



Managing the potential for outdoor recreation: Adequate mapping and measuring of accessibility to urban recreational landscapes



Gro Koppen^{a,*}, Åsa Ode Sang^b, Mari Sundli Tveit^a

^a Department of Landscape Architecture and Spatial Planning, Norwegian University of Life Sciences, ILP – UMB, Postboks 5003, 1432 Ås, Norway

^b Department of Landscape Architecture, Swedish University of Agricultural Sciences, SLU Alnarp, Box 52, 230 53 Alnarp, Sweden

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ABSTRACT

Following the increasing public health concerns related to physical inactivity in the population, the relationship between outdoor recreation and public health has been increasingly acknowledged over the last decades. To improve public health, planners and policy-makers aim to provide good accessibility to recreational landscapes to facilitate outdoor recreational activity. At the same time, they are facing development pressure due to urban growth. In order for planners and policy-makers to secure people access to urban and near urban recreational areas, there is a need to map and measure access in a way that is adequate as a basis for decision-making in planning and design processes. Access is often defined as distance, or proximity, from residents' homes to recreational areas. This paper explores different ways to map and measure distance to recreational areas, and aims to provide better decision support for planners and decision-makers. Moss municipality in Norway serves as a case study. We begin by addressing the meaning of the term 'recreational landscape' and how the choice of definition affects the results when mapping recreational areas. We also discuss who we are measuring distance for, and how different user groups will have different thresholds or critical distances affecting their frequency of visits to a recreational area. Last, we explore different methods for measuring distance within a GIS environment. The paper shows how the purpose of the analysis must be decisive when defining recreational landscapes and choosing methods for measuring access to recreational landscape, in order to provide valuable input to planners and policy-makers aiming at enhancing the possibility for outdoor recreation for people.

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Introduction

Over the last decades there has been increasing political concern over rapidly emerging public health issues related to physical inactivity in the population. Physical inactivity is a major risk factor related to many current health challenges, including obesity and non-communicable diseases such as cardiovascular diseases, cancer and diabetes (World Health Organization, 2010). In recent years, the relationship between outdoor recreation and public health has been increasingly acknowledged, and provision of recreational landscapes is seen as a means to increase physical activity and improve public health (Pate et al., 1995; Dahmann et al., 2010; Mann et al., 2010; World Health Organization, 2010). The positive health effects of outdoor recreation are both related to visual exposure to natural environments (Velarde et al., 2007) and to the physical activity itself (Grahn, 1994; Schantz, 2003). There may also arise synergic benefits from being physical active whilst

simultaneously being exposed to nature (Hartig et al., 1991; Arksey and O'Malley, 2005; Pretty et al., 2005). Recent research has further shown that the distance or proximity to a recreational landscape affects how people perceive their own health (Van den Berg et al., 2010). In addition to serving as arenas for outdoor recreation, urban and near urban recreational landscapes also provide ecosystem services such as reduced noise levels and improved air quality, affecting public health (De Ridder et al., 2004).

Time, motivation and mobility are important prerequisites for people to engage in outdoor recreation. In addition, people must have access to recreational landscapes. Urban and near urban recreational landscapes (for instance forests, coastal areas and parks) are important as landscapes for everyday outdoor recreation, and loss and fragmentation of green space near residential areas may reduce people's access to recreational landscapes. As many cities in Europe face extensive growth and increasing parts of the populations live in urban areas, securing access to recreational areas close to one's home is rapidly becoming a challenge to urban planning. Current compact city strategies put additional pressure on green structure within the city. Although densification as a planning ideal for urban municipalities may provide several benefits for the environment; for instance reduced private car use,

* Corresponding author. Tel.: +47 91147803.

E-mail addresses: gro@koppen.no (G. Koppen), asa.sang@slu.se (Å.O. Sang), mari.tveit@umb.no (M.S. Tveit).

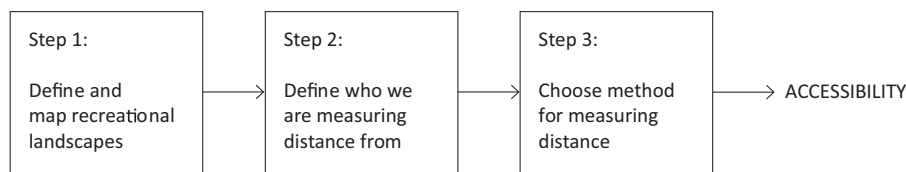


Fig. 1. Steps in mapping and measuring accessibility to recreational landscapes.

preservation of cultivated land and safeguarding nature and biodiversity in undeveloped rural areas, densification also has the disadvantage of adding pressure to urban and near urban green space (Thorén, 2000; Stokke and Falleth, 2010; Jørgensen and Thorén, 2012).

Access to recreational areas need to be measured and analyzed as part of planning processes in order for planners and policy-makers to be able to compare the effects different scenarios, and understanding how people perceive their access to recreational areas is an important basis for urban green structure management. However, a review of how the terms access and accessibility are defined and applied in present research on outdoor recreation reveals that the terms hold several different dimensions. A main distinction can be identified between physical accessibility and cultural, social and socio-psychological accessibility. Cultural, social and socio-psychological accessibility is related to attributes of the user, for instance cultural and social background, gender, age, mobility and recreational preference. These attributes affect the tradition people have for outdoor recreation, their experience, knowledge and sense of safety in a recreational landscape, all of which may affect people's perceived accessibility to a recreational landscape. Physical accessibility, or accessibility related to attributes in the physical landscape, involves both internal access (access *within* a recreational area) and external access (access *to* an area from the outside). The internal accessibility of a recreational landscape depends on attributes such as topography, vegetation structure and infrastructure (footpaths, trails and forest roads) and affects to what degree we are able to move around within an area.

While the internal access is important when at a site, or as a quality factor when determining where to go, the external accessibility has a major impact on how often we choose to visit a recreational area (Gobster, 1995; Van Herzele and Wiedemann, 2003; Skov-Petersen and Goossen, 2009). The main focus in this paper is therefore the external access to recreational landscapes. External physical access is often defined as distance, or proximity, from resident's homes to recreational areas, and measured in number of metres (Hörnsten and Fredman, 2000; Ode and Fry, 2006; Neuvonen et al., 2007).

Recreational areas can be reached by foot, bicycle, car or public transportation. However, policy documents and recommendations regarding distance or proximity to recreational landscapes tend to focus on pedestrians and walking distance (Nordic Council of Ministers, 1996; Norwegian Institute of Public Health, 2009). Being able to reach a recreational area by foot also means that people will have a lower threshold for using the area for outdoor recreation. How people perceive actual walking distances will however differ depending on for instance age or level of mobility. People of different age group and level of mobility will have different limits for how far they are willing to walk to get to a recreational area. According to the Norwegian Institute of Public Health, the limit for how far people will walk or cycle to reach a recreational area is around 10 min. In practice this means maximum 400 m for children and elderly. The number of visits to a recreational area is reduced by 56% when it is further away than 500 m from people's homes (Norwegian Institute of Public Health, 2009).

The Nordic Council of Ministers (1996) recommends 250–300 m as a maximum walking distance to recreational areas for everyday

use. This recommendation is referred to by Hörnsten and Fredman (2000), Ode and Fry (2006) and Neuvonen et al. (2007). According to Hörnsten and Fredman (2000) longer walking distances can function as a barrier for recreation.

Neuvonen et al. (2007, p. 237) explain how this distance barrier is related to time; "In terms of available time during weekdays, most working people have somewhat restricted possibilities to engage in recreation outside their own residential area." In order for people to use a recreational area, it has to be situated within a certain proximity to their homes. Research confirms a correspondence between a recreational area's distance to built-up areas and the frequency of recreational use of these areas (Gobster, 1995; Van Herzele and Wiedemann, 2003). Van Herzele and Wiedemann (2003, p. 111) show that "people who live in close proximity to a green space use it frequently, those who live further away do so less frequently in direct proportion to the increase in distance."

Assessing people's access to recreational landscapes may seem like a straight-forward process. However, in order to map and measure distance to a recreational landscape; three main questions need to be answered. First, what are we measuring distance to? How do we define and map a recreational landscape? Second, who are we measuring distance for? And third, how should distance be measured? These questions represent three separate steps in an analysis, where the choices made will affect the outcome of the analysis (see Fig. 1).

This paper explores how choices made within the different steps affects the outcome of the analysis and hence the basis for decision-making. The aim is to provide valuable input to planners and policy-makers aiming at enhancing possibilities for outdoor recreation for citizens and comparing different scenarios of densification. When mapping and measuring access to recreational landscapes, definitions and methods applied must be transparent in order for planners and policy-makers to assess whether the measurements are adequate for the purpose of the analysis. Different data sources are applied and explored to exemplify different methods for measuring access. Both data sources and methods will be discussed and evaluated with regard to their ability for assessing access.

Methods

Steps in mapping and measuring distance to recreational landscapes

The first step of the analysis is to define and map recreational landscapes. One need to consider what characterizes areas that are suitable for recreation and opposite; consider what characterizes areas that are unsuitable for recreation. Depending on the definition applied, different land cover categories should be included. In the first part of the result section we illustrate how different definitions of recreational landscape affect the mapping of these areas.

The second step is deciding for whom we measure distance to recreational landscapes, and choosing adequate data sources to address this. Distance measurements can be based on either housing data alone or housing data combined with population survey data. The discussion regarding the type of information that could be obtained with the different sets of data for a study area and the

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