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Contributed Paper

A Protocol for eliciting nonmaterial values through a cultural ecosystem services frame

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Abstract: _Stakeholders' nonmaterial desires, needs, and values often critically influence the success of conservation projects. These considerations are challenging to articulate and characterize, resulting in their limited uptake in management and policy. We devised an interview protocol designed to enhance understanding of cultural ecosystem services (CES). The protocol begins with discussion of ecosystem-related activities (e.g., recreation, hunting) and management and then addresses CES, prompting for values encompassing concepts identified in the Millennium Ecosystem Assessment (2005) and explored in other CES research. We piloted the protocol in Hawaii and British Columbia. In each location, we interviewed 30 individuals from diverse backgrounds. We analyzed results from the 2 locations to determine the effectiveness of the interview protocol in elucidating nonmaterial values. The qualitative and spatial components of the protocol helped characterize cultural, social, and ethical values associated with ecosystems in multiple ways. Maps and situational, or vignette-like, questions helped respondents articulate difficult-to-discuss values. Open-ended prompts allowed respondents to express a diversity of ecosystem-related values and proved sufficiently flexible for interviewees to communicate values for which the protocol did not explicitly probe. Finally, the results suggest that certain values, those mentioned frequently throughout the interview, are particularly salient for particular populations. The protocol can provide efficient, contextual, and place-based data on the importance of particular ecosystem attributes for human well-being. Qualitative data are complementary to quantitative and spatial assessments in the comprehensive representation of people's values pertaining to ecosystems, and this protocol may assist in incorporating values frequently overlooked in decision making processes._

Keywords: British Columbia, deliberative decision making, environmental management, environmental values, Hawaii, social–ecological systems, social science

Un Protocolo para Obtener Valores No Materiales por medio de un Marco de Servicios Ambientales Culturales

Resumen: _Los deseos, necesidades y valores no materiales de los accionistas influyen frecuentemente sobre el éxito de los proyectos de conservación. Estas consideraciones son difíciles de articular y caracterizar, lo que resulta en entendimiento limitado en el manejo y la política. Concebimos un protocolo de entrevista diseñado para mejorar el entendimiento de los servicios ambientales culturales (SAC). El protocolo inicia con la discusión de actividades relacionadas con ecosistemas (p. ej.: recreación, cacería) y manejo; después señala a los SAC, dando pie a los valores que encierran conceptos identificados en la Evaluación Ambiental_

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del Milenio (2005) y explorado en otras investigaciones sobre SAC. Hicimos pruebas piloto del protocolo en Hawái y Columbia Británica. En cada localidad entrevistamos a 30 individuos de diversos entornos. Analizamos los resultados de las dos localidades para determinar la efectividad del protocolo de entrevista en la obtención de valores no materiales. Los componentes cualitativos y espaciales del protocolo nos ayudaron a caracterizar los valores culturales, sociales y éticos asociados con el ecosistema de múltiples maneras. Los mapas y las preguntas de situación, o de tipo viñeta, ayudaron a los encuestados a articular valores difíciles de discutir. Las preguntas abiertas permitieron a los encuestados expresar una diversidad de valores ambientales y demostraron ser suficientemente flexibles para que los encuestados comunicaran valores que el protocolo no buscaba explícitamente. Finalmente, los resultados sugieren que ciertos valores, aquellos mencionados frecuentemente en la entrevista, son particularmente prominentes para poblaciones particulares. El protocolo puede proporcionar datos eficientes, contextuales y basados en lugar sobre la importancia de atributos ambientales particulares para el bienestar humano. Los datos cualitativos son complementarios para las evaluaciones cuantitativas y espaciales en la representación comprensiva de los valores de los valores que pertenecen a los ecosistemas. Este protocolo puede ayudar a incorporar valores frecuentemente ignorados en el proceso de toma de decisiones.

Palabras Clave: ciencia social, Columbia Británica, Hawái, manejo ambiental, sistemas socio-ecológicos, toma de decisiones deliberativas, valores ambientales

Introduction

For centuries, people—from philosophers to engineers—have tried to characterize the complex, dynamic relationships between human beings and ecosystems (Schama 1995; Berkes 2004). Many dimensions of these relationships, particularly human preferences and values, are nonmaterial and accordingly difficult to characterize for management (Satterfield et al. 2013). We tested a protocol designed to elicit nonmaterial values and concerns associated with ecosystems and their management to inform decision making. Our goal was to share the benefits and challenges of using such a protocol.

We framed this effort through the lens of ecosystem services (ES), a concept for representing the ways in which ecosystems contribute to human well-being. Research and practice involving universities (Guerry et al. 2012), governments (EPA Science Advisory Board 2009), nongovernmental organizations (Tallis et al. 2010), and corporations (Tercek & Adams 2013) attest to the growing influence of ES in environmental management. As the ES framework becomes increasingly influential, however, a gap persists: how to incorporate social and cultural benefits—such as spiritual importance, cultural heritage, and psychological well-being—in ES research and practice (Chan et al. 2011; Church et al. 2011; Daniel et al. 2012). Such benefits, also described as the nonmaterial benefits people derive from ecosystems, are identified in ES frameworks as cultural ecosystem services (CES) (Millennium Ecosystem Assessment 2005).

Processes for integrating CES into decision making remain ambiguous (Church et al. 2011) and can be contentious (Chan et al. 2012b). Yet failure to incorporate these concerns can lead to project failures due to inattention to critical social impacts or dynamics, or exclusion of key stakeholders. One of many examples occurred in the Guadalupe-Nipomo Dunes Preserve in California, which The Nature Conservancy (TNC) created in 1992 without consulting neighbors. Those residents protested by vandalizing the entrance structure, among other actions. A series of open public meetings allowed TNC to understand and respond to residents' deep connections to the place, leading to a more harmonious relationship in the end (Wondolleck & Yaffee 2000).

Despite widespread agreement on the importance of nonmaterial concerns, many scholars see classifying and assessing CES as problematic for numerous reasons (Satterfield et al. 2013), including difficulties in articulation, representation of varied perspectives, and potential incommensurability of values (see Satz et al. [2013] for a systematic treatment). A further challenge in applying an ES frame to nonmaterial values is that the relevant methods and epistemological frames often differ dramatically from those used to classify and quantify biophysical ES (e.g., water purification, climate stabilization), which strongly shaped this field. These differences do not, however, obstruct all analysis; rather, they suggest a problem of method and call for analytical techniques uncommon in environmental management (Tengberg et al. 2012; Satterfield et al. 2013). There are many places to look for these techniques. Without using the CES label, scholars have studied nonmaterial aspects of human–ecosystem relationships through a variety of methods, theories, and epistemological approaches. Russell et al. (2013), Daniel et al. (2012), and Bratman et al. (2012), for example, review subsets of this work, with particular attention to the benefits provided by nature.

Building on this foundation, CES research has employed diverse approaches. Many studies have focused on spatial representation of aesthetics, tourism, and recreation, in part because they are well-suited to measurement and quantitative analysis (Norton et al. 2012). Other studies spatially represent a larger set of CES (Klain & Chan 2012; Plieninger et al. 2013). Some of these studies use established valuation techniques (e.g., travel cost method) to estimate the monetary value of CES

(Martin-Lopez et al. 2009; van Berkel & Verburg 2012). Recent work on CES has expanded the suite of techniques to include large-scale, face-to-face surveys (Martín-López et al. 2012) and qualitative and observational approaches (Natural England 2009; Tengberg et al. 2012). Our approach resembles these latter examples and combines 3 characteristics not typically found together (see Natural England 2009): attention to a range of values; a focus on CES, while not excluding other ES; and open-ended, discursive data collection techniques. To those ends, we incorporated elements of anthropological methods such as qualitative inquiry (Maxwell 2005), narrative expressions (Satterfield & Slovic 2004), modified grounded theory (Glaser 1992), and participatory and collaborative methods (Beebe 2001; Lassiter 2005).

Although the ES framework is often (and erroneously) associated solely with monetization of nature's services (Spash 2008), our aim was to enable respondents to describe—and researchers to better understand respondents' conceptualizations of—their relationships with ecosystems in their own words, absent monetary valuation. This feature of our protocol partly addresses some scholars' and practitioners' hesitations regarding efforts to quantify (and otherwise parse) values of nature (Norton & Noonan 2007; Spash 2008). Although the ES framework, which seeks to characterize the ways in which ecosystems benefit people (Millennium Ecosystem Assessment 2005), does not de facto include monetization, it does imply a provider–recipient relationship that omits certain human–ecosystem interactions. Thus, we did not use the language of ES in our interviews; instead, we used a systematic open-ended protocol to discuss ecosystem-related values as interviewees conceived of them (Beebe 2001) rather than strictly in terms of provider–recipient relationships (Spash 2008).

Qualitative data—generally intended to explain, rather than predict, phenomena—can play important roles in decision-making processes such as those we aim to inform (van Woerden et al. 2008). Qualitative data collection techniques can provide access to information largely inaccessible through more quantitative approaches (Maxwell 2005). In the case of conservation, these data include rich insight into local perspectives and knowledge, which are increasingly emphasized in conservation planning (Berkes 2004). To maximize this benefit, we designed the protocol to achieve 4 objectives common in qualitative inquiry: elicit a diversity of values and benefits; enable creative and expansive thought (i.e., encourage disobedience to questions); allow detection of prevalence or prominence of particular values and benefits; and help people articulate, and researchers understand, values that can be difficult to express.

We used 2 parallel but distinct case studies (Gould et al. 2014; Klain et al. 2014) to examine if and how the protocol met these objectives. Our intent was not to characterize differences between sites, but to examine the performance of the protocol in distinct contexts.

Methods

Case Studies

We piloted this protocol in British Columbia and Hawaii (Gould et al. 2014; Klain et al. 2014). See Supporting Information and Table 1 for study site characteristics. These pilot sites offered desirable diversity across focal ecosystems, decision contexts, and participant pools. Local decision contexts informed study details (e.g., dimensions used for participant selection).

Interview Protocol

We developed the interview protocol based on theory combined with discussions with an interdisciplinary working group on CES. The group included land managers, philosophers, economists, policy scholars, interdisciplinary social scientists, and ecologists. We designed the protocol to fit into a larger framework of engagement for integrating cultural and social issues into ES analyses (Chan et al. 2012*b*).

The protocol (Supporting Information) included questions designed to be adaptable to different contexts. After initial discussion concerning ecosystem-related activities (e.g., recreation, hunting, collecting) and management, we asked about types of CES, including prompting for values encompassing concepts identified in the Millennium Ecosystem Assessment (2005) and explored in other CES research (Chan et al. 2012*a*): place and heritage, nonphysical values associated with activities (i.e., recreation), spirituality, education, identity, intergenerational, artistic and ceremonial value. Because an important consideration for our qualitative approach was allowing people to express values in ways relevant to their experience, we designed prompts to remain broad while cueing respondents to discuss particular issues. Prompts were conversational and did not contain jargon (Table 2). Researchers asked the same primary questions of all interviewees and followed up with tailored probes (Patton 2002).

The interview included a set of narrative-style questions similar to vignettes in sociological research (Bloor & Wood 2006). In these situational questions, we asked respondents to consider how they would behave in a particular circumstance (Satterfield 2001). The questions we asked followed a common template: "Let's say you want [a physical item from the ecosystem] for a certain occasion. Suppose you had a choice: to [collect the item yourself] or go to a store to buy it. Which would you chose? Why would you make that choice?" (The specific content used for each site, to replace bracketed phrases, is in Fig. 1.) Interviews, which lasted from 1 to 4 hours, also included a mapping component in which interviewees spatially denoted and weighted the importance of CES-associated areas. Because we analyzed mapping data differently than verbal responses and due to space

Table 1. Key characteristics of study sites in British Columbia and Hawaii, where the interview protocol designed to enhance understanding of cultural ecosystem services was tested.

Characteristic of study site	Regional District of Mount Waddington (RDMW), British Columbia, Canada	Southern portion of Kona, Hawaii, U.S.A.
Research partners	University of British Columbia; regional district government; Living Oceans Society	Stanford University; Kamehameha Schools
Size of study area	$\sim$9,880 km^2 (beaches, nearshore, and marine environment)	$\sim$3,200 km^2 (coast to the peak of Mauna Loa volcano, 4169 m.)
Population of study area	11,651	21,640
Number of interviewees	30 individuals	30 individuals
Interviewee selection procedure	stratified purposeful—local professionals whose jobs rely on the marine environment	stratified purposeful—local residents with a diversity of relationships to forest
Ethnic composition of study area (ethnic composition of study sample in parentheses)	white: 73.5% (93% in interview sample); first nation: 23.4% (7% in interview sample); other visible minorities: 3.1% (0% in interview sample)[a]	white: 46% (47% in interview sample); part native Hawaiian: 25% (43% in interview sample); Asian: 19% (3% in interview sample); American Indian: 1.5% (3% in interview sample); other mixed ethnicity: 8.5% (3% in interview sample)[b]
Top four employment sectors in region (employment sector for interview sample in parentheses)	agriculture, forestry, fishing and hunting: 13.5% (33% in interview sample); retail trade: 12.5% (0% in interview sample); accommodation and food services: 10.6% (30.5% in interview sample); construction: 10.4% (0% in interview sample)	education, health care, social assistance: 17.9% (20% in interview sample); construction: 15% (13% in interview sample); arts, entertainment, recreation, accommodation, food services: 13.6% (20% in interview sample); retail trade: 12.3% (10% in interview sample)[c]
Focal habitat types	coastal and marine	forest
Accessibility of ecosystems	most only accessible by boat; public road access to select beaches	upland areas (i.e., forested areas) mostly privately owned; access heavily restricted beaches are public
Decision context	regional marine spatial planning	restoration action and land-use decision making (public and private)
Spatial reference for interviews	compilation of nautical charts	color-coded vegetation, roads, and ahupuaa (traditional land division) boundaries

[a]*Source: BCStats. Regional District 43—Mount Waddington, Statistical Profile. Columbia, Provincial Government of British Columbia: Victoria, B.C. 2011.*
[b]*Source: U.S. Census Bureau. Census 2000 Summary File 1. 2010.*
[c]*Source: U.S. Census Bureau. 2006–2010 American Community Survey. 2011.*

constraints, we do not address maps here. (See Klain & Chan [2012] for details on analysis and results of mapping data.)

This study involved an iterative process for protocol development. The protocol was revised repeatedly, first following pilot interviews in each site. In accordance with an exploratory and place-based approach, we modified the protocol in the early stages of interviews. That is, we used reactions to the protocol from target group members to refine the language and approach used. This iterative approach is common in the social constructivist epistemological framework underlying this study (Denzin & Lincoln 2000).

At both sites we used a stratified, purposeful interviewee selection procedure, selecting respondents to provide representation across relevant categories (Patton 2002). We sought respondents with a variety of backgrounds to help understand whether and how values might vary among the population. We determined attributes for participant selection (Table 1) in each site through pilot work, including discussions with people knowledgeable about the decision context. In Hawaii, the primary dimension for selecting interviewees was their apparent relationship with forest. The secondary dimension was ethnicity because our pilot work suggested that Native Hawaiians tend to have unique relationships with Hawaii's ecosystems. In British Columbia, we selected interviewees whose livelihoods linked directly to the marine environment in diverse ways. We included 2 members of the Kwakwaka'wakw First Nation.

Interviews at times covered sensitive topics due to interviewees' interpretations of or expansions on prompts.

Table 2. Prompts inquiring after cultural ecosystem services.

Cultural ecosystem service	Prompt
Place value	"Are there places in the forest that are especially important to you, but not because of anything physical you gain from them?"
Heritage	"Are there places that remind you of important past events that are important to you and your community?"
Identity	"Identity is the ideas, relationships, and sense of belonging that help shape who we are – who or where we belong to, the community we are a part of and so on. In this sense, you could even say that identity is tied to physical spaces and/or the things people do within those places. Are there places that are important to your sense of identity?"
Nonphysical value of activities	"Now, let's talk about the non-physical qualities or experiences derived from doing a physical activity involving the forests. Now, some of the tangible, concrete benefits from these activities include food, income, and physical stamina. But there might be additional benefits over and above those physical things. Are there other things that you think benefit you or come to you as part of these physical activities you do in the forest or ocean, things that are important but not just about what you physically receive?"
Spirituality	"Spiritual value of a place is difficult to define, but generally captures places that are powerful because they inspire you to be aware of forces or entities larger than yourself. This can be the basis for both negative and positive feelings, including things like awe, reverence, humility, and even fear. I know this is a personal question, but if you feel comfortable and would like to, can you speak about experiences of this kind that might be associated with this area?"
Artistic inspiration	"Has a place ever provided you with ideas or images that you think could or do inspire art or some other visual or creative form?"
Ceremony	"Now, what about ceremony? Do you consider any ceremony to be associated with this place?"
Education	"Have you ever had the experience of a place(s)—or time in the forest or in or on the water—teaching you things?"
Bequest/intergenerational	"Are there particular experiences associated with the forests that you hope your kids or kids in your community will experience?"

Researchers' reactions to these topics were informed by extensive preparation on each site's historical and current social–ecological context. This preparation, for which we used historical and current sources (academic sources, media reports, in-person discussion, and observation), provided researchers with awareness of site-relevant issues. That awareness aided researchers in feeling and expressing empathy toward the diverse, and at times even contradictory, concerns of respondents.

The sample size of 30 in each site balanced in-depth interaction and breadth of coverage with time and resource constraints. In qualitative inquiry, the goal of interviewing until each additional interview largely repeats concepts addressed in previous interviews is often reached between 20 and 30 interviews (Maxwell 2005); we found this to be true in our interviews. However, our samples were not large enough or designed in such a way as to allow us to draw conclusions about subgroups or differences between subgroups. Rather, our samples provided overviews of the diversity of perspectives within places and nuanced insight into the complex phenomena underlying CES.

We analyzed data through a qualitative coding process that combined selective and open coding (Maxwell 2005). Selective coding involves combing data (interview transcripts) for mentions of predetermined themes. In our case these were target CES topics (e.g., spirituality). Open coding entails approaching the data with openness to emerging themes and patterns and is a primary analysis method for grounded theory (Glaser 1992). Supporting Information shows how themes were extracted from respondents' comments. We used Excel (Microsoft Corporation) and the qualitative software NVivo (QSR International) for data analysis. Our testing of 2 techniques for coding demonstrated that data collected via our protocol could be analyzed using widely available spreadsheet programs or specialized software. See Supporting Information for details on coding processes.

Site-specific decisions regarding study steps mentioned above (background preparation, interviewee selection, tailored prompt content, etc.) should be made based on engagement with study communities and appropriate textbooks or manuals addressing these issues (e.g., Patton 2002).

Question: Let's say you want [salmon] [a *lei maile*] for a certain occasion. Suppose that you had a choice: to [go fishing and catch the salmon] [go to the forest to pick the *maile*], or to buy it in a store. Which would you chose? Why would you make that choice? What is lost and what is gained?

Hawaii: *lei maile* prompt

"... if you're collecting it from Hawaii in your home region, it's ... part of that land that supports and sustains you; it's truly representative of your home, and why else do you give it? You know, when you make a lei, you make it either to commemorate a visit to a place or because you're from a place and you're bestowing something of you to whomever you're bestowing it upon."

"[A collected lei would be more] appropriate. Special. Connected to the place. Connected to you. Especially if you also have a connection to that place. ... It provides me with another connection to the forest. With a reason to visit, and to ... be and spend time there. But I think that just being in the forest, in some place that I have a connection to, contributes to my well-being, even if I wasn't gathering anything."

"[Collecting in the forest] changes [people] ... it awakens something in them and ... the process of learning and listening from [elders]. It's very important to keeping us together as 'ohana, as a people. ... going and continuing the practices ... caring and not being selfish, not being greedy and saying, 'Oh, I wanted a ten-strand lei.' You know what, not today; and instilling those lessons."

Values and Benefits

- Identity
- Connection to place
- Dynamic practices
- Ethics
- Social capital
- Value of in-ecosystem experience
- Intergenerational

BC: Salmon prompt

"The spiritual, the sense of identity and connectedness, and education ... knowing where my fish comes from - that I don't catch them myself, but have the world's best neighbor who grunts and hands me a plate of salmon - it's about the most magical thing I can imagine to actually know where my fish comes, where my food comes from, and realizing how exceptional that is in today's world - to know that we directly benefit from the bounty of these resources around us ...The fish came from here, unlike an urban center ... you can't treat nature as if it's somewhere else."

"What's lost is the whole experience of ... feeling refreshed and relaxed and fascinated by the whole process of being out there and trying to catch a fish and find the right spot and when you buy it in the market you don't know what that place smelled like or felt like, its just a piece of food. You don't get the inner peace and exercise and fresh air."
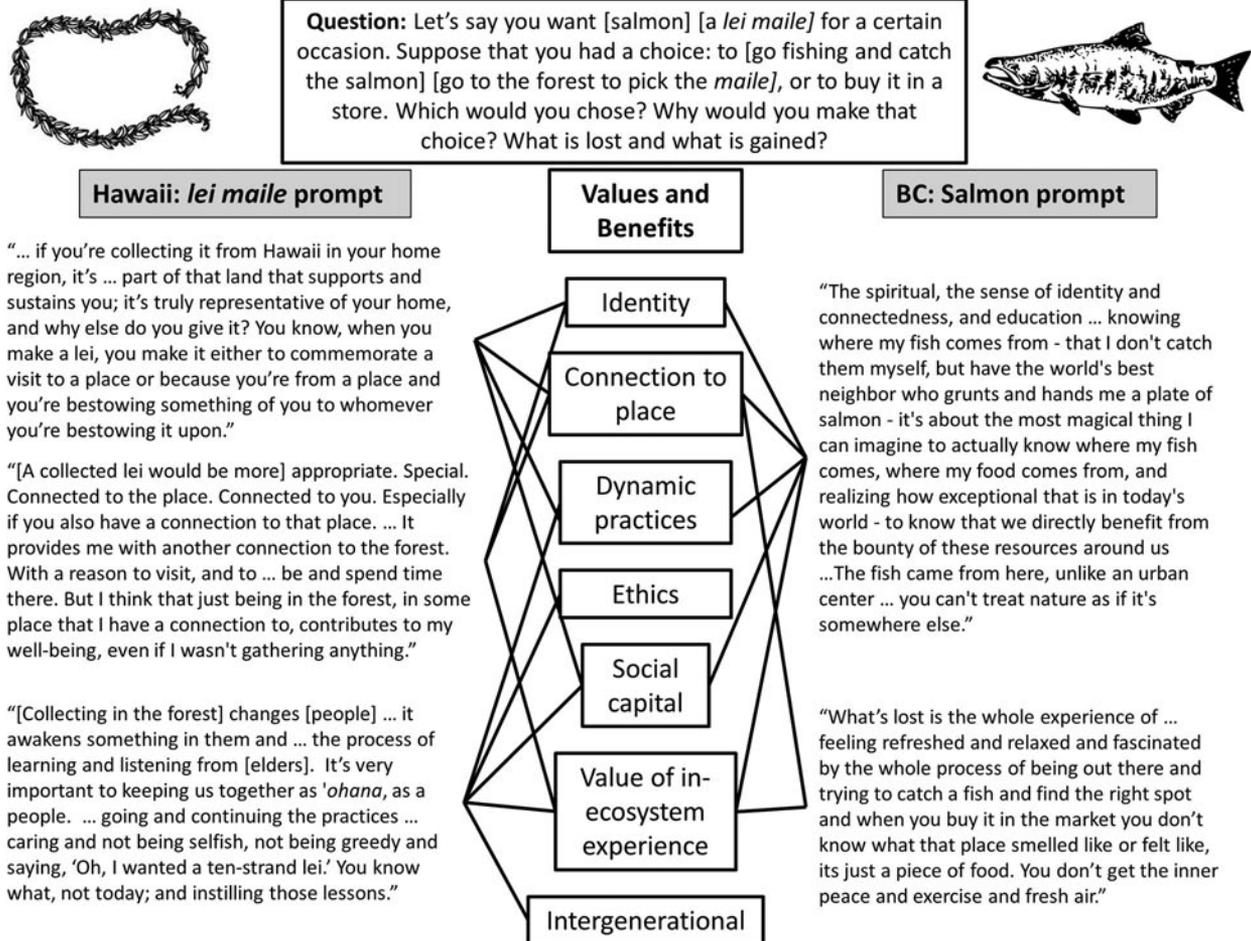
Figure 1. Sample responses to situational prompt and how they relate to values and benefits that people associate with ecosystems. This situational prompt, separating the physical ecosystem services from the experience of collecting or harvesting, aided respondents in articulating nonmaterial values.

Results

Benefits of Protocol for Value Articulation

Interview results suggested that articulating CES concepts is challenging for 2 reasons. Some respondents said they had not fully conceptualized CES benefits prior to their interviews, and others discussed the difficulty of putting CES concepts into words. In Hawaii, for example, over half of respondents mentioned the difficulty of expressing these concepts. One respondent replied to the question about personally important places with: "That's a hard, hard question, I think, just to put into words. Because – because I guess . . . " Despite initial difficulty, this respondent continued to explain her experience of the value in question. Similarly, the majority of respondents struggled with articulation but subsequently shared profound experiences, benefits, and values.

Physical maps of the study areas served as centerpieces for the interviews. Beginning the interview with discussion and mapping of respondents' ecosystem-related activities stimulated thoughts about target ecosystems and related relationships. Viewing, tracing, or pointing to the mapped coastline, for instance, helped respondents recall experiences and express their perceptions of those places and experiences. One respondent alluded to how the map helped him visualize immaterial concepts: "I can see in my mind's eye the tribal geography . . . When I look at this map, I see a whole bunch of things. I see resource development, I see resource development history, I see what gives me pleasure, I see part of my own personal history, and I also see a kin-based cultural landscape that stretches a long time back . . . ."

The situational questions in our protocol invited different cognitive processes and involved an innovative approach to understanding CES. Responses to these questions led to a respondent-generated list of CES, as opposed to responses being reflections on researcher-generated lists of CES. See Fig. 1 for topics raised in response to 2 situational questions. These questions were a rich source of novel CES and additional issues of interest. In response to the query, for example, respondents often discussed social capital—a CES for which we did not have a specific prompt—and additional concerns, such as ethics (Fig. 3).
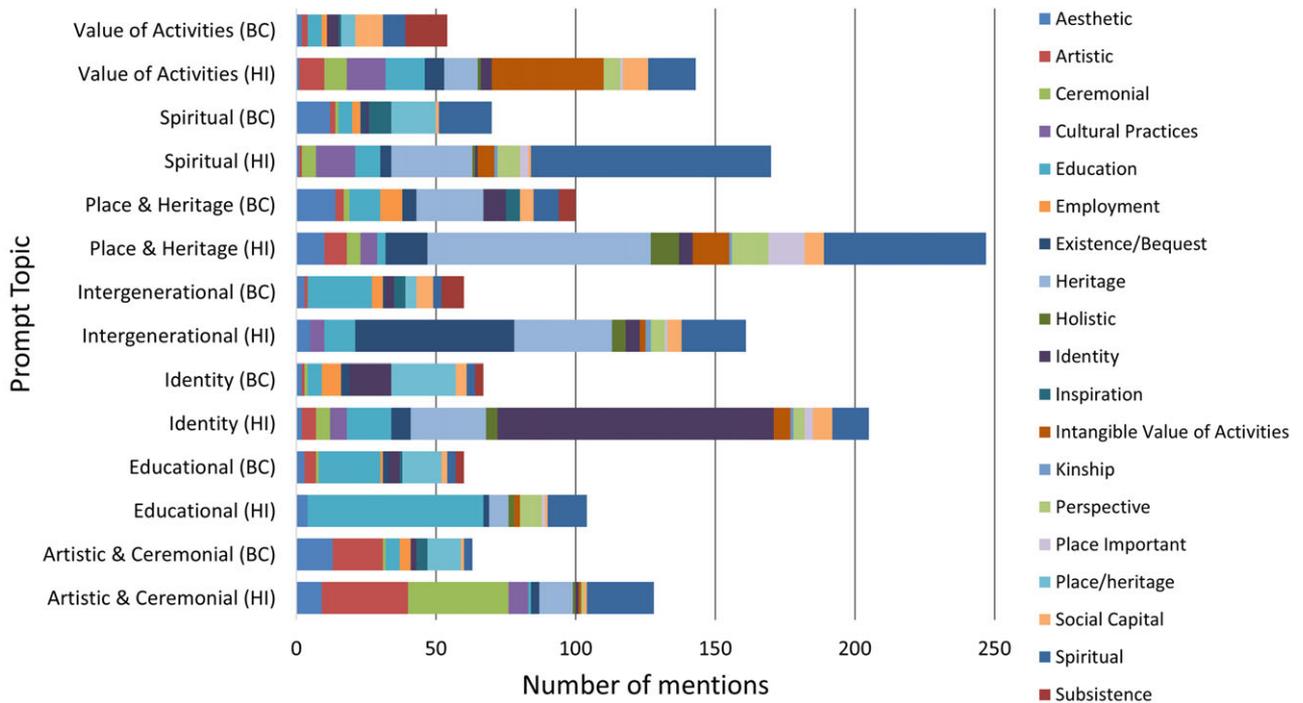
Figure 2. Responses to interview prompts categorized by the benefits and values mentioned in discussion following each prompt (bars, number of times various benefits and values were mentioned in response to the prompt topic; BC, British Columbia; HI, Hawaii).

SOCIAL RELATIONSHIPS

"When you can land a big [salmon], … it is kind of the full experience, … catching the fish, eating the fish, it is the community, the communal atmosphere, the camaraderie … I just had a dinner with local First Nations ….. That's what it's all about. Just sitting down and telling stories, and talking with everybody…" (B.C.)

"…people that I meet through hunting, some of them are lifelong friends now. … these people start a friendship and it's not about the kill or the animal. It's about the experience that I got to show them a place that they've never seen before." (Hawaii)

PERSPECTIVE

"I see a whale, I get where I fit in nature. I get not only how connected I am, I understand how infinitesimally small I am … being a part of something so much bigger…" (B.C.)

"You can just feel how teeny-weeny you are, in the whole scale of the Earth; … your actions can be very loud…." (Hawaii)

KINSHIP

"Taking the Hawaiian descriptor kama'āina, child of the land, very seriously to be able to know my homeland as well as I know my family." (Hawaii)

"I feel tears welling up … and I don't know that I can explain it. I don't even think we have the language in many ways to explain our connection to nature and certainly the connection to the oceans. Is it aesthetics? Is it emotional? I'm even afraid, because I have a science background, to use the jargon that I use – I see it as being Mother Ocean. And Mother Ocean is life-giving." (B.C.)
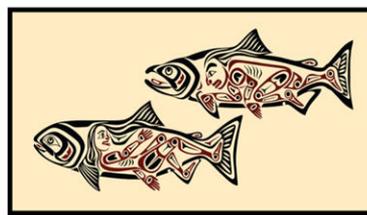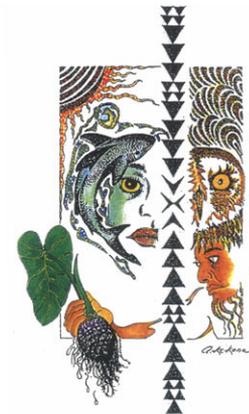
Art: Anthony Kekona

Art: April White

Figure 3. Examples of respondents' unsolicited comments about kinship, perspective, and social relationships in British Columbia (B.C.) and Hawaii. We offer one example of each theme from each site. The kinship quotes express sentiments also found in the place-based art shown (credit displayed on figure).

Eliciting Respondent-Relevant Range of Values and Beliefs

Respondents expressed CES values as heavily intertwined. Within each of our 7 CES-focused prompts, respondents discussed a variety of values (e.g., subsistence, ceremonial, aesthetics). After most prompts, values not prompted comprised the majority of values mentioned (Fig. 1; the total number of responses was always lower in British Columbia because these interviews were, on average, slightly shorter than those in Hawaii).

Enabling Expansive Thought and Detecting Prevalence of Values

Respondents raised numerous themes not explicitly addressed by the interview protocol. These themes were not necessarily ecosystem-related benefits; rather, they were factors related to CES in various ways. Three common emergent themes were kinship with nonhuman entities, perspective (reorienting to life's important concerns or comprehending nonhuman temporal and spatial scales), and social relationships (Fig. 2 & Supporting Information). In Hawaii, emergent themes included access to land (87% of interviewees) and post-colonialism, or living in a society previously colonized (63% of interviewees). In British Columbia, emergent themes included the highly politicized issue of salmon farming and a sense of loss in relation to local access to fisheries and decreased fish stocks.

Respondents discussed certain values more often than others (e.g., in Hawaii, respondents discussed place and heritage values frequently and throughout the interview) (Table 3 & Fig. 1).

Discussion

Our protocol met the stated objectives. It helped people articulate and researchers comprehend a diversity of difficult-to-discuss nonmaterial ES benefits. It allowed emergence of unanticipated topics and enabled detection of salient values in each study. Although our findings do not directly translate into management decisions, they provide crucial in-depth and contextual data related to decision-making processes specific to research sites (Table 3).

The process of employing a similar protocol and process in 2 contexts facilitated reflection on the effort to characterize nonmaterial values. The bundling of values and introduction of unprompted values in our results suggest the appropriateness of the qualitative, narrative protocol we used for understanding CES, both at early research stages when the goal was context-specific understanding of a range of CES (Satterfield 2001) and at all research stages for particular concepts (e.g., spirituality) and contexts (e.g., work with groups more comfortable with narrative and oral expressions of value).

We designed this study to pilot a protocol aiming to provide rich, context-specific understanding of CES in 2 situations rather than to compare CES in Hawaii and British Columbia or conduct statistical comparisons between subgroups in each situation. Both of these latter objectives might be accomplished in future studies with appropriate preparation and design changes. For the first objective—cross-site comparison—to be relevant, studies would require consistency in many process-oriented details (e.g., community engagement, interviewers, participant selection).

The second potential objective—acquiring data appropriate for statistical analysis—could be accomplished if this protocol were considered a precursor to (and provider of crucial narrative context to aid interpretation of) a large-scale survey comprised primarily of closed-ended questions. The data this protocol collects, though inappropriate for statistical analysis, could help guide survey development, for instance by suggesting additional topics to address and providing rough ideas of CES that are particularly salient for a population. Those considering using prevalence data, however, should consider that even the minimal quantification of qualitative data required to estimate prevalence is controversial in qualitative research circles. This is primarily because the open-ended narrative techniques we used were designed to enrich understanding rather than draw definitive conclusions from quantitative summaries. In semistructured interviews, the frequency with which a topic is mentioned is not necessarily proportional to its importance (Maxwell 2005); other techniques are more appropriate for ranking values (see Chan et al. 2012b). Critics of counting of qualitative data claim quantification is meaningless or, worse, misleading due to its incompatibility with the data collection method, whereas proponents argue that quantification provides valuable summaries and can indicate relative importance (Becker 1970; Denzin & Lincoln 2000).

We take a middle road, seeing the primary value of qualitative data in their nuanced explanations, stories, and connections and recognizing value in basic quantification through simple counts. Although our protocol did not produce comparative rankings of values, numerical descriptors of results (i.e., quasi statistics) can indicate the prevalence of particular topics addressed by respondents (Maxwell 2005). We emphasize, however, that if statistical analyses are desired, different instruments are needed. Our results imply that the social science analogue of biophysical techniques used in ES research (e.g., a survey producing data analyzable with statistical techniques) may be unproductive for some CES analyses. If quantitative data are desired, a carefully designed survey could ensure that items measure separate target constructs and produce data appropriate for certain purposes. This approach, although it would constrain types of data

Table 3. Management implications of the study of cultural ecosystem services in both research sites.

	British Columbia (B.C.) decision context: regional marine spatial planning Hawaii decision context: ecological restoration and land-use decision making (public and private)	
Summary of finding	*Observation*	*Management implication*
Interconnectedness of values	Cultural ecosystem services (CES) are often intertwined, both with other CES and with material ES.	Attempting to separate CES to manage for particular CES may not be logical or possible in many cases.
Richness of connection to ecosystems	Residents can be richly articulate when explaining their intangible links to ecosystems (i.e., they provided a great diversity of responses)	Planning that invites submissions of diverse concerns will enable a more balanced process and resulting plan than one that relies on few kinds of submissions or prioritizes particular kinds of interests (e.g., monetary ones).
Prevalence of particular values	B.C.: respondents ascribed the highest relative nonmonetary value to places with wildlife abundance and diversity, cultural heritage sites, and sites for outdoor recreation.	B.C.: to capture what holistically matters to people, marine spatial planning ought to prioritize the protection of sites important for locally salient values.
	Hawaii: a diversity of respondents recognize spiritual and cultural heritage values inextricably linked to upland forests.	Hawaii: land use management and restoration plans should explicitly address forest features of spiritual or cultural importance (e.g., particular plants, forest conditions, or sites).
Emergent concerns	B.C.: residents expressed widespread concern related to the environmental threat of salmon aquaculture, loss in access to fisheries, and abundance declines in historically valuable stocks.	B.C.: improve implementation of precautionary approach for fisheries management (aquaculture and wild); increase investment in rebuilding fish stocks and providing equitable access to fisheries.
	Hawaii: tensions embedded in postcolonial society, issues of access to land and ethnic diversity influence how residents experience CES.	Hawaii: increase responsiveness of land management to these—and other—sensitive issues; consider how different members of society may interpret current conservation activity (e.g., neocolonialism).

collected, could hold value related to increasing demands for quantitative empirical data in decision making. In addition, existing frameworks (e.g., Keeney 2009) provide guidelines for considering and quantitatively assessing holistic suites of values in decision making. Future research might explore combining our protocol with such approaches.

That CES can be experienced differently by different people is of central concern in decision making (Natural England 2009). Many ES initiatives begin with stakeholders developing and discussing realistic scenarios of ecosystem change. This process identifies salient ES and often involves recognition of values not captured by numbers and maps (Goldstein et al. 2012). Our protocol is well-suited to understanding diverse values and could be easily adapted to existing ES processes, providing one potential route to more systematic, intentional inclusion of nonmaterial services benefitting different people.

One benefit of prompts encouraging unanticipated content—a fundamental characteristic of qualitative inquiry—is greater recognition of context-specific factors mediating human–ecosystem relationships. Discus-

sions of post-colonialism (Hawaii) and salmon farming (British Columbia) are cases in point: each represents substantial departure from conventional ES and CES value classes and highlights place-specific, complex histories that include sensitive, emotionally charged issues (Herman 1999; Young & Matthews 2010). Future research on CES could explore questions such as: When people discuss their relationship with nature, how well does the ES metaphor, and particularly the CES metaphor, apply? How can and should we address sensitive issues arising in CES research? How do nonmaterial benefits and moral values interact and overlap (Taylor 2009)?

We addressed concepts well-documented in ethnographic literature, such as the relationship among ecosystems, spirituality, and cultural heritage (West 2006). Our protocol (in contrast with ethnography) is designed for relatively rapid assessment. Consequently, our protocol and process lack the nuance and depth of ethnography. Our approach, however, provides rich information about CES in a particular place in a management-relevant format. It can complement ethnography at different research stages or provide an alternative in situations where ethnography is not feasible (Beebe 2001).

Despite the relative brevity of our on-site interactions, most respondents described the interview as enjoyable, enriching, or inspiring and were eager to learn about research results. This phenomenon and potential implications for action research are discussed in Supporting Information.

Suggested Design Features

Our results suggest that organizing the interview in reference to maps and asking situational questions facilitated articulation. Other qualitative researchers have found that vignettes, which are similar to our situational questions, have numerous benefits, including allowing for multiple interpretations of a prompt or situation and aiding respondents in discussing sensitive issues (Barter & Renold 2000). Our results are consistent with these findings. Situational questions facilitated an indirect approach to respondents' values and encouraged dissection of the reasoning behind a particular choice rather than broader reflection on aspects of human–ecosystem relationships.

We acknowledge the centrality of scale in environmental research and action (Reid et al. 2006) and designed our protocol to facilitate understanding of place-specific CES. The interview's use of a physical map focused discussion on specific locations, which helped make complex intangible concepts more concrete to interviewees familiar with maps as expressions of place. Representing nonmaterial values through mapping exercises (Raymond et al. 2009; Klain & Chan 2012) is a ripe area for research.

Limitations

Knowing how truthfully or deeply people responded would aid in analysis (Lassiter 2005). Unfortunately, this knowledge is difficult—if not impossible—to acquire and philosophically complex (e.g., What is a sufficiently deep answer?). Uncertainty in this realm is unavoidable and must be considered along with substantial benefits of interviews, benefits that include insight into fundamental beliefs and felt experiences; provision of an understanding of why people feel as they do; and introduction of unanticipated issues. If response quality is a substantial concern for CES research, future researchers might build on indices of discursive quality and design studies that strive for rigorous measurement (Steenbergen et al. 2003).

Related to response quality is the issue of reflexivity (Bourdieu & Wacquant 1992), including the unavoidable impact of interviewer identity on responses. Both of our interviewers were outsiders to the study communities, which undoubtedly affected responses (Alvesson & Sköldberg 2009).

Given that an issue's framing can impact cognition (Lakoff 2010), we were concerned that even implicit ES framing might constrain responses. We aimed to avoid

this, and the protocol achieved a desirable balance between acquiring relevant information and soliciting only a certain type of response. Our experience suggests that the open-ended nature of the prompts allowed people to express ecosystem-related values as they conceived of them. The emergence of themes well beyond those raised by prompts provides evidence that our prompts were not overly constraining. Kinship is a prime example: organizing the physical world in reference to kinship (or kincentric ecology) implies an epistemology different from dominant land-management paradigms (Turner 1992; Viveiros de Castro 1998). Those paradigms, with their basis in scientific and Western approaches, often do not include consideration of such knowledge (Nadasdy 2007). That kinship emerged in our study indicates our success in adopting a focus broader than benefits and the producer–consumer metaphor underlying ES.

The overarching question, however, of whether the ES framework can accommodate the diversity of values inherent in CES or whether other frameworks should be applied still warrants discussion. We suggest that the ES framework can accommodate these values, but only if it is expanded from the expression of only monetary or spatially explicit benefits. We see value in remaining vigilant of the vast realms of human–nature relationships inhospitable to monetization, spatialization, and quantification. Researchers are challenged to develop ways to characterize the nuance, dynamism, and delicacy of these values so that they can more frequently and rigorously find a place at the decision-making table. This expansion of the ES framework offers promise for future research (Natural England 2009; Chan et al. 2012*b*; Tengberg et al. 2012).

Evidence-based decision-making processes can benefit from explicitly considering values and perceptions. One example of this explicit consideration can be found in Kamehameha Schools, a landowner in Hawaii with the goal of serving Native Hawaiian people. In a land-use decision based on ES analysis, the organization selected a less-profitable course of action that enhanced and honored nonmaterial ecosystem values (Goldstein et al. 2012). The organization's ability to articulate those nonmaterial values ensured their consideration alongside maps and numbers.

A 70-year-old Native Hawaiian interviewee described a role for articulating nonmaterial values in decision making:

> "[This analysis] would be able to plant the seed for the quote-unquote decision-makers in the arena that we don't function [in] on a regular basis. And even if we did function there, we probably wouldn't fare as well. But you would be able to be that stepping stone that helps link us a little bit more closely together. . . . I look at you folks as being . . . a voice. Not *the* voice, but *a* voice for us. . . . You can share something of what we hold of value. . . . You can share it in such a way so that once the seed has

been dropped out there, there's no way that people can say, 'Oh, we did not know.'"

Our protocol can help obtain data on environmental values in a format that may facilitate consequent application to decision-making (Table 3). The type of data we collected has an important role to play in deliberative and quasi-deliberative decision-making contexts (Rodela 2012), which recognize that many crucially important values are not adequately expressed in quantitative terms (van Woerden et al. 2008). Much CES work suggests the need for participatory and deliberative processes in CES analyses (Church et al. 2011) and that the process used to study CES is as important as the findings themselves (Hernández-Morcillo et al. 2013; Satz et al. 2013). In the words of our interviewee, we see this malleable protocol as an opportunity to provide diverse constituents with greater "voice"—a step many would claim to be essential for more effective and, perhaps more importantly, equitable decisions.

Acknowledgments

Supporting Information

Interview protocols (Appendix S1), methods details (Appendix S2), reflections on action research and respondent satisfaction (Appendix S3), and emerging themes details (Appendix S4) are available online. The authors are solely responsible for the content and functionality of these materials. Queries (other than absence of the material) should be directed to the corresponding author.

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