human societies as a result of the state and quantity of *natural capital* (MEA 2003, 2005). Natural capital is a term that describes the limited physical and biological resources of ecosystems, and the limited capacity of ecosystems to provide services. The concept of ecosystem services provides a framework for understanding the flow of goods and services from ecosystems to humans, the factors that affect the ability of ecosystems to provide goods and services, and the mechanisms by which the effects occur. It is intended to inform planning and decision making by accounting for the full range of goods and services provided by ecosystems and showing how they can be incorporated into decision making, with the ultimate goal of sustainability. Ecosystem services is an "approach for integrating into decision making, ecosystem values often heretofore dismissed as externalities" and an "approach to bridge the gap between ecology and economics" (Chan et al. 2012).
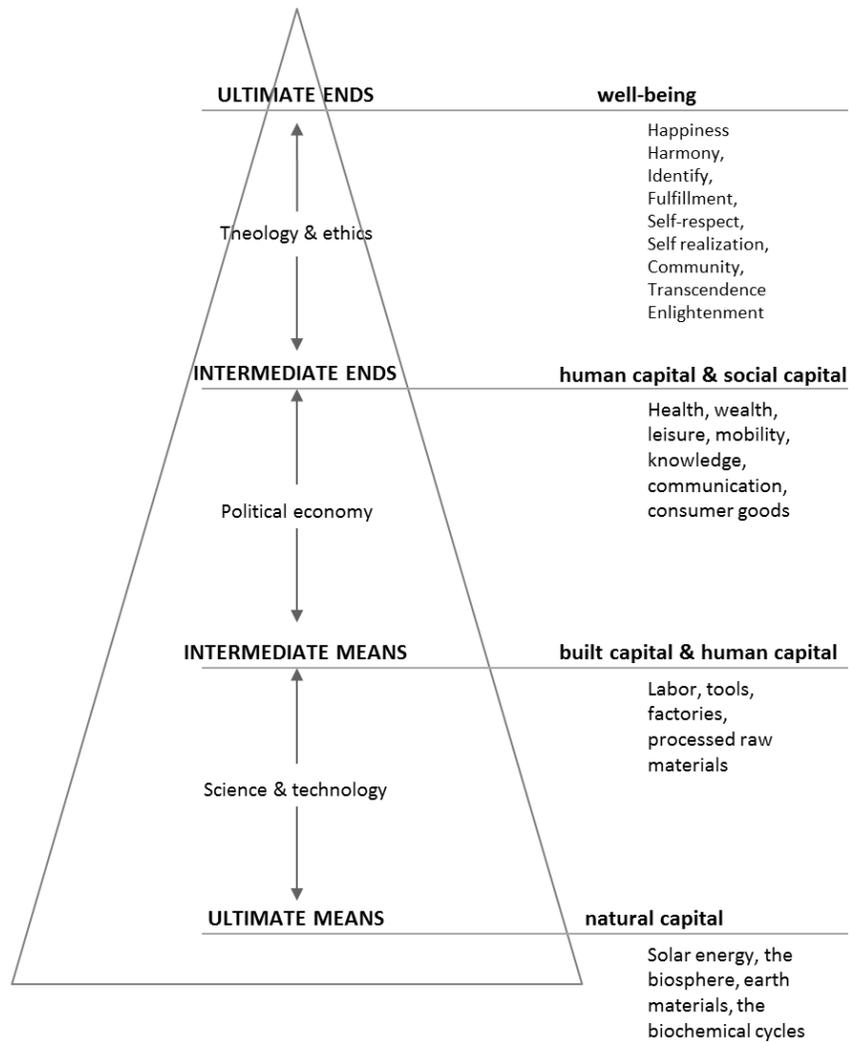
FIGURE 3.3 Daly Triangle (with Meadows Modification)

Ecosystem services are typically classified as follows:

- *Provisioning Services*: Products obtained from ecosystems. Examples include food, water, fiber, minerals, and energy resources.

- *Regulating Services*: Benefits obtained from the regulation of ecosystem processes. Examples include flood and erosion control, water and air purification, and pest and disease control.

- *Cultural and Amenity Services*: Non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences. Examples include cultural heritage, aesthetic and spiritual experiences, sense of place, recreation, and tourism.

- *Supporting Services*: Services that do not directly benefit humans but are necessary for the production of other ecosystem services. Examples include soil formation, nutrient cycling, and providing habitat for plants and animals.

The conceptual framework for Ecosystem Services used in the Millennium Ecosystem Assessment (MEA 2003), a major technical effort to define and develop the concept of ecosystem services, is shown in Figure 3.4.

The Millennium Assessment (MEA 2003, Chapter 3) defines a larger set of cultural ecosystem services:

- Cultural diversity,
- Spiritual and religious values,
- Knowledge systems (traditional and formal),
- Educational values,
- Inspiration,
- Aesthetic values,
- Social relations,
- Sense of place,
- Cultural heritage values, and
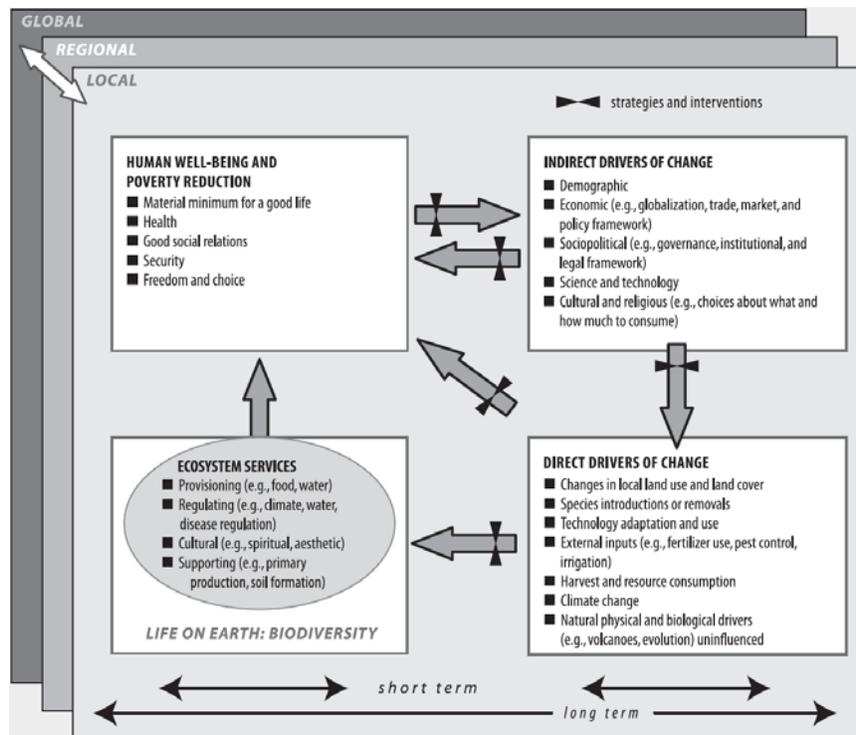- Recreation and ecotourism.

FIGURE 3.4 Ecosystem Services Framework (from the Millennium Assessment [MEA 2003])

Ecosystem services are applied to the activities in the Human-Landscape Interactions Matrix (Table 2.2.), with subcategories of cultural services indicated in parentheses. In part, these cultural ecosystem services relate closely to the human needs identified in Maslow's Expanded Hierarchy, particularly the higher level "growth needs" (B-Needs), while some of the provisioning services (e.g., food and water, fiber, minerals, and energy) correspond to lower-level needs (D-Needs) on Maslow's Expanded Hierarchy.

Similarly, cultural and provisioning ecosystem services relate closely to the social and economic dimensions (People and Profit) of the TBL. Cultural and provisioning services satisfying a range of physical and emotional needs of people while providing goods and services that provide economic returns directly, or that can be processed in some way to become an input to an economic process that provides economic returns.

The ecosystem services framework fits well with BLM's multi-use mandate for management of public lands, which dictates the provision of a wide range of goods and services to improve human well-being while maintaining sustainability with respect to ecosystem functions. The ecosystem services framework emphasizes a full accounting for ecosystem services and common valuation (where possible). The ecosystem services framework operates at multiple spatial and temporal scales and also lends itself well to mapping. The federal government (including the BLM) is actively involved in various ecosystem services-related activities.

Weaknesses of ecosystem services include an historical emphasis on ecological values, with less emphasis on cultural and other values, as well as a lack of accepted definitions/standards for ecosystem services entities. The complex, inter-related nature of ecosystem services and ecosystems, and the challenges of valuation of ecosystem services, especially cultural ecosystem services, make practical application of the ecosystem services framework very challenging.

3.6 RESULTS OF THE HUMAN-LAND INTERACTION FRAMEWORKS EVALUATION

The five frameworks described above and several other information sources were evaluated according to the following criteria:

- Whether the framework was merely explanatory in nature, or would be likely to support an actual decision-making process;

- How well the framework applied to the full range of actors (stakeholders);

- Whether or not the framework was designed to have an environmental resource focus;

- Whether or not the framework would be likely to support measurement of values;

- Whether or not the framework would be likely to support geospatial mapping of values;

- Whether the framework would be flexible with respect to the scale of application, or was designed for a specific scale (e.g., a project area or a watershed); and

- Whether the framework would support indicators (i.e., parameters that describe the status and trend of a resource).

Results of the evaluation suggest that while all of the evaluated frameworks have value for the study, most of the frameworks do not meet the criteria well. As noted above, Maslow's Hierarchy and the Reis Theory of 16 Basic Desires are better at explaining the behaviors of individuals, while the TBL better explains the behavior of organizations, such as NGOs, agencies, and corporations. Review of the literature suggested that none of the human motivation frameworks are "correct" in the sense that they indicate the true nature of human needs, desires, and values, but rather should be considered as alternative constructs that are more or less useful to gain insight into how humans interact with BLM-administered lands. While these insights are valuable, these frameworks (and the Daly Triangle) are primarily conceptual in nature, primarily explanatory in terms of usefulness, and, at least in the context of BLM planning and land management decision making, are too limited to serve as a practical foundation for meaningful incorporation of human dimensions into BLM decision making.

Overall, the framework that best met the evaluation criteria for applicability to BLM land use planning and management decision making was Ecosystem Services, which is suggested as the basis for future efforts to deepen understanding of human dimensions in the context of BLM decision making. In addition to best meeting the evaluation criteria above, there is a wealth of current literature and many ongoing research and development activities concerning ecosystem services, including activities within the U.S. Department of the Interior and the BLM itself, which will be quite useful moving forward.

4 SUMMARY AND CONCLUSION

This paper describes an initial exploratory effort to enhance BLM's abilities to incorporate human dimensions into BLM land use planning and management decisions, in order to better respond to the wide range of needs and values of BLM stakeholders, and thereby improve the quality of BLM decisions. This initial effort sought to develop a comprehensive list of human-landscape interactions that take place on BLM-administered lands, and to associate the activities central to these interactions with various actors (BLM stakeholders), and with the values, both tangible and intangible, that the actors derived from their interactions with BLM-administered lands. This effort led to the development of the Human-Landscape Interactions Matrix, and a simple high-level conceptual model of human-landscape interactions.

The Matrix and model show that while all actors interact with BLM-administered lands in order to realize values that address their particular needs, both the needs and the values vary greatly by actor, and many activities are associated with multiple needs. The Matrix and the model are potentially useful for gaining a better understanding of the likely effects of proposed land use activities on multiple stakeholders, both by expanding the number of stakeholders that are considered in the decision-making process, and also by better identifying the full range of values the various stakeholders derive from BLM-administered lands. This knowledge can be used to proactively identify and respond to stakeholder concerns, and, where necessary, to modify decisions to reduce impacts.

The study also evaluated a range of information sources, including human values frameworks, that may be useful to BLM's efforts to enhance human values considerations in its decision making. While several of the evaluated frameworks provide useful insights into the nature of the human-landscape interaction, the Ecosystem Services framework was selected as the framework that best met the study's evaluation criteria and will likely provide the best foundation for comprehensive, long-term, and effective consideration of human dimensions in BLM decision making.

5 REFERENCES

Besser, D.T., et al., 2014, "Mapping Landscape Values: Issues, Challenges and Lessons Learned from Field Work On the Olympic Peninsula, Washington," *Environmental Practice* 16:138–150.

Brown, G.G., and P. Reed, 2000, "Validation of a Forest Values Typology for Use in National Forest Planning," *Forest Science* 46(2):240–247.

Chan, K.M.A., T. Satterfield, and J. Goldstein, 2012, "Rethinking Ecosystem Services to Better Address and Navigate Cultural Values," *Ecological Economics* 74:8–18.

Daly, H., 1973, *Toward a Steady State Economy*, W. H. Freeman and Company, San Francisco.

Elkington, J., 1997, *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*, Capstone Publishing Ltd., Oxford, United Kingdom.

Jacob, G.R., and R. Schreyer, 1980, "Conflict in outdoor recreation: a theoretical perspective," *Journal of Leisure Research* 12(4):368-80.

Macdonald, M., S. Wearing, and J. Ponting, 2009, "The Nature of Peak Experience in Wilderness," *The Humanistic Psychologist* 37(4):370–385.

Maslow, A.H., 1943, "A Theory of Human Motivation," *Psychological Review* 50(4):37–96.

Maslow, A.H., 1954, *Motivation and Personality*, Harper and Row, New York.

Maslow, A.H., 1968, *Toward a Psychology of Being*, D. Van Nostrand Company, New York.

Maslow, A.H., 1970a, *Motivation and Personality*, Harper & Row, New York.

Maslow, A.H., 1970b, *Religions, Values, and Peak Experiences*, Penguin, New York (original work published 1964).

MEA (Millennium Ecosystem Assessment), 2003, *Ecosystems and Human Well-Being. A Framework for Assessment*, Island Press, Washington, D.C.

MEA, 2005, *Ecosystems and Human Well-Being: Synthesis*, Island Press, Washington, D.C.

Meadows, D., 1998, *Indicators and Information Systems for Sustainable Development*, The Sustainability Institute, Hartland Four Corners, Vt.

Mitchell, M. Y., J.E. Force, M. S. Carroll, and W. J. McLaughlin, 1993, "Forest places of the heart: Incorporating special places into public management," *Journal of Forestry* 91(2):32-37.

Reiss, S., 2000, *Who Am I: The 16 Basic Desires That Motivate Our Actions and Define Our Personality*, Tarcher/Putnam, New York.

Reiss, S., 2004, "Multifaceted Nature of Intrinsic Motivation: The Theory of 16 Basic Desires," *Review of General Psychology* 8(3):179–193.

Rolston, H., and J. Coufal, 1991, "A Forest Ethic and Multivalue Forest Management," *Journal of Forestry* 89(4):35-40.

Savitz, A., 2006, *The Triple Bottom Line: Why Sustainability Is Transforming the Best-Run Companies and How It Can Work for You*, Jossey-Bass, San Francisco.

Schroeder, H. W, 1996, *Voices from Michigan's Black River: Obtaining Information on "Special Places" for Natural Resource Planning*, St Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station.

Slaper, T., 2011, "The Triple Bottom Line: What Is It and How Does It Work?" *Indiana Business Review* Spring:4–8.

Tuan, Y. F., 1974, *Topophilia*, New York: Columbia University Press.

U.S. Department of the Interior, 2014, *U.S. Department of the Interior Strategic Plan for Fiscal Years 2014–2018*, Office of Planning and Performance Management, Washington, D.C.

U.S. Department of the Interior, Bureau of Land Management Office of the Solicitor (editors), 2001, *The Federal Land Policy and Management Act, as Amended*, U.S. Department of the Interior, Bureau of Land Management Office of Public Affairs, Washington, D.C.