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What does nature feel like? Using embodied walking interviews to discover cultural ecosystem services

> *"Walking, ideally, is a state in which the mind, the body, and the world are aligned, as though they were three characters finally in conversation together, three notes suddenly making a chord".*
>
> *(Solnit, 2001: 5).*

> *"What is currently called the "background" appears to be vague and peripheral, but I will show that it is a more precise kind of order. It functions in the formation of new and ever more precise scientific concepts".*
>
> *(Gendlin, 2017: 50).*

> *"There is no easy way to deal with cultural values, pertaining to ecosystems or otherwise. […] But it is not uncharted territory, and it is not a total quagmire: We can represent these values more fully and can, in so doing, greatly improve the validity and legitimacy of ES research and decision-making"*
>
> *(Chan et al, 2012: 755).*

Abstract

The development of cultural ecosystem services (CES) concept has progressed beyond the common categories of economic benefits from tourism and recreation, and yet definitions of CES remain vague and often shallow. It is necessary to develop methodologies that can more fully express the depth of meaning of non-material benefits humans receive from nature to both strengthen the conceptual foundation of CES, and to support the evaluation, management, and decision-making processes pertaining to protected areas and other environments. This study demonstrates how embodied interviews, conducted with informants while walking in nature, capture real-time intuitive and grounded perceptions of, and reactions to, four different ecosystem types and their associated services. The results provide a deeper and more nuanced understanding of diverse human-nature relationships and reflect two distinct groups of CES values or themes: general (common across research sites) and local (site-specific). The twelve General CES include cognitive and psychological services, among them calmness and newness, heightened imagination and curiosity, increased energy and motivation, and gaining new perspectives. Local themes differed from one ecosystem to another and included more biodiversity- and geodiversity-related values pertaining to local species and geology, as well as more sensory-based experiences.

1. Introduction

One recurring critique of *cultural ecosystem services* (CES) evaluation, i.e. the evaluation of the intangible benefits people receive from ecosystems (MA, 2005), is that most methodologies used to assess CES, particularly quantitative approaches, often miss the personal, intricate, and holistic experiences that ecosystems provide for people, and misrepresent the special relationships between humans and nature that evolve from these experiences (e.g., Chan et al., 2012; Daniel et al., 2012; Plieninger et al., 2015; Fish, 2016; Teff-Seker and Orenstein, 2019). This criticism comes from scholars who study CES, who have come to appreciate that the character of interactions between people and nature can be attributed to different types of values. Chan, Gould, and Pascual (2018) referred to three such types of CES values: *Intrinsic Values* (the worth of nature in and of itself); *Instrumental Values* (what nature does for humans); and *Relational Values* (preferences, principles, and virtues of human-nature relationships). Ecosystem Services (ES) have historically focused on instrumental values, and this has shaped the characterization of Cultural Ecosystem Services (CES) likewise as instrumental. However, some definitions of CES have evolved in the past two decades to include values that go beyond "instrumental" interactions with nature, indicating that CES can often have a highly subjective, abstract, and complex nature. These qualities are also the reason why it is difficult to evaluate these services using traditional assessment techniques (Chan et al., 2012; 2018).

Early CES assessments led to rather generalized, superficial lists of CES, that arguably promoted an a-cultural, disembodied, and decontextualized understanding of CES (Raymond et al., 2018). For instance, many early CES studies and large-scale assessments, (as well as some recent ones, e.g., Wangai et al., 2016; Santarém et al, 2020), focused predominantly on tourism and recreation, emphasizing revenue from tourism and related economic activity, while ignoring other user communities, values, and services (Pert et al, 2015; Teff-Seker and Orenstein, 2019). A practical ramification of this lacuna is that it prevents those who rely on such assessments, e.g., scientists, educators, park managers, and decision makers, from adequately valuing those benefits that inspire individual and community attachment to nature. Proper characterization of the depth and intensity of human-nature relationships, in both quantitative and qualitative terms, could strengthen positive public engagement with nature and catalyze concern and support for

conservation efforts (Daniel et al., 2012; Blicharska et al., 2017; Chan et al., 2018, Colléony et al, 2020), improving local land management practices (e.g., water planning, see Bark et al., 2015), and addressing place-based identity and indigenous land rights (Pascua et al., 2017). For these reasons, this study proposes an embodied, grounded methodology that offers new insights into the way people experience nature, and what they perceive to be the benefits of those interactions.

CES value types or categories have been the subject of some debate, and even large-scale assessment frameworks have differed in the way that they identify or classify them. The UN 2005 Millennium Ecosystem Assessment (MA) report addresses multiple types of CES: cultural diversity, spiritual/religious, indigenous knowledge, educational, inspirational, aesthetic, social relations, sense of place, culture and heritage, recreation, and tourism (MA, 2005:40). The Economics of Ecosystems and Biodiversity (TEEB) assessment also includes mental and physical health (TEEB, 2020), as does the UK National Ecosystem Assessment (UKNEA), with the latter adding life skills and capabilities (UKNEA, 2014).

Teff-Seker and Orenstein (2019) summarize these using six CES categories: Social and cultural identity; Spiritual values; Cognitive development; Recreation and tourism; Aesthetic values; and Mental and physical wellbeing. One can see relational values, such as heritage, identity, or mental wellbeing attributed to a specific natural area or landscape, as a composition of several (or even all) of the abovementioned CES categories. Relational values can also be seen as a separate CES category, or as a concept that precedes, transcends, and encompasses ES in general, and CES in particular, emphasizing that the attribution of value to an ES is based on context-specific human-nature interactions (Fish et al. 2016).

Even when CES categories are defined and agreed upon, CES assessment continues to be challenging. In fact, the UKNEA posits that CES are often the most challenging part of ES assessments due to inconsistencies not only in terminology, but also in conceptual frameworks, methodologies, and approaches to measurement (UKNEA, 2014). While quantitative biophysical and monetary assessments are the main tools for other ES evaluations, many CES are difficult to capture in such ways, partially due to their highly subjective and complex nature (Chan et al, 2012; MacBride-Stewart, 2019). Moreover, CES are not the product of a one-way interaction from the ecological to the social realm, but as noted widely in the burgeoning literature on relational values,

98 they are co-produced through complex and dynamic relationships between ecosystems and humans
99 (Fish et al., 2016; Chan et al., 2018; Gould et al., 2020; Orenstein, 2021).

100 Despite these challenges, CES assessments are of great importance. Studies indicate that
101 CES are considered by stakeholders and decision makers to be at least as valuable as regulating or
102 provisioningES (Martín-López et al., 2012). Additionally, the Millennium Ecosystem Assessment
103 asserts that human cultures, knowledge systems, religions, and social interactions have been
104 strongly influenced by ecosystems, and that lost CES are particularly difficult to replace
105 (Plieninger et al., 2013). Yet, despite their significance, CES are often underrepresented,
106 misunderstood, or misrepresented in decision-making processes (Gould et al., 2015; Blicharska et
107 al., 2017; Jones et al, 2020). For example, planning or land management decisions tend to ignore
108 or underestimate the importance of complex or place-specific values such as local identity, sense
109 of place, and spirituality (Ryfield et al., 2019; Jones et al., 2020). Blicharska et al. (2017) address
110 the challenge of operationalizing CES values, i.e., of providing scientific CES assessments that
111 can support practical decision-making. They support the *cascade model* suggested by Potschin and
112 Haines-Young (2011), which separates CES into resources and ecosystem elements (including
113 *structure and process*, *function*, *services*), and types of ways in which humans experience them
114 (*benefits* and *values*) (Potschin and Haines-Young, 2011, 2016).

115 However, Blicharska et al. (2017) suggest that additional aspects or dimensions should be
116 added to these five assessment categories. First, there is an underlying *spatial* dimension to the
117 cascade model that needs to be addressed in such assessments, including various landscape scales
118 and viewpoints. Second, it is important to include the *temporal* changes in both the ecosystems
119 themselves and in the way they are perceived by humans. Third, it is necessary to include different
120 *stakeholder groups* in CES assessments. Orenstein (2021) also discusses this third axis, which he
121 terms the "demographic dynamics of social systems", i.e., recognizing how the characteristics of
122 different demographic groups (among them age, education, gender, ethnic or religious affinity)
123 impact the nature and intensity of CES perceptions and values, and how these perceptions and
124 values change over time and across space. Lastly, Blicharska and colleagues argue that there is a
125 need for dissolving the ambiguous and confusing appearance of CES evaluations (the "shades of
126 grey"), and for creating a clearer *general* framing and evaluation method of CES, including CES
127 value categories, that can be applied across ecosystems and cultures (Blicharska et al., 2017).

Although CES are defined as *non-material* benefits that people receive from nature, much of the assessment literature is dedicated to economic (i.e., monetary) approaches. These use both direct monetary evaluations for services and related costs such as travel to national parks (i.e., actual expenditures), as well as indirect evaluations (e.g., local business income/willingness to pay), or other variables such as visitor numbers, recreational preferences, or health effects (Chan et al., 2012; Daniel et al., 2012; Cheng et al., 2019; Cabana et al., 2020). However, assessing additional aspects of CES with quantitative tools, including the economic assessment of spiritual or identity values, would be, by definition, inadequate, and provide limited insight into the true value of such services (Chan et al., 2012; Milcu et al., 2013). The conceptual shift, since the beginning of the 21st century, in understanding the complexity and dynamic quality of human-nature relationships and experiences suggests a need for a parallel shift in the methodologies used to assess them. Such methodologies are increasingly drawn from the social sciences and the humanities, including qualitative or mixed-methods research designs (Hirons et al. 2016; Cheng et al. 2019).

Qualitative methodologies can provide opportunities for including elements in CES evaluation that are difficult to quantify, and they have the potential to help gain a deeper understanding of CES components. Applied qualitative methodologies have included open or semi-open interviews and questionnaires, field observations, focus groups, action research, document analysis, participatory GIS, scenario analysis, and social media analytics (Milcu et al., 2013; Hirons et al., 2016; Cheng et al., 2019). While all these methodologies can provide important data, several meta-analyses of CES research find that even qualitative studies often do not address the intricate and complex human experiences derived from CES and conclude that new approaches are still needed to provide a holistic view of CES to support decision making processes (Ryfield et al., 2019, Jones et al, 2020).

For the purposes of our study, our definition of CES follows that of the Convention on Biological Diversity (CBD, 2020), which includes the biotic and abiotic elements and their interactions, and includes geodiversity, bodies of water, and climate. This supports a holistic and inclusive multifunctional landscape-based assessment, that sees landscapes as both aggregates of smaller entities, and as one (whole) entity (as in Termoshuizen and Opdam, 2009; Teff-Seker and Orenstein, 2019). In line with this approach, the current study also proposes that the

158 multifunctional nature and complexity of CES require an assessment tool that allows informants
159 to express both the intricate and the complex nature perceptions and values.
160 To this end, the current study took an embodied approach, which recognizes the
161 multifunctional and multi-dimensional nature – physical, mental, social, spiritual – to assess CES
162 and human-nature experiences. An embodied approach to CES assessment is one which addresses
163 the immediate, intuitive, holistic (simultaneously physical and mental) experience of a specific
164 person at a specific time and place. Raymond et al. (2018) support this direction, arguing that
165 investigating embodied experiences is an essential next step towards accounting for the dynamic
166 relations between individuals, cultures, and ecosystems. Tapping into personal and group
167 narratives of nature experiences and relational values would not only inform conservation and
168 recreation efforts, but also advance the values of justice and equity in decision-making processes
169 (Gould et al., 2020)
170 The current study applied an embodied protocol to walking interviews conducted in
171 protected areas officially designated as national parks or nature reserves. The study's main goal is
172 to ascertain what types of data and insights are discovered through embodied walking interviews.
173 In particular, it seeks to determine whether this methodology uncovers new and different CES
174 themes or categories, seldom found or utilized by other commonly used methodologies, including
175 qualitative methods such as open interviews or focus groups. The study applied an embodied
176 protocol to 120 walking interviews conducted in four designated protected areas, with each case
177 study in a different country and ecosystem. The following section will review the literature on the
178 two main parts of the methodology: walking interviews and embodied thinking (focusing).
179

180 2. Materials and Method

181 2.1. Conceptual Background

182 *2.1.1 Walking Interviews*

183 In the past two decades, geographers have begun to understand the scientific value of walking
184 interviews in acquiring knowledge that pertains to the relationship between people and their
185 environments. A survey of the available literature, however, indicates that the methodology itself,

i.e., its characteristics, advantages, and disadvantages, are rarely examined or assessed (Pierce and Lawhon, 2015). Additionally, most geographical studies that use walking interviews are conducted in urban environments. They are also mostly "go along" interviews, where the interviewer follows the interviewee, as opposed to walking in "contrived" paths chosen by the interviewer (e.g., Kusenbach, 2003; Anderson, 2004; Adams and Guy, 2007; Pierce and Lawhon, 2015).

Adams and Guy (2007) suggest that rather than diminish or distract from the human experience of a certain environment, walking interviews give a "*multisensual experience of the city, mediated through sound, smell, tactility, taste, as well as sight*" (2007:134). Moreover, Anderson (2004) claims that, for geographers, "*conversations held whilst walking through a place have the potential to generate a collage of collaborative knowledge*" (Anderson, 2004:1), including atmospheres, emotions, reflections, and beliefs, and offering more access to intellects, rationales, and ideologies. Anderson argues that these additional types of knowledge can go beyond externally generated knowledge generated by centers of power, and could therefore be seen as part of a post-modern effort to create more equitable and collaborative forms of knowledge (Anderson, 2004: 260).

Walking interviews have also been said to offer opportunities for minorities, under-represented, and/or oppressed people to better express themselves and relate their experiences. Harris (2016), in a study that analyzed the advantages and disadvantages of walking interviews with students of color, suggested these interviews "*allow the researcher to observe how participants' identities act as a filter to shape their perceptions of the environment, exposing the nuances of how one's background informs their interactions*" (p.369). Similarly, Warren (2017) found that walking interviews allow better insight into the experiences of faith, ethnicity, and gender minorities.

In their comparative study of sedentary versus walking interviews, Evans and Jones (2011) found that walking interviews produced more place-specific data, tended to be longer and were more spatially focused. They note that there has been a growing number of researchers using the methodology of walking interviews, at least in part due to current emphasis on sustainable and inclusive planning, encouraging practitioners to pay more attention to how individuals and communities value the spaces in which they live (Evans and Jones, 2011). Lynch and Mannion (2016) posit that the path and movement themselves are important, allowing interviewees to get

closer to the non-human elements of their environment and to be more place-responsive. Moreover, they argue that walking interviews also provide insights and constructive experiences for the participants themselves (Lynch and Mannion, 2016:334 and 341).

Walking interviews have additional advantages relevant for CES assessment: they generate richer data than sedentary interviews because interviewees are prompted by meanings and connections to the surrounding environment; they make participants more likely to give honest answers, rather than what they thought was the "right" answer to the interviewer's questions (Evans and Jones, 2011); they build better rapport between interviewer and interviewee in comparison to sedentary interviews (Harris, 2016); they allow both physical immersion and mental wandering; and they allow researchers to become better acquainted with the studied area (Pierce and Lawhon, 2015).

While walking interviews are not a novel methodology in themselves, walking interviews taking place in nature, with the intention of assessing CES, are rather unique. With the exception of Lynch and Mannion's work (2016) addressing the lack of research on non-urban walking interviews, all studies mentioned above related to interviews in urban environments, predominantly walk-alongs, with the goal of understanding connections between spatial elements and social-cultural identity and experiences. The current study thus stands out by using contrived, semi-open walking interviews in non-urban (relatively natural) areas, and with the specific purpose of evaluating the CES provided by these areas and their natural elements.

2.1.2 Embodied thinking ("Focusing")

Eugene Gendlin (1997) used the term *felt sense* to address a person's core embodied experience, which includes, but is not limited to, one's combined physical, mental, and emotional experience. Gendlin, a noted psychologist, created a process that facilitated a person's access, and enhanced their ability to address, their felt sense and communicate it in words to the listener, arguing that such practice has the potential to provide new insights for both the speaker and listener. Several subsequent studies have also supported using an embodied approach to study the psychological benefits of nature experiences (e.g., Williams, 1999; Wang et al., 2018). In addition to the original, therapeutic, practice of *focusing*, Gendlin also added the notion of *Thinking at the Edge* (TAE). In

TAE, focusers are encouraged to explore the felt sense and reach new conceptual insights that this unusual way of thinking and communicating allows, encouraging the focuser to step outside conventional ways of thinking or linguistic expression (Gendlin 2004, 2007).

While many variations and exercises involving focusing have developed since Gendlin first designed the process, the basic process of focusing includes a speaker and a listener-moderator. The speaker attempts to focus their attention on their felt sense, and the listener-moderator (originally the therapist) encourages them to do so, listens empathetically, and attempts to find patterns and "anchors" (i.e., linguistic expressions that seem to be central to the respondent's thought process). They then ask follow-up questions based on the content given to them by the speaker, inviting them to dig deeper into the felt sense and verbalize their experiences, opening additional paths of thinking, and encouraging them to reach and go beyond the edge of language and normative thinking (Gendlin, 2007). When transformed into an interview, the interviewer assumes the role of the listener-moderator, while the interviewee receives the role of the speaker.

Focusing traditionally includes the following six steps, summarized below:

1. **Clearing a space**: paying attention inwardly, separating the self from one's sensations, viewing them as if from the outside, the speaker asks themselves what they feel emotionally.
2. **Felt Sense:** The person then chooses one issue from what arose from the previous step on which to focus, allowing oneself to feel the unclear sense of it.
3. **Handle:** The person attempts to let a word, phrase, or image come up from the felt sense.
4. **Resonating**: Going back and forth between the felt sense and the word or phrase and check how they resonate with each other, letting the words change until the speaker feels they describe the felt sense accurately.
5. **Asking**: The listener echoes the words of the speaker and asks why the speaker characterizes the issue that way, allowing shifts in the subject.
6. **Receiving:** Receiving whatever comes with a shift, dwelling for a while on that expressed feeling. (Gendlin, 2007).

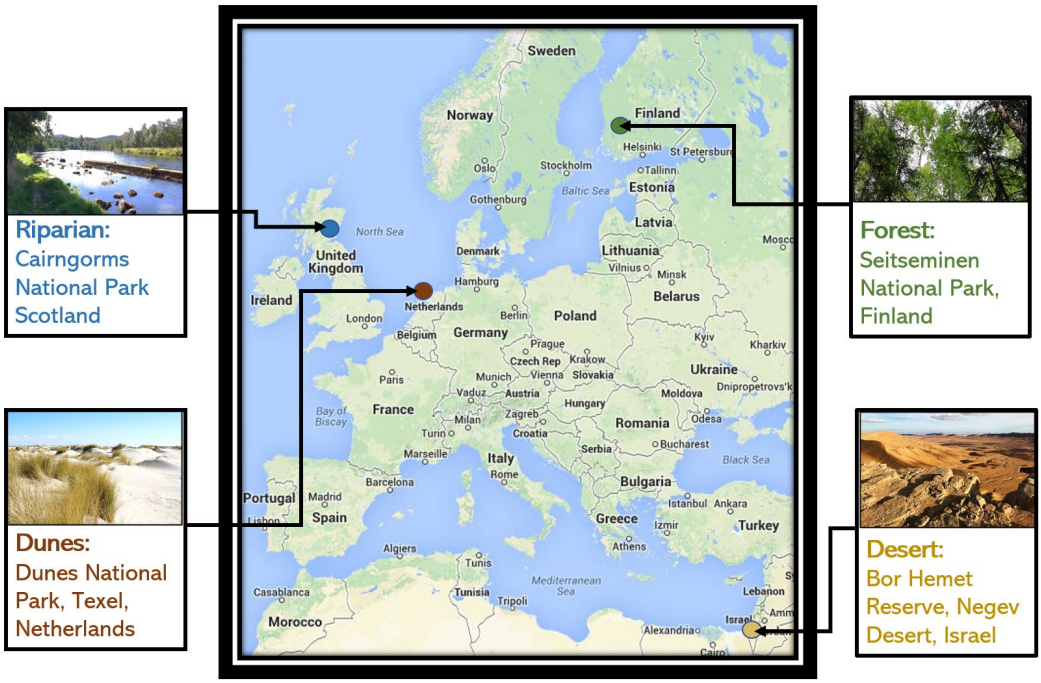
Tokumaru (2011) suggests that while focusing and TAE were and are used primarily for psychotherapy, they can be highly relevant for examining the relationship between people and their environments. Landscape Architect Ram Eisenberg, in his study of the TAE process in relation to landscapes, conducted sedentary (sitting) focusing sessions in peri-urban areas

(Eisenberg, 2016), and also applied focusing walk-along interviews in a study he performed for the Tel-Aviv municipality to assess the city's walkability. In the latter, he examined how embodied experiences related to participant moving patterns in urban areas, naturally "flowing" in certain paths and not in others (Eisenberg, 2018). Inspired by these examples, the current study chose to use embodied walking interviews (i.e., "focusing interviews") to discover and understand new types of embodied CES experiences of protected natural areas.

2.2. Site selection

The study, using a protocol for embodied interviews, was applied across four ecosystem types in four national contexts across Europe and the Middle East. All sites were in designated natural protected areas in their countries. These included Bor Hemet nature reserve in the Northern Negev Desert Highland, Israel; the coastal Dune Nature Reserve on Texel Island, Netherlands; an old-growth coniferous boreal forest in Seitseminen National Park, Finland; and a riparian forested park on the outskirts of Grantown on Spey, Cairngorms National Park, Scotland, UK (Figure 1). The study used contrived go-alongs, in which the participants walk on a predetermined path or trail, with only relatively limited off-path detours, due to reasons of participant safety or park regulations.

Figure 1: Location of the Case Study Sites



2.3. Interview protocol

The interview protocol used here was designed by Teff-Seker and Orenstein (2019), inspired by the work of landscape architect Ram Eisenberg (2016), who incorporated embodied thinking in his design process and teaching. The primary researchers also attended one or more workshops on focusing and TAE methodologies organized by experts in the field (L. Arch. Ram Eisenberg and Dr. Donata Schöller). The protocol is broadly based on the six *focusing* steps developed by Gendlin to address *the felt sense*, i.e., the genuine, intuitive, embodied experience. While the stages are not parallel to Gendlin's, the protocol does encourage participants to "make a space" in the first step, and then, for each successive step, follow stages 2–6 of Gendlin's focusing process (locating the felt sense, holding, resonating, asking, receiving what comes), inviting speakers to address their felt sense at each stage.

The protocol includes the following prompts:

1. ***Walk in silence*** *for a minute, noticing your breathing and how it feels when your feet touch the ground.*
2. *Describe the* ***physical experience*** *of walking here.*
3. *What comes up when you* ***look at the landscape*** *in front of you?*
4. ***Zoom in*** *on something and describe it. Why did it catch your eye?*

5. *Find a comfortable place to sit or stand.* ***Close your eyes****. Describe what you receive from your* ***other senses****.*
6. *Walking again,* ***give a name to your experience of walking here****. Why this name?*
7. *Did* ***anything else*** *come up during this walk?*

After every prompt, the interviewer asked non-leading follow-up questions that stem from the content provided and invite the interviewee to delve deeper and "think at the edge". The interviewer asked questions such as:

- *"**Why** do you think this is what comes up for you?" (e.g., if a speaker says that looking at the tree makes them sad, the listener-moderator can ask why it makes them feel sad);*
- *"**How** (in what way) do you mean?" (e.g., if a speaker says that the bird song sounds strange, the moderator can ask them what in what way is it "strange" to them);*
- *"**What else** (comes up for you right now)?" (when the moderator feels that one thread of thought has ended, s/he invites the speaker to address another aspect of their experience).*

Interviews were performed in 2017–2018, either in the local language or in English. Though not limited in time, most interviews lasted between 15 to 30 minutes, with some lasting up to an hour, according to the dynamic of the specific interview (no time limitation was set by the researchers). Interviews were not ended by the interviewer, but rather when the interview faded naturally after the last prompt, or with the participant indicating that they would like to finish the interview. Interviews were performed as part of a longer walk, with the total walk or stay in the protected area lasting between one and several hours (up to seven hours), according to the inclination of the participants. Eisenberg (2018) found that 20-30 minutes was the natural length of an embodied walking interview. In cases where a group of people walked the trail together, the interviewer and one participant walked separately, a few minutes before or after the group, out of hearing range and, when possible, out of sight, to allow for privacy and to decrease distractions.

2.4. Sample

In the current study, a total of 120 participants were interviewed, 30 in each site, a sample size that

is considered large for qualitative open interviews. While sample size norms and recommendations for qualitative open interviews vary greatly from one field to another, a meta-analysis of qualitative sample sizes in social studies performed by Sim and colleagues (2018), indicates that published recommendations range anywhere between four and 30 cases per case-study, and five to 35 for cases of grounded theory. Other researchers support "informational redundancy" as the main criteria for determining sample size, i.e., when the information received from each additional interview repeats that which was gathered in previous interviews (Sim et al., 2018). This redundancy was achieved at 30 participants in the first case study (Negev, Israel), and applied for the rest of the case studies thereafter.

The sample included people of different ages (12–76), gender identifications (65 female, 55 male), locals and non-locals, a wide range of formal educational achievement, ethnicities, residential status, and an assortment of professional backgrounds and occupations (e.g., teacher, supermarket employee, judge, engineer, cook, artist, tour guide, scientist, hotel manager, camel herder). To provide a sense of anonymity, due to the personal nature of these interviews, only first name, age, gender, and locality were collected for interviewees, although participants often added information about themselves during, before, or after an interview. While a certain extent of physical ability was necessary for participation, and trails were not wheelchair accessible, the physical ability and stamina of interviewees was also heterogeneous within these limitations. Participants were recruited using social media networks (predominantly local and tourist Facebook groups), local advertising, posters, on-site recruitment, and resulting chain referrals (i.e., snowball sampling). For additional information on the recruitment process, see *Text S1: Sampling, Recruitment, and Participation Process*; and *Text S2: Posters and texts used for participant recruitment*. For demographic distribution, see *Table S2*: *Case Study Demographic Sample Distribution* in the Supplementary Materials.

2.5. Data analysis

Interviews were recorded and transcribed, then analyzed, using thematic analysis via Atlas.ti, a Computer-Aided Qualitative Data Analysis Software (CAQDAS) used for thematic analysis of interviews and focus group discussions. In thematic analysis, once data are collected, the

researcher generates short descriptions ("codes") for parts of the text relevant to the research question or field. The researcher then finds recurring themes or thematic patterns among the codes and explains their manifestations and connections with each other in relation to the research topic (Aronson, 1994; Braun and Clarke, 2006). The current study used a grounded approach, i.e., ground-up or inductive analytical method, to discover the various types of CES-related insights that walking embodied interviews provide, without defining the theme categories beforehand. For instance, a participant might say "*The lake always seemed like an enchanted place for me when I was a child*", and the codes extracted might be "fond childhood memories" and "imagining the lake was magical". The themes extracted during the analysis process could then be, for instance: "lake", "memories", "childhood", "imagination", "magic", and "sense of wonder". Themes could also be aggregated into meta-themes, so for instance, "lake" could be added to themes like "river" or "sea" to create the meta-theme "bodies of water".

Each interview was analyzed separately, then codes from each group of 30 interviews from the same site were analyzed together, and finally all 120 were analyzed collectively. A "theme" was determined if at least 10% of the site sample respondents addressed it, to avoid purely individual or anecdotal themes. (Codes mentioned by 1-2 participants appear in the full theme list in *Table S1* in the Supplementary Materials). A validation process also took place, in which three or more researchers - at least one local to the case study country who was a native speaker of the interview language - compared their coding structure, themes, and interpretation of the speakers' statements. This was done to create common coding styles, and to ensure statements were not misunderstood due to cultural or other individual differences. An additional round of review was performed by the researchers to assure agreement on themes and meta-themes.

3. Results

The embodied interviews yielded CES categories which we divided into two sets of themes: those common to all four sites ("general" themes), and those unique to individual sites ("local" themes). These are described and explained below and in Figure 2. Among the demographic groupings of participants, divided by gender, level of formal education, occupation, age, or local versus non-

locals, only differences between locals and non-locals were noted. Respondents who were local to the research site, or formerly lived in the area, often expressed a sense of "being home" or in their "right place", evoking childhood memories and awareness of changes in the landscape throughout the years or seasons.

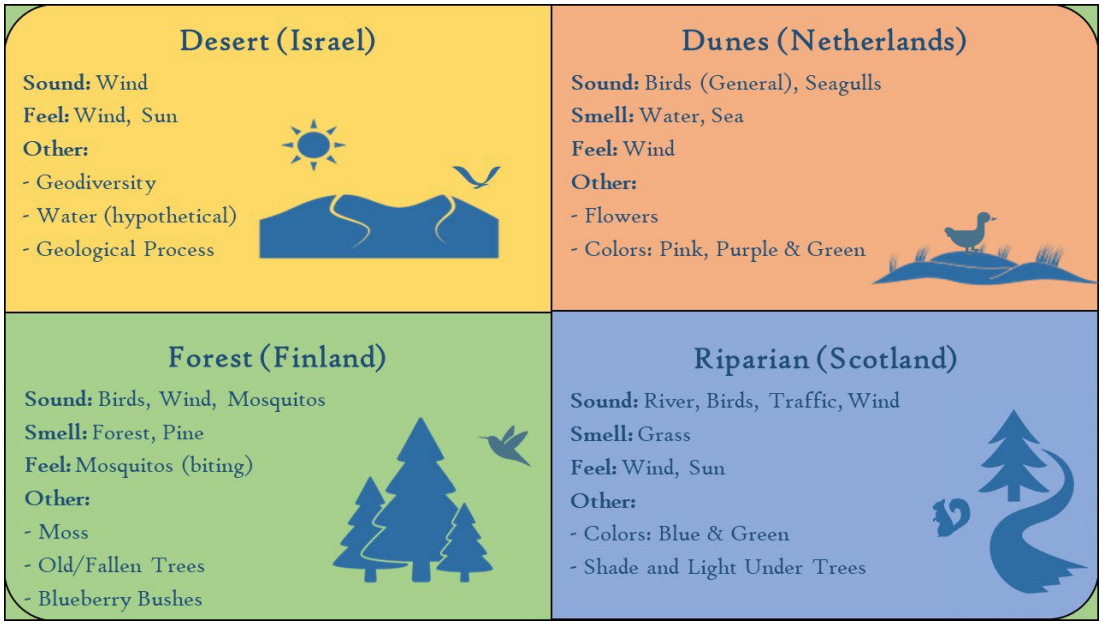
In the following subsections, we elaborate upon site-specific themes, i.e., local CES themes found in three (10%) or more of interviews for a specific site, followed by a description of the common or general CES, found in 10% or more of interviews in all four case studies.

1.1. Themes: Site-specific

For each site, interview analysis yielded unique site-specific themes, which were found to predominantly relate to the local landscape and include a more nuanced description of the elements that characterize that ecosystem (Figure 2 and Box 1). For example, in areas with an abundance of water birds, as in the Netherlands and Scotland, participants elaborated on what species of birds they heard or saw. In the case of trees in an old-growth Finnish forest, participants not only noted specific tree species, but also whether they were upright or fallen, if they were still alive or not, and whether there was moss, fungi, or lichen on them, and whether they looked pleasant to hug. In the Scottish riparian landscape, participants noted the sound of the river flowing over the rocks, the speed of the water, the smell of wet grass or the urge to sit on the riverbanks or jump into the river's waters. In the Negev desert, participants noted geodiversity such as rock formations, mountains, crevices, and caves (see Teff-Seker and Orenstein, 2019 on the importance of geodiversity for CES assessments, especially in dryland landscapes), the feel of the wind on their skin, and they often imagined what it is like when the dry riverbed is flooded with water. Negative experiences, predominantly anecdotal (referenced by 1-2 participants per case, and included in *Table S1*), were also usually case-specific. These included themes such as mosquito bites in Finland (the only negative CES mentioned by over 10% of a case sample), noise disturbance from nearby traffic in the UK, discomfort caused by rain in the European and UK cases, a fear of wolves in Finland, and fear of snakes, scorpions, and flash floods in the Israeli desert. Figure 2 below includes the most common themes for each case study, excluding general themes found in all four case studies and anecdotal themes. Sensory categories were highlighted due to their prevalence in

case-specific themes, expressing other aspects of physical experience that go beyond visual landscape characteristics (and also stimulated by the embodied protocol sensory prompts).

Figure 2: Local Themes



Box 1: Examples: Representative excerpts from interviews relating to local themes

Bor Hemet Nature Reserve (Northern Negev Desert; Israel)

- *"This environment is much more characterized by things in geology than by the animals. I [only] see a few species of plants… a few trees… so the stones and the colors of the stones and the features of them make up most of the changes in this landscape. […] I can think about where, and how they originated."* ***(Themes: geodiversity).***

- *"That tree looks fascinating. […] Stuck like that, in a place that you wouldn't expect it, and it has a story to it, it's also very big and has a very special shape, not characteristic of a tree, and it is also very dry. I can't see whether it's dead or resting here before the first rain, but it has something very dramatic about it. […] There's a story there. […] I respect anything who can survive in these conditions. It's something that evokes awe and praise for the creator for creating such amazing things."* ***(Themes: water: hypothetical, imagination)***

Texel Dunes National Park (Texel Island, Netherlands)

- *"It's a nice time of the year, you hear the birds sing. I'm a bird lover so I hear what species they are, and I see a lot of flowers I know. I know less about the flowers, but still, in these habitats I can recognize quite a few. So it's always, I really enjoy it and makes me forget about other things, just experience nature, that's what I really like."* ***(Themes: birds, here and now)***

- *"A couple of years ago these ponds were not here, but all of this landscape changes all the time […] Actually, I am not so interested why it's here, but more the experience it gives me, because I love it so much, it really makes, all those watery and the grassy small wetlands, make it [the landscape] even more beautiful."* ***(Themes: changes in landscape, smell: water).***

Seitseminen National Park (South-Western Finland)

- *"I see a lot of trees that have fallen down which is not something you see every day. And I do see the path as well, and kind of spots between the trees, which reminds you that it is a path that people walk quite a bit. And there's rocks on the path so that it is easy to walk so you get sort of…to actually sense the old forest more by yourself. […] [The forest] has aged by itself […] when there are fallen trees that have not been collected away. I myself see it as positive, yes, it's very full of biodiversity and I feel that there should be more forests like this."* ***(Themes: old/fallen trees, path).***

- *"There is much more light in this place. It's always interesting to see - we don't see it yet - the change that is starting to happen when the trees have fallen down and when the light comes, and it changes the nature. And also, what starts to happen to the trees once they are fallen […]. These trees already have mosses on them. […] The bark when it starts to roll away. And all these funguses that start growing. They are sometimes really beautiful, the funguses."* ***(Themes: moss, fungi, fallen trees)***.

Cairngorms National Park (Scotland, UK)

- *"It's nice hearing just the river flowing and the birds tweeting and the sort of smell, because it's been warm, it smells like flowery […]. The smell of sap and leaves."* ***(Themes: smell: river, sound: river, smell: flowers, feel: sun)***

- *"It's a lovely woodland, very shady, some dappling of light coming through the leaves onto the pathway. A sort of an earthy pathway with some ferns beside it. There's a breeze, there's the wind, the sound you know through the leaves... […] It feels right. It feels as it's supposed to be. […] I think there's lots of green, and I think there's something about green that's very calming. There's lots to look at, it's very natural, there's lots of movement, there's lots of shapes and colors. And I guess that's taking you away from all of the worries and the frustrations you would otherwise have and focus on that instead."* ***(Themes: colors: blue and green, calm/relaxing, shade and light under the trees)***

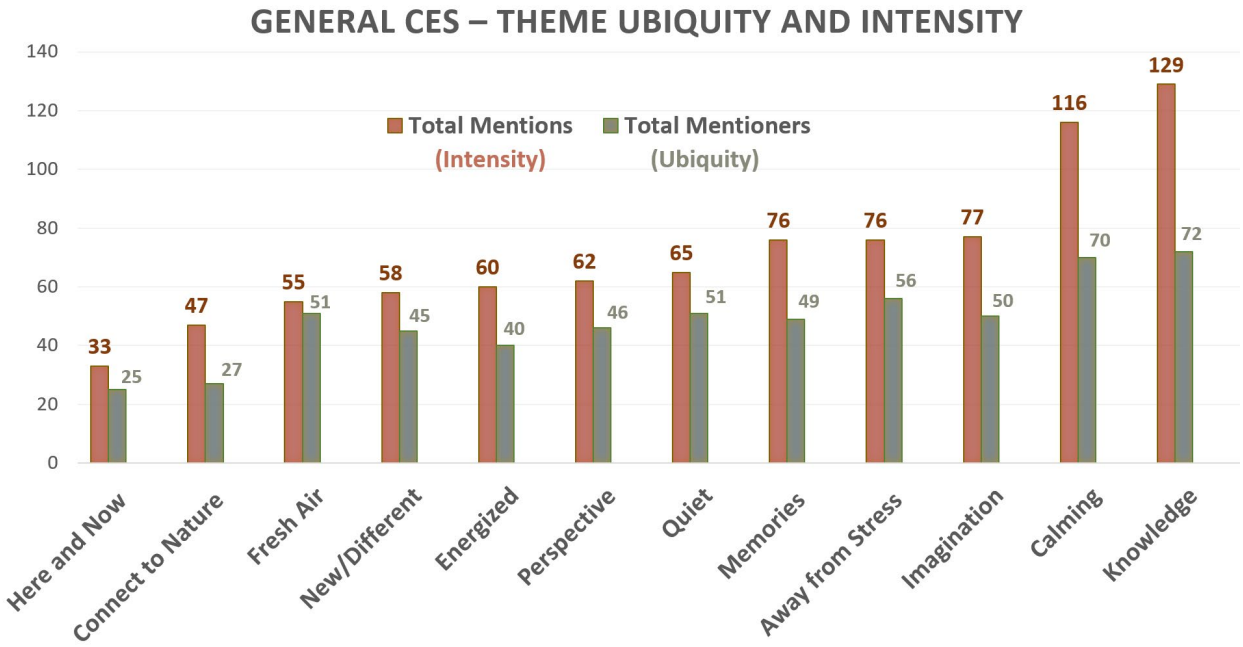
1.2. Themes: General

436 Certain themes were common across all study sites and formed a list of geographically pluralistic,
437 *general* CES. Twelve themes were common (10% or more) to all four case studies (Figure 3 and
438 Box 2): 1. Enjoying *knowledge* (desire to learn or share information); 2. A *calming* (mental and
439 physical) effect; 3. Activation of one's *imagination*; 4. *Getting away* from stress sources; 5. Fond
440 *memories*; 6. Audible *quiet*; 7. Gaining a *new perspective* on life or the world; 8. Feeling *energized*
441 or motivated; 9. Experiencing something *new or different* to everyday life; 10. Breathing *fresh air*;
442 11. Feeling *connected to nature*; 12. Being "*here and now*" ("in the moment").

Box 2: Examples: Excerpts from interviews relating to general themes
• *"Walking in nature often brings up memories, thoughts, contemplating things…Lots and lots of contemplating. In truth, not so much with how things are at that moment. A lot of dreaming, a lot of fantasies come up. We'll do this, we'll make that idea a reality, we'll be this way." (Israel).* ***(Themes: memories, perspective, imagination).***
• *"Walking is for me a type of meditation. And I smell, I hear, I feel, and I get in touch with nature […], and I calm down. Walking is for me to come to myself, and, yes, to get my thoughts clear, and…get sorted. […] It's different when I walk here [in Texel] and I walk at home…Here I feel I'm free and nothing, no problems. No thoughts about money or something like that. Just free and joy and…kind of happiness. […] I feel like a part of nature." (Netherlands).* ***(Themes: perspective, connect to nature, new/different, away from stress)***
• *"It makes me feel relaxed […] I also feel - it makes me feel kind of normal […] it makes me feel like natural, like this is supposed to be the landscape that I was supposed to see always, and not only when I come to this place". (Finland).* ***(Themes: calming, connected to nature)***
• *"I feel revived, I feel refreshed. I feel positive. Happy. Stress-free. It gives you a really good feeling to be alive and to experience it and […] nothing seems to be a problem. You can go head-on and face anything that gets thrown in your way." (UK).* ***(Themes: energized, away from stress, perspective)***

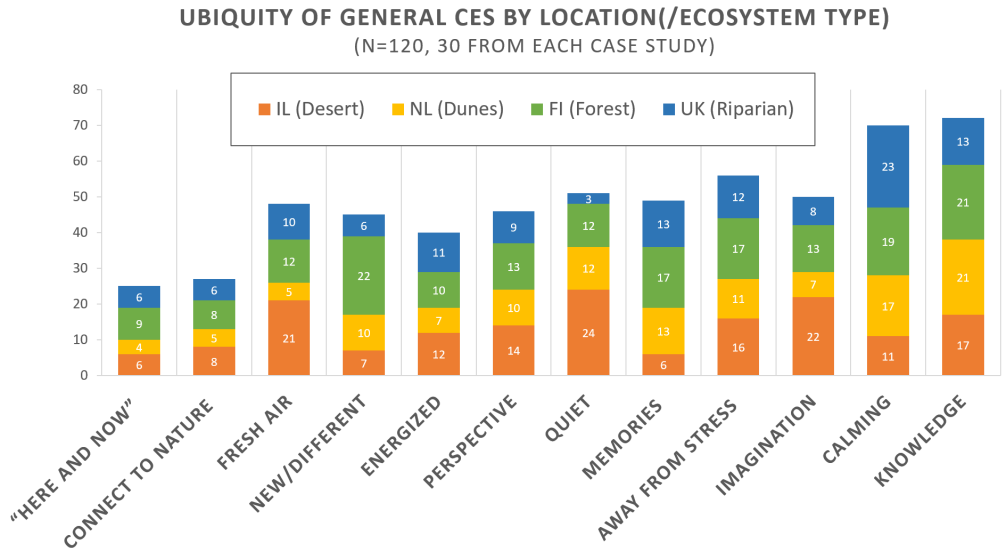
443

444 **Figure 3: General CES – Theme Ubiquity and Intensity**



As this is a qualitative study, the numbers presented in these figures do not purport to be statistically significant. They primarily aim to provide answers to questions of "what", "how" and "why", in regard to the existence of certain CES, with less emphasis on questions of "how much" or "how many". At the very least, it is possible to observe that some general CES might exist (or that they are perceived to exist) in many ecosystems and sites, but that they do so at different levels of intensity in each location or landscape and they are attributed to different aspects of landscape in each different ecosystem type (see Figure 4). Addressing not only ubiquity (how many participants mentioned a theme), but also intensity (how often a theme was mentioned in each site and across sites), could also provide additional insight into the relative prominence of that theme for the given case and sample.

Figure 4: Ubiquity of General CES by Location (/Ecosystem Type)



4. Discussion

The findings of the current study support the notion that embodied interviews can provide novel insights regarding the nature of CES values, and bridge some of the critical methodological gaps indicated by CES scholars. The methodology allows the representation of simultaneous appreciation of physical, mental, cultural, and ecosystem-based composite impressions, which in turn can provide new and different data that reflects the intricacies and depth of human-nature experiences, relationships, and values.

4.1. General CES Themes

The general CES categories presented here differ in some meaningful ways from those used by other methodologies, including non-embodied interviews, surveys, or group discussions, as well as the categories found in the Millennium Ecosystem Assessment (MA, 2005) and other large-scale ecosystem assessments, in which the assessment categories are decided by the scientists beforehand. Based on a bottom-up process, the general CES found in this study are at once specific and complex, but also often more abstract or vague. This is the result of the non-binary and non-exclusive way people experience nature and express themselves verbally. As the interview excerpts presented above demonstrate, real people simultaneously experience different senses,

different time periods, and different thoughts and feelings. The proposed embodied methodology provides an unconstrained and inviting platform for participants to think and speak of their experiences and can host the complex notions that make up a landscape's cultural services (as suggested by Gould et al., 2020, and Teff-Seker and Orenstein, 2019).

When compared to site-specific CES, it was found that *general CES*, prevalent across all sites, allow participants to relate more to emotional, cognitive, and other internal and holistic experiences, such as "memories" or "relaxation". Only two sensory themes, "fresh air" and "quiet", were found across all four ecosystem types, suggesting that they could be associated, cross-culturally and cross-ecosystem, with nature experiences in general. The findings suggest that the general CES discovered in this study could be viewed as a potential answer to the call from Blicharska et al. (2017) for CES general categories and evaluation parameters, which could dissolve the inherent ambiguity and vagueness of CES and create value categories that can be applied and studied in any ecosystem or society. Even if the list of twelve general CES might not fully apply to all ecosystems, cultures, or individuals, together with the suggested protocol it serves a useful tool to identify CES on a per-case basis.

4.2. Site-Specific (Local) CES

Using grounded theory to extrapolate CES-related themes, rather than pre-determined analysis categories, is another important part of the proposed methodology, providing a closer, more authentic representation of nature experiences that is less influenced by the researcher's preconceived hypotheses. Extracting *local* themes from the ground up is especially important because local cultural norms, concepts, and knowledge systems, in addition to unique ecosystem features, play an important role in how specific landscapes, local species, and human-nature interactions are perceived and experienced by those closest to them.

Site-specific themes are less abstract: they address local species, as well as physical or climate/weather elements, and include more site-specific sensory experiences. Nevertheless, local and general themes are not binary juxtapositions, and therefore cannot be easily separated. Interview content suggests that local and general services or values are intertwined, that they are both part of the individual's holistic nature experience, and that they shape, feed, and rely on each

other for their existence and development. Understanding the relationship between them, as it manifests in the embodied experience, can contribute to a better evaluation of relational services, place attachment, and local or place-based knowledge and culture (see Raymond et al., 2018).

These types of relationships, such as those that characterize place attachment, are particularly evident in the testimonies of those who perceive themselves as locals of a certain area, especially residents, past or present, of nearby villages, towns, or cities. First, many of them not only feel relaxed and free while walking the path, but they feel "at home", or, as others put it, as if they are in their "right" and "natural" place. Second, locals often recognize and appreciate the temporal ― seasonal, natural, or man-made ― changes a certain path and its surroundings reflect, adding another meaningful dimension to their experience. This additional temporal dimension is also present in the specific knowledge and attachment to that area's natural history and heritage. Third, the local landscape, fauna and flora carry memories, knowledge, connotations, and cultural symbolism that are embedded in locals' tacit, mostly subconscious, "felt sense". These findings are supported by those of Raymond et al (2018), whose work emphasizes the importance of recognizing spatial-temporal intricacies and changes and their relationship to cultural and social local knowledge and values, suggesting a need to include local and intimate spatial-temporal knowledge in CES evaluation, as also advocated by (other) local CES scholars (e.g., Flood et al., 2021).

4.3. Methodological Implications

These findings indicate that the methodology used in the current study, both on the data collection (interview) phase and in the analysis phase, could be used to answer the call made by scholars such as Gould and colleagues (2020) to broaden and deepen CES assessments, addressing the diverse and dynamic nature of CES, and recognizing individual and collective narratives of human-nature relationships and experiences. As they assert, using methodologies that incorporate all these aspects would support a more just and equitable representation of cultural and relational ecosystem services (Gould et al., 2020).

The results of this study indicate that embodied interviews, combined with the spatial-temporal changes allowed by the natural movement of walking, show a promising ability to extract

some of these local, cultural, and relational values and services. They have the potential to provide place-specific data for planners, park authorities, and local government officials that could aid these professionals in enhancing local values such as place-based identity, affinity to local nature, and general resident satisfaction and wellbeing. These insights could also serve to bring awareness to an area's natural value and attract day visitors and tourism to the area, as well as awareness to the environmental nuisances that detract from visitor experiences (e.g., artificial noise). The findings of this study regarding the method of embodied walking interviews therefore also address the factors mentioned by Blicharska et al. (2017) and Orenstein (2021) as ones that provide more authentic CES assessment than most disembodied methods: they can elicit spatial and temporal data, and they can allow some demographic dynamics and differences in CES perception (in this case locals vs. non-locals) to come to light.

Embodied (focusing) walking interviews can also be an integral part of, and offer a deeper qualitative foundation for, the inter-disciplinary and transdisciplinary scientific direction supported by many CES scholars. This could include a combination of a variety of qualitative, quantitative, and spatial methodologies (e.g., Chan et al., 2012; Daniel et al., 2012; Gould et al., 2015; Cheng et al, 2019; Jones et al., 2020; Cabana et al., 2020). The grounded CES themes found through these interviews can also offer a basis for qualitative and mixed-methods assessments (e.g., as a pool of topics on which to base CES survey questions), adding rigor to the scientific method and process, as well as interpreting them into actionable and more easily evaluated categories or services. Embodied interviews, when coupled with grounded analysis, enable a bottom-up approach, and thus extract CES themes, which are not based on the perceptions or interests (and therefore implicit bias) of the scientists or evaluators, but rather on the perceptions and values of the target population's stakeholders. This type of evaluation could provide a more accurate understanding of visitor experiences in general, but especially for scientifically and politically underrepresented groups who might have divergent landscape and ecosystem values, such as indigenous populations and ethnic or social minorities.

4.4. Limitations and Future Research

While all twelve general CES categories were found in all four case studies, they were not found in the same intensity or prevalence in all sites. It is difficult to suggest or justify an explanation for these observations without further study. These variances could be the result of differences in ecosystem features, but could also stem from local cultural or linguistic norms, or even from personal differences (with differences having a greater effect the smaller the sample size). However, the current study is a qualitative study, set out to explore the *types* of insights that the embodied walking interviews method might provide for CES evaluation, and as such is not statistically representative, nor should ratios be seen as statistically significant. However, these results could still be indicative of certain general trends that could be explored further, and if statistical significance is desirable, these findings could provide a basis for follow-up studies, which could include quantitative, and even participatory-spatial (PGIS or PPGIS) surveys (such as the surveys depicted in Fagerholm et al., 2021).

Embodied walking interviews, as depicted here, are also difficult to execute logistically, they are time-consuming and resource-intensive, and offer more abstract (yet deeper) analysis categories and findings. This is a form of tradeoff (quality for quantity) but coupling these interviews with other, less time- and resource-intensive CES assessment tools, quantitative, or qualitative, could also provide a larger sample size and facilitate implementation in additional sites.

Lastly, while some general CES found here could be relevant for other ecosystems and cultures beyond those explored in the current study, they should be further examined in additional and diverse cultures, landscapes, and ecosystems that were not included in the current study. The proposed list of twelve general CES is not an exhaustive or restrictive one, and additional case studies might indicate the existence of further general services or a regrouping or reconceptualizing of those introduced in the current study. Beyond these categories, while the methodology and protocol were designed to be flexible and tap into place-based experiences of CES in many landscapes and cultures, they could be tailored (e.g., by performing a pilot study with a limited local sample) for more accurate and authentic results for diverse settings, cultures, populations, and languages. This should include efforts to promote the participation and CES representation of demographic groups that are traditionally marginalized due to ethnicity, gender, immigrant status, or geographic location, and individuals or groups who are less likely to participate in outdoor

593 recreation and CES scientific evaluations (see Gentin, 2011; Johnson et al., 2001). Moreover, with
594 the exception of two Bedouin participants in the Israeli Negev case study, representatives of
595 indigenous populations or land-based cultures were not surveyed in this study, despite their
596 potentially unique contribution to CES evaluation. Future studies addressing these populations
597 could yield additional insights both into CES categories and perceptions, and the methodology
598 proposed herein holds great potential in this regard.

599

600 # 5. Conclusions

601 The study has shown that the methodology of embodied walking interviews in natural areas can
602 offer deep, substantial, and useful data regarding the cultural services that different ecosystems
603 provide. The study divided embodied CES themes into general CES themes (i.e., those that were
604 found across all case study sites and could be provided by nature in multiple types of ecosystems)
605 and local (site-specific) themes. Local themes were those found in one or some case studies but
606 not all, and they most often addressed either site-specific sensory experiences or specific biotic
607 and abiotic ecosystem attributes, such as local biodiversity, micro-climate, bodies of water, or
608 geodiversity. General themes tend to be more abstract (e.g., imagination) or subjective (e.g., quiet),
609 but were perceived as beneficial by residents and by multiple demographic groups across cultures
610 and landscapes.

611 Despite the intangible nature of CES in general, embodied interviews showed that many
612 participants, local and non-local, could provide clear, practical information, which is useful for
613 managers and planners. This includes direct and indirect reference to path accessibility, the state
614 of park and vegetation maintenance, infrastructures for facilitating visits and recreational activities
615 (e.g., benches, docks, huts), or noise disturbance from nearby traffic. These and other site-specific
616 themes, in addition to the frequency and intensity of the mention of general themes found in a
617 certain protected area or national park, could provide useful insight for park managers, planners,
618 and policy makers, to understand, promote, and enhance the cultural ecosystem services of nature
619 reserves and parks.

620

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