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Beyond services: A process and framework to incorporate cultural, genealogical, place-based, and indigenous relationships in ecosystem service assessments

Pua'ala Pascua [a,*], Heather McMillen [a,b], Tamara Ticktin [c], Mehana Vaughan [a,e], Kawika B. Winter [a,d]

[a] University of Hawai'i at Manoa, Department of Natural Resource and Environmental Management, 1910 East-West Road Sherman 101, Honolulu, HI 96822, USA
[b] USDA Forest Service Northern Research Station, New York City Urban Field Station, 431 Walter Reed Road, Bayside, NY 11539, USA
[c] University of Hawai'i at Manoa, Department of Botany, 3190 Maile Way, Room 101, Honolulu, HI 96822, USA
[d] National Tropical and Botanical Garden, Limahuli Garden and Preserve, P.O. Box 808, Hanalei, HI 96714, USA
[e] University of Hawai'i Sea Grant College Program, 2525 Correa Road, HIG 238, Honolulu, HI 96822, USA

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ABSTRACT

Cultural ecosystem services (CES) – the non-material benefits realized through human-environmental interactions – contribute to ecosystem service assessments by revealing key social dimensions in natural resource management. Yet there is limited understanding of how CES are experienced by individuals with strong generational and genealogical ties to land. Consequently place-based CES are frequently absent from management policies. We use a case study from Hawai'i to: 1) outline a process of eliciting place-based and indigenous CES; 2) develop a Hawai'i-based CES framework that is adaptable to other place-based communities; 3) demonstrate how place-based CES compare/contrast with standard CES; and 4) discuss how this process can enhance resource management and land-use planning. Through interdisciplinary methods drawing on multiple years of research and workshops in two rural Hawai'i communities, we highlight concepts not well captured in the existing CES literature including reciprocal relationships between people and place, sense of security, traditional values, and cultural subsistence. Our framework presents CES from a Hawaiian place-based/indigenous point of view by highlighting four main categories: *'Ike* (Knowledge), *Mana* (Spiritual Landscapes), *Pilina Kanaka* (Social Interactions), and *Ola Mau* (Physical and Mental Wellbeing). Ultimately, this research provides a methodology to engage place-based communities when identifying CES in ecosystem service assessments.

1. Introduction

Understanding the relationships between people, place, and resources is an essential aspect of successful, long-term natural resource management (Lyver et al., 2016, Winter and McClatchey, 2008). In recent years, scholars, resource managers, and decision-makers have turned their attention toward ecosystem service assessments as a tool to better understand the ways that people use, perceive benefits from, and interact with natural resources. Ecosystem service assessments make valuable contributions to natural resource management as they characterize the full suite of environmental benefits provided to people (Daily and Matson, 2008). As a result, decision-makers and decision-influencing bodies have called for integration of these assessments at global (i.e. IPBES, 2016), national (i.e. National Ecosystem Services Partnership, 2016), and regional scales (i.e. Goldstein et al., 2012). This mounting interest has resulted in a growing body of literature that documents the theoretical assumptions and methodological requirements behind the assessments (Costanza et al., 1997; De Groot et al., 2002). Yet there remains a need for applied ecosystem service research that can illustrate how services are perceived and experienced by individuals with strong cultural, generational, and genealogical ties to land. These strong connections are salient in place-based and indigenous communities across the globe, which further amplifies the need to understand how place-based perspectives can inform sustainable natural resource management.

Ecosystem service assessments address four main classes of services: provisioning services (i.e. food and water), regulating services (i.e. regulation of flood and droughts), supporting services

* Corresponding author.
E-mail address: puaalap@hawaii.edu (P. Pascua).

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(i.e. nutrient cycling), and cultural services (i.e. recreation and spirituality) (Millennium Ecosystem Assessment, 2005). Provisioning, regulating, and even supporting services can be quantified through well-established methods (Millennium Ecosystem Assessment, 2005), thus they are readily incorporated into assessments and management recommendations (Bunse et al., 2015). However, beyond recreation and scenic values, cultural ecosystem services (CES) have been both under-studied and under-represented in natural resource management (Chan et al., 2012; Daily and Matson, 2008; Daily et al., 2009; Milcu et al., 2013).

CES are important as they provide valuable insight into the human-environmental interface, ultimately revealing critical pathways for sustainable interactions with natural resources (Asah et al., 2014; Liu et al., 2007; Plieninger et al., 2015). CES are broadly defined as the non-material benefits that result from paired human and environmental interactions (Millennium Ecosystem Assessment, 2005). Subsequent studies have refined that definition to acknowledge CES as they relate to individuals with an attachment to a given area (Chan et al., 2011), to groups that share an adopted belief, worldview or ideology (Andersen et al., 2012), to those who derive indigenous identities from landscapes (Winthrop, 2014), and to groups that define well-being through a particular interpretive lens or cultural background (Baulcomb et al., 2015). Drawing from those definitions, in this study we define CES as the ways place-based and indigenous groups interact with their surroundings to derive all forms of sustenance and maintain connection to place.

Most CES assessments focus on recreation and scenic beauty, with less documentation of spiritual values, cultural identity, social cohesion, and heritage values (Chan et al., 2012; Gould et al., 2015). This is likely because many CES assessments identify the services easiest to value with the established methods rather than identifying services truly valued by a given community (Milcu et al., 2013). Yet, in places where groups share strong cultural ties to land based on place-based, multigenerational connections, recreation and scenic valuations do not adequately capture the total value of those landscapes in a way that can inform natural resource management and sustainable land-use planning (Liu and Opdam, 2014). CES assessments must incorporate methods to verify that the CES being discussed are indeed important and relevant to the given community (Baulcomb et al., 2015). Accurate identification of CES and their related benefits and values is a critical first step as it will facilitate subsequent analyses including valuation and assessments of trade-offs (Chan et al., 2012). While we recognize there remain a number of challenges to overcome in measuring and integrating CES into broader assessments, in this study we specifically focus on the identification stage to highlight foundational cultural aspects often overlooked in resource management.

Neglecting to acknowledge CES in resource management and decision-making can lead to dire and unintended consequences including ineffective regulations, low adoption of regulations, and public dissatisfaction with both regulations and regulators (Adamowicz et al., 1998; Asah et al., 2014; Chan et al., 2012). Some suggest that place-based and indigenous values are not accurately captured in existing ecosystem service methods; thus they have been unrepresented in resource management, particularly in policies on land-reform and wildlife management (Adamowicz et al., 1998; Kusel, 2001; Liu and Opdam, 2014; Venn and Quiggin, 2007). Others note fundamental challenges in aligning indigenous aspirations with external goals from land managers or other interest groups (Robinson et al., 2016). In this regard, identifying CES in an accurate and culturally appropriate way is vital in resource management efforts, particularly if they can make place-based values visible before important decisions are made (Turner et al., 2008). This provides a unique opportunity to highlight and empower place-based and indigenous values and practices through the avenue of ecosystem services (Jackson and Palmer, 2014).

The literature on CES in place-based communities is limited (the few examples include Adamowicz et al., 1998; Andersen et al., 2012; Gould et al., 2015; Jackson and Palmer, 2014; Kenter et al., 2011; Venn and Quiggin, 2007; Winthrop, 2014). As a result, interdisciplinary studies are critical to advance place-based CES research. One such study involving Native Coast Salish communities in Washington State (Donatuto et al., 2016), presents community-defined indigenous health indicators and attributes to enhance awareness and understanding of the human, environmental, and spiritual aspects often overlooked in standard health assessments. In examining biocultural relationships, Winthrop (2014) uses the term "culturally reflexive stewardship" to describe the ways that multigenerational residents demonstrate a strong commitment to culturally valued landscapes. In their research on community resilience, Berkes and Ross (2013) discuss the ways that socio-ecological factors (like CES) continually change and adapt while remaining within critical thresholds. A study on the emotional impact of natural disasters on native well-being (Palinkas et al., 1993) uses methods in psychology to show that cultural services like traditional relationships, subsistence production, and goods distribution are linked to environmental health. Additionally, two resource management tools from Aotearoa (New Zealand) are key in enhancing CES research: the Cultural Health Index and the Mauri Model. Tipa and Tierney's Cultural Health Index (2006) highlights cultural factors that impact Maori well-being including links between lands and genealogy, exercise of customary custodianship, ancestral teachings, life giving forces, and kinship. The Mauri Model (Morgan, 2010), a decision-support tool that continues to grow in popularity and application across the Pacific, quantifies impacts to *mauri* (the life force of all living things) across social, cultural, and environmental dimensions.

While there is growing interest to ensure CES are both represented and considered equally alongside the other classes of ecosystem services, there are few documented instances where a CES framework highlighted important values and was used to inform decision-making (Chan et al., 2012). There is also a need for participatory and interdisciplinary methods in CES assessments that can capture place-based sociocultural perspectives and expand researcher perspectives beyond the standard CES in the literature (Chan et al., 2012; de Oliveira and Berkes, 2014; García-Nieto et al., 2015).

Here, we present a case study from Hawai'i to outline a process of eliciting place-based and indigenous CES. Informed by community workshops and a small working group, we created and present a Hawai'i-based CES framework that can be adapted for other place-based communities. We use the framework and emerging themes from the process to demonstrate how CES from place-based communities compare/contrast with standard CES documented in the literature. We conclude by demonstrating how this process can be applied to aid natural resource management and sustainable land-use planning by making important considerations visible in decision-making.

1.1. Background

1.1.1. Existing CES categories

The most frequently cited CES framework comes from the Millennium Ecosystem Assessment (2003). CES is one of four functional classes acknowledged in the MA. The 2003 framework highlights CES obtained through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences (Table 1). While the MA framework is intended to be widely applicable, the early stages of our research aimed to elicit and