

Expanding and Deepening the Application of Cultural Ecosystem Services in Estuary Stewardship and Management

Eleanor J. Sterling, Pua'ala Pascua, Erin Betley,
Nadav Gazit, Amanda Sigouin

This brief was developed for the 2020 NERRS Science Collaborative Catalyst project “Cultural Ecosystem Services (CES) in Estuary Stewardship and Management” and is intended to strengthen the conceptual foundation for CES in the National Estuarine Research Reserve System (NERRS) by synthesizing information that may be relevant for staff, partners, and collaborators across the national network. An expanded summary will be made available in the near future.



Strengthening Conceptual Foundations

What are Cultural Ecosystem Services?

Humans derive many benefits from coastal and estuarine ecosystems and ecosystem services are increasingly recognized as a valuable tool to characterize those benefits. Cultural ecosystem services (CES) are one of four main categories evaluated within an ecosystem service assessment (supporting, provisioning, regulating, cultural) and are often described as the non-material benefits that humans receive from their interactions with the environment¹. CES result from, and often embody, a complex set of linkages between nature, culture, human values, and governance².

Why are Cultural Ecosystem Services Important?

Efforts to identify and monitor CES are increasing as managers and decision makers recognize the critical importance of understanding the relationships between people and their environment^{3,4} as well as the role of culture in managing healthy human and non-human systems⁵. Understanding these feedbacks between human and environmental well-being is integral to long-term and successful application of stewardship and management strategies^{6,7}. Evidence shows that including CES in ecosystem services assessments can broaden perspectives to provide a fuller understanding of an ecosystem and its functioning⁸⁻¹⁰, pinpoint inequities^{11,12}, enhance community resilience and trust^{13,14}, reduce conflict¹⁴, help prioritize areas for action¹⁵⁻¹⁷, deepen stewardship and management efforts^{18,19} particularly through respecting factors like tenure rights and cultural models of social norms^{8,20}, and meet U.S. Federal mandates regarding equity, justice, and conservation of social, cultural, and heritage values⁹.

Despite their importance, CES remain underrepresented in ecosystem service assessments due to significant theoretical and practical gaps in their identification and evaluation²¹, which presents a timely opportunity to expand and deepen the application of CES in stewardship and management.

A compilation of common CES categories and frameworks, case studies, and full citations for all sources cited in this document are available on the [project page](#).

NERRS Resonance and Relevance

Enhancing and advancing the application of CES has strong synergies with ongoing efforts within and beyond the NERRS network. CES explorations resonate with the NERRS 2017-2022 Strategic Plan, which includes a focus on interdisciplinary research, ecosystem services, and human well-being. Similarly, efforts to advance and enhance the representation of CES in estuary stewardship and management support the National Ocean Service's focus on place-based conservation programs, which "value the experiences of local and indigenous populations and help provide services that combine their traditional knowledge with modern technologies and techniques"²². In 2020 a NERRS Human Dimensions Ad Hoc Steering Committee articulated a pressing need to strengthen and streamline representation of human dimensions across the System²³, which could be further supported by expanding CES efforts.

When meaningfully identified and monitored, CES can illuminate key locally-centered values and priorities across Research, Educational, Coastal Training, and Stewardship sectors. Thus, deepening understanding and action-oriented application of CES research can advance conservation outcomes that are central to the success of the NERRS, while also improving and supporting well-being outcomes for both human and ecological communities. As recognition of the resonance, relevance, and capacity to measure and monitor CES grows across the NERRS network, so too has the number of studies that aim to advance meaningful application of CES in specific Reserves including in Kachemak Bay²⁴ and a joint exploration in Rookery Bay²⁵ and North Carolina²⁶. Restoration, management, and other programmatic priorities have been, and continue to be, shaped by expanding and deepening CES research²⁷ (for more, see our supplementary [compilation of case studies](#)). Examples of action-oriented outcomes include identifying and monitoring diverse human interactions with locally valued species, designing decision-making tools based on culturally informed values, and strengthening relationships with Reserve partners through dialogue and exchange.

How Have Cultural Ecosystem Services Been Assessed?

CES are increasingly assessed using monetary valuation methods, e.g., surveying visitors' willingness to pay to project the dollar value of a coastal wetland system. While these types of assessments may be a valuable entry point to begin to identify benefits, solely relying on them has significant limitations²⁸. For example, economic assessment methods could adversely impact user groups already marginalized in resource management and can overwhelm and suppress positive attitudes toward ecosystem services^{2,28}. In contrast, non-monetary and related CES assessment can be useful to enhance diversity, equity, and inclusion in stakeholder engagement by creating meaningful opportunities for reflection and exchange.

Broadening the terms and concepts used to describe ecosystem interactions and contributions to human well-being may help to illuminate related efforts that may already be underway. There are a number of concepts that share strong synergies with the human dimensions, environmental interactions, and reciprocal relationships characterized by CES, for instance nature's contribution to people (NCP)²⁹, connectedness to nature³⁰, culturally reflexive stewardship³¹, ecocultural revitalization³², and social values for ecosystem services³³.



An Overview of Assessment Methods and Case Studies

Selecting a method to assess CES is a reflection of many factors, some practical (e.g., time and resource constraints) and others value laden (e.g., what is the context? who is valuing CES and for whose benefit?)². Below is an overview of non-monetary assessment methods that may resonate with the unique context and diverse needs of Reserves across the NERRS. Included with each method is a reference that has utilized the assessment technique and describes the method in greater detail. This brief overview of methods complements a [collection of case studies](#) on the application and assessment of CES in different contexts.

Arts

- Performance³⁴
- Creative writing³⁵
- Participatory creative processes³⁶
- Visual media³⁷

Assessment of Existing Information

- Literature or multimedia^{38,39}

Discussion

- Collective decision-making through discourse (deliberation)⁴⁰⁻⁴³
- Discussion only (i.e., to inform future decision making)⁴⁴

Ethnographic

- Participant observation/Participatory action research^{45,46}
- Unstructured interview⁴⁴
- Storytelling-oriented exchange^{42,46}

Mapping/modeling

- GIS/Remote sensing deskwork (not participatory)⁴⁸
- Participatory mapping and modeling^{49,50}
- Computational⁵¹
- Cultural models⁵²
- Game/simulation⁵³
- Visioning/Future scenarios^{17,46}

Survey/sorting

- Q-methodology⁵⁴
- Structured survey^{33,55}
- Semi-structured or unstructured survey⁵⁶⁻⁵⁸

Other

- Social media^{17,19}
- Transect/Landscape walk⁵⁹

Recommendations when Advancing Application of Cultural Ecosystem Services

Broaden Perspectives on Relationality

In and of itself, the concept of ecosystem services (ES) can support the dominant paradigm of “nature as a service provider”, which emphasises an instrumental relationship between humans and nature⁶⁰. A number of efforts have aimed to counter this framing, like O’Connor and Kenter⁶¹ who recognize multiple forms of relationships between humans and the environment: 1) how we live from the world (e.g., the environment as a resource), 2) how we live in the world (the environment as a place that sustains our values and experiences), 3) how we live with the world (nature or non-humans as beings who co-exist alongside humans), and 4) living as the world (exemplified by Indigenous worldviews regarding kinship, the Deep Ecology movement, etc.). Identifying which of these relationships to include in a CES analysis is important.

Clarify who benefits, access to benefits, and potential tradeoffs or unequal impacts across user groups

Communities are not homogeneous and within a community there are often multiple competing CES and related values across space and time⁶²⁻⁶⁷. Individuals assessing CES should be clear on who is represented in the assessments and who is not.

Chaudhary et al.⁶⁸ recommend analyzing trends and patterns of access to benefits — Are the CES primarily benefiting local residents? Are they primarily important for visitors to an area? Are there perhaps competing interests between these different user groups? Researchers conducting the assessments should also be mindful of factors that may impact their own unconscious bias (e.g., institutional representation, academic disciplines and training, etc). Strategic and equitable partnerships with local stakeholders can be useful to identify CES that otherwise may not have been considered.



Consider both individual and collective benefits

Often the unit of measurement of CES is presumed to be the individual, building on neoclassical economics in which collective outcomes can be explained as the result of many individual decisions³¹. This assumption contrasts with instances in which individual actions advance shared and collective benefits; sometimes the more appropriate unit of analysis is at a collective or group level^{62,69}. While understanding priorities and behavior at the individual scale may reveal new insights, assessing CES solely at the individual scale can undermine group and social values related to the natural world and may bias towards the often dominant cultural norms that favor individual actions over communal ones⁶².

Identifying an appropriate unit of analysis (individual and/or group) can inform the best method for measurement. For example, a group setting should be used when the goal is to promote discussion and identify community-driven strategies³⁹. Group deliberative discussion can be a useful tool to support these goals. Arts based and ethnographic methods including storytelling could also be effective to enable community building and to elicit and explore issues that would likely not have surfaced with other approaches. To fully understand CES in a given location, it is important to recognize the presence of both individual and shared cultural values and consider what is most appropriate in order to reach sustainable long term solutions.

Using mixed methods approaches can reveal a range of values

Mixed methods approaches can help provide a full picture of CES by eliciting a deeper understanding of the values in a given place than one method alone². In particular, researchers found that providing some structure (for instance predefined categories) can be useful in expanding participant reflections on what constitutes CES, and that this approach can be complementary to more open-ended interview methods that brought to light important connections between CES factors^{2,44,70}.

Consider what your indicator is actually measuring

The types of metrics or indicators used to measure CES can vary considerably, depending on the amount of time and other resources available. There is a critical distinction in measuring the presence of an opportunity, and providing evidence of the extent and depth of the benefit to well-being. For instance, some indicators measure numbers of visitors to a protected area to demonstrate visitors' value of the site. This contrasts with practice- and meaning-based indicators that measure benefits or contributions to well-being, for example measuring trends in multigenerational participation in a particular activity or assessing changes in values as a result of a particular experience. Measuring a suite of CES activities is an important first step; however, deepening the application of CES in resource management and stewardship may more closely align with assessing the impact of a CES on human well-being.

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