Recording Manifestations of Cultural Ecosystem Services in the Landscape

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Recording Manifestations of Cultural Ecosystem Services in the Landscape

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ABSTRACT Attempts at assessing the values people attach to ecosystems reveal profound methodological gaps regarding the non-material domains associated with aesthetic, spiritual or heritage values. This paper presents a new approach for trying to grasp these intangible benefits—conceptualised as cultural ecosystem services (CES)—based on the assumption that making use of CES leaves discernible marks on the physical landscape. We explore the potential for tracing visible manifestations of CES in a field walk-based landscape analysis. The results provide information on the character, significance, and spatial distribution of CES and allow for analysis in terms of correlations with landscape features or ecosystem services bundles. Based on our results, the method has two main strengths: 1) as an approach suitable for statistical analysis and integration with spatially explicit and quantitative data in comprehensive landscape assessment; and 2) as a simplified version which can generate valuable data for exploratory or complementary uses.

KEY WORDS: landscape values, landscape analysis, spatial analysis, quantification, ecosystem services bundles

Introduction

With increasing resource degradation, it is becoming more and more evident that ecosystems are essential for human well-being. Involving more than 1360 experts worldwide, the Millennium Ecosystem Assessment (MA) (2005) is the most extensive attempt to appraise the condition of, and trends in, the world’s ecosystems and the services they provide to people. To be able to comprehensively address the broad array of human needs related to nature, the study applies the concept of ecosystem services, defined as “the benefits people obtain from ecosystems” (MA, 2003, p. 49). A great share of the ecosystems worldwide are deliberately managed by humans. In such culturally modified landscapes, biodiversity and ecosystem services have often been sustained through a long and complex history of settlement and land use (Antrop, 1997; Jones-Walters, 2008).

Ecosystem services range from the provision of food, clean water and regulating services, such as flood and disease control, to a variety of intangible assets. These non-material benefits, termed cultural ecosystem services (CES), are obtained...
through “spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences” (MA, 2003, p. 58). According to a detailed MA outline by de Groot and Ramakrishnan (2005), CES include six subsets:

- Cultural identity, a category that focuses on the current cultural linkage between humans and their environment. The diversity of physical features surrounding people influences the diversity of their cultures. Cultural identity is closely connected with knowledge systems and languages.
- Heritage values, encompassing memories deposited in landscapes through past cultural modification. They can be related to land use practices that are maintained due to their historical value or to ancient elements of the cultural landscape, such as terraces.
- Spiritual services, comprising sacred, religious or other forms of spiritual inspiration derived from ecosystems.
- Inspiration, as landscapes provide a rich source of inspiration which can be expressed, for instance, in the use of natural motifs or artefacts in the arts or folklore.
- Aesthetic appreciation of landscapes.
- Recreation and tourism.

As the MA (2005) points out, there is a variety of strong linkages between CES and the determinants and constituents of human well-being, which often play a critical role in landscape-related decision-making. Recent research has demonstrated that, while provisioning ecosystem services tend to become less important in the course of economic development, human well-being remains strongly linked to CES, especially in developed countries (Guo et al., 2010).

However, the integration of CES in the overall analysis of ecosystem services and the development of corresponding management strategies and policies often remains unsatisfactory. It is especially difficult “to find meaningful ways of comparing the intangibles to the economic values generated from ecosystems” (Gee & Burkhard, 2010, p. 357), due to many open questions about how to explicitly assess CES. For example, the MA evaluated only three aspects associated with CES, namely spiritual and religious values, aesthetic values and recreation. For the other features related to non-material benefits—specifically cultural identity, inspiration, and heritage values—no data have been made available. Further, the recently conducted United Kingdom National Ecosystem Assessment (UK NEA, 2011) reveals severe gaps concerning knowledge, data, and evidence for cultural services and goods, while a study by Rey Benayas et al. (2009) draws a similar picture. The latter’s meta-analysis on the effects of restoration projects included 89 studies, using a total of 526 indicators for assessing project outcomes in terms of biodiversity and ecosystem service provision. Yet none of these indicators covered aspects related to CES.

Nevertheless, within the broad spectrum of disciplinary perspectives present in contemporary cultural landscape research (Jones, 2003; Palang & Fry, 2003; Schaich et al., 2010), there are some promising efforts being made towards advancing methods for assessing CES, especially through stronger consideration of social science-based methods and results (e.g. anthropology, ethnology, sociology). Common to these approaches is a focus on human perception, the significance of which is underlined in
the European Landscape Convention, particularly with its definition of a landscape as “an area, as perceived by people” (Council of Europe, 2000). Likewise, UNESCO’s efforts towards protecting and preserving representative cultural landscapes of ‘outstanding universal value’ through the World Heritage Convention are largely based on cultural traditions (Head, 2012). A global landscape convention currently under consideration by UNESCO is likely to assume a similar perspective (UNESCO, 2011). Such a focus could be a powerful tool for assessing CES not only in terms of the number of people affected (e.g. visitors for recreational purposes), but also revealing how non-material values and uses are constituted in socially and culturally stratified ways and how they are connected to specific features of physical landscapes.

The methodological backbone of CES assessments is the conducting of qualitative interviews with, for example, local populations about their perceptions concerning non-material ecosystem benefits. However, typical interview approaches entail some problems. First, people often are not aware of cultural landscape values. As Stephenson (2008) notes, there are general “shortcomings in the identification of landscapes’ cultural significance” (p. 127). People tend not to reflect on, for instance, the enrichment provided by landscape-based inspiration or aesthetic experiences, and as they are not or only partly conscious of these things, they are hardly able to readily articulate their thoughts about them for the interviewer. For this reason, interviews are often accompanied by triggers for raising awareness (e.g. asking interviewees to maintain a diary while going for walks; see The Research Box et al., 2009) or are explicitly conducted in settings where people are confronted with severe landscape-related problems, supposing that here people are more likely to be consciously aware of what they value (Stephenson, 2008). Second, even if interview partners are aware of non-material ecosystem benefits, they often find it difficult to express themselves about them in an interview context. This may have to do with lack of experience (e.g. many people are not used to talking about spiritual values) or with the impression that words generally do not provide an adequate vehicle. Another problem is based on the fact that interviews for analysing CES are, not least due to the characteristics just mentioned, necessarily intensive and in-depth; thus they can hardly be conducted using quantitative, standardised questionnaires. Consequently, studies on non-material landscape values or connections between physical landscape attributes and personal identity and well-being typically provide qualitative data (e.g. O’Brien, 2006). As data on other ecosystem services are mainly quantitative (e.g. amount of food produced or carbon sequestered), this makes it difficult to integrate study results into comprehensive reports on different types of ecosystem services and their trade-offs. Finally, data generated through typical interview techniques which do not integrate maps, photos or fieldwalks into the process do not deliver spatially explicit data, making it hard to relate non-material values to a specific place or feature of the physical landscape.

Taking these deficiencies into account, in the past few years great efforts have been made to complement interviews on CES with other methods. The project ‘Pathways to Europe’s Landscape’, for example, presents an approach building on (collective) narratives (EPCL, 2003). Sometimes participants are asked to take pictures as a starting point for interviews on landscape meanings; this is called photo elicitation (see e.g. Stewart et al., 2004). Dobson (2011) portrays community walking initiatives as an approach for detecting evidence of place attachment. Several studies have been
successful in mapping social and cultural values by integrating spatially explicit elements into their interviews, for instance requesting the participant to show on a map where he perceives the surroundings to be beautiful or where she goes to spend her leisure time (Brown, 2005; Fagerholm & Käyhkö, 2009; Tyrväinen et al., 2007). Countryside surveys and geographical information systems (GIS) are proving to be powerful aids for capturing diverse landscape values in a spatially explicit way. The tools ‘Historic Landscape Character Assessment’ and ‘Landscape Character Assessment’, commissioned by English Heritage and Natural England, have been particularly successful in providing a basis for gathering qualitative and semi-quantitative information on CES (Fairclough et al., 2002; Swanwick, 2004; Swanwick & Land Use Consultants, 2002; Turner, 2007). In sum, all of these initiatives underline the benefits of having a broad methodological toolbox for capturing intangible assets related to landscapes: ranging from land surveys through participatory GIS and focus-group sessions to post-experience in-depth interviews (compare Brown & Weber, 2012; Norton et al., 2012; The Research Box et al., 2009).

The obvious necessity to complement interviews, that is, methods focusing on evidence expressed by means of language, with approaches addressing specific places, landscape features or landscape-related activities, forms the background of this study, which started from the consideration that land uses leave visible marks in the landscape. This is self-evident in cases such as food production, where grain or remnants such as bales of straw, can clearly be seen in fields. But the underlying assumption of the method presented and tested in this paper is that making use of non-material services also leaves such marks on the physical landscape. From this perspective, there are visible manifestations of CES, and the basic idea of the proposed approach is to record such visible signs of people actually using ecosystem features in a non-material manner.

The present study aims at developing and testing the method, rather than achieving profound results for a given area. With this in mind, three questions are addressed:

- Is it possible to trace visible manifestations of CES in a systematically conducted landscape analysis?
- What types of CES become evident through visible manifestations?
- To what extent does this approach allow for a spatially explicit assessment and quantification of CES?

Focusing on visible manifestations of use, we have combined a classical survey of landscape features with an activity-based assessment of landscape values. Activity, meaning here the experiencing of landscapes, is a crucial constituent for landscape values, as highlighted by several authors. Eiter (2010) presents an extensive discussion on land use as a specific way of experiencing and perceiving landscape values. Smith (2006) studies heritage values, describing heritage as a cultural process of acquiring or engaging with a sense of history. From her perspective, physical heritage sites provide “background, setting, gravitas and, most importantly, a sense of occasion for those both passing on and receiving cultural meaning, knowledge and memories” (p. 46). Stressing experiences in their importance for the constitution of values, she states that “the sites themselves are cultural tools that can facilitate, but
are not necessarily vital for, this process” (p. 44). This insight on the relationship between physical features and activities is also reflected in the general landscape values model developed by Stephenson (2008), where human activities form a fundamental component of values related to landscapes. All these approaches are strongly influenced by phenomenology, which strives to understand and describe worldly phenomena as experienced by human beings. In its focus on traces in landscapes which reveal activities in the past, rather than on the activities themselves, the method presented in this paper particularly parallels phenomenological studies in archaeology (Brück, 2005; Tilley, 1994, 2005).

Methods

To investigate visible manifestations of CES, the approach outlined above was tested within the study area of a multi-faceted research project on ecosystem services in the Swabian Alb Biosphere Reserve in Germany (Research Group Ecosystem Services, 2011). The basic task of the inventory carried out was to systematically record visible signs of use for non-material purposes in the investigation area. For this, systematic fieldwalking was employed, which in its basic approach is comparable with methods common in archaeology (see Foard, 1978; Grant et al., 2008). It comprised walking over the whole study area, following a constantly revised plan attempting to ensure that, at a minimum, all relevant marks of more than one metre in extension would be detected, though some marks found were smaller. The plan did not comply with a grid of walking lines at fixed distances, but was rather determined by the geomorphology and density of vegetation as the main factors influencing visibility. The procedure was open: there were no pre-defined categories or indicators. The area was assessed using the following question: what signs of use relating to non-material benefits or rather CES can be seen? This could encompass trail signs for hikers or campfire sites as indicators for recreational uses, benches at scenic viewpoints as indicators for aesthetic uses, or wayside shrines as indicators for spiritual uses.

Some further guidelines were applied. First, in order to achieve more decisive results, only observed indicators for a predominantly non-material use were recorded. A number of landscape features are connected to different uses; a pathway, for example, can be used by agricultural machinery, thus serving food production activities, but can also be used by hikers. According to our scheme, only a pathway that predominantly has the character of a hiking trail would be included in the inventory. Second, the focus of the inventory was on relatively permanent signs. Short-lived indicators which could only have been found by coincidence (e.g. the observation of a person taking a picture) were not integrated within the survey. The guideline here was that a manifestation should be visible for at least one year or rather year round. Finally, to test what kind of results can possibly be derived from this particular approach, only those signs actually visible in the landscape were included, whereas general background information (e.g. information on hiking trails demarcated in tourist maps) or information obtained through other methods, for instance from interviews with people encountered in the investigation area, was not used. In order to achieve spatially explicit results, each visible indicator of a CES was mapped on site during the field tours. For this, a topographic map (scale 1:25 000) was used; additionally, aerial photographs helped to pinpoint indicators.
We tested the approach in the summer of 2010, using an investigation area in the district of Unterlenningen (Figure 1), belonging to the low mountain range of the Swabian Alb in southwestern Germany. To reduce the number of variables, the analysis focused on a single land use type, namely the region’s typical form of orchards, called *Streuobstwiesen*: meadows relatively sparsely stocked with fruit trees, mainly apple, cherry, plum and pear trees. The meadows are predominately used for livestock (grazing, haymaking); meanwhile, the trees provide fruits for direct human consumption or as a basis for juices or spirits. In the Swabian Alb region, this special form of agroforestry characteristically forms a large belt around villages, ranging from the bottom to the lower and middle sides of the area’s valleys.

**Figure 1.** Location of the study area in the Unterlenningen district, Germany.
The investigation area comprised the western part of the Streuobstwiesen belt around Unterlenningen, covering 19 hectares. Following a systematic plan as outlined above, the fieldwork, conducted by a single person, took 14 hours overall.

For analysis, the data gathered in the field were integrated into a geographic information system, using ArcGis 9.3.1 software. Most of the features were characterised as points (e.g. benches) and a few as lines (e.g. hiking trails). Due to their very limited spatial extent, gardens and huts were also integrated as points; areas were not calculated for any manifestations. In order to organise the data in an interpretable form, recorded indicators were grouped in categories according to similarity of use: all facilities serving as seating were assigned to the category ‘benches’, for example, and all indicators in the context of gardening formed one category. These use categories were then correlated with the different types of non-material benefits (i.e. CES) described by the MA. Determination of which sign predominantly serves which use and which type of non-material benefit was carried out on the basis of existing knowledge on land uses and their meanings and attributed values in the region.

**Results**

Applying the approach outlined above, a total of 61 manifestations of CES were recorded in the investigation area, grouped into seven categories based on similarity of use:

- **benches** (11 counts): this category comprised a number of seating installation types, sometimes also equipped with tables (Figure 2).
- **hiking trails and signs** (10 counts): signs recorded serve as guides for hiking or cycling trails or indicate directions to places of interest (Figure 3). Some trails were classified as pathways predominantly or even exclusively used for recreational purposes (because they do not permit the use of cars or agricultural machinery).
- **recreational facilities** (eight counts): small private huts in the meadows (often with a terrace, flowers, currant bushes and so on; see Figure 4), indicating a leisure time use, were associated with this category, but also well-established campfire places and, as another example, a rope ladder hanging in a tree.
- **subsistence gardens** (19 counts): small gardens can be found in the Streuobstwiesen, some with a fence around them, others not (Figure 5). Here, mainly vegetables are grown, obviously for self-subsistence use. These were classified as manifesting a predominantly non-materially motivated use, and not as an indicator for a provisioning service: small-scale gardening in Germany is mainly undertaken for recreation and also as an expression of a specific way of life entailing tasks and values such as growing things by hand, doing physical work, or introducing children to nature.
- **hunting facilities** (six counts): this category comprised elevated hunting blinds. Hunting in Germany is usually practised for recreation. Like gardening, it entails strong connections to questions of identity, but also to social relations: it can be treated both as an expression of how you see yourself and how you want others to see you.
memorials, commemorations, historical sites (five counts): recorded manifestations are indicative of cultural ties to the past. For example, some sitting benches were equipped with commemorative plaques (Figure 6), but there was also a little heart with initials cut into the bark of a tree. Another example is a quite well-preserved castle from the fourteenth century in the investigation area, with signs informing visitors about the history of the place.

other (two counts): as singular occurrences, these manifestations could not be assigned to a specific category. A small Christmas tree plantation likely indicates religious values, but as a source of subsistence it is also connected to identity. The other example is a small, artificial pond in the orchards. Somebody invested much work in constructing it, which no doubt reflects non-material values; it remains a matter for speculation to draw conclusions concerning the specific character of these values, though.
During the fieldwork an unexpectedly high number of temporary signs of non-material uses were observed; however, according to the predetermined guideline, these were not included in the survey (e.g. horse droppings from recreational horseback riding, chairs standing alongside a path, evidently waiting to be removed after having been used for a party in the Streuobstwiesen). There were also a number
Figure 4. Private hut in the orchards.

Figure 5. Small vegetable garden.
of signs with dimensions of less than one metre, especially a number of nest boxes for birds. As the detection of all of these signs could not be guaranteed, they were not considered for further analysis.

The manifestation categories were linked with the types of CES outlined in the MA (Table 1) as follows: identity was associated with the subsistence gardens, hunting facilities, the pond and the Christmas tree plantation (Figure 7a). Heritage values were indicated by the manifestations grouped under ‘memorials, commemorations, historical sites’ (Figure 7b). The Christmas tree plantation was the only sign found of possible spiritual values; moreover, we were not able to clearly relate any visible manifestations to inspirational services. Aesthetic experiences were associated with benches (Figure 7c) and, finally, there were a relatively large number of recreation indicators: hiking trails and signs, private recreational facilities, benches, subsistence gardens, and hunting facilities (Figure 7d).

![Image of a commemorative plaque](image-url)

**Figure 6.** Commemorative plaque on a bench in the orchards (“To the memory of Miss IRMA LEUZE, Swabian Alb Association, local chapter Owen”).

**Table 1.** Types of cultural ecosystem services and associated visible manifestations.

<table>
<thead>
<tr>
<th>Type of cultural ecosystem service</th>
<th>Associated visible manifestations</th>
<th>Number of associated visible manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity</td>
<td>Subsistence gardens; hunting facilities; pond; Christmas tree plantation</td>
<td>27</td>
</tr>
<tr>
<td>Heritage</td>
<td>Memorials, commemorations, historical sites</td>
<td>5</td>
</tr>
<tr>
<td>Spiritual services</td>
<td>Christmas tree plantation</td>
<td>1</td>
</tr>
<tr>
<td>Inspiration</td>
<td>–</td>
<td>0</td>
</tr>
<tr>
<td>Aesthetic services</td>
<td>Benches</td>
<td>11</td>
</tr>
<tr>
<td>Recreation</td>
<td>Hiking trails and signs; recreational facilities; benches; subsistence gardens; hunting facilities</td>
<td>54</td>
</tr>
</tbody>
</table>
Integrating data about these manifestations of non-material uses into a geographical information system provided spatially explicit information indicating where cultural services are derived from in the investigated area. Manifestations are clearly not distributed evenly across the Streuobstwiesen. On the contrary, the study reveals hot spots of CES provision in general as well as hot spots for specific CES

Figure 7. Spatial location of manifestations regarding the following types of cultural ecosystem services: a) identity, b) heritage values, c) aesthetics and d) recreation.
types, some of which showed clearly patterned relationships, such as that between
topographic features and aesthetic services.

Preparing the results in a visual, spatially explicit manner also suggests common
combinations or bundles of CES. For example, places demonstrating heritage values
usually also provide recreational and aesthetic services (compare bottom right in
Figure 7b, 7c and 7d with the area around the castle). Likewise, visualisation may help
to detect linkages between landscape features or characteristics and CES. For instance,
Figure 7c points to connections between aesthetic services and topography. However,
due to two methodological constraints, these results can provide only tentative insights.
First, some manifestations are associated with more than one type of CES (e.g. benches
are associated with both aesthetic and recreational services). Consequently, since some
types of CES are based at least partially on the same indicators, it does not make sense
to discuss correlations between them; thus, investigation of correlations would only be
possible for manifestation categories which exclude each other. Second, statistical
analysis regarding the correlations between different types of CES—as well as between
CES and specific landscape features—was not possible due to the exploratory character
of the study and its small number of counts.

Discussion

Tracing Visible Manifestations of CES through Landscape Analysis

Although the method presented here appears to be quite applicable for moderately
open landscapes, such as the fruit tree meadows (Streuobstwiesen) we studied, it may
not be feasible to employ it on landscapes with less visibility, such as forests, which
may require inordinate investments of time. Conversely, applying the approach in
very open, less-structured landscapes could also provoke difficulties. Here problems
could arise due to the likely necessity of increasing the size of areas under
investigation, as the scale of uses and their manifestations would generally be more
extended in very open than in highly structured landscapes. This need for larger
investigation areas would disproportionately increase the amount of time needed for
conducting surveys, as it would still be necessary to walk over the whole area in
order to subject it to close inspection.

It is important to note that when carrying out an inventory of visible manifestations
of CES it is not possible to clearly distinguish between recording and interpretation.
Recognising a landscape element as a manifestation of a cultural service implies
judgements about its potential uses: a bench, for example, is used for sitting down,
resting, enjoying scenery and, thus, is seen as serving aesthetic and recreational
purposes. Another—and equally possible—interpretation could be that benches also
serve inspirational or are even connected with spiritual purposes. This shows that, as in
the case of interviews, the data generated by this approach are to an extent coloured by
researchers’ perceptions and interpretations. Therefore, in order to achieve transpar-
ency, it is very important to outline and explain the indicators used, basing them
specifically on existing knowledge and conventions regarding land uses and place
attachment in the area investigated. It is thus impossible to develop a standard procedure
for recording visible manifestations of CES—at least not in the sense of a universally
applicable guideline regarding what kind of manifestation counts as an indicator for a
particular type of CES. However, scientific agreement could be achieved concerning a
given place, resulting in context-specific guidelines. For such context-sensitive
identification of patterns or structures of meaning, understandings and expressions of
land use in a given region, drawing on reconstructive methods applied in the analysis of
qualitative interviews should prove quite helpful, including approaches based on
Grounded Theory (Glaser & Strauss, 1967) or Objective Hermeneutics (Reichertz, 2004).
As hypothesised, the use of CES could indeed be traced in terms of visible
manifestations in the investigated study area. It was possible to systematically record
these manifestations of CES, to quantify them and to integrate them into spatially
explicit representations (map/GIS). However, there are some issues constraining this
general result. First, in practice it proved difficult to handle the temporary character
of many manifestations. A considerable number of indicators for non-material uses
were only perceived by coincidence and, thus, could not be integrated into a more
systematic analysis. As such, this potentially rich source of data could not be fully
incorporated within the chosen approach, which only takes into account those
indicators which can be completely quantified.
Second, this exploratory study shows that visible manifestations are good indicators
for some, but not for all, types of CES. For instance, it was not possible to find any
indicator for inspirational services, even though it is highly probable that people do
actually derive inspiration from the investigated Streuobstwiesen. In this instance, the
landscape is probably not the right place to look for manifestations, and indicators
might be better found in places like local art exhibitions, regional literature and poetry,
or children’s kindergarten drawings. Another possible approach for capturing these
services is revealed by the study of The Research Box et al. (2009) that associates certain
physical landscape features with the delivery of cultural services (p. 96, Table 10.3). In
this sense physical features may be used as basic proxies for intangible qualities.
The framework of the MA distinguishes different types of CES. Drawing on this, the
present study has also associated manifestations with different types of CES. However,
it is often not possible to exclusively associate one manifestation with one type of CES.
Instead, a number of manifestations serve as indicators for two or more CES. Non-
material ecosystem benefits, or rather their indicators, can overlap. Taking this into
account, analysing CES in terms of isolated, single units should be seen only as a first
step, which should then be followed by investigation of the coherence of the located non-
material benefits as a whole. This means that we need to explore typical combinations or
bundles of CES (Raudsepp-Hearne et al., 2010), for instance between heritage,
recreation and aesthetic values, as the tentative results of this study suggest. Being able
to correlate the different types of CES, both among themselves and with other ecosystem
services, could also prove a great step forward in assessing those ecosystem services
which up to now have been very difficult to grasp, such as identity. If the linkages
between these services and others are known, we may be able to use indicators which are
easier to assess as proxies (for instance, official data on recreational uses).

Spatially Explicit Assessment and Quantification of CES
An important aim of this study has been to test the extent to which the presented
approach allows for a spatially explicit assessment and quantification of CES. The
results show that, with some limitations, both are possible.
The visualisation of CES manifestations on maps or within a GIS not only allows for spatially explicit assessment, such as in terms of ecosystem service hot spots or areas where provision of benefits is low. As already pointed out, the application of statistical methods would also help us to identify common connections between different ecosystem services and between ecosystem services and landscape features. Furthermore, the data can be linked with other spatially explicit information, such as management plans or designated protected areas. Repeated analyses of visible manifestations of CES could likewise provide a monitoring tool.

Nevertheless, in relation to some types of cultural ecosystem services, we are faced with a mismatch between the location or scale of a visible manifestation and that of the related ecosystem service. A good example of this from this case study is the inspiration derived from the investigated area, which does not seem to be openly manifested on site, but rather in other places. In some cases, there is a difference between the place where a CES is used, with this use becoming evident via a visible manifestation, and the place where this service actually originates. This difference is illustrated by comparing Figures 2 and 8. Identifying the sitting bench as a manifestation of an aesthetic service in Figure 2 could mean that the service itself should then be associated with the location of the bench and that subsequent conclusions are to be drawn about how aesthetics depend on certain characteristics of this place (e.g. the tree next to the bench). However, it should be taken into consideration that the bench is actually the place of ‘consumption’, rather than the place where the CES is for the most part ‘produced’ by the landscape elements being viewed. The view enjoyed when sitting on the bench is shown in Figure 8. Clearly, this aesthetic value depends to a degree on the characteristics of the bench’s location, but more importantly, it depends on those of the location on the other side of the valley. Thus, in this case it would be a misinterpretation to associate the service purely with the immediate place where people make use of it. At the same time, it would also be a misinterpretation to locate aesthetics exclusively at the place of their origin, as with the landscape features shown in Figure 8, because there one would not have access to such a fine view. This example demonstrates how much care is required when interpreting visible manifestations in terms of their relation to specific places, which presumably is particularly, though not exclusively, true for aesthetic services.

Also, concerning quantification things are more complex than one might first expect. Visible manifestations can easily be counted. However, the number of counts only provides approximate information on the absolute or relative importance of CES. The first limitation is that a visible manifestation may not indicate by how many people the service is actually used. Second, the extent to which a service is reflected in manifestations in the area varies across the different types of CES. In the study presented here, one type of CES is not visibly manifested at all in the area (inspirational services) and another only to a very limited extent (spiritual services), although it is very likely that these services are of importance in the area. Additionally, the example of spiritual services points to another problem: the extent to which CES become evident through visible manifestations is strongly dependent on the cultural context, which may vary across relatively small scales. The area investigated in this study belongs to a predominantly Protestant municipality. In Protestant culture, it is not common to express religious values through manifestations such as wayside crosses as can often be observed in Roman
Catholic-dominated areas. However, this does not necessarily mean that people in this Protestant municipality attach less spiritual values to their surroundings than their Catholic neighbours not many kilometres away, where one would certainly find more indicators of spiritual services. Likewise, manifestations of CES may vary across different land use types. As such, it is very important to consider the cultural and the land use context when comparing manifestations of CES for different areas. For instance, in the case presented here it would be possible to quantitatively compare the indicators of cultural uses in the Streuobstwiesen of Unterlenningen with those in an adjacent and similarly structured community, with the aim of drawing conclusions about the relative importance of different types of services.

Conclusions

Assessing CES by recording their visible manifestations is an approach that can deliver valuable information on non-material benefits in a given area. However, we have found several limitations. Most importantly, not all types of CES can be captured adequately with this method; moreover, spatially explicit and quantitative data are provided only to a limited degree. Therefore, we see the benefits of this method mainly as a complement to other approaches, such as interviews with individuals, focus groups, and literature reviews. In this regard, the method of recording visible manifestations can be an important component of the multi-faceted toolbox which is indispensable for assessment of CES (Chan et al., 2011).
This study has aimed at conducting a basic exploration and evaluation of this method. In light of the results, further development of the method is recommended. First, we should strive to enhance our understanding of the place-specific expressions of cultural ecosystem services as well as suitable procedures to record them in these particular contexts. It would be highly desirable to integrate this approach into existing or developing practical techniques such as Landscape Character Assessment, so that experience is gradually gained in applying it in a range of different cultural settings. Second, statistical analyses should be undertaken of correlations between different types of CES, or ecosystem services in general, as well as between CES and physical landscape features. This could profoundly enhance our understanding of the tightly interlinked nature of many ecosystem services.

Future application of the method may take two primary directions. On the one hand, it can be applied in a strictly systematic way, providing quantitative and spatially explicit data suitable for all kinds of statistical analyses and for integration with quantitative assessments of other ecosystem services (Troy & Wilson, 2006). On the other hand, applying a simplified version of the method may also be fruitful. A relatively rough quantification and spatial exemplification could be conducted in order to provide an overview of, for example, hot spots or blank spaces for CES provision or to derive exploratory insights into the relative importance of single CES types when comparing different investigation areas. Foregoing a complete record of manifestations would help to highlight the advantages of this approach as a potentially very quick and easy method of generating useful data in an under-explored field. Additionally, this approach would make it possible to integrate the potentially rich sources of data on CES that are normally observed only through coincidence, thus paying attention to the often ephemeral and fleeting qualities of these types of benefits. In particular, a simplified approach could serve as a perfect basis and complement for interviews on CES, as it may reduce some of the difficulties in interviewing people in such a context. It could, for instance, be beneficial to use pictures of manifestations of CES in the area in question as concrete starting points for talking about activities and values related to these services.

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