Landscape and Urban Planning 144 (2015) 151–162

Contents lists available at ScienceDirect

Landscape and Urban Planning

journal homepage: www.elsevier.com/locate/landurbplan

Geocaching data as an indicator for recreational ecosystem services in urban areas: Exploring spatial gradients, preferences and motivations

Anna F. Cord[a,*], Franz Roeßiger[b], Nina Schwarz[a]

[a] Department of Computational Landscape Ecology, Helmholtz Centre for Environmental Research – UFZ, Permoserstr. 15, 04318 Leipzig, Germany
[b] Institute for Geography, Faculty of Physics and Earth Sciences, University of Leipzig, 04103 Leipzig, Germany

HIGHLIGHTS

- We use geocaching data to assess the cultural ecosystem service recreation.
- We combine georeferenced geocache locations and their visit rates with survey data.
- Stated and revealed preferences regarding experience of nature did not match.
- Motivations and characteristics of geocachers showed huge diversity within the community.
- Geocaching data allow exploring spatial patterns and preferences regarding recreation.

ARTICLE INFO

Article history:
Received 2 August 2014
Received in revised form 24 August 2015
Accepted 27 August 2015

Keywords:
Ecosystem service
Geographical Information System
Global Positioning System
Urban green space
Stated and revealed preferences
Questionnaire

ABSTRACT

Outdoor recreation as a cultural ecosystem service offers an important opportunity for many people to experience directly the benefits that ecosystems provide, particularly in urban areas. The recent emergence of social media and other sources of 'big data' creates exciting alternative possibilities for assessing how people use nature for recreational purposes. In this study, we focus on 'geocaching', a worldwide outdoor game in which the participants use a Global Positioning System (GPS) receiver to hide and seek containers called 'geocaches.' We use the city of Leipzig (Germany) as a case study and focus on nature-related geocaches to explore short-term recreation as a cultural ecosystem service. We use georeferenced localities of geocaches and their visit rates as quantitative measures and combine them with a content analysis, as well as with quantitative results of an online survey. Using this data, we distinguish between revealed and stated preferences. We found that the density of geocaches was highest close to the city centre and that geocaching is indeed a type of local recreation and an urban ecosystem service, as green areas and experiences in nature are important for this activity. Stated and revealed preferences, however, often did not match for the different types of geocaches that we identified. While geocachers may have quite different motivations, the activity appears to be mostly done by young, well-educated people according to our surveys. In summary, geocaching data offer exciting opportunities to explore spatial gradients, as well as preferences and motivations regarding short-term recreation.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

Outdoor recreational activities offer an important opportunity for many people to experience directly the benefits that ecosystems provide. This particularly concerns people living in urban areas, where the contact with (semi-)natural environments is often limited (Daniel et al., 2012) and where outdoor recreation is typically provided by green spaces (Bolund & Hunhammar, 1999). Although it is considered an important cultural ecosystem service (ESS) (MA, 2005; TEEB, 2011), everyday outdoor recreation is far less often analysed in quantitative ESS assessments than day or overnight tourism – probably because it is more difficult to measure (Daniel et al., 2012; see also MA, 2005 with its strong focus on tourism).

The recent emergence of social media and other sources of 'big data', however, creates exciting alternative possibilities to assess how people use nature for recreational purposes (Wood, Guerry, Silver, & Lacayo, 2013). For example, the locations of photographs uploaded to flickr (http://www.flickr.com) can be used to approximate visitor rates at defined recreation sites (e.g., national park, museum) on a global scale (Wood et al., 2013). Spatially explicit

* Corresponding author.
E-mail addresses: anna.cord@ufz.de (A.F. Cord), franz.roessiger@googlemail.com (F. Roeßiger), nina.schwarz@ufz.de (N. Schwarz).

http://dx.doi.org/10.1016/j.landurbplan.2015.08.015
0169-2046/© 2015 Elsevier B.V. All rights reserved.

data on 'geocaching' offer similar opportunities. Geocaching (see the next section for an introduction to this source of 'big data') is a newly emerged outdoor recreation activity which also takes place in cities and often on urban green spaces. As opposed to other spatially explicit assessments of short-term recreation in urban areas, where this ESS is mostly mapped by combining spatial data on the size and quality of green spaces with indicators of accessibility (Haase, Schwarz, Strohbach, Kroll, & Seppelt, 2012; Lautenbach, Kugel, Lausch, & Seppelt, 2011; van Herzele & Wiedemann, 2003), geocaching data comprise georeferenced localities of geocaches and their visit rates, which can be used as direct quantitative measures for this recreational activity.

However, when using such data from social media and networking websites or other online databases to inform conclusions on recreation or other cultural ESS, understanding the motivations of the users is crucial. Especially in urban landscapes, in addition to the nature-based needs of humans (e.g., contact with nature, aesthetic preference), human-interaction needs (e.g., social interaction) may play an important role in user motivation (Matsuoka & Kaplan, 2008). The universal appeal of geocaching is remarkable and the motivations for joining the geocaching community are as manifold as its members. Typically, these include experiencing nature, discovering and exploring new places, promoting physical activity, collecting achievements and experiencing competition, while also benefiting from the educational aspects of geocaching (Hawley, 2010; McNamara, 2004; O'Hara, 2008; Taylor, Kremer, Pebworth, & Werner, 2010). Apparently, depending on their reasons for practicing this activity, geocachers have divergent preferences with regard to the location, difficulty and design of the geocaches. Further, geocaching not only consists of 'consumption' (i.e., the seeking of geocaches) but also 'creation' (i.e., the hiding of geocaches) (O'Hara, 2008). Similar to the manifold motives of the geocachers, the intentions of a geocache owner to hide a cache at a particular location may range from creating a sophisticated physical or mental challenge to simply achieving high visibility for the cache. Geocaching data therefore creates a particularly interesting opportunity to explore the spatial components as well as motivations and preferences surrounding this new form of public space use.

Here, we focus on nature-related geocaches, in particular on those located on urban green spaces, to differentiate between short-term recreation in the sense of a cultural ESS (which must, similar to all other services, show a significant dependence on ecosystem structures and functions; see Daniel et al., 2012) and other forms of recreation. We contrast these with caches that show no dependence on ecosystems, i.e., those associated with religious or historic architecture. Our aim is to explore the significance, opportunities and limitations of using geocaching data to quantify short-term recreation in urban areas, with a focus on disentangling differences between stated and revealed preferences. We use the city of Leipzig (Germany) as a case study, analyse georeferenced localities of geocaches and their visit rates as quantitative measures for this recreational activity and combine them with survey data. More specifically, we define the following with respect to nature experience as part of the ESS recreation:

- Revealed preference: total number of people who either found or did not find a cache within a year (number of quests, see Table 1)
- Stated preference: attractiveness of geocaches stated in a survey

Our research question is: How important is nature experience for the newly emerged outdoor recreation activity of geocaching, based on revealed and stated preferences of the users? To answer this question, we follow a stepwise approach: (1) we first analyse the locations of geocaches within the city, (2) we distinguish different intentions of geocaches and examine their visitation rates as revealed preferences, and (3) finally, we use survey data from geocachers to explore their stated preferences and motivations when geocaching on urban green areas. This allows us to integrate spatial, social, and perceptual information (Ryan, 2011). To our knowledge, this is the first study that utilises spatially explicit information on geocaching activities to explore stated and revealed preferences regarding nature experiences on urban green spaces for the ESS recreation.

Table 1
Brief glossary of important geocaching terms relevant to this study (largely based on the descriptions on http://www.geocaching.com).

Term	Explanation
Favourite points	For every ten geocaches that a cacher (with a premium account, see below) has found, he/she will be able to favourite one exceptional geocache in his/her find history
Geocache/Cache	Hidden container that includes, at minimum, a logbook for geocachers to sign
Geocacher/Cacher	Person who is geocaching
Multi-Cache	Consists of multiple discoveries of one or more intermediate points containing the coordinates for the next stage; the final stage contains the logbook
Owner	Person who has hidden the cache and retains all responsibility for the geocache listings, the placement, and the care of the geocache
Premium Cache	Cache that can only be accessed by premium members (this membership is not free of charge)
Quest	Total number of people who either found or did not find the cache. Not an official term, but used in this study as a measure of the visitation rate
Reviewer	A volunteer (typically also a geocacher) who reviews and publishes the cache listings
Traditional Cache	Original geocache type consisting of, at minimum, a container and a logbook or log sheet. Larger containers generally include items for trade

2. Geocaching – an emerging outdoor recreation activity

Geocaching is a worldwide outdoor game of hiding and seeking treasures, in which the participants use a *Global Positioning System* (GPS) receiver, mobile device or other navigational techniques to hide and seek containers, called 'geocaches' or 'caches'. Geocaching only emerged in the year 2000. The activity was conceived shortly after the removal of *Selective Availability* (i.e., the intentional degradation of GPS signals), which had been in place to restrict the accurate use of GPS to the US military (Taylor et al., 2010). Due to this improved accuracy of the system (the error of more than 100 m was reduced to 10–15 m) and its opening to the general public, small containers could be specifically placed and located in the landscape. In particular, relatively cheap GPS receivers, including smartphones, and widespread access to the internet have helped geocaching flourish throughout the world (McNamara, 2004). The predominant and longest-existing geocaching website is http://www.geocaching.com (owned by Groundspeak, Inc.), from which the data used in this analysis were obtained.

Geocaching has grown very popular in only a few years, with over six million active members and 2,695,877 active geocaches currently hidden all over the globe (August 19th, 2015; according to http://www.geocaching.com). The countries with the highest total numbers of active geocaches are the United States, Germany, and Canada. Geocaches vary in size and difficulty and are typically hidden in any type of place that the owner (the person who has hidden the cache) finds particularly interesting and that she/he wants someone else to experience (Gram-Hansen, 2009). As part of the game, geocachers tend to build very creative geocache containers and make use of very specific terms to classify by type, difficulty and other attributes of geocaches (see Table 1) that are not known outside the community. To avoid 'over-saturation', which could lead to geocachers accidentally finding a cache when in fact looking for

Download English Version:

https://daneshyari.com/en/article/7460938

Download Persian Version:

https://daneshyari.com/article/7460938

Daneshyari.com