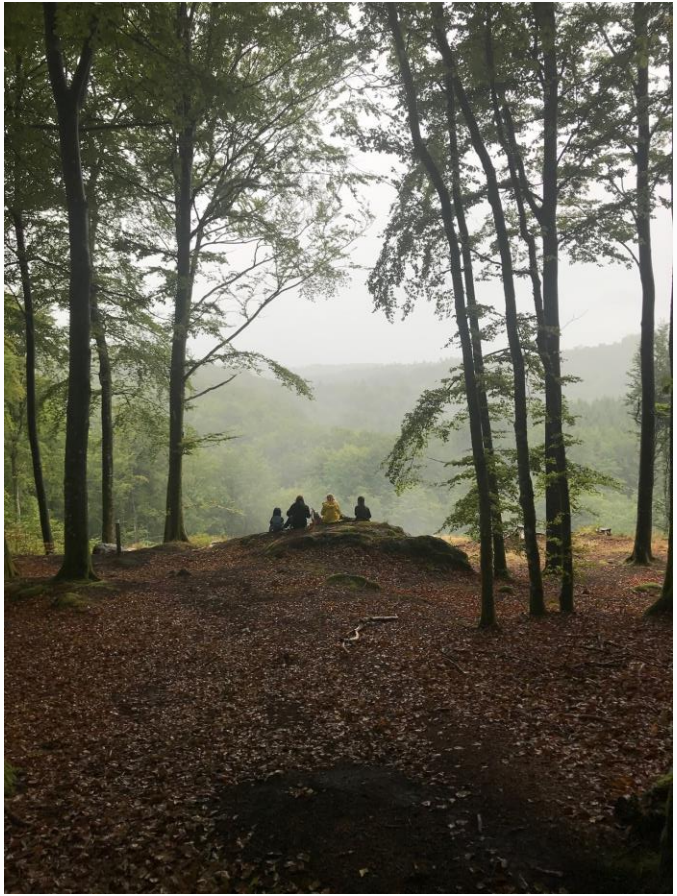
UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

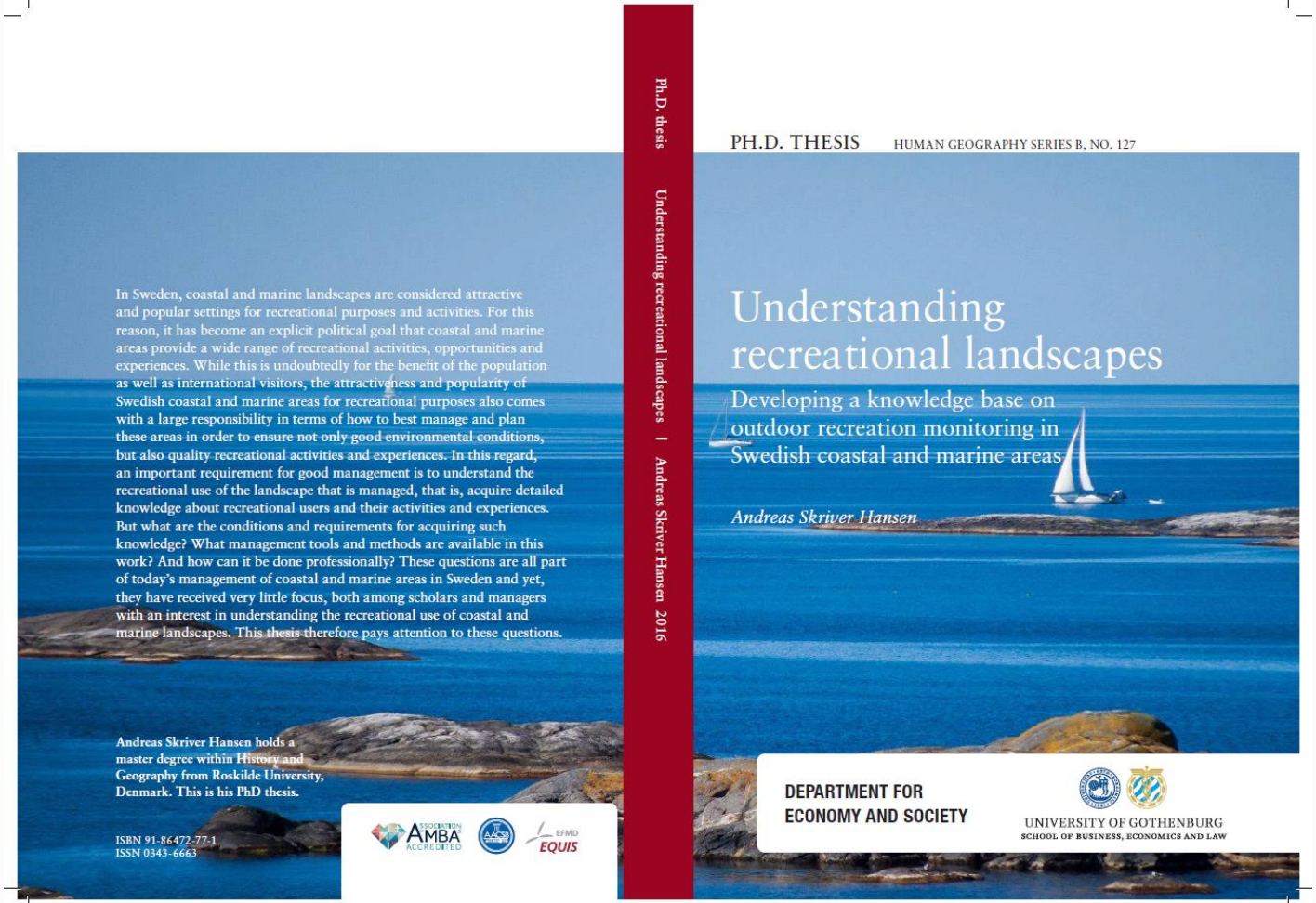
CRITICAL PERSPECTIVES ON THE USE OF AND METHODS FOR VISITOR MONITORING

ANDREAS SKRIVER HANSEN, GÖTEBORGS UNIVERSITET

Overview

1) A bit about me
2) Why monitor visitors?
3) Monitoring methods and techniques
4) Many new challenges
5) The role of technology
6) Examples of new monitoring methods
7) Challenges with new technology
8) What are the next steps?




In Sweden, coastal and marine landscapes are considered attractive and popular settings for recreational purposes and activities. For this reason, it has become an explicit political goal that coastal and marine areas provide a wide range of recreational activities, opportunities and experiences. While this is undoubtedly for the benefit of the population as well as international visitors, the attractiveness and popularity of Swedish coastal and marine areas for recreational purposes also comes with a large responsibility in terms of how to best manage and plan these areas in order to ensure not only good environmental conditions, but also quality recreational activities and experiences. In this regard, an important requirement for good management is to understand the recreational use of the landscape that is managed, that is, acquire detailed knowledge about recreational users and their activities and experiences. But what are the conditions and requirements for acquiring such knowledge? What management tools and methods are available in this work? And how can it be done professionally? These questions are all part of today's management of coastal and marine areas in Sweden and yet, they have received very little focus, both among scholars and managers with an interest in understanding the recreational use of coastal and marine landscapes. This thesis therefore pays attention to these questions.
Andreas Skriver Hansen holds a master degree within History and Geography from Roskilde University, Denmark. This is his PhD thesis.
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Understanding recreational landscapes
Developing a knowledge base on outdoor recreation monitoring in Swedish coastal and marine areas
Andreas Skriver Hansen
DEPARTMENT FOR ECONOMY AND SOCIETY
UNIVERSITY OF GOTHENBURG
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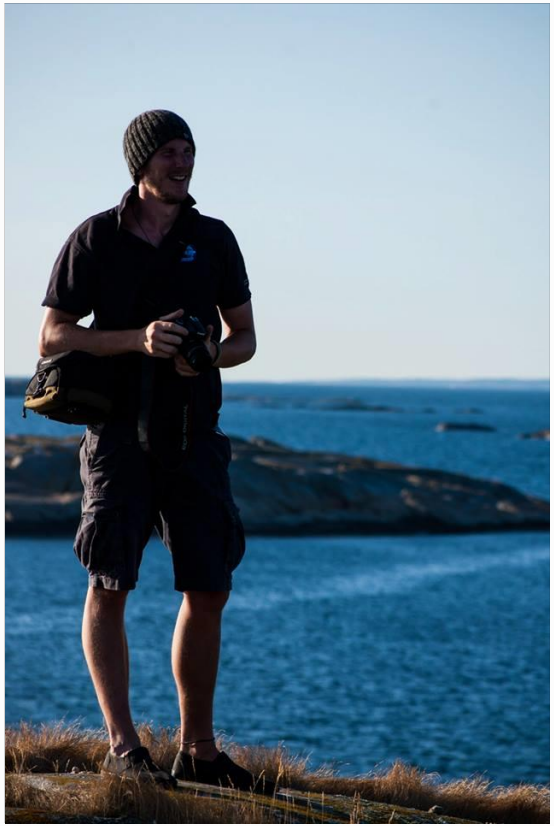
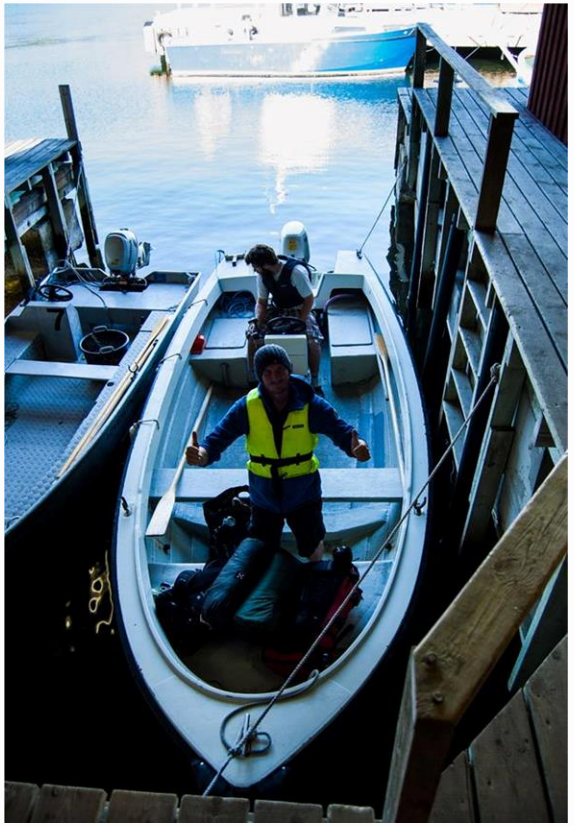



KOSTERHAVETS
NATIONALPARK



Fokusområden

A reminder: why monitor visitors?

Five reasons

- Outdoor politics
- Nature management
- People management
- Documentation of existence
- Quality experiences

Research

Political attention

Lov om friluftslivet (friluftsloven)

Innholdsfortegnelse

Lov om friluft

Datc
Departement
Sist endret
Publisert
Ikrafttredelse
Endret
Kunngjort
Korttittel

Kapitteloversikt:

Kapitel I. Om ferdsel m

Regeringens proposition
2009/10:238

Framtidens friluftsliv

Prop.
2009/10:238

Regeringen överlämnar denna proposition till riksdagen.

Visby den 8 juli 2010

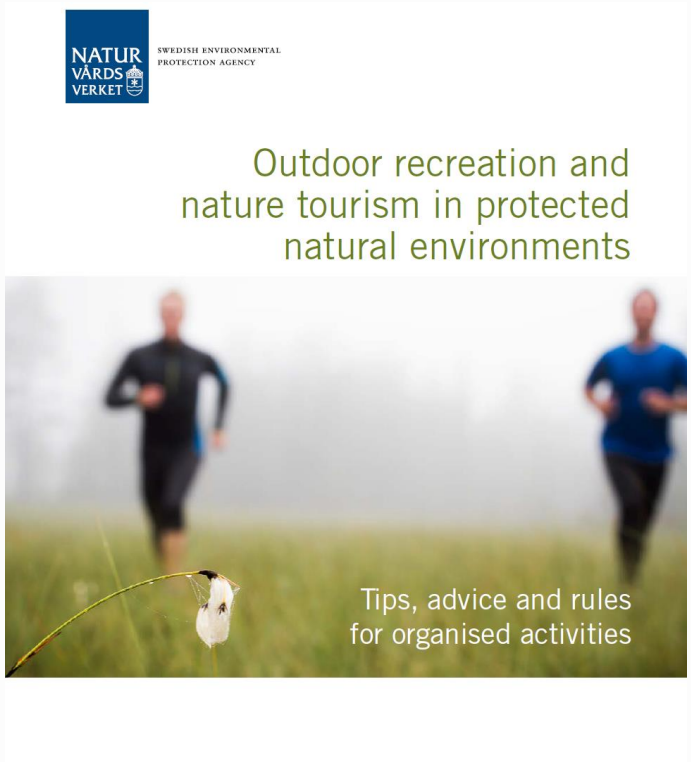
Fredrik Reinfeldt

Andreas Carlgren
(Miljödepartementet)

Political attention

1. Accessible nature	*6. Sustainable regional growth*
2. Strong commitment and cooperation	*7. Protected areas as a resource for outdoor recreation*
3. Free public access forms the basis of outdoor recreation	*8. Valuable outdoor recreation at school*
4. Access to nature for outdoor recreation health	*9. Outdoor recreation for the good of the people*
5. Attractive natural areas close to urban centres	*10. Good knowledge about outdoor recreation*

A planning topic



Nature management

People management

upptacktsfard.se

Documentation of existence

What is not (well)documented will not be planned for

- Swedish planner, 2017

Documentation of existence

MSP planning process in Sweden December 2019

Quality experiences



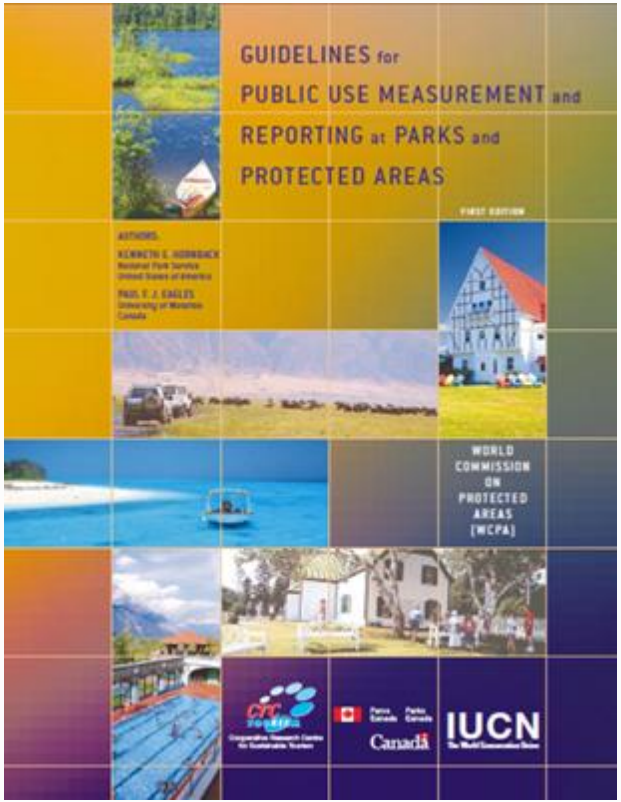


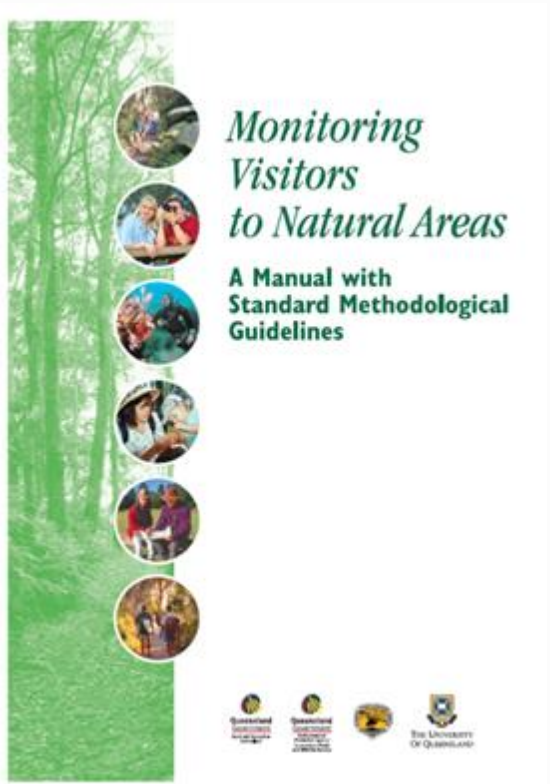


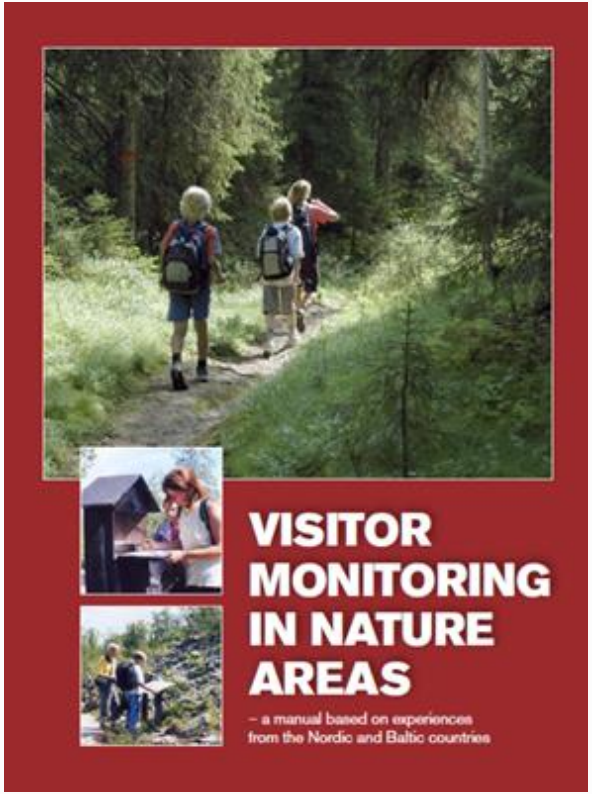





Monitoring methods and techniques







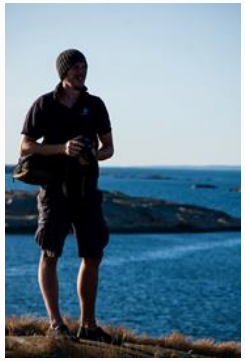
Visitor counting and tracking

Advantages
- Follows visitor numbers and movements
- Passive monitoring activity

Features
- Electronic/mechanic counters
- Aerial photos/satelite
- Misc counting options (i.e. fish licences, hut passes, harbour fees)
- GPS trackers

Useful for studying
- Visitor movement and concentration
- Visitor ‘hot spots’
- Seasonal changes

Visitor surveys and observations




Besöksstudie i Kosterhavet 2013! /Visitor study in Kosterhavet 2013!

Tack!/ Please turn!

Advantages

- Can be standardized or customized
- Active monitoring activity
- Available for all visitors in the area

Features

- On-site observations
- On-site interviews and questionnaires
- Reg. cards and mail-back questionnaires
- Online surveys

Useful for studying

- Visitor profiles/demographics
- Visitor activities
- Visitor motivation
- Visitor satisfaction
- Visitor opinions

New challenges for visitor monitoring

Six challenges

- Increasing visitor numbers
- New types of visitors
- Area geography
- New types of activities
- Different approaches to nature
- Detailed knowledge requirement

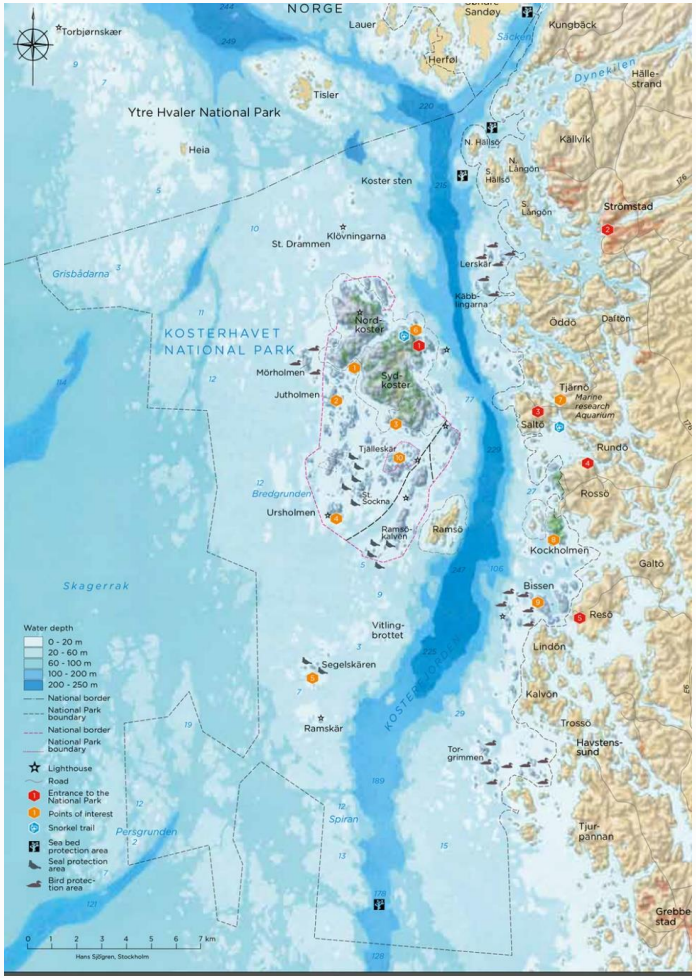
Increasing visitor numbers (around urban centers)

New types of visitors

Kinesiska turister vallfärdar till Fjällbacka

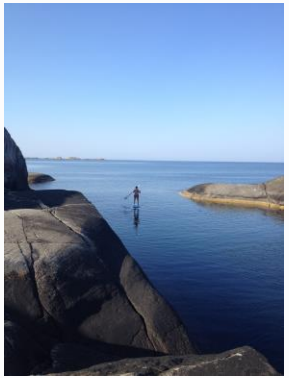
Publicerad 11 september 2018

Allt fler kinesiska turister väljer att åka till Sverige och det märks tydligt i Fjällbacka i Bohuslän på Västkusten.
Samhället har blivit ett populärt stopp för kinesiska bussresor.
Men då de nya turisterna varken talar engelska eller har betalkort anpassade för våra system, är de en helt ny sorts besökare på orten.



Area geography

New types of activities



Different approaches to nature

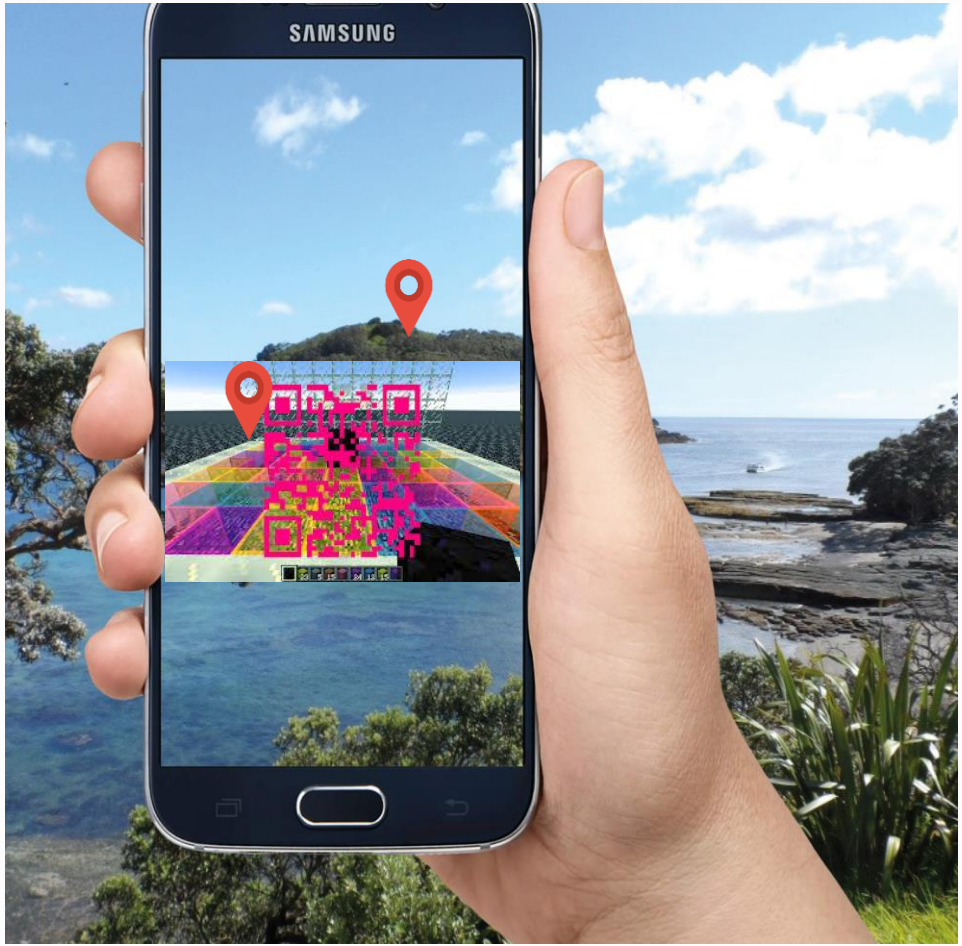
gonintendo.com

www.geocaching.com

Detailed knowledge required

The role of technology

- More opportunities
- Flexibility
- Better spread
- Easier access
- (Relatively) cheap



Drones

Journal of Coastal Conservation (2019) 23:633–642
https://doi.org/10.1007/s11852-019-00694-y

Using drones to quantify beach users across a range of environmental conditions

Euan J. Provost[1] · Paul A. Butcher[1,2] · Andrew P. Colefax[1,2] · Melinda A. Coleman[1,2] · Belinda G. Curley[3] · Brendan P. Kelaher[1]

Received: 19 October 2018 / Revised: 23 April 2019 / Accepted: 24 April 2019 / Published online: 11 May 2019

Abstract
Beaches are economically and socially important to coastal regions. The intensive use of beaches requires active management to mitigate impacts to natural habitats and users. Understanding the patterns of beach use can assist in developing management actions designed to promote sustainable use. We assessed whether remotely piloted aerial systems (commonly known as drones) are an appropriate tool for quantifying beach use, and if beach activities are influenced by environmental conditions. Novel drone-based methods were used to quantify beach use. Drone flights recorded 2 km of beach, capturing video footage of the beach from the dune to water interface and the breaker zone. Flights were undertaken during three school holiday periods at four popular beaches in New South Wales, Australia. These videos were later analysed in the laboratory to categorise beach users. Of the total users sampled, 45.0% were sunbathing, 22.8% swimming, 21.2% walking, 10.6% surfing, and less than 0.5% were fishing. Participation in walking, surfing and fishing was similar throughout the sampling periods. However, sunbathing and swimming significantly increased during the austral spring and summer sampling periods. Usage patterns varied significantly among beaches, and during the different sampling periods, suggesting that adaptive management strategies targeted to specific areas are the most appropriate way to protect beach habitats and users. Furthermore, we demonstrate that drones are an effective assessment tool to improve coastal management decisions.

Keywords Drones · Remotely piloted aerial systems · Coastal management · Beach attendance · Beach use

Online media platforms

isprs International Journal of Geo-Information

MDPI

Article

User-Generated Geographic Information for Visitor Monitoring in a National Park: A Comparison of Social Media Data and Visitor Survey

Vuokko Heikinheimo [1,*], Enrico Di Minin [1,2], Henrikki Tenkanen [1], Anna Hausmann [1,2], Joel Erkkonen [3] and Tuuli Toivonen [1]

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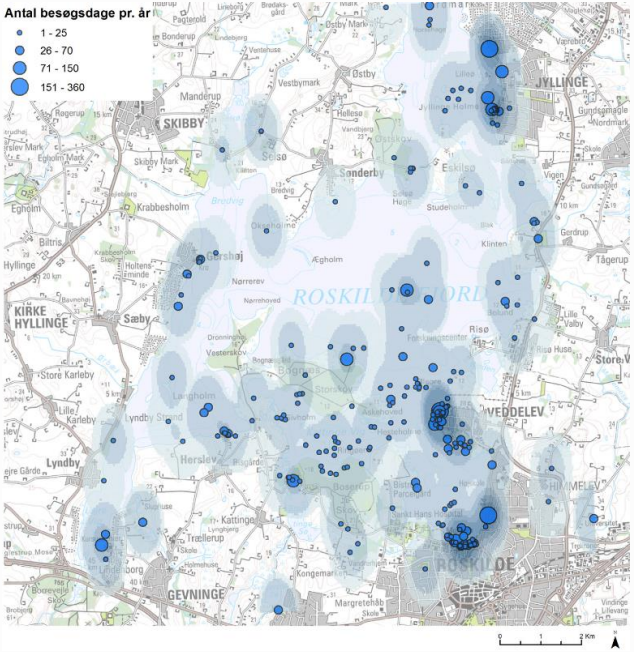
Academic Editors: Alexander Zipf, David Jonietz, Vyron Antoniou, Linda See and Wolfgang Kainz
Received: 23 December 2016; Accepted: 12 March 2017; Published: 16 March 2017

Abstract: Protected area management and marketing require real-time information on visitors' behavior and preferences. Thus far, visitor information has been collected mostly with repeated visitor surveys. A wealth of content-rich geographic data is produced by users of different social media platforms. These data could potentially provide continuous information about people's activities and interactions with the environment at different spatial and temporal scales. In this paper, we compare social media data with traditional survey data in order to map people's activities and preferences using the most popular national park in Finland, Pallas-Yllästunturi National Park, as a case study. We compare systematically collected survey data and the content of geotagged social media data and analyze: (i) where do people go within the park; (ii) what are their activities; (iii) when do people visit the park and if there are temporal patterns in their activities; (iv) who the visitors are; (v) why people visit the national park; and (vi) what complementary information from social

PPGIS



KØBENHAVNS UNIVERSITET
INSTITUT FOR GEOVIDENSKAB OG NATURFORVALTNING

Blåt friluftsliv i Danmark

Berit C. Kaae, Anton Stahl Olafsson og Hélenè Draux

Kartläggning av **marint friluftsliv** i Göteborgsregionen, Orust och Uddevalla

I denna pilotstudie vill vi testa ett nytt sätt att synliggöra friluftsliv vid kust och hav, för att bidra till att lyfta dessa intressen i kommunernas fysiska planering.

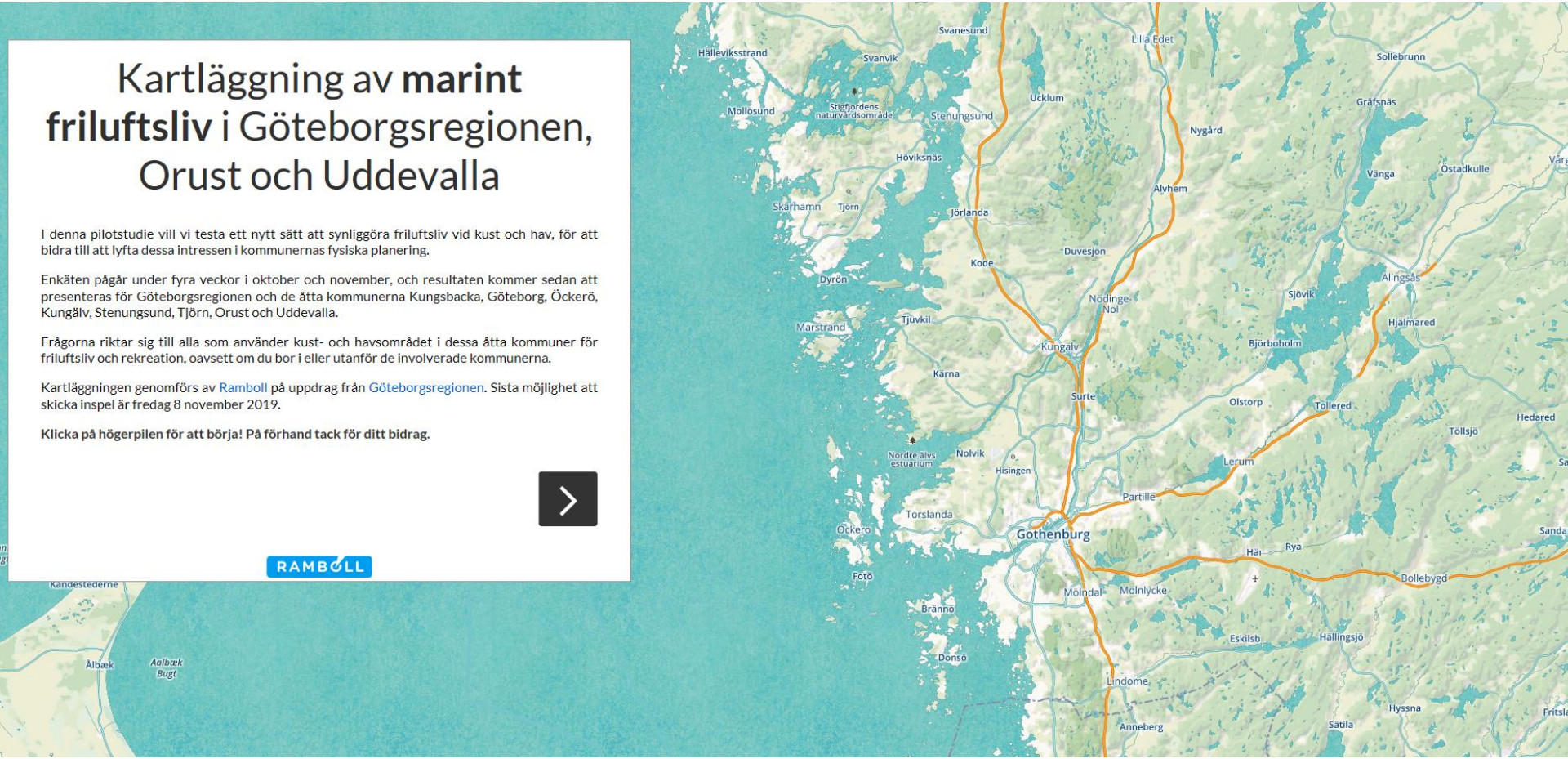
Enkäten pågår under fyra veckor i oktober och november, och resultaten kommer sedan att presenteras för Göteborgsregionen och de åtta kommunerna Kungsbacka, Göteborg, Öckerö, Kungälv, Stenungsund, Tjörn, Orust och Uddevalla.

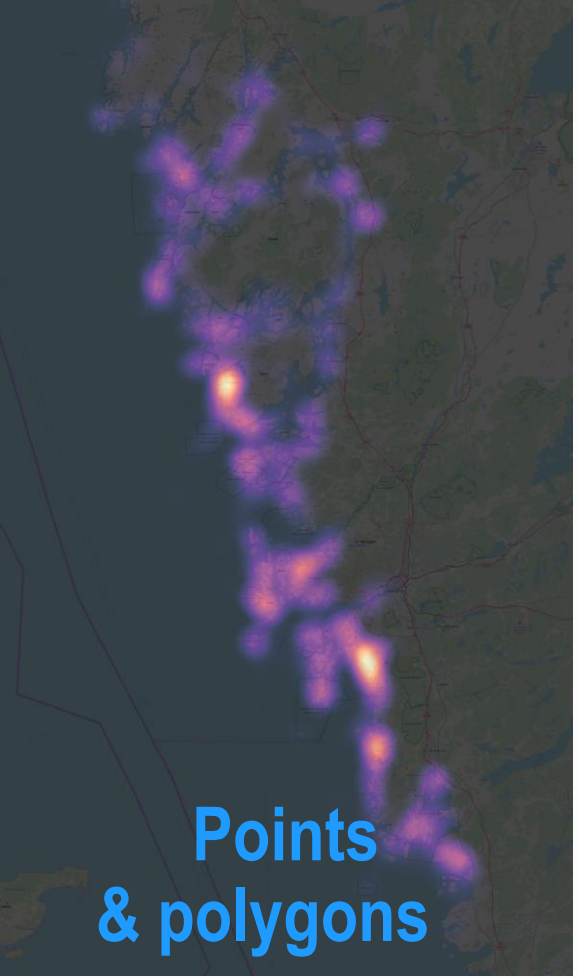
Frågorna riktar sig till alla som använder kust- och havsområdet i dessa åtta kommuner för friluftsliv och rekreation, oavsett om du bor i eller utanför de involverade kommunerna.

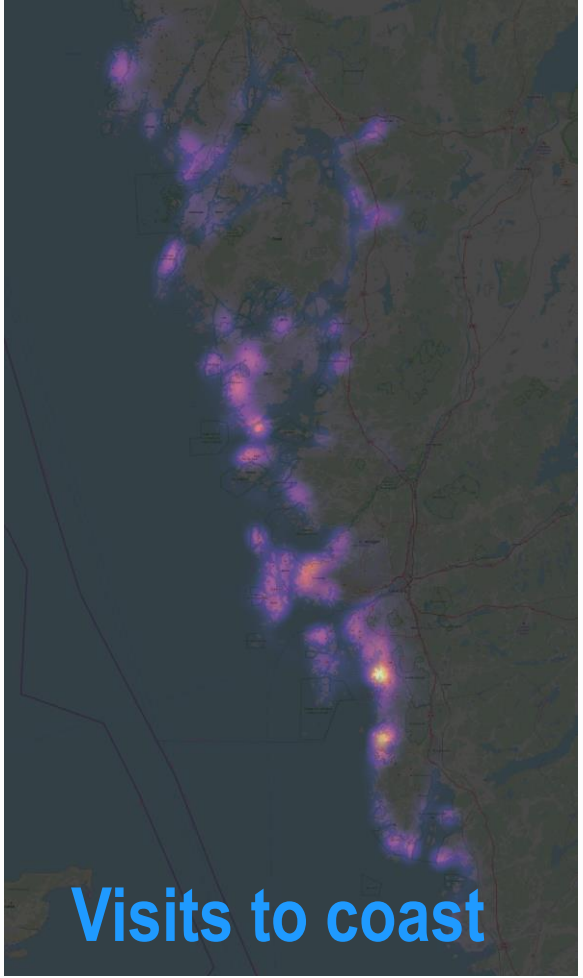
Kartläggningen genomförs av Ramboll på uppdrag från Göteborgsregionen. Sista möjlighet att skicka inspel är fredag 8 november 2019.

Klicka på högerpilen för att börja! På förhand tack för ditt bidrag.

RAMBØLL

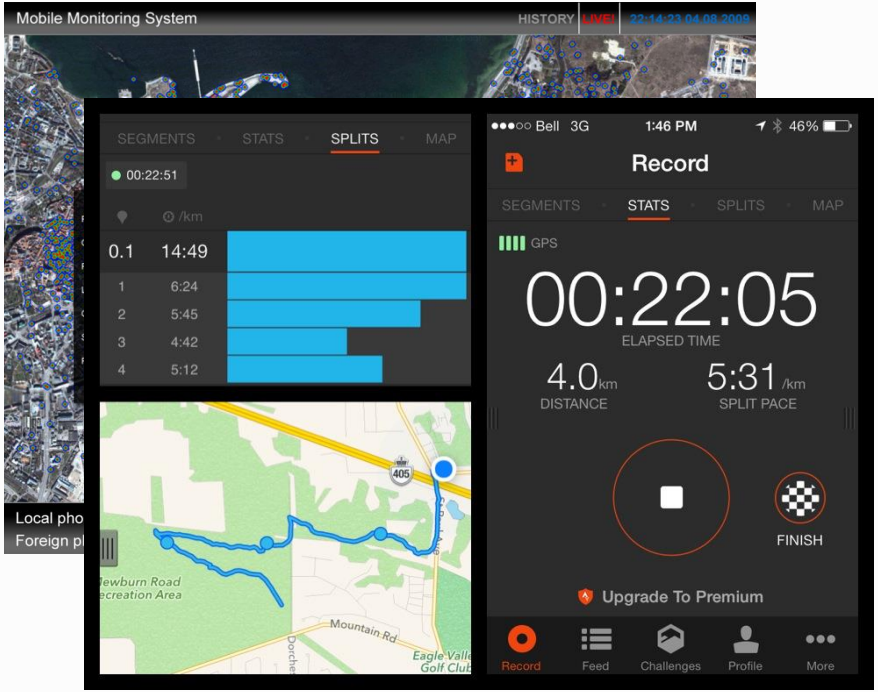



Points
& polygons


Visits to coast


Visit on water

GPS tracking (e.g. strava)



Landscape and Urban Planning 157 (2017) 608–617

Contents lists available at ScienceDirect

Landscape and Urban Planning

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

Research Note

Smartphone GPS tracking—Inexpensive and efficient data collection on recreational movement

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[a] Department of Environmental Sciences, University of Helsinki, P.O. Box 65 (Viikinkaari 2, Environment House), Finland
[b] Botany Unit, Finnish Museum of Natural History, University of Helsinki, P.O. Box 7 (Unioninkatu 44), Finland

HIGHLIGHTS

- Smartphone GPS tracking provides useful spatial data for planning and management.
- Explored visitor spatial patterns on formal trails and informal paths.
- Mapped off-trail movement and located hotspot areas of high use intensity.
- Heavy wear observed in situ validated hotspots identified via smartphone tracking.

ARTICLE INFO

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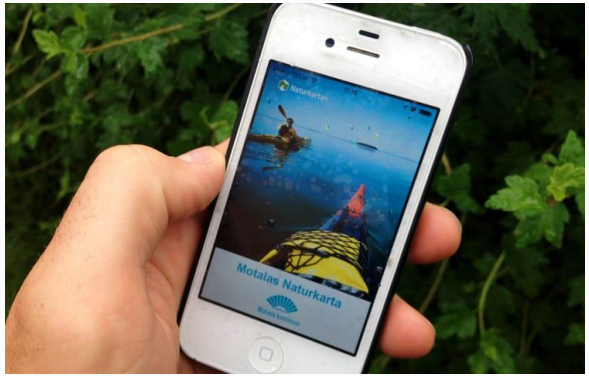
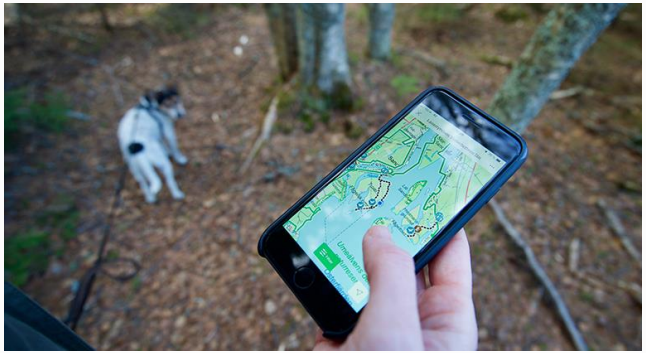
Keywords:
Smartphone GPS tracking
Recreational use
Off-trail movement
Urban forests
GIS
Self-tracking

ABSTRACT

This research note describes the methodological and practical applications of using smartphone GPS tracking (SGT) to explore the spatial distribution and density of recreational movement in multiple-use urban forests. We present findings from the pilot phase of an on-going case study in Keskuspuisto (Central park), Helsinki, Finland. The study employs an inventive and inexpensive approach for participatory data collection i.e. gathering GPS data from recreational users who have already recorded their routes for purposes other than research, using any kind of sports tracking application on their personal mobile phones. We used the SGT data to examine visitor spatial patterns on formal trails and informal paths, and present examples with runners and mountain bikers. Hotspot mapping of mountain bikers' off-trail movement was conducted identifying several locations with clustering of off-trail use. Small-scale field mapping of three hotspot areas confirmed that the method accurately located areas of high use intensity where visible effects of path widening and high level of wear on the forest floor vegetation could be observed. We conclude that the SGT methodology offers great opportunities for gathering useful and up-to-date spatial information for adaptive planning and management as it highlights areas where conservation and visitor management measures may need to be adjusted. We suggest that this method

Mobile apps





New ideas for monitoring visitors

Martin Goossen, Alterra, part of Wageningen UR, The Netherlands, martin.goossen@wur.nl

of visitors and their spatial distribution, depending on usage and infrastructure. These simulations have emerged as a suitable tool to capture the complex spatial behaviour of visitors in natural areas and to analyse the consequences of recreational use and behaviour changes (Gimblett et al., 2001). The pool of studies that address the spatial and temporal distribution of recreation seekers with the use of simulations is growing rapidly (Gimblett & Skov -Petersen, 2008). Models as RBSim (Cole 2005), MASOOR (Jochem et al, 2008), kvintus.org (Skov -Petersen, 2005) are developed. The models are as good as the input (available data) is. They have proven to be useful for managers.

Tracking

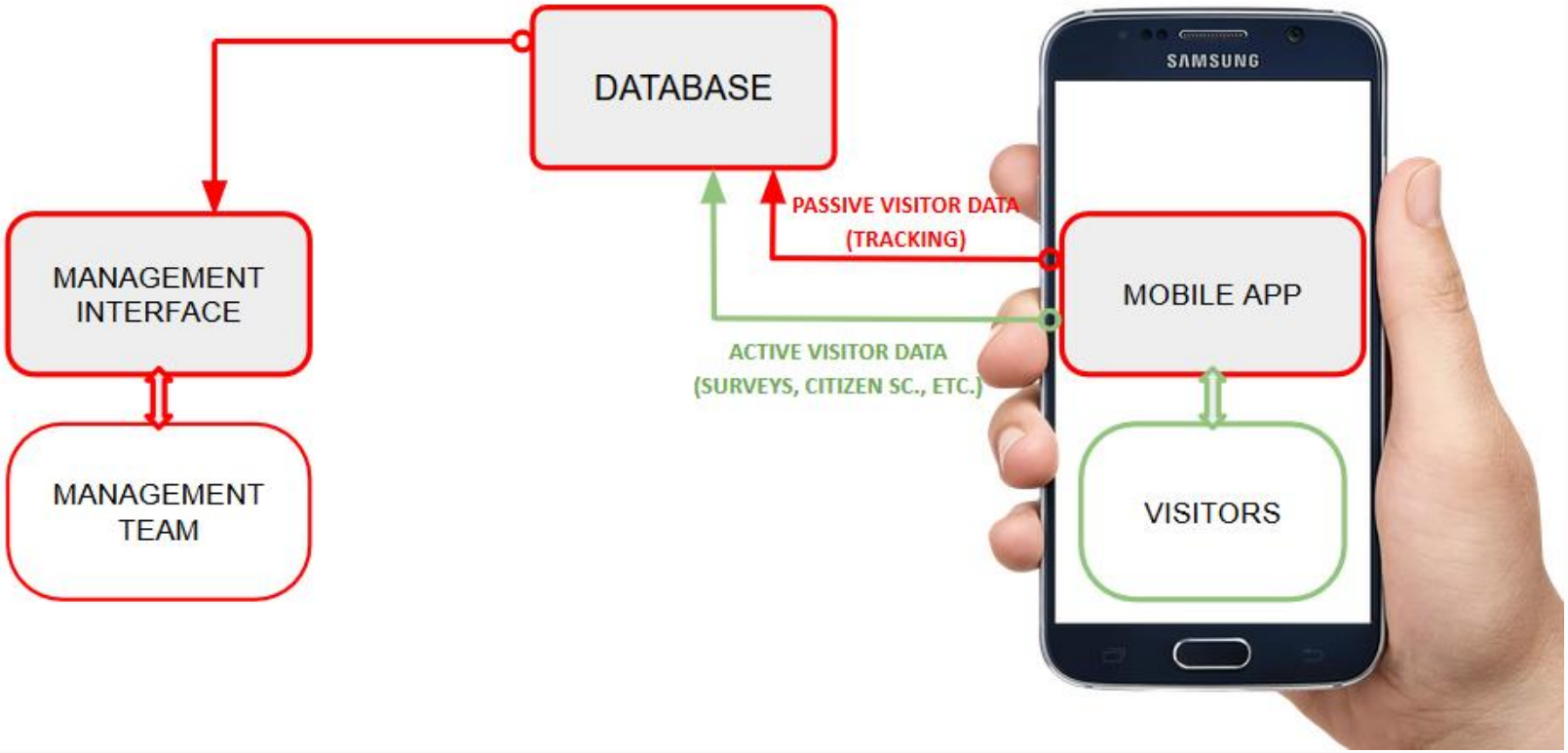
The focus on the project is on an inventory of possibilities to use (open source) location-based data to count visitor numbers in specific areas. As the costs of technology continue to decrease, finding technological means to automate the tracking of visitors could not only lead to have insights into the total amount but also to understand the choices of visitors. An increasing number of visitors are bringing smartphones when visiting. Smartphone penetration levels are continually increasing. Counting visitor numbers on the basis of data from mobile telecommunications networks is an interesting method, but very restricted because of privacy laws. Mobility measurements and counts must be based on absolutely anonymous and aggregated counts. Only one company in the Netherlands has a contract with a provider to use their data. The first result is that it is useful to have insights into the total amount of visitors (also tourists from other countries) at a municipal, provincial or national level but not on a sight level.

With the Activity Recognition API of Google it is possible to track users if they are logged in to specific apps with wifi technologies like geofencing, ibeacons and augmented reality. In the project we analyse the usability of these new technologies to count the amount of visitors. The first result is that a visitor would only download an app if the app delivers something useful for the visitor.

Naturkarten.se (OutdoorMap)

Signs with QR codes

A. Passive & Active Monitoring



Citizen science

Journal of Environmental Management 203 (2017) 87–97

Contents lists available at ScienceDirect

Journal of Environmental Management

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

Research article

Monitoring the environment and human sentiment on the Great Barrier Reef: Assessing the potential of collective sensing

Susanne Becken [a, *], Bela Stantic [b], Jinyan Chen [b], Ali Reza Alaei [a], Rod M. Connolly [c]

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Sentiment analysis

ABSTRACT

With the growth of smartphone usage the number of social media posts has significantly increased and represents potentially valuable information for management, including of natural resources and the environment. Already, evidence of using 'human sensor' in crises management suggests that collective knowledge could be used to complement traditional monitoring. This research uses Twitter data posted from the Great Barrier Reef region, Australia, to assess whether the extent and type of data could be used to Great Barrier Reef organisations as part of their monitoring program. The analysis reveals that large amounts of tweets, covering the geographic area of interest, are available and that the pool of information providers is greatly enhanced by the large number of tourists to this region. A keyword and sentiment analysis demonstrates the usefulness of the Twitter data, but also highlights that the actual number of Reef-related tweets is comparatively small and lacks specificity. Suggestions for further steps towards the development of an integrative data platform that incorporates social media are provided.

1. Introduction

We are living in a networked society, and the use of mobile Internet is a recent phenomenon that has experienced exponential of using social media sensors has been in disaster management. The analysis of 10 million Twitter posts in the aftermath of Hurricane Sandy in New York in 2012 demonstrated that tweets reported damage faster and more accurately than the National Federal

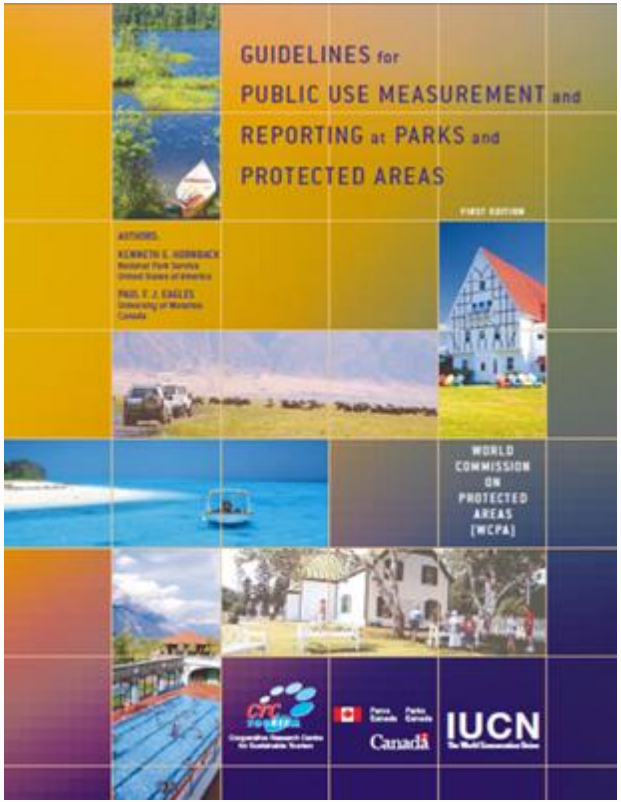
Challenges with new technology

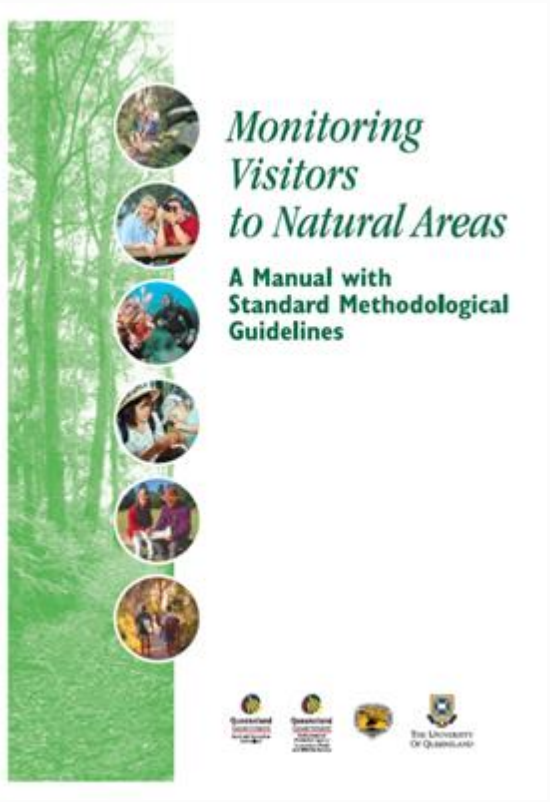
Challenges

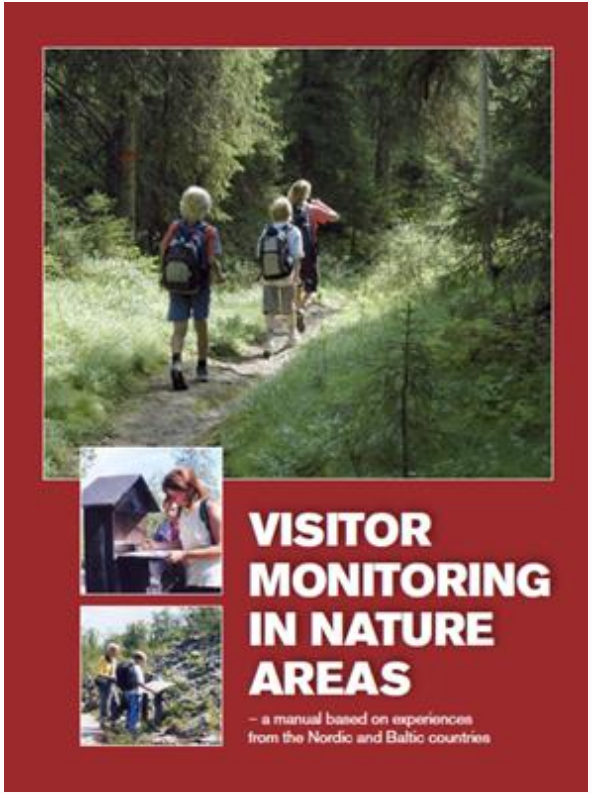
- GDPI
- Range
- Network
- Battery
- Ethics
- Too advanced
- Not using technology

How do we deal with this?

An update needed!







Important to remember

New monitoring technologies provide both many challenges and opportunities, and still develop highly dynamically. It is not one new technology, but several, and there is not one technology that will suffice and replace the traditional ones, but rather a multi-method approach or even a method triangulation might be the path to follow.

P. Fredman 2020

UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Thank you!