

Involving Forest Communities in Identifying and Constructing Ecosystem Services: Millennium Assessment and Place Specificity

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ABSTRACT

The ecosystem services (ES) approach entails integrating people into public forest management and managing to meet their needs and wants. Managers must find ways to understand what these needs are and how they are met. In this study, we used small group discussions, in a case study of the Deschutes National Forest, to involve community members and forest staff in determining what and how people benefit from forests. We compare results with the Millennium Ecosystem Assessment (MA) classification. Results show that people identified benefits in many of the same ways and categories as in the MA. Small group discussions also merged or expanded existing MA categories in novel ways. They identified new benefits not found in the MA classification scheme but identified only four of eight subcategories of regulating services and no supporting services. These findings imply that involving people in the place-specific management of public forests using the ES approach gives managers a clearer understanding of the benefits people recognize and value, as well as those they either are not aware of or do not value. Such information is useful in forest management and in public outreach.

Keywords: ecosystem services, millennium assessment, social-ecological systems, focus group interviews, Deschutes National Forest

Increasing globalization of timber markets poses challenges to traditional provisioning resource-oriented management of US public forests. For example relative to Brazil and Indonesia, slow-growing trees and longer harvest times in the United States requires more resources to produce comparable amounts of timber.

This places the US forest sector at a disadvantage regarding timber as a primary forest provisioning service. As echoed by the associate chief of the US Forest Service, there is a need for a more comprehensive ecosystem services (ES) approach to public forest management (Collins 2007). The ES approach entails integrating people into public forest

management and managing to meet their various needs and wants. However, managers must first understand what people's needs and wants are and how those are valued and met.

The classification scheme of the Millennium Ecosystem Assessment (MA), although one of the most elaborate classifications of ES (Fisher et al. 2009), may not be adequate for the management of particular forests especially for intangible or cultural ES. The services provided by a forest to people of a particular place might not be constructed by those people in the same, and/or as distinct, categories as in the MA. The MA classification system may be less comprehensive than the amalgam of ES people get from a particular forest. Thus, successful application of the ES concept to the management of specific forests requires a place-based classification of ES that involves the people of that place in the collective identification and construction of perceived benefits.

In this article, we present the results of a study that involved community stakeholders to identify ES that are specific for the De-

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schutes National Forest (DNF) in central Oregon. We also compare the place-specific ES to the MA classification of ES and discuss broader applications of place-specific ES for forest management and planning.

Classifying ES

The ES model is becoming central to natural resource management because it involves a more comprehensive accounting of human benefits than traditional reporting methods (Smith et al. 2011). The MA exemplifies that centrality by considering ES as the benefits people obtain from ecosystems and urges increased measurement of such benefits including assessments of changes in their delivery (Millennium Ecosystem Assessment 2005). The ES approach is important because it entails valuing the benefits people get from ecosystems and determining and managing for the ecological processes and functions needed to deliver those benefits (Collins 2007). Collins (2007) argues that by conceptualizing these benefits as values they can be better measured and

protected. Thus, the ES approach to public forest management is also about value management.

According to the MA, people benefit directly from three main classes of ES: provisioning, regulating, and cultural services (Millennium Ecosystem Assessment 2005). Provisioning services are the products people obtain from ecosystems such as food and fiber. Regulating services are benefits obtained from the regulation of ecosystem processes such as air quality and climate regulation, and cultural services are nonmaterial benefits people obtain from ecosystems through reflection and spiritual, cognitive, recreational, and aesthetic experiences. The MA includes a fourth category of ES, supporting services. The benefits, to humans, of this category of services is rather indirect because supporting services or processes such as nutrient cycling, soil formation, and primary productivity are needed to produce the other ES from which we obtain direct benefits. Table 1 is a summary of the major cat-

egories and subcategories of ES, including brief descriptions of each subcategory, according to the MA.

Despite its elaborate classification of ES into distinct categories and subcategories, some scholars advise that the MA classification system be considered as an evolving conceptualization of ES (Carpenter et al. 2006, Sachs and Reid 2006). The scientific community is urged to continue reassessing ES and to check the validity of the concept including its definition and how it can be used by stakeholders such as land managers and other practitioners (Stokstad 2005, Fisher et al. 2009). Some advocate for multiple classification systems that are context specific and purpose oriented (Costanza 2008, Fisher and Turner 2008, Fisher et al. 2009).

Context and purpose are important factors to consider in identifying, classifying, and managing for ES, especially for cultural ES. Cultural ES are primarily socially constructed to reflect the desires of people of a particular place. Managing for these services

Table 1. Summary of major categories, subcategories, and brief descriptions of ES.

Category	Subcategory	Brief description
Provisioning services	Food	Food products obtained from plants, animals, and microbes
	Fiber	Includes wood, cotton, hemp, silk, wool, and more
	Genetic resources	Genes and genetic information used for plant and animal breeding
	Biochemicals, natural medicines, and pharmaceuticals	Many medicines, biocides, and food additives such as alginates and other biological materials
Regulating services	Ornamental resources	Animal and plant products such as shells, skins, flowers, and whole plants
	Freshwater	For drinking, energy supply, and other uses
	Air quality regulation	Extraction from and contribution to chemicals in the atmosphere
	Climate regulation	Local changes in temperature and precipitation caused by changes in land cover, and sequestration and/or emission of greenhouse gases
	Water regulation	Timing and magnitude of runoff, flooding, and aquifer recharge caused by changes in land cover
	Erosion regulation	Soil erosion and landslide regulation caused by changes in vegetative cover
	Water purification and waste treatment	Filtration and decomposition of organic waste introduced into water systems; assimilation and detoxification of compounds via soil and subsoil processes
	Disease regulation	Changes in the abundance of human pathogens and disease vectors because of ecosystem changes
	Pest regulation	Changes in the prevalence of livestock and crop pests and diseases caused by ecosystem changes
	Pollination	Changes in the distribution, abundance, and effectiveness of pollinators caused by ecosystem changes
Cultural services	Natural hazard regulation	Systems such as coral reefs and mangroves can influence the effects of hazards such as hurricanes and large waves
	Cultural diversity	Ecosystem diversity influences cultural diversity
	Spiritual and religious values	Values attached to ecosystems and their components by individuals, society, and religions
	Knowledge systems	Ecosystems influence the type of traditional and formal knowledge developed by different cultures
	Educational values	Ecosystems provide the basis for both formal and informal education in many societies
	Inspiration	Ecosystems inspire arts, folklore, national symbols, architecture, and advertising
	Aesthetic values	Beauty and aesthetic value that many find in ecosystems
	Social relations	Ecosystems influence the types of social relations formed in particular cultures
	Sense of place	Valuing the sense of place associated with recognized features within ecosystems
	Cultural heritage values	Value placed on the maintenance of either cultural landscapes or culturally significant species
Supporting services	Recreation and ecotourism	Choice of where to spend leisure time influenced in part by the characteristics of the natural or cultivated landscapes of a particular area
	Soil formation	Rate of soil formation depends on the ecosystem and its properties
	Photosynthesis	Oxygen production necessary for most living organisms
	Nutrient cycling	Cycling and maintenance of various proportions of nutrients essential for life
	Water cycling	Cycles through ecosystems and essential for life

Source: Adapted from the Millennium Ecosystem Assessment (2005).

requires that managers determine what people consider as benefits and the extent to which those benefits are important to the people of that place. The MA classification may not adequately reflect the place-specific realities of particular social-ecological systems, i.e., how ecological systems are coupled with the social structure and function of a particular place. People are embedded within different sociocultural contexts—values, beliefs, histories, experiences, traditions, and political, economic, and micro-cultural circumstances. By shaping different perceptions and understandings of the benefits received from ecosystems, these contexts define place-specific elements of ES. For example, it is unlikely that people in Utah will perceive, understand, and value the benefits they get from Ashley National Forest in the same way as people in Bend, Oregon, would for the DNF. Place-specific assessments using approaches that involve the people of these places in the collective identification and construction of those benefits are needed to ensure that place-specific realities are accommodated in management decisions.

The DNF is experimenting with the ES approach (Smith et al. 2011). Part of that approach explores the question of how people see and understand the benefits they get from the DNF. In this article, we address the following questions: How do we involve people in the identification and classification of the benefits they get from a particular forest? Do the people of the DNF region view and understand the benefits they get from the forest in the same ways and categories as outlined in the MA? What are the implications of place-based views and understandings on the application of the ES approach to public forest management? We illustrate how a place-based construction of ES illuminates some similarities and differences between place-based ES and the MA classification. We use a method that facilitates the placement of people's desires at the center of the identification and classification of ES. We explain how this approach better integrates people in public forest management; how that integration facilitates a more comprehensive conceptualization of ecosystems as social-ecological systems such that both social and ecological processes become more salient.

Involving Forest Communities

To involve forest communities in the collective identification and construction of

the benefits they obtain from the DNF, we conducted focus group interviews with various stakeholder groups in Central Oregon (Krueger and Cassey 2000). The use of focus group interviews to involve communities in the identification and coconstruction of benefits obtained from ecosystems is virtually nonexistent. However, such an approach has been used to assess recreation needs (Knap and Propst 2001).

The initial lists of forest community stakeholders and potential focus group participants were provided by DNF staff. Potential participants were each sent e-mails and follow-up phone calls were made, as necessary, explaining the study and requesting participation. Using the snowball technique, where focus group participants suggest others they think would contribute to the study, additional interviewees were contacted and similarly requested to participate. Because our intent was to qualitatively explore, in depth, what and how people of the DNF "see" and "think about" the benefits they get from the forest, a random sample of interviewees was unnecessary (Weiss 1995). A total of 47 individuals (23 women) participated in seven focus group interviews, held at the DNF headquarters in Bend, Oregon, between November 2009 and May 2010. Each focus group interview lasted, on average, 2.2 hours. Interviewees included recreationists, year-round residents, local officials, regulator and environmental group representatives, members of nongovernment organizations, industry and academia, and DNF staff. Three of the focus groups comprised only DNF staff; two others were a mix of both DNF staff and other stakeholders, and the last two included only non-DNF staff participants.

The two questions addressed by focus group participants and reported in this article include (i) what and how do you benefit from the DNF and (ii) what and how you think others within and beyond the Deschutes area benefit from the DNF? The "what" pertains to the identification of benefits and the "how" was intended to elicit the collective construction of the material and social-psychological conditions surrounding the attainment of identified benefits.

Our goal was to create comfortable and permissive environments to foster self-disclosure among participants in each focus group. The interview protocol was reviewed and approved by the University of Washington's Institutional Review Board and each participant's consent was sought before the

commencement of interviews. Additionally, when talking with participants and potential participants, we referred to focus group interviews as small group conversations to minimize possible apprehensive attitudes toward interviewing. Furthermore, nondirective techniques were used to moderate these conversations by placing emphasis on the realities of participants (Krueger and Casey 2000). Thus, interview questions remained open ended, allowing participants to respond without boundaries and clues for potential responses. This provided participants with ample opportunity to comment and respond to others, explain, revisit and re-explain, thereby coidentifying and coconstructing what and how they and others benefit from the DNF. Because we wanted to build a grounded understanding of these benefits from the perspective of and as collectively understood by the participants, the focus group approach and the nondirective technique were most appropriate (Glasser and Straus 1967, Krueger and Cassey 2000).

Focus group conversations were recorded and later transcribed for analyses. Transcripts were read and reread before data analysis. Initial data analysis involved first cycle coding methods, primarily in vivo and values coding (Saldana 2010). First cycle coding methods were used to familiarize ourselves with participants' use of descriptive words and language, and their perspectives and values regarding their perceived benefits from the DNF. Both deductive and inductive approaches were used for second cycle coding and subsequent data analysis. Deductively, the MA classification served as a coding and analytic guide and was used to iteratively search for text and first cycle codes that convey categories of benefits expressed by interviewees. This process of pattern coding (Saldana 2010) involved segregating, grouping, regrouping, and relinking these texts and codes to specific categories within the MA classification scheme.

Inductive analysis followed the grounded theory approach to coding and analysis (Glasser and Straus 1967, Holton 2010). In grounded theory, important concepts emerge during data analysis, rather than from predefined knowledge, as is the case with deductive analysis. Thus, as an analytical approach, it minimizes the influence of the researcher's presumptions about the results. Through the grounded theory approach, the relatively large number of text and first cycle codes that did not fit into any of the MA categories were iteratively

Table 2. MA subcategories of ecosystem services and sample quotes illustrating interviewees' classification.

Category	Subcategory of ES	Sample quote
Provisioning services	Food	"... subsistence for hunters, fishermen, that's what they rely on to get them through the year ..." "... things they can eat, huckleberries, deer, elk, ducks ..."
	Fiber	"... aspects of woods ... how it's used from firewood to commercial stuff ..."
	Biochemicals, natural medicines, and pharmaceuticals	"... we might find some plant out there that is the cure-all of whatever ... we did cancer research ... Taxol ..."
	Ornamental resources	"... probably not a good living but they're gathering pine cones that they resale ..."
	Freshwater	"... We have municipal watersheds floating around, so communities benefit from clean water coming off the forest."
Regulating services	Air quality regulation	"... not to mention the purest air ... you can find ..."
	Climate regulation	"... which some of them are priceless and especially the environmental benefits and carbon sequestration ..."
	Water regulation	"... water storage ... it's a filter for us who live adjacent to the forest ..."
	Water purification and waste treatment	"... the water that comes off the Deschutes for the city of Bend ... the only treatment it has is a little bit of chlorine. So clean water is a big thing that Deschutes provides people in the community ..."
Cultural services	Cultural diversity	"... huge Asian community that comes for the traditional use of harvesting Matsutake on our forest. So it's a cultural, and there's locals that harvest mushrooms and harvest other products ..."
	Spiritual and religious values	"... the things I was saying about spiritual and it's about the connections, your connection with your dog, people get in environment like that, the opportunity to connect more with your own soul and spirit than I think with other people."
	Knowledge systems	"... the whole wild-land interface, the Deschutes became a leader in that." "... there are also places where not a lot of people know about ... they find their special little post and then they go there for years."
	Educational values	"... districts bring kids out to the woods. It's a place for them to learn about the environment, because unless they read it in a book or see it in a film in school their only other link to the National Forest is to go cut fire wood or go camping, and they may not have the connection to process, of what happens on the ground. So the education component ..."
	Inspiration	"... DNF the view is certainly inspirational ... " ... incredible views that can inspire you."
	Aesthetic values	"... the scenic thing, pretty, anywhere you go in Bend you can see the National Forest ... " ... part of the attraction is the beauty of the forest and scenery ..."
	Social relations	"... the mushroom program started, wondering who these people are on our National Forest. So I think the agency had to help create a sense of place, community and relationships, to bring people together to talk about things. The forest acts as this background or stage, if you will, for the actors in all these different social issues."
	Sense of place	"... how we came to the Deschutes, it was just looking for a better place to be, ... the DNF ... hits all of that, ... as a place to work and place to live, without a doubt." "... it just kind of crazy to see that ... I could be in one place but it would bring back memories from so many different places that I have been to."
	Cultural heritage values	"Our wilderness areas are our temples ... " "People get really connected to a place and bring their families there, generation after generation to do that."
	Recreation and ecotourism	"... I think get a lot of rejuvenation from getting out in the forest and experiencing the great scenery that we have around here ..."

grouped and regrouped into emergent themes and categories that reflected the values and benefits participants perceive to get from the DNF.

How Stakeholders Identify and Coconstruct ES

Results suggest that people identify and coconstruct some benefits they receive from the DNF in the same ways and categories as illustrated in the MA. Interviewees also described how they see and understand some benefits by merging or expanding existing MA categories in novel ways. They merged several categories of cultural and provisioning services, and expanded on cultural ES, especially sense of place and recreation, as two important benefits they get from the DNF. Participants even identified new benefits not found in the MA classification

scheme. These findings have implications for the use of the ES concept and the MA classification in managing particular public forests. In the following sections, we present the results, substantiated with quotes from focus group participants, and discuss their implications. You will notice that these quotes are truncated pieces of speech assembled from the various focus group interviews to illustrate specific ES.

Matching MA Categories

Interviewees see and understand, as benefits they get from the DNF, all the subcategories of cultural services present in the MA, all but one of the provisioning services (genetic resources was missing), and only four of eight subcategories of regulating services. The following subcategories of regulating services were not mentioned in any

of the focus group interviews: disease regulation, pest regulation, pollination, and natural hazard regulation (Tables 1 and 2).

The fact that stakeholders identify all and even new categories (see New or Emergent Categories section) of cultural ES and all but one category of provisioning services is a possible indication of the orientation of people's values. However, that stakeholders did not identify genetic resources as a provisioning service, and regulating services such as pollination, and regulation of erosion, pests, and diseases is an even more important finding for managers. Involving forest communities in the identification and classification of the benefits they obtain from a particular forest entails not only understanding and managing for their values, but also identifying the benefits people may not recognize or value. Although the regulating services

are important and valued, some are less obvious to people than the cultural and provisioning services. That is, involving people in the identification of ES also helps identify gaps between expert and community understandings of ES. The failure to mention some regulating services may reflect participants' unawareness of these benefits, difficulty articulating these benefits, or they may simply be taken for granted. This finding has implications for outreach and education programs, in that regulating service benefits need to be specifically articulated to increase peoples' understanding. Education and outreach efforts can then be guided by what the public sees and understands as well as by what they ignore or appear to ascribe less importance to.

Data analysis did not reveal any of the subcategories of supporting services. This is not surprising, given the wording of interview questions focusing on "benefits people obtain from the forest." Supporting services are not understood nor articulated as of any *direct* benefits to people—although they support the other services that directly benefit people (Millennium Ecosystem Assessment 2005). Mindful of the question wordings and the focus of group conversations, the lack of mention of supporting services echoes the community-expert knowledge gap mentioned earlier. Outreach and education programs need to specifically articulate the supporting services to create the understanding that direct human benefits derive from underlying ecosystem processes.

Muddling MA Categories

In addition to the benefits aligned with the MA categories, participants identified and constructed some benefits in ways that merged or more clearly elaborated on the linkages among the MA categories. For example, interviewees saw some provisioning services as too intrinsically tied to cultural services to warrant separate categorization. Data analysis also revealed more elaborate descriptions of the sense of place and the recreation subcategories of the MA, which were two especially important cultural services identified by participants. In the following sections, we present and illustrate with quotes the intermingled provisioning and cultural services, and the elaborated subcategories of the sense of place and recreation benefits people obtain from the Deschutes.

Merging Some Cultural and Provisioning Services. Interviewees identified the social arrangements and experiences within which some provisioning services are obtained as cultural benefits. For example, in reference to Christmas tree harvesting, a provisioning service, participants mentioned:

You end up being really happy with your \$5.00, perhaps really scrawny tree. I mean it's not sort of fully flushed out but it's neat, 'cause you went out and cut it down as a family expedition.

Similarly, other participants reiterated the cultural essence of mushroom harvesting:

... mushroom gather, and I know it is definitely a big component, and even though I know it is [considered] a product today, I have been doing it for over 30-plus years as a family event ...

Accordingly, it is not only about provisioning services, it is also about opportunities for family to convene and interact. As emphasized by the Christmas tree harvester, the associated cultural service of "family expedition" is valued as much as, if not more than, the quality of the Christmas tree. Thus, involving people in public forest management via the ES approach may orient management practices more toward facilitating appropriate social experiences associated with some provisioning services than on silvicultural practices to enhance the aesthetic properties of such services. This social construction that blends provisioning and cultural services into a single package of benefits fortifies the view that public perceptions and understandings of ES is "very important" and "separate" from ecological-economic and other understandings of ES (Costanza 2008).

Sense of Place. Interviewees revealed a much more elaborate definition and classification of the sense of place they obtain from the DNF. The DNF attracts people to the area around the forest, keeps them attached to this area, and they feel rewarded by living in this area. Place attraction, place attachment, and place reward are the three distinct subcategories of how people value the senses of place associated with the DNF. The following three quotes illustrate the subcategories of place attraction, attachment, and reward, respectively:

I'd say the main reason people even come to this area is the DNF. ... part of the attraction is the beauty of the forest and scenery ...

It's a more relaxed serene place to, quality of life, I'd say, than other environments that we could live in.

... lot of us are aware of how lucky we are for living in such a beautiful place ... uh, promotes a sense of community and ownership of the land ...

Health and/or Healing Benefits. Although the MA indicates feeling well and being strong as one of the overall benefits of ES, it says very little about the direct physical and mental or psychological health benefits of ecosystems. Interviews revealed a wide range of physical, psychological, and/or mental health benefits obtained from DNF. People actively seek to spend time in the forest to acquire physical health benefits and therapy for mental and psychological strains, such as emotional and nature-deficit distresses, resulting from the social and cultural contexts of everyday life. The DNF is, thus, valued as a place for regenerative and recuperative mental health, especially for "troubled" children. The following quotes illustrate some of these benefits:

... about emotional wellbeing, nature deficit disorder, we actually have an important role of linking our community with the forest.

... kids have carpal tunnel syndrome because of texting and video gaming endlessly. ... this [is a] very important place for kids to be, to directly experience life.

a lot of groups of kids are taken to the forest to do different things and lots of times troubled kids benefit greatly from that, it's healthy. ... there are a lot of great mental and physical health benefits from [the] forest too.

there is the mental flossing, if you will, that occurs, just cleaning out the cobwebs of what we deal with day-to-day, clean out the cobwebs and enjoy it and just let your mind wander, that's a refreshing thing ...

... people seeking adventure, thrill and risk, to feel alive and energized ... do that on the National Forest ... people must have connection to nature and if they don't then things go bad really fast ...

The first and last quotes not only reflect the value of these benefits but also how necessary they are for the normal functioning of individuals and consequently their immediate community/society. That the presence of vegetation helps with mental health issues related to various forms of attention deficiencies, crime and violent behaviors, and the serious threat it poses to society, especially among the youth, is well known (e.g., Taylor et al. 2001, Louv 2008). The DNF, therefore, provides a place where people can connect directly with nature and, by so do-

ing, acquire physical, psychological, and mental health benefits.

Self-Identity, Self-Expression, and Empowerment. Interviewees value the DNF as a place to freely express themselves and their identities, exercise independence and freedom, and play creatively. The following quotes speak to the vast array of values related to self-expression and empowerment:

... out on the National Forests and so it gives them a sense of identity, a sense of self. It defines who you are ...

Being able to make the living that they want ... going out and cutting poles ... that sense of independence and living their life the way they want ... even if they get in trouble with the Forest Service now and then (laughter) if they can get away with it, by God I am going to do it.

... go someplace where they can wear what they want and be obnoxious and go fast or be quiet, whatever they seek ... you do things that you might not really want to do like jump in really cold water but then you do it and it's really fun ... the kids love that you did it ... you get to be a kid again in some ways ...

These might all be considered extensions of the MA recreation category. Interviewees also valued a wide variety of subcategories of benefits associated with recreation that clearly expand the benefits attributed to recreation and leisure pursuits but are not well elaborated within the MA classification. These benefits include, physical health; introspection; nature bonding; peace and tranquility; adventure, risk, and thrills; social bonding; escape and solitude; and many others. Although these benefits are not articulated in the MA, they have been extensively explored in recreation benefits-based management research literature pioneered by Driver (1977) and his colleagues. Investigating complimentary aspects of these two strands of literature is important for future research and applications of the ES framework in forest management.

New or Emergent Categories

New subcategories of ES, not found in the MA, also emerged from the focus group conversations. We deductively (based on existing definitions of cultural and regulating services) place these new subcategories under the MA categories of cultural and regulating services, but they include unique elements not currently well described or captured by existing definitions.

Volunteering and Stewardship. Interviewees identified volunteering for various activities within and tied to the forest as

a vehicle through which they obtain a wide variety of personal and social benefits. Some of these benefits include acting on normative pressures to "give back" to place and nature, community bonding and improved quality of life, more intense connection with nature, and initiating and sustaining other positive environmentally significant behaviors (general environmental stewardship). A variety of ecological benefits, resulting from volunteering, such as erosion regulation via trail maintenance, and reducing/controlling the spread of invasive species were also valued by interviewees. The following quotes illustrate the range of values people attribute to volunteering for various activities associated with the DNF:

... volunteering on trails, I wanted to give back to the trails that I always knew ... having to contribute to the place ... there's a sense of belonging there ... that's intangible that's very hard to get at, and it comes from the volunteering ...

... volunteering ... it's almost like a sense of fulfilling your duty ... it's part of your obligation as an American citizen to take care of these lands that we all have a part of ... our volunteers can get involved in something that they really believe in that demonstrates their values toward the land.

... that does build bonds within the community, off the trail as well ... adds to my quality of life, at least the community aspect ... volunteering is part of that root ...

... one of the key benefits of volunteering for me, is just being on the land ... I write checks to lots of organizations ... but nothing brings it home like being on the land with your face down three inches ... hacking the dust that just blew up in your face. You never get a connection like that when just hiking a trail ... volunteering helps me in my relationship with the land.

... people will say, this place is clean, I guess we can carry an empty beer can home in our car ... so they take it ... that's another benefit of the volunteering is it sort of spreads and what you do starts to propagate ... I think that's great.

... for me, pulling weeds, turning around and seeing an area that was full of Mullen or spotted knapweed, at least for the moment, it's clear of it. I'll get little buggers that come up, and that's okay ...

The volunteering category of benefit illustrates the very complex and interlinked nature of ES. Like recreation, volunteering provides cultural benefits such as intense nature bonding, community building, sense of place, and fulfilling perceived sense of duty to nature. However, volunteering also enhances ecological processes such as control of erosion and invasive species, which are ultimately useful in assuring other ES. The

volunteering category of services also illuminates some expert-community differences in how ES are understood and, therefore, how they are managed. Although the DNF staff largely thinks of volunteering as helping to improve forest conditions, volunteers see it as a route through which they obtain a variety of personal and social benefits.

Home: Affordable Housing. The forest serving as home both for the temporarily and for the permanently homeless was identified as a benefit people get from the DNF. Interviewees mentioned that

... I wonder if law enforcement could answer this better, but ... a lot of homeless people go to fringe of the forest and ... find a little corner and I know some of it is on forestland ... absolutely, we have a lot of it, residents ... Affordable housing.

When I first moved out here, still looking for a job ... (I) lived out in the forest for a while ... cheaper and wonderful experience ...

The forest as a home for the homeless is somewhat of a predicament for public forest management and further illustrates the manager-community divide in the perception and understanding of some ES. The first quote, which came from a DNF staff member, indicates perceived illegality of residing in the forest. The second quote, from a community member, appreciates the DNF serving as affordable and enjoyable temporary housing and seems to completely contrast the content of the first quote. Although some interviewees expressed anticipated discomforts with encountering a "real homeless" person in the forest, others expressed the wonderful experience of having the forest as a cheaper temporary residence. Quite understandably, the first quote hints at a trade-off between providing a home for the homeless and eliminating anticipated discomforts of other forest users. However, the second quote suggests that not all forest dwellers are "real homeless" people. Diverse arrays of people use the forest as residence, which may suggest revisiting assumptions and management practices and adopting a rather more multiple-use approach to managing this particular benefit. Additionally, respondents associated "real" homelessness with mental or psychological malfunctions. However, participants also identified the forest as a source of mental and spiritual healing. It is therefore not surprising that "real homeless" people drift toward the DNF where some "mental flossing" and "cleaning of mental cobwebs" occurs. Thus, the DNF may not only provide a home for

the “real homeless,” it may be performing a much needed psychotherapeutic function.

Regulation of Urban Sprawl. Focus group interviews revealed that forest ecosystems also regulate socioeconomic and developmental processes such as urban sprawl. According to interviewees,

... a simple practical matter of there is a boundary that you can't build on so it would force Bend to grow in certain ways, for land use issues you can't grow that way ... they have to develop an urban growth boundary that can accommodate it and there's always a lot of contention over where it is to be, we just had it here in Bend ... and all it does is allow for a more orderly development ...

The urban sprawl regulating role of the DNF expands existing definitions of regulating services beyond its emphasis on the regulation of ecological processes to include regulation of social processes. Migration to communities within the Deschutes area is often driven by the relatively small size of these communities, the beauty of surrounding natural landscapes, and ready access to recreation opportunities. This sprawl regulating service suggests that the very existence and administrative character of the DNF provides an ES by regulating the manner and extent to which these elements of the place can be altered. The DNF performs a self-regulatory function by attracting people to the area but also mediating urban growth, which somewhat ensures the continuous availability of other benefits. Urban growth regulation and the continuous presence of the forest also reduces run-off and consequently improves water quality and increases groundwater recharge. Thus, involving people in the coidentification and construction of ES results in a more comprehensive conceptualization of ecosystems as social–ecological systems wherein the mutually interactive benefits of regulating both ecological and social processes become more salient.

Conclusion

The results show that involving people in place-specific and collective identification of ES may promote better understanding of the MA classification scheme vis-a-vis the values and benefits held by forest users. The three dimensions of place attraction, attachment, and rewards typify the in-depth and place-specific articulation of the sense of place benefit outlined in the MA. Most importantly, interviews revealed that the MA does not encompass all the benefits that peo-

ple of a particular place might obtain from a given ecosystem. Benefits such as volunteering and stewardship, temporary affordable residence, and regulation of urban sprawl are completely absent in the MA. Relying on the MA classification scheme alone would have led managers to omit some aspects of what people of the Deschutes NF region perceive as important benefits. These findings support arguments that the MA classification scheme is a work in progress and that multiple classifications of ES that are context specific and purpose oriented are needed (Carpenter et al. 2006, Costanza 2008, Fisher and Turner 2008).

The fact that certain categories of ES are less salient or completely absent in the thinking and expressions of nonexperts who value their involvement in the management of these resources is critical. Small group conversations not only help us understand how stakeholders see and understand ES, but also allow us to identify gaps in understanding, thereby informing, as well, possible outreach and education efforts. For example, when thinking about human benefits, only four of nine subcategories of regulating services and no supporting services were mentioned. Education and outreach efforts could clarify the link between the underlying supporting services and the more direct human benefits of the forest that are reflected more commonly in provisioning and cultural services.

Our findings revealed that people of a particular place view and understand ES in ways and categories that do not necessarily mirror those of the MA. The ES approach entails valuing the benefits people get from ecosystems and determining and managing for the ecological processes and functions needed to deliver those benefits (Collins 2007). In addition to these ecological processes and functions, our findings identified social processes and functions that could be considered in management practices. According to these findings, attention to social processes surrounding the collection and harvesting of culturally important provisioning services, such as Christmas Trees and mushrooms, could help meet the cultural needs and values of people within the DNF.

The findings also illustrate how understanding and managing for cultural services can provide benefits for regulating, supporting, and provisioning services. For example, volunteer activities, which are not directly elucidated in the MA list of ES, provide so-

cial and community benefits, but also result in erosion control, invasive species removal, watershed and habitat restoration, and many others. Although volunteering might be considered one of many subelements within a broad cultural service category, its importance for both residents and for forest management and education goals suggests it should be highlighted as a separate category in a place-based ES framework for the DNF. As illustrated earlier, a wide array of benefits are obtained through volunteering.

Focus groups have been used to assess stakeholder needs in various management contexts including the assessment of recreation needs (Knap and Propst 2001). In the DNF, it also proves to be a useful tool in involving forest community members in the identification and categorization of the benefits obtained from a forest. This approach is known to result in richer data sets and more elaborate understanding of the complexity of social reality than quantitative methods (Gobster 1998). It would have been difficult for us to associate harvesting of Christmas trees and mushrooms with cultural services and to include those as such in a survey questionnaire assessing the benefits people get from a forest. Even if volunteering were mentioned as a benefit in a survey, there will be little opportunity to ask for explanations. Similarly, although the DNF staff thinks of volunteers as helping with forest management, the volunteers think of volunteering as beneficial to them in a wide variety of ways, which we believe can help inform the way DNF managers recruit volunteers and organize and manage volunteering events. For example, in addition to framing recruitment efforts around soliciting help with forest projects, managers could also emphasize the personal and social benefits obtained through volunteering. Thus, focus groups also help bridge differences in the understanding of benefits between managers and other stakeholders.

Although our findings suggest that the MA classification alone may not be adequate for managing particular forests using the ES approach, the MA classification scheme provides a useful guide to orient place-specific and purpose-oriented assessments. Because of place-specific differences, our results are only illustrative for the management of other forests. However, the focus group approach is easily replicable in other forest settings and other practitioners can adapt it to their own areas. Our findings suggest attention to place-specific and purpose-oriented

assessments involving people of particular places providing richer understandings and improving management efforts to apply the ES approach to public forest management. Unlike other methods of social assessment such as surveys, the personal nature of small group conversations enhanced favorable community attitudes toward management. Participants expressed appreciation that the DNF management “cared enough” about them and what they value of the forest to include them in such conversations.

One limitation of the place-specific group approach, specifically for national forests, is that national forests have a national constituency. National forests are, in theory, managed for the interests of all Americans, not just those living in the immediate vicinity. Although the views of nearby residents are important, other stakeholders from other areas may have additional or even conflicting perspectives on the ES provided by DNF. We recommend follow-up studies to explore how people from other areas (farther away) understand and value the benefits provided by DNF. Additionally, and despite delving deep into the identification and co-construction of ES, we know very little about how prevalent the perception of these benefits is or their relative importance, among the communities at large within the DNF. A follow-up survey would shed more

light on issues of prevalence and the prioritization of these benefits.

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