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CULTURAL ECOSYSTEM SERVICES IN THE BEAVER HILLS BIOSPHERE

PREPARED FOR

Beaver Hills Biosphere Association

PREPARED BY

Jon Weller

Jonathan_weller@ucalgary.ca

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Key Messages

- Ecosystem services are the crucial contributions the natural world makes to human wellbeing.
- The concept of cultural ecosystem services has emerged as a means to capture the life-enriching and life-affirming contributions ecosystems make to human well-being.
- These 'non-material' benefits are the product of a complex set of interactions between people and the environment and are readily recognized as essential for individual and community well-being, as well as the long-term sustainability of societies.
- Although of great importance to individual and community well-being, cultural ecosystem services are difficult to capture and quantify in biophysical or nonmonetary terms, which has limited their integration into land use management processes.
- To respectfully engage with cultural ecosystem services, and bring a consideration of these services into conservation and land management processes, it is necessary to rethink the ways in which we gather information about the value of ecosystems.
- Engaging with the concept of cultural ecosystem services can support the conservation and stewardship of wetland ecosystems in the Beaver Hills Biosphere, but this work needs to:
    - Develop a clear understanding of cultural ecosystem services
    - Seek out non-monetary forms of valuation for cultural ecosystem services
    - Remember that cultural and social dimensions are always present
    - Ensure communities are engaged in cultural ecosystem service analysis
    - Incorporate culture as a foundation of strategic planning and operations

Introduction

Wetlands are consistently cited as some of the most important ecosystems in the landscape, serving a wide variety of complex ecosystem functions. As one quickly observes in moving through these spaces, wetlands are important habitat for a host of flora and fauna; the chatter of birds and lush growth are testaments to these areas' productivity and the rich biodiversity they support.

Below the surface, wetlands provide a range of crucial stabilization and filtration functions. Acting much like the kidneys in a human body, wetlands receive and filter water and waste from both natural and human sources, cleaning polluted waters and protecting shorelines from damage. Moreover, by storing water above ground and recharging aquifers, wetlands also stabilize water supplies, thus mitigating both floods and drought. Finally, as the global population has become increasingly concerned with the impacts of climate change, researchers have begun to look to wetlands as important carbon sinks and climate stabilizers that can alter and mitigate changes associated with a warming world. And yet, in addition to all of the above, wetlands, along with the rest of the natural world, provide a wide range of services to humans that go far beyond such material processes.

Over the past decade, the concept of cultural ecosystem services has emerged as a means to understand the life-enriching and life-affirming contributions ecosystems make to human wellbeing. These 'non-material' benefits are the product of a complex set of interactions between humans and the environment and are readily recognized as essential for individual and community wellbeing, as well as the long-term sustainability of societies.

As part of the Wetland Conservation and Stewardship Pilot Project initiated by the Beaver Hills Biosphere Association, a goal was set to "initiate an inventory of cultural ecosystem services associated with wetlands, focusing on both traditional (First Nations and Métis) and western knowledge, in an effort to develop a wetland extension model for landowners and land managers within the Biosphere." Before undertaking an inventory of CES, it is important to articulate what is meant by the concept and establish a clear understanding of what value the identification of such services will provide. Neither of which are simple, nor commonly agreed upon, pursuits. To take this first step, and develop a foundation for future inventory work, this report aims to understand the place of culture in the work of a Biosphere, synthesize contemporary debates and understandings of CES, articulate the potential contributions that engaging with CES can have for the conservation and stewardship of wetlands, and highlight several key questions that need to be addressed while pursuing an inventory of CES.

Background & Context

Launched in 1976, the UNESCO Man in the Biosphere (MAB) Programme's World Network of Biosphere Reserves has grown and changed considerably over the past half-century. Comprised of core protected areas and a series of geographic zones that establish a gradual intensification of resource use, biosphere reserves were originally designed as sites of good scientific practice

where researchers could observe ecosystem change and investigate the varying impacts of human use. Biospheres[1] today are understood more comprehensively as sites for learning about and applying solutions to achieve sustainability. In practice, being a site dedicated to the goals of sustainable development means carrying out three core functions:

- Conservation of biodiversity and cultural diversity
- Economic development that is socio-culturally and environmentally sustainable
- Logistic support, underpinning development through research, monitoring, education and training (UNESCO, 1996)

Achieving these functions is not a simple pursuit, in part because of their inherent complexity, but more so because the committees that oversee a Biosphere lack the regulatory authority, direct management, and decision-making powers that are generally required to take action. Instead, Biospheres are overseen by local community committees that undertake educational and demonstration projects, provide logistical support for scientific research, coordinate regional conservation or sustainability initiatives, and work with relevant government agencies in cooperative decision-making forums.

What is notable in the above description of Biospheres is the central importance placed on the social and cultural dimensions of sustainability. Although early documentation on the Biosphere programme speaks to the intended inclusion of social science approaches and the importance of human-environment interactions, these people-centred aspects were not addressed often (Batisse, 1997). It has only been in the past two decades, since the approval of the 1996 Seville Strategy and Statutory Framework for the Biosphere network (UNESCO, 1996), that significant conceptual and practical changes relating to the inclusion of people in the management of Biospheres have occurred. (UNESCO, 2017)

The Statutory Framework ushered in several important changes including the addition of the idea of sustainable development, a concept that includes human uses of the ecosystem, as one of the core functions of the biosphere program. Goals to preserve cultural diversity and associated cultural values, as well as local livelihoods, and ecological systems became more explicit justifications for the establishment of Biospheres. As well, the views and needs of diverse local populations became more visible, in turn supporting a wider rethinking of issues of inclusive governance. These changes have been reiterated and refined through a series of MAB Strategy documents and the Madrid (2008-2013) and Lima (2016-2025) Action Plans, all of which embrace the function and importance of people in the environment (UNESCO, 1996, 2008, 2017).

However, at the same time, recent research demonstrates that there is “a wide gap between the conceptual emphasis place by UNESCO on the social and cultural dimensions of sustainable development and the priorities or activities of Canadian biosphere reserves” (Reed & Massie, 2013). In a survey of Canadian Biospheres asking respondents to assess the level of priority and effectiveness for various objectives, social and cultural dimensions were neither a high priority nor

[1] In Canada, several Biosphere associations, including Beaver Hills, have begun moving away from the term 'biosphere reserves.' The shift is due, in part, to a desire to respect the wishes of Indigenous peoples for whom the term reserve has negative connotations. In addition, the term 'reserve' suggests protection in the sense of a park or other protected area, which is not entirely accurate. In light of these concerns, this report avoids the use of the term ‘reserve’ in favour of, simply, Biospheres.

something practitioners felt they were effective in advancing. Economic development and facilitating collaboration, in contrast, were each given heavy emphasis by respondents, suggesting a disparity between the inclusive goals set by UNESCO and the ongoing practice of Biospheres.

The authors of this study offer two potential explanations for these results. First, they note, the explanation may lie in the interpretation of the concept of social and cultural dimensions. Elsewhere in the survey respondents highlighted projects related to topics such as food security, healthy communities, and tourism, but tended to consider this work through the frame of economic development. In each of these cases, there are significant social and cultural elements, which may or may not be addressed by a particular Biosphere, that are influential and deserving of attention.

While this first explanation may simply point to a flaw in the survey results, it may also highlight a lack of awareness or understanding of how social and cultural dimensions are interwoven through much of the work of a Biosphere. This concern points to the second explanation offered by the authors, that the UNESCO mandate and action plans "are not well understood by local managers or board members" (Reed & Massie, 2013, p. 217).

Together both explanations indicate that despite high-level commitments and recognition of the importance of cultural and social dimensions, these requirements and concepts have not yet been absorbed into the practice of Biospheres. The authors conclude by suggesting that this gap "could be addressed through improved communication about the expectations and meaning of social and cultural dimensions of sustainability" (Reed & Massie, 2013, p. 217). This recommendation is certainly correct, further communications on these topics can only serve to improve uptake and understanding. However, an additional layer of explanation for these results is that social and cultural dimensions are complex and multifaceted, and the guidance put forward by UNESCO on these matters lacks clarity and practical tools to conceptualize and integrate these aspects into management and decision making.

It is toward these practical challenges that the linked concepts of ecosystem services and cultural ecosystem services are directed, offering a potential avenue for understanding and working with the social and cultural realms. The recent UNESCO Lima Action Plan for Biospheres noted the potential value of the ecosystem service approach, but little exists to suggest that Biospheres around the world have explored this avenue in any significant way.

Lima Action Plan (2016-2025)

Strategic Action Area A: The World Network of Biosphere Reserves consisting of effectively functioning models for sustainable development

A7 BRs recognized as sources and stewards of ecosystem services

> **A7.3** Implement programmes to preserve, maintain and promote species and varieties of economic and/or cultural value and that underpin the provision of ecosystem services.

(UNESCO, 2017)

Ecosystem Services

At its core, the concept of ecosystem services (ES) is a relatively simple idea. Ecosystems, through different ecological functions, provide services and goods that people appreciate and rely on. ES, therefore, refers to the multiple ways in which humans derive benefit from the environment. A tree may provide shade, reduce wind, cut down noise from a nearby highway, produce fruit, and filter oxygen, all services that humans rely upon. Taken to the ecosystem level a forest may do all the same and much more.

"Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other nonmaterial benefits"

(Millennium Assessment, 2005)

The concept initially arose in the 1970s as an awareness-raising tool to highlight the lack of appreciation for the ways that human societies depend on the natural world and should, therefore, work to conserve those necessary systems. If people could just become more aware of the often-unseen ways that their quality of life depends on the proper functioning of ecosystems, the argument went, then surely, they would be more willing to support conservation efforts.

It was not until the early 2000s, building upon a growing interest among the academic community through the 1990s, however, that the concept gained considerable traction in policy and environmental governance spheres.

The impetus for growing recognition of the ES framework as a tool for comprehensive socio-ecological assessments was the initiation of the Millennium Ecosystem Assessment (MA) in 2001. The MA adopted the ES framework and applied this approach across the globe to take stock of human impact on the environment, popularizing the framework among international environmental science and policy communities.

Today, assessments of ES take place at different spatial scales, from a single ecosystem, such as an urban park to an entire region, such as a biosphere. They can also be undertaken for different purposes, to develop a baseline understanding, or to inform specific programs, like an offset payment system.

Central to the ES framework are four categories of services.

- Supporting services: are the basis of all of the services. They are the fundamental components of all ecosystems that make possible the continued provision of other services. Examples include nutrient cycling, photosynthesis, soil formation, and habitat provision.

- Provisioning services: are the ecosystem goods that are essential to human needs. Examples include raw materials, water, and food.
- Regulating services: are the processes that moderate natural phenomenon. These include pollination, decomposition, water purification, erosion and flood control, and carbon storage and climate regulation.
- Cultural services: are the non-material benefits that contribute to the development and cultural advancement of people. Examples include cultural identity, sense of home, and spiritual experience.

Each of these services, the ES framework maintains, emerge from the functions of biophysical structures or processes, result in benefits to people, and are subsequently valued for the provision of those benefits. This model of the flow of services is described as the cascade model (Fig 1).

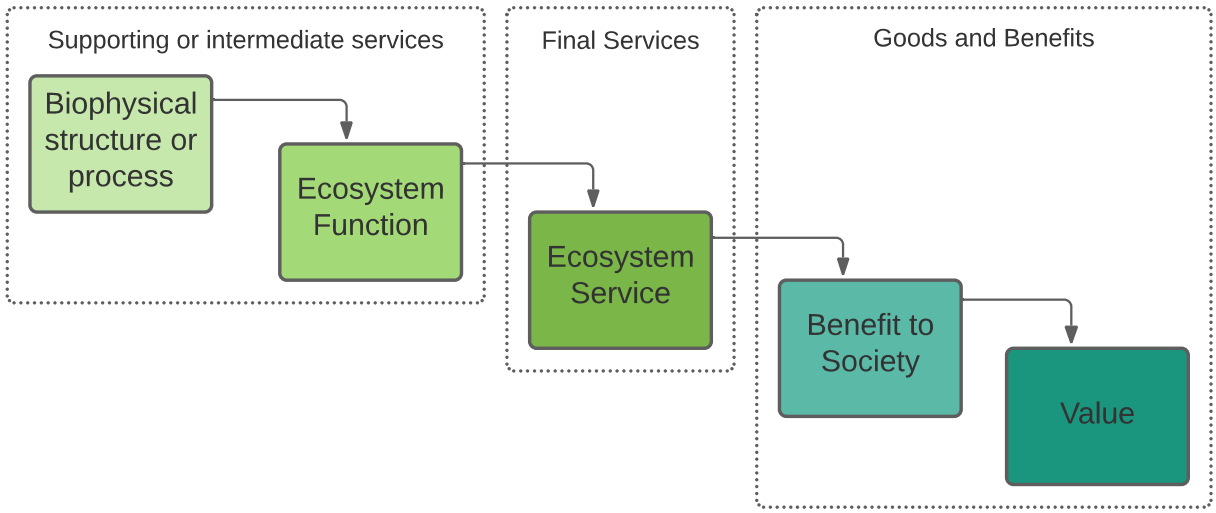

Figure 1: Cascade model of ecosystem services

Since the publication of the MA in 2005, the literature on, and adoption of, the ES framework has grown considerably, leading to widespread uptake in government, non-profit, private, and financial sectors. The rate of adoption is, in large part, attributable to the framework's ability to identify and value ES in concrete, measurable, and quantifiable ways. If, for example, a wetland's capacity to reduce flood occurrences can be identified, this service can be valued by the cost savings associated with limiting downstream flooding. In turn, the conservation of this particular service can be weighed against alternate activities, and programs, such as markets for compensation, can subsequently be developed to promote stewardship of this resource.

Although the ES framework has been readily adopted around the world, cultural ecosystem services (CES), despite being consistently recognized alongside the other categories of services, have proven difficult to capture and quantify in biophysical or nonmonetary terms, thus limiting their integration into the overall framework.

Cultural Ecosystem Services

The common definition of CES is that they are the "nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences" (Reid et al., 2005). When an individual thinks about a given ecosystem, they may see wildlife habitat or consider the food and materials the environment provides, but more often than not, these services are linked, in some manner, to a nonmaterial aspect of a person's life, be it the pleasure of bird watching or the identity derived from traditionally harvesting food.

In this way, CES are among the most highly valued and directly perceived ES, and they have some of the most direct links with wellbeing. Recognizing the ubiquity of nonmaterial benefits and the persuasiveness of arguments grounded in matters of spiritual significance or cultural identity, CES have become one of the most useful vehicles for communicating the importance of protecting ecosystems. However, the idea of nonmaterial benefits is a vague and expansive starting point. Although inspirational, the concept of CES has faced several criticisms and challenges.

Many have raised concerns that the catch-all nature of CES stretches the idea of ecosystem services too far by attempting to incorporate elements that have no direct link to biophysical systems (Kirchhoff, 2012, 2019). In the quest to acknowledge all the ways that people benefit from the environment, there seems to be a loss of any recognition of the tangible things that these benefits rely upon, which makes the framework difficult to implement.

In contrast, others have taken their critiques in the opposition direction, claiming that CES do not go far enough in capturing the full range of human-environment interactions (Winthrop, 2014). By framing intangible connections and values as CES to make them supportive of decision-making and governance processes, too much emphasis is placed on a small number of cultural services that are easily quantified and fit into a market-based system of valuation.

Emerging from a concern with the limited instrumental focus of CES is a related criticism whereby there is a deep discomfort with the idea of quantifying and assigning a monetary value to nonmaterial benefits. There is a concern not only for the ways that market-based systems can favour those with existing wealth but also because monetary valuations cannot capture the myriad ways that individuals value ecosystem services. As Diaz et al. (2015, 13) argue, for example, "farmers who cherish an agricultural way of life as part of their cultural heritage may feel that these values cannot be captured monetarily. The provision of clean drinking water by vegetated watersheds is seen by some cultures as an entitlement and not a commodity, thus being beyond the market logic." Moreover, even when a limited number of CES are used, it remains challenging to effectively assign a monetary value in the same way as other services.

Ultimately, despite the widespread recognition that CES are crucial and deeply meaningful, conceptual and practical challenges have limited the integration of CES into ES assessments, management, decision-making, and governance processes (Gould et al., 2019; Satz et al., 2013). But, regardless of the practical challenges, interest in CES continues to grow.

The concept of CES is still seen as offering a valuable venue within which to begin thinking about an important dimension of human-environment relationships, as well as to emphasize

nonmonetary, deliberative, and participatory valuation methods for all ES. By bringing to light the diversity of views and ways of valuing the environment, CES provide a means to challenge and expand the existing modes of environmental and resource governance.

To understand the above claims and criticisms more fully, the next sections will address several specific aspects of CES in more detail.

How to conceptualize Cultural Ecosystem Services?

Perhaps the most persistent challenge for those seeking to work with the concept of CES is the difficulty of conceptualizing and articulating what these services are. CES are the outcomes of dynamic and complex relationships between ecosystems and humans. Their spatial boundaries are difficult to define, they are associated with every ecosystem on the planet, and the relationships often play out over long periods. Combined, these factors make it extremely difficult to develop a consistent list of CES types that captures the varied services that arise.

Standard frameworks that are used tend to reinforce a linear notion of service delivery based on the cascade model and duplicate a typological structure set out in other ES categories (Fig. 2). Specific CES are classified in a hierarchical structure that attempts to group similar types of activities.

Division	Group	Class	Examples
Physical and intellectual interactions	Physical and experiential interactions	Experiential use of plants, animals, and land-/seascapes in different environmental settings	Whale or bird watching, snorkelling, diving
		Physical use of land-/seascapes in different environmental settings	Walking, hiking, kayaking, boating, recreational fishing, using urban green spaces
	Intellectual and representative interactions	Scientific	Subject matter for scientific research, e.g., pollen record, genetic patterns
		Education	Subject matter of educational value, e.g., for school trips; books
		Heritage, cultural	Historic records of a place; cultural heritage preserved in water bodies or soils, e.g., pottery remains, relics
		Aesthetic	Artistic representations of nature
		Entertainment	Ex-situ viewing of the natural world through different media, e.g., wildlife television

			programs
Spiritual and symbolic	Spiritual and/or emblematic	Symbolic	Emblematic plants and animals; national symbols, e.g English rose, American eagle, South African springbok
		Sacred and/or religious	Holy or spiritual places important to spiritual or ritual identity, e.g., River Ganges in India, sacred forest groves, sacred plants or animals
	Other cultural output	Existence	Enjoyment and philosophical perspective provided by the knowledge of, and reflections on, the existence of wild species, wilderness, or land-/seascapes, e.g., presence of the Amazon rainforest and its wildlife for dwellers of South America's capital cities
		Bequest	Willingness to preserve plants, animals, ecosystems, and land-/seascapes for the experience and use of future generations, e.g., long-term conservation

Figure 2: Classification and examples of cultural ecosystem services based on the Common International Classification of Ecosystem Services model (CICES) (Hirons et al, 2016, p. 549)

However, there are several fundamental challenges with these types of models that merit examination.

First, there are complex linkages between wellbeing and the environment, which are not fully accounted for in standard CES frameworks. The greatest strength of ES frameworks is that they can draw a connection between the management of natural resources and impacts on human wellbeing by demonstrating the value, through increased wellbeing, that a service provides. However, wellbeing is both subjective and relative across groups. Meaning that people garner different levels of wellbeing from different services. As one innocuous example highlights, a hike through a flooded wetland fighting off swarms of mosquitos may, for one person, be an enjoyable experience, and for another be an absolute nightmare. This kind of discrepancy makes it difficult to definitively determine what cultural benefits arise from various services and raises a discussion about the idea of ecosystem disservices, that is, those functions that are detrimental to human wellbeing.

Second, a related concern is the elusiveness of culture. Standard frameworks for understanding CES tend to rest on an idea of culture and cultural services as 'things,' which are static and able to be identified and attributed value. More and more, however, these static ideas of what culture is are being challenged and replaced by notions of process, whereby culture, including aspects like worldviews, cultural symbols, and cultural norms and practices, are continually created and

reinvented by people. The idea of culture as an ongoing process challenges some of the foundation ideas of CES.

Finally, one of the most pressing challenges to the concept of CES is with respect to the construction of values. As noted before, in order to be practical, CES need to be ascribed value, which is an understanding of their worth, importance, or usefulness. The ES Framework only examines those functions of the environment that provide a recognizable service to people, that is, an ecosystem's instrumental value. But this approach neglects what many people see as the inherent or intrinsic value of the environment, that it is simply valuable in its own right. Moreover, a focus on instrumental values creates a path for ascribing monetary or quantitative values to particular services.

The limited perspective that focusing on instrumental values affords, however, does not do justice to the multiple ways that different individuals and groups value an ecosystem. Much of the value that is ascribed to ecosystems and the services they provide are non-instrumental and intricately tied to larger principles such as reciprocity, respect, care, and leading a good life, which can be perceived in vastly different ways between individuals and across cultures. A clearer characterization of CES and the values that are ascribed to them, Satz argues, "can be realized if cultural ecosystem services are seen as producing a large number of intangible and nonmarket benefits (e.g., social cohesion), that can in turn hold or have assigned to it different kinds of value (e.g., moral, religious, aesthetic). In other words, a given non-material benefit provided by an ecosystem can be associated with different values and those values may have different weights for the individual"(Satz et al., 2013, p. 676).

Despite the difficulty of the idea of values, this kind of clear understanding of how CES are valued, or neglected, has significant consequences for what management decisions are made with respect to the environment. Ensuring that a plurality of environmental values is included in assessments and decision-making processes is key to an inclusive approach that truly benefits all people connected to an area.

In response to these conceptual and practical challenges, several alternate ways of framing CES have emerged in recent years. Two prominent and impactful examples of these efforts are a novel conceptual framework developed by Fish et al. and a recent rethinking of the ES framework by the International Panel on Biodiversity and Ecosystem Services (IPBES) in terms of nature's *contributions* to people. These two examples will be explored in detail below.

A Novel Conceptual Model for Cultural Ecosystem Services

One of the most innovative ways of reimagining our understanding of CES emerges from a belief that CES arise from human-ecosystem *interactions* and *relationships*. Traditionally in ES frameworks, CES follow a simple linear and unidirectional sequence as captured in the cascade model. In this understanding, the flow moves from ecological features to ecosystem services and the benefits people derive from them (Haines-Young and Potschin, 2010). Some attempts have been made to complicate this flow through the addition of various feedback loops, but overall, the logic remains the same, that somewhere in the environment these cultural services exist, like raw material, ready to be used by people.

For an ecosystem service to qualify as cultural, a significant relationship between the biophysical structures and the satisfaction of human needs and wants must be demonstrated. In practice, however, most human experiences with nature are more complex than this framing allows, making it difficult to adapt culture to such a model. As Fish et al. explain, "cultural ecosystem services are not, it seems, external components of nature awaiting discovery and allocation by people, like wood is placed in the hearth, or food and water is ingested. Instead, they are typically constructed, intangible and interpretative in character and emerge out of the relations between the non-human and human" (2016, p. 210).

Acknowledging these complexities, Fish et al. (2016) developed a model to frame CES as co-produced outcomes of dynamic interactions between cultural practices — expressive, symbolic and interpretive interactions— and environmental spaces — the places, localities, landscapes and seascapes in which people interact with each other and the natural environment (Fig. 2). The interaction between practices and spaces results in a variety of benefits that are understood in terms of the **identities they help frame,** the **experiences they help enable** and the **capabilities they help equip**. Finally, overarching the entire relationship are cultural values, which influence how ecosystems accrue meaning and significance for people.

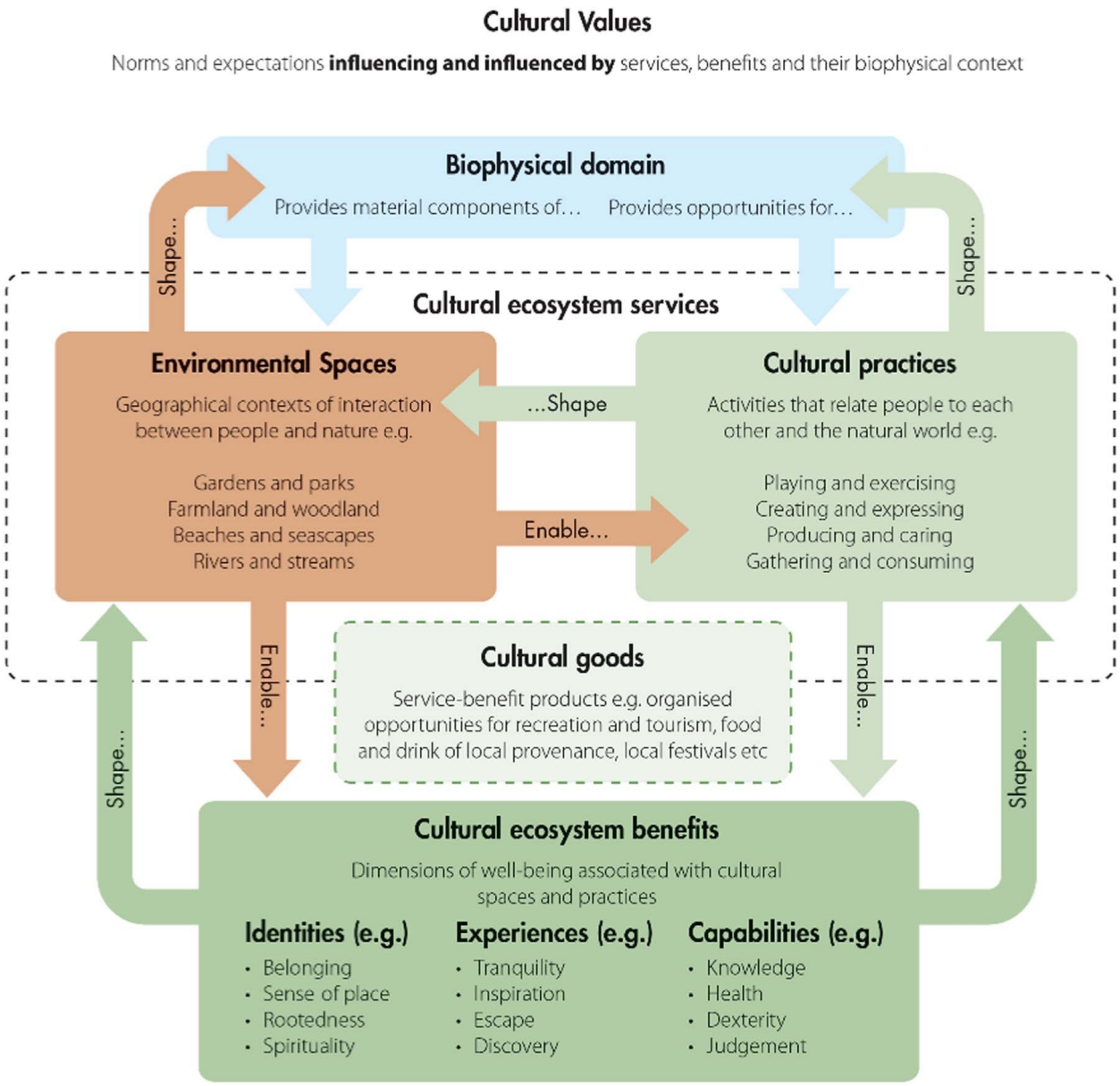

Figure 3: Fish et al.'s conceptual model for cultural ecosystem services

There is a great deal of depth to the model developed by Fish et al. but even with a cursory understanding, it is clear that the disaggregation of CES in terms of spaces, practices, goods, benefits, and values, lends itself to greater clarity and application in ecosystem assessments and decision making. What this framing does is it provides a useful starting point for understanding the nuances of what sort of practices, in what sort of environmental spaces, result in what sort of benefits and for whom? (Willis, 2015) Given the complexity and subjectivity of the human-environment relationship, answering these questions cannot be done without the

What this framing does is it provides a useful starting point for understanding the nuances of what sort of practices, in what sort of environmental spaces, result in what sort of benefits and for whom?

adoption of participatory and deliberative research techniques, designed to tease out the texture of the relationships and negotiate clashes between different perspectives. Having a framework from which to begin those conversations and facilitate mutual learning, however, is essential for moving forward productively.

Nature's Contributions to People

In its 2018 meeting, the IPBES endorsed a new framework (Fig. 4) labelled "Nature's Contributions to People" (NCP), which builds upon the standard model of ES popularized by the MA (Díaz et al., 2015, 2018; Pascual et al., 2017). Central to the development of the NCP framework was a belief that ES were too narrowly defined to capture a broad range of worldviews, knowledge systems, and stakeholders, as well that the treatment of cultural dimensions through a subcategory of CES was largely inadequate.

Therefore, the NCP makes two significant changes, first, "the NCP approach recognizes the central and pervasive role that culture plays in defining all links between people and nature," and second, "use of NCP elevates, emphasizes, and operationalizes the role of Indigenous and local knowledge in understanding nature's contribution to people" (Díaz et al., 2018, p. 270). Most importantly, achieving these two goals requires broad and inclusive engagement with a wide range of stakeholders. Only through deliberative and participatory processes, the IPBES argues, can assessments of NCP be comprehensive and legitimate.

Instead of ES, the IPBES focuses on NCP, which encompass "all the positive contributions, losses or detriments, that people obtain from nature" (Díaz et al., 2018, p. 270). At first glance, this definition does not appear markedly different from that of ES, both rest on an idea of flow from nature to people. However, in making the change, the IPBES is trying to counter the pervasive tendency in ES frameworks to focus on natural sciences and economics that result in monetary valuations of strictly defined supplies of services.

The hope with the NCP framework is that it can reset the conversation around how people benefit from nature and provide flexibility in categorizing nature's contributions. The NCP framework embraces the need for defined types of contributions to support assessment, monitoring, and decision-making, but also acknowledges that strict categorizations can limit the ability of groups to articulate their understanding of the ways that nature contributes to wellbeing.

To facilitate this flexible goal, two approaches are proposed. The generalizing perspective relies on three categories of contributions, regulating, material, and nonmaterial, that are understood through 18 specific reporting categories (Fig. 5). Supplementing the generalized approach, the NCP framework encourages the development of a context-specific perspective. This perspective, developed through deliberative and participatory processes with communities and stakeholders, leads to the formation of an additive list of categories and services that are representative of different worldviews and value systems that are not represented in the generalized perspective.

One of the most significant changes, in the context of this discussion, is the removal of a distinct category of CES from the NCP framework. Nonmaterial contributions remain, but culture permeates through and across all three general groups. The material contribution of food, for example, cannot be easily disentangled from the cultural dimensions that influence harvesting,

distribution, ceremonial, and identity matters. This framing highlights the reality that all of the contributions that nature provides to humans are mediated by the forces of culture and these dimensions should be considered when working with any contribution.

The publication and promotion of the NCP framework has ignited a healthy debate in academic circles about the relative value of this new approach compared to ongoing innovations in the ES framework. While these debates will continue, it is important to recognize that whether or not the NCP framework is widely adopted, it is not an entirely novel proposition. Instead, the NCP framework simply formalizes and articulates recent conceptual and methodological innovations in ES research, ideas like those developed by Fish et al., and, in turn, highlights future directions for the field (Kadykalo, 281).

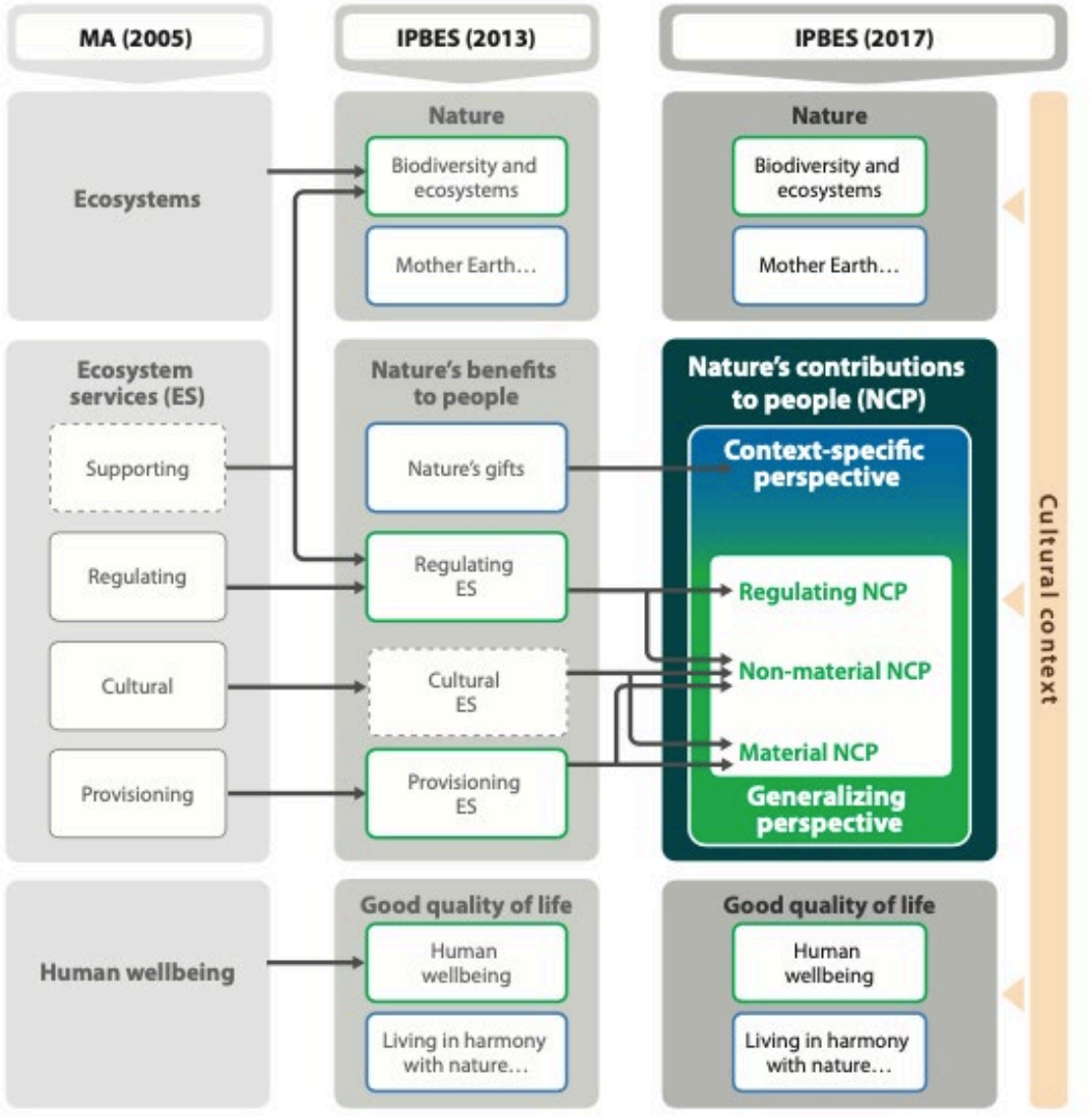

Figure 4: Evolution of the Nature's Contributions to People framework. (Diaz et al., 2017)

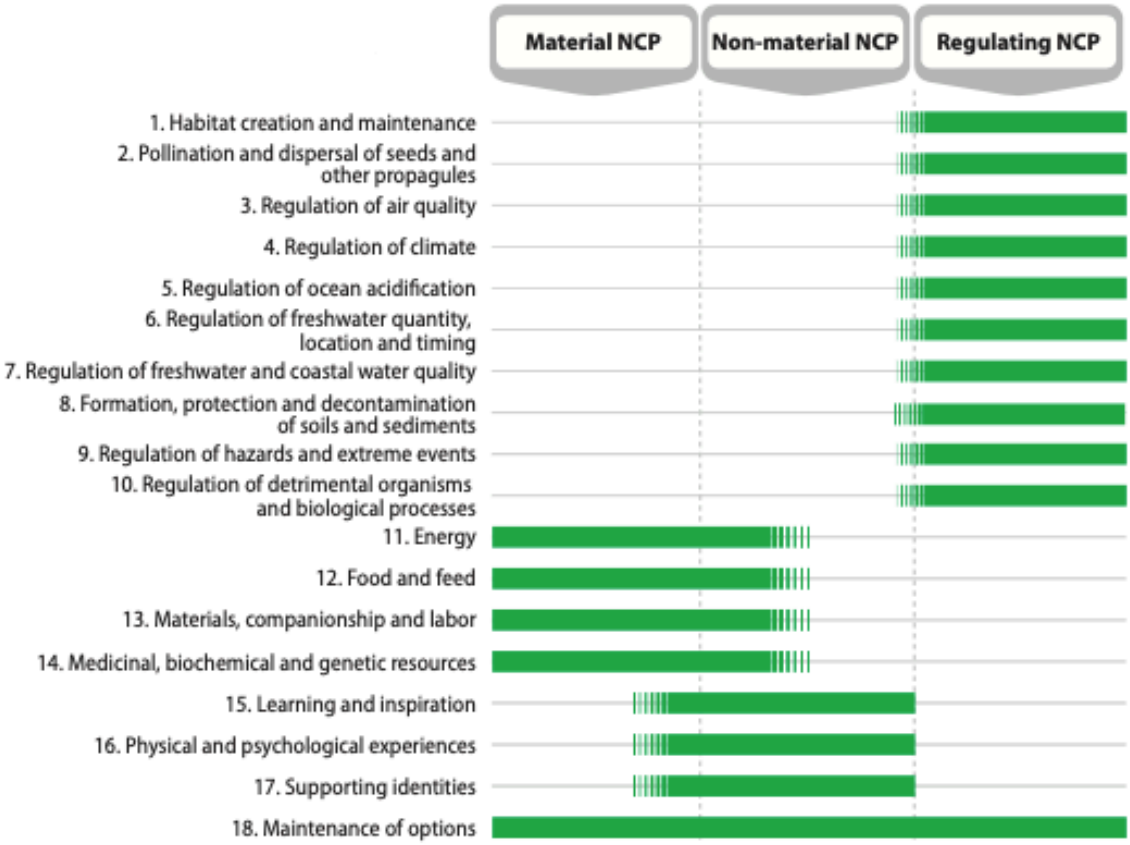

Figure 5: Mapping of the 18 NCP reporting categories onto three broad groups distinguished in the generalizing perspective. (Diaz et al., 2017)

Politics of Valuing Cultural Ecosystem Services

Engaging with and striving to understand the value of CES raise questions of governance, decision-making, and power. At the centre of these debates is the question of who decides what is seen and what is valued.

Market-based approaches to valuation have gained the greatest traction in ES assessments due to the relatively straightforward path to integrating such measures into decision-making and management processes. But, with respect to CES, the objections are multiple, including concerns about distortions in favour of those with wealth, crowding out of intrinsic values, and the common assumption that services in a market-based model are substitutable. For many people, the benefits they derive from nature and the value they ascribe to particular ecosystems are beyond market logic, they are central to identity, heritage, and sense of meaning.

CES draw critical attention to non-market valuation approaches, reminding managers and decision-makers that the people for whom nature's services are meant to benefit must be involved in

questions of valuation. Allowing multiple voices to be heard in the assessment process can guide questions about what CES are identified, how they are valued, and what activities are appropriate to support the maintenance of important services.

While ensuring multiple perspectives are incorporated in CES assessments is crucial, it is also important to engage communities and stakeholders in the design of assessment projects, decisions that arise from assessments, and overall organizational guidance. What this looks like varies considerably depending on the organizational context but is roughly captured in the aims of inclusive and participatory governance. In the context of Biospheres, the creation of inclusive governance structures has become prominent, especially as it relates to ensuring Indigenous peoples are included.

Innovation in Biosphere Governance

Mount Arrowsmith Biosphere Reserve (MABR) offers a useful example for how governance structures can be adapted to include multiple representatives. Formally designated in 2000, the MABR struggled for much of its first decade with limited support, both financial and otherwise, from community and stakeholders, as well as associated challenges with defining a productive vision for the organization. Despite these challenges, growing concerns regarding urban growth, natural resource extraction, fresh water quality, diminished biodiversity, and loss of traditional knowledge, language, and culture, reaffirmed the value and potential role of the MABR. In 2014, the MABR began a process of restructuring its board of governance to include with Indigenous governments, large-scale regional landowners, stakeholders, and multiple levels of government. Today, the renewed MABR is governed by a roundtable of representatives from each of these groups and have been successful in rejuvenating a range of projects in the biosphere region that are culturally appropriate and desired by the communities. Although none of these projects are focused on CES assessment, the existing governance structure is a strong example of how an organization can be set up in a way that could promote and guide an inclusive, culturally respectful CES process.

Methods for assessing Cultural Ecosystem Services

While much of the debate in the field of CES surrounds proper conceptualization of these services or contributions, an equally important and related issue is the practical challenge of assessment. Multiple methodological approaches have been developed, tested, and refined to identify and assess CES, which vary depending on the goals of the assessment process (Fig. 6). A review of these approaches is beyond the scope of this report, but several detailed methodological overviews and guidance documents for identifying and valuing CES exist (Cheng et al., 2019; Harrison & Dunford, 2015; Hernández-Morcillo et al., 2013; Kelemen et al., 2015; Plieninger et al., 2013; Raymond et al., 2014)

In brief, the methodological approaches for inventorying and evaluating CES can be characterized across various dimensions: whether they draw on quantitative or qualitative data or a mixture, result in monetary or nonmonetary valuations, involve stakeholders in the valuation process, facilitate deliberations and social learning between stakeholders, and whether they produce spatial representations of services. Each of these approaches can be used in isolation or combined in innovative ways to capture a comprehensive picture of CES.

Frameworks like NCP encourage practitioners to undertake the broadest possible assessments; however, practical matters such as time, skill, and resource capacity will determine what can ultimately be achieved. Decisions about which methods to employ in any given assessment need to be made based on the conceptual framework, project goals, and preferences of project partners.

Method	Quantitative or qualitative data	Preferences: stated or revealed	Valuation: monetary or nonmonetary	Stakeholder involvement	Deliberative	Spatial approach
Shadow pricing	Quantitative	Revealed	Monetary	No	No	No
Hedonic pricing	Quantitative	Revealed	Monetary	No	No	Yes
Travel cost/time methods	Quantitative	Revealed	Either	No	No	Yes
Production function approaches	Quantitative	Revealed	Monetary	No	No	No
Willingness-to-pay/accept	Quantitative	Stated	Monetary	Yes	No	No
Benefits/value transfer	Quantitative	Either	Either	No	No	No
Choice experiments	Quantitative	Stated	Monetary	Yes	No	No
Scaling methods	Quantitative	Stated	Nonmonetary	Yes	No	No
Ranking methods	Either	Stated	Nonmonetary	Yes	No	No
Time-use methods	Either	Stated	Nonmonetary	Yes	No	No
Photograph analysis	Quantitative	Revealed	Nonmonetary	No	No	Yes
Quantitative modelling	Quantitative	Revealed	Either	No	No	No
Geographic information system (GIS)-based	Quantitative	Revealed	Either	No	No	Yes

approaches						
Bayesian belief networks	Either	Either	Either	No	No	No
Narrative and artistic methods	Qualitative	Stated	Either	Yes	No	No
Scenario creation	Either	Stated	Either	Yes	Yes	No
Anthropological methods	Qualitative	Either	Either	Yes	Yes	No
Deliberative approaches	Either	Stated	Either	Yes	Yes	No
Participatory GIS	Quantitative	Stated	Either	Yes	Yes	Yes
Participatory modelling	Quantitative	Stated	Either	Yes	Yes	No
Expert opinion	Either	Stated	Either	No	No	No
Multiple/combined approaches	Either	Either	Either	Yes	Yes	Yes
Multicriteria decision analysis	Either	Stated	Either	Yes	Yes	Yes
Integrated assessment modelling	Quantitative	Revealed	Either	No	No	Yes

Figure 6: Overview of methods for cultural ecosystem service assessment (Hirons et al. 2016)

Engaging with Cultural Ecosystem Services

Due to the inherent complexity of CES, making sense of, identifying, assessing, and working with these types of services can be frustrating and challenging. The assessment process and the integration of CES into conservation and stewardship programs are contingent upon the context within which the work takes place, the geography, organizational and institutional structures, ecosystem health, social structures and capacities, and history. Although the challenge of working with CES may be daunting, the value of engaging with culture robustly and respectfully is immense. Below are several points that highlight this value and raise important considerations for undertaking CES assessment work.

- CES are a valuable part of any ES assessment and compensation program. Whether an ES assessment process is designed to develop a compensation structure for conservation and stewardship activities, or not, CES offer a vital contribution. Instead of being monetized and included as a separate ES alongside more easily defined and measured services such as wildlife habitat, CES can be supplemental criteria.
- Regardless of their inclusion in any formal compensation process, an understanding of CES can be used to promote and influence personal environmental behaviours and enhance the uptake of an ES program. A landowner may conserve a wetland based on several ES such as flood mitigation or water purification and receive compensation for those efforts, but, in addition, these efforts will often be motivated by nonmaterial justifications, such as a desire for stewardship or family legacy.
- Nonmaterial motivations and associations are often the most compelling reasons for conservation and need to be taken into account. As is the case with the formation of the Beaver Hills Biosphere, local communities frequently rise up in citizen-driven campaigns to press for conservation and sustainable development. Understanding how individuals and communities associate with and value the landscape is key to understanding their motivations, or lack thereof, for conserving an area and developing programs to support the goals of sustainable development.
- The process of inventorying and ascribing value to CES can create space for discussions about the political dimensions of environmental governance and decision making. In addition to the diversity of traditional Western cultural ideas about why an ecosystem is valuable, Indigenous, non-Western, and non-scientific perspectives are often overlooked or sidelined as a result of a focus on scientific and economic approaches. The concepts embedded in contemporary conceptualizations of CES can "increase the visibility of different socio-ecological values that remain masked by mainstream ES approaches to valuation. The CES agenda has the potential to open up discussions on the political dimensions of value in different ways, and as such it has the possibility of improving governance" (Hirons et al., 2016, p. 551).
- Inventorying CES can provide information that can deliver greater depth and dimension to projects unrelated to ecosystem assessment and compensation. One of the great appeals of the CES concept is that it highlights how socio-cultural values underpin all other ES. On the land education programs or food security initiatives, for example, can be enhanced and made more meaningful by the inclusion of cultural dimensions, which can be identified and understood through the CES framework and assessment process.

Indigenous Peoples and Biospheres

Often when the cultural dimensions of Biospheres are discussed and incorporated into conservation projects it is with respect to the traditions, ways of knowing, connections, and sacred places of Indigenous peoples. However, CES are not a simple solution for capturing Indigenous peoples' relationships to the land. As noted throughout this report, CES are complex, diverse, and require multiple approaches and perspectives to understand. Moreover, the ES framework is a very distinct product of the Western scientific tradition, which often does not mesh together easily with Indigenous ways of knowing. Therefore, employing a CES framework to understand and incorporate Indigenous cultures into the work of a Biosphere should be done in the spirit of reconciliation with direction from and in partnership with those communities who have an interest in the area.

There are many examples from across the country of Biospheres working to build meaningful relationships with Indigenous peoples. Some of the most innovative work is being done by those organizations that have actively sought to engage Indigenous leaders in Biosphere governance structures. Since its formation, the Georgian Bay Biosphere Reserve (GBBR), for example, has included members of the Wasauksing and Henvey Inlet First Nation on the board of directors and extended invitations to all Indigenous communities in the area. In the Clayoquot Biosphere Region the Board of Directors is comprised of appointments from Hesquiaht First Nation, Ahousaht, Tla-o-qui-aht First Nations, Yuułuʔiłʔatḥ Government, Toquaht Nations, District of Tofino, District of Ucluelet and the Alberni-Clayoquot Regional District Area C, as well as two At-large Directors. The knowledge and dedication of these members guides the work of the organizations and ensures communication with the communities. In 2018, the Canadian Biosphere Reserves Association developed a series of reflection papers and videos to highlight some of this innovative work. These resources can be found online at: https://www.biospherecanada.ca/reconciliation

- Interwoven throughout the previous points is the fact that inventorying and assessing CES can be a framework for gathering the story of the landscape and using that to tell vital and valuable stories. Underlying the concept of CES is a belief that the land has a story to tell. This is something that most people inherently know if only because they have their own story that is grounded in the places that they live, recreate, remember, and travel.
- The concept of CES reminds us why people care passionately about the management of particular areas, because, as Williams and Patterson eloquently explained, "resources are not only raw materials to be inventoried and moulded… but also, and more importantly, they are places with histories, places that people care about, places that for many people embody a sense of belonging and purpose that gives meaning to life' (Williams & Patterson, 1996, p44).
- Of course, CES are not the only framework through which to gather and tell these kinds of stories. Individuals have long sought to make sense of human-environment relations

through literature, art, environmental history, cultural landscape studies, landscape aesthetics, and more. Some of this work is already being undertaken or supported by the Beaver Hills Biosphere, but the CES concept, including its integration into a wider understanding of NCP or ES, provides a useful framework to gather these disparate studies, make sense of how contemporary populations benefit from the environment and use this information to inform management decisions and promote conservation.

Recommendations for Wetlands Conservation and Stewardship in the Beaver Hills Biosphere

As noted earlier, social and cultural dimensions are well-established as important components of the environment and are meant to be a priority for Biospheres around the world. However, this conceptual embrace has not often translated into practical application. The concept of CES offers a valuable resource for Biospheres to conceptualize and work with the complex arena of social and cultural dimensions.

Aiming to understand the multiple benefits of restoring and stewarding wetlands, the Wetland Conservation and Stewardship Pilot Project initiated by the Beaver Hills Biosphere Association is an innovative approach to addressing the above challenge. Work on this topic would be beneficial not only for the Biospheres' operations but would also help fill an important gap in our collective understanding. Despite a significant quantity of research on ecosystem services provided by wetlands (Xu et al., 2020), CES are largely neglected (Ajwang' Ondiek et al., 2016; Mitsch et al., 2015; Scholte et al., 2016) and no research was found highlighting the value of CES in Biospheres.

Below are several recommendations and points to consider when moving forward with an inventory of cultural ecosystem services.

- **Develop a clear understanding of CES**: While a program of inventorying CES for wetlands in the Beaver Hills Biosphere could be undertaken immediately, how that inventory looks, the types of CES that are assessed, how they are valued, and how they are linked to other ES needs to be determined first and a coherent overarching framework adopted, the NCP and the model developed by Fish et al. provide strong guidance.
- **Seek out non-monetary forms of valuation for CES:** Although potentially useful for supporting ES compensation systems, monetary valuations of CES are fraught with difficulties and should be approached with caution. Other means of valuation exist and can contribute to conservation efforts.
- **Remember that cultural and social dimensions are always present:** Whether CES are formally included in an ES compensation program, cultural and social dimensions should be considered during the design, implementation, and review of the program. As the NCP framework highlights, culture is woven into all categories of ES. Being aware of the political and conceptual challenges raised by CES will enhance any efforts to implement and gain support for an ES compensation program.

- **Ensure communities are engaged in CES analysis:** Decisions on how to undertake an inventory and assessment of CES, especially as they relate to Indigenous and Métis perspectives, should happen in discussion with stakeholder groups. The discussion put forward in this report, along with the well-developed frameworks and guidance documents, such as the NCP concept put forward by the IPBES, can support those conservations.
- **Incorporate culture as a foundation of strategic planning and operations:** Engaging with culture in a Biosphere setting can serve a range of purposes beyond the development of a compensation program. As such, the social and cultural connections that are integral to the stewardship of the region and the wellbeing of its residents should be integrated into all programs and initiatives. To ensure culture is part of the foundation of all Biosphere work, articulate and include it in strategic planning and visioning projects. For example, adopting a fourth guiding principle for the organization such as *Continued Connections* could inform, shape, and guide all programs undertaken by the Biosphere.

Menorca Biosphere Reserve

While the circumstances, including the history, landscape, and population of the Spanish Menorca Biosphere are much different than anything found in Canada, this organization offers a valuable lesson is clear strategic direction and integration of culture. Program planning for the Biosphere is grounded in five cornerstones: environment, social welfare, economy, culture, and tourism. Each of these cornerstones is built up through a course of action and, importantly for this report, culture is given a key spot as a one of the five cornerstones. In describing the culture cornerstone, the organization states that "culture is an essential part of the biosphere reserve. It represents a manner of understanding our world and the singularity of our people, and is apparent in a number of intellectual, artistic and artisanal pieces. It also constitutes an immense amount of intangible heritage that shapes the identity of the people; traditions and customs, oral tradition, language usage, etc. Additionally, Menorcan culture is a heritage that is quite alive, and its mark grows on a daily basis." (http://www.menorcabiosfera.org/)

Conclusion

The Beaver Hills region faces considerable environmental challenges arising out of rapid urban and semi-rural growth. An increasing human footprint in the area is creating pressures on the ecosystems that make up this region and threaten to reduce the quality of the ecosystem services that many people rely upon. While the Beaver Hills region is invaluable as a source of food, livelihoods, biodiversity, settlement, and quality water, it is also an area of deep cultural connection. For many who live in the area, the unique wetland ecosystems of the Beaver Hills are a source of personal identity, recreation, inspiration, and meaning. For the Indigenous and Métis peoples of the region, the wetlands and the landscape of which they are a part are integral components of their cultural traditions, ways of life, worldviews, and ongoing livelihoods. In all cases, the maintenance of these cultural dimensions relies upon the health and proper functioning of the overall ecosystems.

To support the conservation and stewardship of wetland ecosystems in the Beaver Hills region, the concept of ecosystem services has been drawn upon as a framework through which to understand the myriad ways that people benefit from the environment. This report aimed to provide an introduction to the concept of CES, which captures an integral part of the wider range of benefits to people and shed light on the ways that people value and care for the land. However, CES are not straightforward, they are deeply human and, as such, inherently complex and diverse. Decades of thinking and practice related to CES have resulted in a stronger understanding of how to conceptualize, identify, and assess the cultural dimensions of peoples' relationships to nature. However, despite the growth in understanding on this topic, CES remain a contingent product of the people and ecosystems from which they arise.

An approach to inventorying and assessing CES ultimately must be responsive to the goals of a project, the desires of communities and stakeholders, and be practically achievable. However, if taken on robustly and coherently, an analysis of CES can provide invaluable information that can support conservation and sustainable development.

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