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**Capturing cultural values through
participatory mapping, a contribution to
ecosystem valuation.
The case of Oslo's peri-urban forests,
Norway**

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Declaration

I, Gavin Steder, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Date: 11/05/2017

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Abstract

Although ecosystem service valuations have become common within the policy and research communities as a support tool for land management decisions, cultural ecosystem services lack the same representation in ecosystem valuations due to the nature of cultural ecosystem services being perceived as “subjective”. This thesis explores both the conceptual and methodological challenges that have hindered the integration of cultural ecosystem services into ecosystem service valuations. Using the peri-urban forests of Norway’s capital, Oslo, this thesis utilized a mixed method research approach to develop an analytical framework that conceptualizes some of the more abstract socio-cultural values recognized by the Norwegian Environmental Agency. This thesis carried out a demonstration of the framework using a participatory mapping protocol, resulting in hot spot maps of the socio-cultural values incorporated within the framework. These hot spot maps show value plurality within the landscape and with their spatially explicit representation, this thesis shows some of the potential policy applications derived from these results. With validation from the participants used in the mapping protocol, this thesis shows that by conceptualizing socio-cultural values based on the dynamic relationship between people and landscape, not just valuing ecosystems based on the benefits they provide, it is possible to map the socio-cultural values that have been characterized as “subjective”. This research has given insight into the practicalities and possibilities for mapping socio-cultural values, contributing to the capabilities of ecosystem valuations, and addressing the knowledge gap of mapping socio-cultural value.

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Chapter 1; Introduction

Within landscape research, a “landscape” is most often viewed with a natural science perspective, classifying landscapes by their physical and spatial parameters (Tengberg et al., 2012). However, landscapes have always had an influence on the socio-cultural and political domain, and are constantly affected by human interaction. Some social science research has approached landscape with the perspectives of the people who use, perceive, transform and define a particular area (Tengberg et al., 2012). With the constant interaction between people and place, landscapes are full of historical, cultural and spiritual meanings, all of which are embedded with emotional memories. These social contexts ascribed to landscapes are then reflected by cultural and individual identities (V. Gundersen et al., 2015). Due to the dynamic interaction between the natural world and cultural forces, landscapes are always changing (Antrop, 2005). However; inappropriate landscape development can diminish or degrade ecological functions, bio-physical interdependencies and cultural/historical connections between communities and landscapes (Stephenson, 2008). Thus, it is instrumental that decision makers assess the full range of value within a landscape, such as socio-cultural, ecological, intrinsic and utilitarian values (Sherrouse et al., 2011) in order to develop policy that best preserves all ecosystem services, while trying to adapt resource management to withstand evolving needs and stresses. One of the tools that has been adopted by policy communities to address this issue is the ecosystem service framework (García-nieto et al., 2013)

Ecosystem services (ES) are benefits that people get from ecosystems. The ES approach examines the links between ecosystems and human well-being (*Millennium Ecosystem Assessment*, 2005), and the mapping of ES is an important tool for giving spatial explicit information for various decision making applications (Martnez-Harms et al., 2012). Within the ES framework, cultural ecosystem service (CES) have been at the forefront of ecosystem conservation and are fundamental to current ES frameworks (Hernández-Morcillo et al., 2013). However, even with expressed importance on the need to integrate CES into policy, they have thus far suffered from poor quantification and integration into resource management decisions (Milcu et al., 2013), as the values placed on nature by stakeholders are inadequately captured by the more traditional, utilitarian valuation methods (Sherrouse et al., 2011).

Mapping CES is commonly done through the process of identifying causal relationships (if there is a parking lot, the forest surrounding that infrastructure is more intensely used because it is an access point) and making them into spatial indicators for mapping (Martnez-Harms et al., 2012). Thus, the most studied CES are the ones that are more thoroughly captured by this process, such as recreational and aesthetic values (Milcu et al., 2013). This oversimplification of value can mislead the decision-making process (Martnez-Harms et al., 2012) by only presenting values that are captured by current valuation methods and convincing decision makers that these values are representative of CES, while marginalizing the CES that are not captured by these methods (Milcu et al., 2013). This underrepresentation of CES data can result in biased ecosystem assessments by failing to make meaningful links between society and nature (Hernández-Morcillo et al., 2013). Although the process for integrating CES into decision-making is still ambiguous, failure to include these social-cultural dynamics can result in project failures and conflict (Gould et al., 2015).

One case of this inadequate capture of cultural values has taken place in Norway. The Norwegian term of *friluftsliv* is directly translated to “open air life”, and is often used in terms of outdoor recreation. However, outdoor recreation is a small portion of its meaning and does not encompass the totality of its cultural significance (Aasetre et al., 2012). The traditional definition of *friluftsliv* is being challenged by a national trend of commercializing Norwegian natural and semi-natural areas (Aasetre et al., 2012). Shown through local media outlets, this type of conflict is visible in Norway’s capital, Oslo. The municipality has re-zoned some of Oslo’s peri-urban forests as ‘activity zones’ with the intent of making the forest more accessible to the local population using ‘recreational infrastructure’ (*Oslo mot 2030: Smart, trygg og grønn*, 2015) and to reduce the amount bureaucracy needed in order to do so (Melby, 2015). The laws regulating these forests, up to this point, have been to maintain these areas for *friluftsliv*, and these activity zones are seen by various local groups as a way to test the boundaries of the norms that have regulated these forests since the 1930’s (Nissen, 2015). In an effort to try and avoid these types of conflicts in the future, Norway has made municipal mapping and valuing of recreational areas a national goal to be completed by 2018 (Norwegian Environment Agency, 2013). The guidelines for managing this undertaking are set in a manual that was prepared by the Norwegian Environment Agency called the *M98 manual, Kartlegging og verdsetting av friluftslivsområde*, the aim of which is to try and

capture a diverse set of values for semi-natural and natural areas (Norwegian Environment Agency, 2013).

The experiences people have in nature help to dictate their perceptions of their local ecosystems from an individual and communal level (Tyrväinen et al., 2007). These perceptions are part of the foundation for the socio-cultural context of the local ecosystem (Tyrväinen et al., 2007). Personal meanings are one of the most important characteristics, but with no quality criteria for mapping these values, they are one of the most absent in the valuation of ecosystems (Tyrväinen et al., 2007). Most attempts at mapping cultural values, other than recreational and intrinsic values, have been critiqued for not demonstrating clearly developed conceptual frameworks or defined rationales (Hernández-Morcillo et al., 2013). This study will use bodies of literature such as Chan et al. (2016), Irvine, K. et al., (2016), and Fish, R. et al. (2016) to address this knowledge gap by developing and testing an analytical framework for mapping the least defined value dimensions of the M98 manual. A participatory mapping protocol will be used to test the analytical framework, as previous research has shown this to be an effective method for facilitating communication between stakeholders and policy makers (Potschin et al. 2013). In turn, this research will look to evaluate the participatory mapping protocols ability to capture the socio-cultural values in the analytical framework, and assess its contribution to policy decision-making using the peri-urban forests of Oslo, Norway as a case study.

1.1) Objectives:

1. Develop an analytical framework that characterizes the least defined socio-cultural values in the M98 manual, allowing for rational clarity and consistency in a participatory mapping protocol.
2. Develop a methodological protocol and test with key stakeholders of Oslomarka.
3. Assess the methodologies ability to capture cultural values from the analytical framework.

1.2) Research questions:

1. Does the recreational opportunity spectrum framework, focusing on activity-opportunity, represent the different value types stakeholders have for Osломarka?
2. What methodologies work best for mapping different socio-cultural values?
3. Can abstract socio-cultural values in the M98 manual be linked to physical attributes? If not, how can they be spatially identified? If so, what characteristics and why?
4. What applicability does mapping socio-cultural values have for policy context?

1.3) Structure of the thesis

The aim of this thesis was to explore the possibilities of capturing socio-cultural values to assist ecosystem service valuation for policy support tools. Chapter 2 will briefly introduce you to the physical orientation of the study location, and the current policy context this research is associated with. Chapter 3 is a background section that is split into two parts. First, it will delve more deeply into the history of Osломarka by investigating how the local landscape has been used and governed within previous centuries up to the present, giving insight to the socio-cultural context of current day norms and policies. The second part of this chapter will explore the relevant literature on CES, showing how it has been conceptualized thus far and how the concept of CES is evolving. Chapter 4 will discuss the methodological approaches to capturing cultural values, from conceptual understanding of cultural context, the mapping protocol, and the assessing of the mapping protocols capabilities of accurately capturing these values. Chapter 5 will present the data collected from the various stages of this mixed methodological research, and the results from that data. Chapter 6 will then look to answer the research questions by addressing the results and discuss their representativity, the applicability to policy, further research opportunities and the limitations of this research. Lastly, chapter 7 will sum up the ability of this research to achieve its objectives and answer its research questions, its contribution to ecosystem valuation and the potential for future research and mapping of cultural values.

Chapter 2: Study Area

2.1) Description

Because of the conflict surrounding the activity zones in *Oslo mot 2030: Smart, trygg og grønn* (2015), the peri-urban forest of Oslo, Norway, known as Oslomarka is a main focal point of this research. With the activity zones being relatively small, and not wanting to limit participant responses, this research will incorporate all of the forests within Oslo municipality. This will allow for any information gathered concerning Østmarka to be more largely incorporated into the municipalities pilot M98 project test for mapping and valuing outdoor recreational landscapes.



Figure 2.1) Map of the activity zones and their relative position in Norway (*Oslo mot 2030: Smart, trygg og grønn*, 2015)

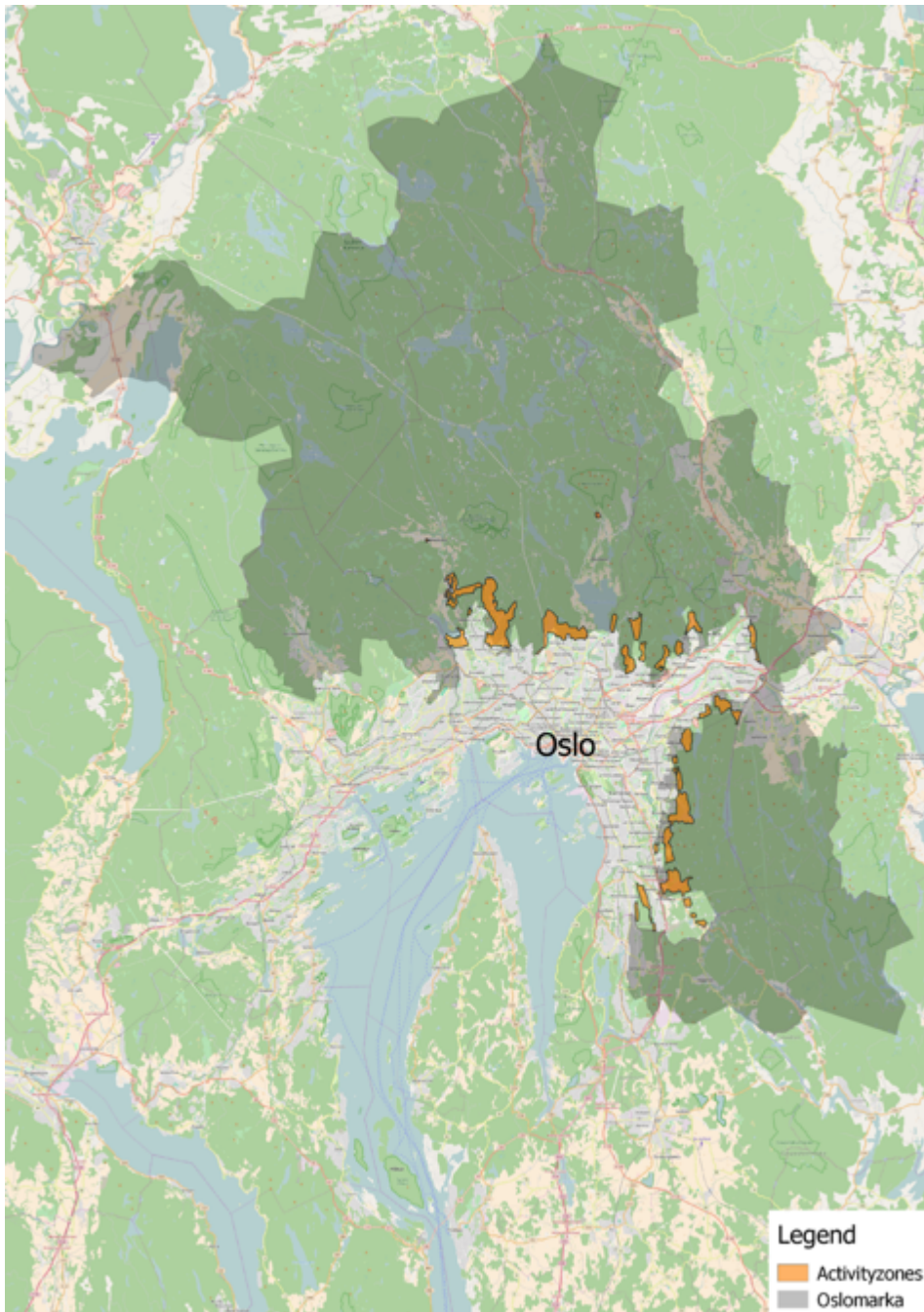


Figure 2.2) Map of Oslomarka with activity zones

2.2) Policy Context

Oslomarka is the forest surrounding Norway's capital city of Oslo, and has been an important location for recreational research and management since the late 1990s (Gundersen et al. 2015). Based on results from a survey by Synovate (2011), it is estimated that 86% of Oslo's population use these peri-urban forests annually (Barton et al. 2015). Oslomarka has been sheltered from major development due to local legislation called *Markaloven*, as seen in

appendix C. Stated by §1, the purpose of the act is to promote and facilitate outdoor recreation, nature adventure, and sports, while the borders of Marka were established to preserve Norway's rich and diverse landscape. This shows the importance emphasized by Markaloven of the socio-cultural connection between Marka and the impact it has on the well-being of its residents. So far, Oslo has managed to develop and grow while respecting the forests' borders. However, the fact that Oslo is currently the fastest growing capital in Europe (Norwegian Environment Agency, 2016), is putting the border under mounting pressure.

The aim of preserving Oslo's peri-urban forests for recreation in Oslo's Municipal plan, *Oslo mot 2030: Smart, trygg og grønn* (2015), is nevertheless open to strong political debate. As shown in appendix B, it proposes that sections of the Oslomarka border are regulated as "activity zones", a recreational activities zoning framework that allows for an increased and intensified development of recreational infrastructure within the activity zones. It does state in Markaloven §11 that no action can be taken that will substantially alter the area's value as an outdoor recreation area. With the traditional regulatory framework being based on an activity-opportunity definition of recreation (V. Gundersen et al., 2015), these proposed activity zones aim to increase access to the forest through recreational infrastructure, and do so with less bureaucracy (Melby, 2015).

Although the activity zones abide by the traditional regulatory framework, there has been strong disapproval voiced by representative groups such as *Naturvernforbundet Oslo og Akershus*, *Østmarkas Friends* and *Lillomarkas Friends* (Mellingsæter, 2015). They have been described as a "political hot potato" in local newspapers, and through local media, public opinion has critiqued activity zones as a bureaucratic way of getting around the Markaloven border regulations (Mellingsæter, 2015). A key argument for the attack on Markaloven, is how vaguely the activity zone proposal defines infrastructure (Nissen, 2015). Although this conflict was very prominent in the media, the activity zone proposal was still passed into the master plan *Oslo mot 2030: Smart, trygg og grønn*, (2015). However, in 2015 the green party was elected into office, and part of their platform was removing the activity zones from the city's plan.

The activity zones debate is one part of the mounting conflict concerning the misinterpretation of cultural concepts and socio-cultural contexts of semi-natural and natural areas (Aasetre et al. 2012). The Norwegian national goal of mapping outdoor and recreational landscapes as presented in the M98 manual, is one potential solution to avoiding these types of conflicts in future policy decisions. The M98 manual is to be used at a municipal level and outlines considerations and methodologies for mapping outdoor and recreational landscapes (Norwegian Environment Agency, 2013). The majority of values outlined in the M98, as seen in table 2.3, are either well defined or specific enough to ensure a high level of consistency between the municipalities mapping these values. However, the M98 does recognize a few values, such as Kunnskapsverdier (knowledge values), Symbolverdi (symbolic value), and Opplevelseskvaliteter (special natural or historical experience qualities) that are more abstract and are at risk of being considered ‘subjective’ compared to the other values in table 2.3 (Daniel et al., 2012; Norwegian Environment Agency, 2013). Even though these values are acknowledged in the guidelines, the M98 manual provides little information on the best method mapping or processing this kind of information. With the tight restrictions on time and resources in the public sector, there is a high probability of these values being under-represented or simply not captured during this process, possibly causing further conflict over green space similar to the activity zones debate.

Valuation Criteria	
User Frequency	How large is the current user frequency?
Regional and National Use	Are the users of this area not local?
Special natural or historical experience qualities	Does this area have special natural or cultural history experience qualities? Does the area have a special landscape?
Symbol Value	Does the area have special symbol value?
Function	Does the area have a special function (access zone, corridor, parking lot, ect.)?
Suitability	Is this area well suited for a particular activity or activities that can not be found in other areas?
Facilitation	Has this area been adapted for a particular activity or group?
Knowledge value	Is the area suitable for teaching context or area specific nature or culture scientific qualities?
Soundscape	Does the area have a good sound environment?
Encroachment	Is the area encroachment free?
Extent	Is the area large enough to satisfy the needs of desired activity?
Accessibility	Is the accessibility of this area good or could it be good?
Potential use	Does the area have potential beyond current use?

Table 2.3) The different value criteria and questions associated for those criteria as presented in the M98 manual

Chapter 3: Background

3.1) Historical policy, governance, and use of Oslomarka

As stated in Tengberg et al. (p.17, 2012), “culture is to society what memory is to individuals”. In order to get a holistic perspective on the socio-cultural values and norms concerning Oslomarka and its governance, a literature review of books, magazines, and articles on the history of Oslomarka was conducted. This gave insight to how the local population has placed themselves within nature throughout the last couple centuries, creating the cultural values and norms governing how these areas should be used and by who (Tengberg et al., 2012). By exploring the social and ecological dynamics that have shaped Oslomarka into what it is today, this research has a more in-depth understanding of the current policy, conflicts, and the socio-cultural values surrounding to Oslomarka which is addressed in later portions of this paper.

Oslomarka

In the early 1500's, Oslomarka was owned by the Roman catholic church and in 1536, the church transferred ownership to the King (Luccarelli et al., 2013). Ownership of land within Oslomarka has been transferred between the king, local government, and private hands many times throughout the last couple centuries, with a large share of the forest still in private ownership. In the local context, the institutional meaning of private owner does not give full rights to the land and restricts development and specific types of uses that are dependent on the location within Oslomarka. Property rights in the local context gives all rights of capital gain derived from that land to the land owner. However, the availability of access and personal use is extended to everyone. The cultural concept of Allmensretten, the right to roam, has been preserved as a cultural norm for centuries, and was encapsulated into legislation through the Outdoor Recreation Act of 1957 (Norwegian Environment Agency, 2017). People can roam where ever they wish and use the land for personal nourishment with some restrictions on hunting, fishing, and access of farm land. The public, however, is not entitled to the monetary benefits or allowed to inhabit private property over a certain period of time without explicit permission from the land owner (Norwegian Environment Agency, 2017). This cultural norm and legal right is one of the platforms that later contributes to the importance of regulating Oslomarka for recreational use.

With the technical advancements for processing wood, during the 1600's and 1700's there was a major increase in timber exports from Oslomarka to supply the amount of wood needed for the increased production of ironworks. Peasants filled the labor demand needed for the increased timber export, thus the majority of people occupying the forests were the peasants who lived and worked in Oslomarka (Luccarelli et al., 2013). The 1700's was a transitional period of land use as well, shifting from an area largely used for timber exports and livelihood, to an area where the upper class residents of the city wanted to spend their free time. By the early to mid 1800's the perceptions of Marka had started to shift, largely because of writers such as Peter Christian Asbjørnsen, Jørgen Moe, and Bernhard Herre who wrote fantastical folklore about mystical beings; mainly trolls. These stories depicted Marka as a wondrous place, with ample opportunity for adventure (Luccarelli et al., 2013).

It wasn't until the late 1800's that the recreational use of Oslomarka really started to take form. In 1886 the Norwegian trekking association (DNT) was founded ("DNT," 2017) and over a 30-year period they had demarcated routes through the woods for recreational use. Around this time, a "søndagstur" (Sunday walk/hike) became an institution among Norwegians and became a defining line between the upper and working class (Luccarelli et al., 2013). Skiing was a prominent way for people who lived and worked in the forest to travel through Marka as it was very practical for the local conditions. Although skiing in Norway is linked mainly with recreation in the 20th century, it wasn't actually considered a sport until 1886, when the first ski competition was held in Nordmarka, as shown in figure 2.1. The extra time it took for skiing to become a sport might be indicative of the class difference between the upper and working classes, as skiing was used primarily as a means of transportation and industry up to this point. However, this quickly became a very popular pastime rather than a mode of transportation. Within 12 years of that very first ski competition, 22 ski clubs were established in Marka, which inevitably drove DNT to start making summer and winter trails (Luccarelli et al., 2013).

With more recreational infrastructure in place and recreational use of Oslomarka on the rise, the early 1900's were a significant time period in the shifting of the social importance contained within Oslomarka away from forestry and livelihood to recreational use and enjoyment. Even though a "søndagstur" was an institution before this time period, the increase in recreational users in the early 1900's helped dissolve the delineation between class

and gender, as everyone was enjoying the same areas for the same reasons (Luccarelli et al., 2013). It was also during this time period that Norway began getting more global exposure, as the forestry workers who had previously been a part of the working class peasants and who grew up skiing as part of their livelihood, had now gone to the Olympics and were winning gold medals. This gave notoriety to the working class people for utilizing the skills they developed from their blue collar jobs. This notoriety helped in the solidification of skiing as part of Norwegian cultural identity (Luccarelli et al., 2013). Some of these working class heroes would once again use the knowledge they gained from their past to aid in the resistance movement against the Nazi occupation of Norway during WW2 by using local knowledge about the landscape and survival in harsh winter conditions to conduct sabotage missions against the Nazis (Christensen, 1993). With the younger generation idealizing these people, as well as the skills and knowledge they had, Marka was further associated with all the attributes and skills it took to become like these working class heroes (Luccarelli et al., 2013).

With the increase of recreational users during this time period, along with the expansion of Oslo, recreational use was starting to clash with the forestry sector, the other major user of Marka. Up to this point Marka had mainly been used for timber production, taking advantage of the local landscape for their production process. Most notably by using the waterways to float the harvested trees. As Oslo grew, the natural resources surrounding the city began to be allocated for city use, such as municipal drinking water. This, in turn, forced forestry practices to change and instead of using waterways to transport the product, roads were built to accommodate the vehicles needed for extracting timber. This pressure to adapt a way of life to changing preferences was causing conflict within the local communities (Luccarelli et al., 2013). During the 1930's, concerns about the shifting uses of Marka were not limited to foresters, as organizations like Oslomarkas Friluftsråd and Oslo og Omland Friluftsråd (OOF) were very prominent in voicing their concerns about property rights and development in Marka (Luccarelli et al. 2013). It wasn't until then that the forests surrounding Oslo were encompassed by the term Oslomarka, and in 1938 OOF suggested a boarder between the city and Oslomarka, effectively proposing the fist version of Markaloven (Luccarelli et al., 2013). As more actors started becoming interested in different ways to develop Oslomarka for various purposes, more conflicts occurred. Between the 1940's and 1970's the local government tried to develop Oslomarka according to technical innovations in forestry, water

use, roads, and train tracks but were resisted due to public outcry from various interest and user groups (Luccarelli et al., 2013).

Not all of the infrastructure development in Oslomarka was contested at this time. In the 1930's there was only 95km of road and by the 1960's there was 300km of uncontested roads in Oslomarka (Luccarelli et al., 2013). However, along with this increased infrastructure, came increased recreational use and one of the byproducts of putting in more roads for forestry was the introduction of bicycles in the forest. Along with technical advancements to industry, came the reduction of people needed to produce the same amount of goods, diminishing the population of people who were living and working in Oslomarka. From 1900 to 1999 the number of labor workers living in Marka went from 600 to 4. With only people in the forest using it for recreation, the prioritization of protecting Oslomarka for recreational use was re-enforced. Another byproduct of the technological advancements of forestry was its effectiveness in enabling more people to take advantage of Oslomarka though the infrastructure being built by adapting their production according to the shifting preferences (Luccarelli et al., 2013). Legislation at the end of the 1900's emphasized the prioritization of preserving Oslomarka for recreational use and started to recognize the importance of Oslomarka for its biodiversity and ecosystem services. Oslomarka had been effectively preserved by the local people persistently voicing its importance when plans to develop have threatened the diminish the cultural values of various areas and for various reasons, and in 2009 Markaloven was officially enforced by legislation.

3.2) Theoretical framework

3.2.1) Activity-opportunity oriented forest management

Among the various different regulatory frameworks for managing recreational use, the Recreational Opportunity Spectrum (ROS) is one of the more well established (Gundersen et al., 2015). ROS is a forest management zoning model that separates different forest areas based on the type and amount of use. This framework fits very well with the goals stated in Markaloven §1 because ROS aims to address the administrative (i.e. managing services offered, enforcing regulations, etc.), social (i.e. the interactions between people, their activities and the possible conflicts that come with those interactions), and physical (i.e. infrastructure, bio-physical, and other human induced changes) dimensions of forest management, providing multiple user groups with a high level of recreational quality in

specific areas (Gundersen et al. 2011). The ROS framework, in the context of Osломarka, has been used to propose a four-zone forest management system (Gundersen et al 2011). The zones are classified by the different types of recreational opportunities available in a particular forest area, as well as how close that particular forest area is to its target user population (V. Gundersen et al., 2015). The two main considerations used for placing specific forest areas into zoning categories are 1) how often that area is used for recreation, rated from low to high, and 2) the recreational demands and needs of the population, rated from general to special, (V. Gundersen et al., 2015). As shown in figure 3.1, the four different zoning categories are *general consideration*, *special consideration*, *wilderness*, and a *service* category.

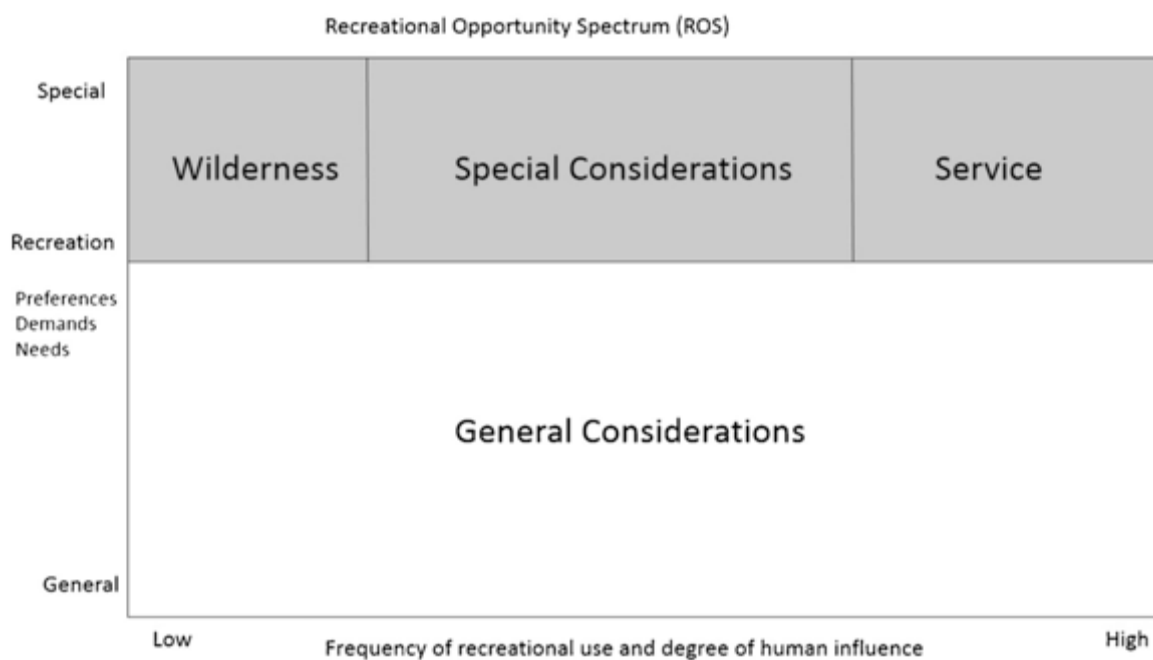


Figure 3.1) Visualization of the ROS spectrum from V. Gundersen et al. (2015)

The zoning category ‘general considerations’ is defined as “the basic adaptation to recreation within the frame of sustainable forestry” (Gundersen, 2015.p.212). In the local context, these conditions are already mandatory of all forestry management in Norway. ‘Special consideration’ areas have specific restrictions to the kind of forestry practices that can take place, but are still accessible for some amount of selective logging and occasionally small amounts of clear cutting as a way to keep a balance between recreational users and land owners (Gundersen et al., 2015). The zoning category ‘wilderness areas’ is characterized by a high level of biodiversity, leaving no direct economic gain to land owners, and the ability to provide solitude (Gundersen et al., 2015). Lastly the ‘service’ category is distinguished by its

high level of usage and is generally the areas of forest that border the city. They are the areas of forest that have the highest maintenance, due to the level of infrastructure and management needed (Gundersen et al., 2015).

This type of regulatory framework fits broadly with a utilitarian view of ecosystems. As stated by Gundersen et al. (2015.p.212): “The concept is based on an activity-opportunity definition of recreation, implying that users are seeking opportunities for activities, experiences, and benefits”. ROS has been developed based on a gradient of instrumental values, with the assumption that the principle relationship people have with forests are activity-based (V. Gundersen et al., 2015). This rationale simplifies the relationship that people have with their local ecosystems by downplaying the dynamic interaction between people and landscape. For example, ‘wilderness’ may be perceived by users of peri-urban forests, while not fulfilling objective criteria for remoteness from infrastructure as defined by the INON classification system (“Nature for Livet,” 2016), nor biological criteria of uniqueness needed for defining Nature Reserves. This thesis questions whether ROS is consistent with non-material values, in particular the relationships and values people attach to the local ecosystems. If these relationships are misrepresented in proposals for zoning, such as ‘activity zones’, it may be one explanation for the conflicts of interest associated with the proposals in the Municipal Plan to 2030.

3.2.2) Cultural Ecosystem Services

The ecosystem service framework is a utilitarian approach that aims to identify the links between ecosystems and human well-being (*Millennium Ecosystem Assessment*, 2005). It has become common in the policy arena as it is a widely accepted approach amongst the international environmental science and policy communities (Daniel et al., 2012). The benefits of an ecosystem are commonly referred to as ecosystem services (ES). As defined by Chan et al., ES are “the provision of direct and indirect benefits to people from ecosystems”(p.8, 2012). These benefits can take the form of material and non-material values. Services associated with provisioning, supporting, and regulating are considered material values. Services that are associated with cultural benefits are considered non-material (Chan et al., 2012). Ecosystem services valuation has often been used as a tool to explain ecological attributes and tradeoffs in monetary terms as it has been argued (TEEB, 2010) as an accepted

way of showing the relative importance of ecosystem services in a context that is understandable to the general public and to those in decision making roles (Chan et al., 2012).

The ES that are most often difficult or impossible to accurately represent through economic valuations are the ones in the socio-cultural category. Also known as cultural ecosystem service (CES), they are defined in Plieninger et al. as “ecosystems’ contributions to the non-material benefits that arise from human-ecosystems relationships” (2013.p.118). There are six categories of CES that are recognized by the Millennium Ecosystem Assessment (2005), they are heritage values, cultural identity, spiritual services, inspiration, aesthetic appreciation of natural landscapes, and recreation and tourism (Tengberg et al., 2012). Unlike provisioning and regulating ecosystem services, CES often do not have as clear of a link to their direct effects on human wellbeing and are often linked to a specific place or landscape (Plieninger et al. 2013). One argument for their importance is irreplaceability, as once they are deteriorated they can not be replaced or substituted through imports and technological advancements (Darvill et al. 2015).

In the context of Norway, the official translation of cultural ecosystem services is “opplevelses- og kunnskapstjenester” (*Nature for Livet*, 2016.p.31). The direct translation back into English is *experience and knowledge services*, leaving “culture” out of the translation. The Norwegian classification of CES includes 4 different types of services, 1) Knowledge and learning, 2) Recreation, Outdoor recreation, and Nature-based tourism, 3) Place Identity, and 4) Spiritual enrichment (“Nature for Livet,” 2016). These four types of services ascribed to the Norwegian definition seemingly coincide with the CES categories from the Millennium Ecosystem Assessment (2005). However, having “culture” taken out of the typology could be a contributing factor for why CES are represented the way they are in Norwegian policy.

CES are recognized as being important for policy, but they are often labeled as ‘subjective’ and dismissed because they are hard to quantify in monetary terms (Daniel et al., 2012). This is partially due to the ES framework viewing ecosystems from a purely utilitarian perspective (Laurans et al. 2013). The utilitarian viewpoint of ecosystems ties very closely to the neoclassical economic theory of maximizing personal utility (Aasetre et al., 2012). However, as stated by Chan et al., (2016) few people make personal choices strictly on the basis of personal gain or maximizing personal satisfaction. In fact, the importance and meaning people

attribute to CES can often be better understood in terms of ‘held values’, i.e. in terms of principles, convictions and social norms guiding people’s relationship to nature. From this side of the argument however, CES do not capture the socio-cultural value of these services. Heritage values and cultural identity, arguably, are not services that are provided by an ecosystem, even if the ecosystem has an effect on why those values are where they are. Ultimately, those values are ascribed to that place by people (Twigger-Ross & Uzzell, 1996). Even though the use of CES in research is an attempt to bring socio-cultural values into the ES framework, some CES are ascribed to an environment as a whole and are not specific attributes that can be used and manipulated (Aasetre et al., 2012).

The intent of the ES framework in a policy setting, is to allow for standardized comparisons between value dimensions that otherwise would be at odds with one another (Fish, R. et al., 2016). The problem with CES is that these services are not organically developed by natural systems (Fish, R. et al., 2016), but are the meanings people ascribe to a place which are reflections of cultural and individual identities (Kyle & Chick, 2007), and because of this, forgo any independently measureable standards (Fish, R. et al., 2016). Although the conceptualization of CES within the ES framework does not fully reflect the dynamic relationships between people and ecosystems, which diminishes its ability to articulate what is culturally valuable, it does not mean that the ES framework as a whole should be disregarded as a result of its presence in the environmental science and policy communities (García-nieto et al., 2013). As seen in figure 3.2, there have been recent developments in conceptual frameworks that capture a much more diverse human nature relationship within the realms of the CES framework. This type of framework not only diverges from the dominating utilitarian view of CES in the ES framework, but also implicates that value is not just the sum of the physical characteristics, but includes the dynamic relationships associated with what is being valued. This emphasizes that policy makers should not assess an area’s biophysical domain, cultural practices, environmental spaces, and the cultural benefits as separate entities, but as attributes that are interdependent on one another (Fish, R. et al., 2016). While this type of dynamic understanding of ecosystem interaction is important for holistic resource management, extending it past a conceptual framework into something like ecosystem valuation and application in a policy setting, is another task altogether (Fish, R. et al., 2016).

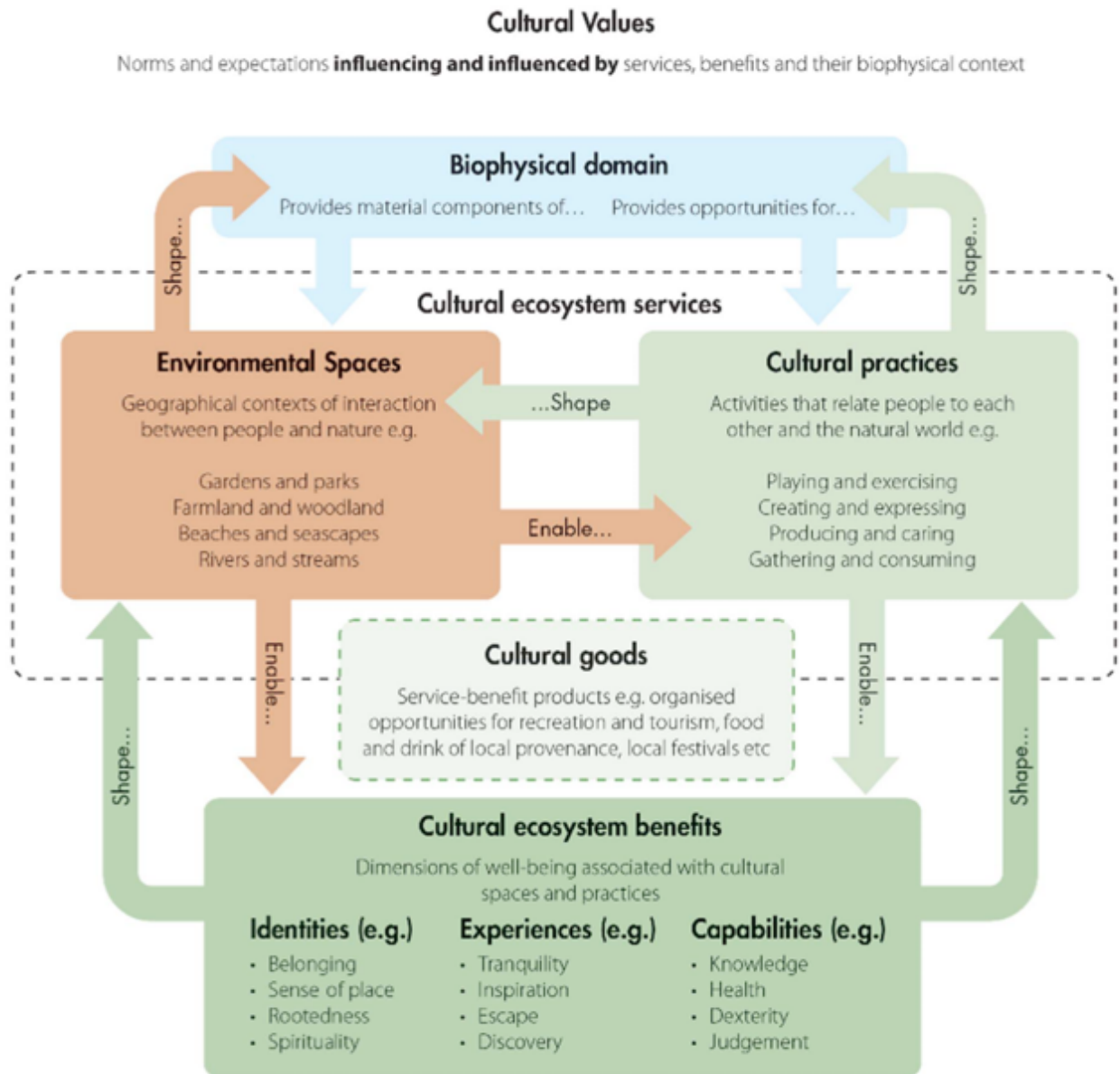


Figure 3.2) Conceptual framework for CES developed by Fish, R. et al., (2016)

3.2.3) Instrumental, intrinsic, and relational values

CES valuations that do not accurately reflect dynamic relationships are not the sole reason for CES having had limited consideration in policy settings. Some of the CES categories recognized in MA (2005) reflect a much less formal understating of value, such as heritage value and cultural identity. These values are those that most often get characterized as “subjective” or “intangible” (Daniel et al., 2012), giving them very little actual consideration compared to something much more concrete, like an economic analysis (Fish, R. et al., 2016). A portion of this subjective understanding of CES can be attributed to the lack of consistency within the research community. As stated by Irvine, K. et al., (p.186, 2016), “This plurality,

typified by frequent interchangeability in usage of the terms shared, cultural, social and plural values within and between papers, leads to a fuzziness of concept and vagueness in meaning that is unhelpful for the methodological challenges associated with valuation”.

The lack of agreement on terminology is similar to the issue of conceptualizing value. Traditional valuation methods do not capture the dynamics of relationships as presented in figure 3.2, because the ES framework is traditionally viewed through an economical lens, compartmentalizing ES as attributes to be valued independently and then made into an aggregated sum (Irvine, K. et al., 2016). Terminology has been treated the same way by looking to place attributes into cultural, social, and shared value typologies. An alternative to classifying what is and what isn't within the typology of a social or cultural value, Chan et al., (2016) proposes to look at why something is valued and for what purpose. This difference in perspective can be exemplified by comparing the utilitarian perception of ES to the conceptual framework shown in figure 3.2.

CES valuations have been conducted on the basis of protecting nature because of instrumental values (what can nature provide for people, individually and communally, i.e. personal satisfaction) and intrinsic values (value coming from being untouched and absent of people e.g. wilderness reserves) (Chan et al., 2016). When referring back to the definition of CES given by Plieninger et al. (2013), it suggests that the benefits people get from ecosystems derive from human-ecosystem relationships. By only looking at the utilitarian perspective of instrumental value or the intrinsic perspective of valuing nature for nature, creates a distance between people and nature and positions them as completely separate entities. Chan et al., (2016) has proposed a third valuing rationale called relational values. These values do not pertain to any specific object in an ecosystem, but to the relationships people have with those objects or ecosystems and the responsibilities that go along with those relationships (Chan et al., 2016).

A good example of relational values is the spiritual perceptions of sacred areas, and the environmental stewardship that coincides with those areas (Daniel et al., 2012). One of the issues that policy has had to overcome is how to translate what is sacred into legislation for the protection of places with spiritual significance to local populations (Daniel et al., 2012). These lands cannot be valued based on a level of personal satisfaction (instrumental value) or by willingness to pay for non-use (intrinsic value) because satisfaction does not delineate

what is sacred (Chan et al., 2016). In order to translate this relationship into policy, it takes a deep understanding of the links between what is sacred, the ecosystem itself, and the local community (Daniel et al., 2012). Hence, valuing sacred areas for policy is completely out of reach of the utilitarian valuing systems used in the ES framework. The understanding of “sacred lands” in the context of cultural ecosystem services can be extended beyond traditional stewardship relationships of indigenous communities to the public’s identity being rooted to a particular landscape and a sense of place (Chan et al., 2016). In this sense, Oslo’s urban inhabitants may also hold values for Oslomarka forest that can be described as sacred, of stewardship etc. – relational values that go beyond instrumental or intrinsic values and that are normally associated with research on traditional societies’ relationships with nature.

Chapter 4: Methodology

Within qualitative research, trustworthiness is often scrutinized because attributes such as validity, reliability, and transferability cannot be assessed in the same way as natural science research (Shenton, 2004). However, various researchers have developed measures in an attempt to deal with these issues. As presented in Shenton, (2004), credibility, transferability, dependability, and conformability are the four criteria that need to be addressed in order to ensure trustworthiness in a qualitative study. In an effort to address these criteria, a mixed methods data collection approach was adopted. The types of methods used in this study are common in various fields of research; however, using mixed methods has shown to provide more comprehensive data, as well as a conformation of findings, thus increasing the trustworthiness of the research (Bekhet & Zauszniewski, 2012). As seen in table 4.1, this study incorporated four different types of data collection methods along with the literature review and the historical analysis. Each one of the objectives and methods was developed to address the four characteristics presented by Shenton, (2004).

Methods	Specific Objectives	Objective 1: Develop an analytical framework that characterizes the least defined socio-cultural values in the M98 manual, allowing for rational clarity and consistency in a participatory mapping protocol.	Objective 2: Develop a methodological protocol and test with key stakeholders of Oslomarka.	Objective 3: Assess the methodologies ability to capture cultural values from the analytical framework.
(A) Field Visits		x		
(B) Stakeholder interviews/analysis		x		
(C) Participatory mapping			x	
(D) Mapping validation survey				x

Table 4.1) A descriptive chart showing which objective will be achieved by which methodology.

Credibility; becoming familiar with the socio-cultural aspects of the people using Oslomarka was part of ensuring credibility. It is a responsibility of the researcher to comprehend the information gathered from respondents in order to convey their perspective of value

accurately (Bryman, 2012). Preliminary sight visits were conducted to allow the researcher to get a more comprehensible understanding of the geographical diversity of Oslomarka, as well as conduct non-participant observations to get a more objective account of how local people were using the different areas, and how different user groups used the same areas in different ways (Cooper, Lewis, & Urquhart, 2004). This first hand account of local variation in geography and user group activity allowed for better comprehension of responses during the stakeholder interviews and participatory mapping protocol. The second step for understanding the cultural context of Oslomarka was doing stakeholder interviews with representatives from local interest and user group organizations based around Oslomarka. These stakeholder interviews helped strengthen observations made during the site visits, show contradictions between what was observed and what is stated, and helped to increase the validity of this research by allowing the researcher to have a better understanding of the socio-cultural context of the study area (Bekhet & Zauszniewski, 2012).

Transferability; with the majority of ES mapping being based on ecosystem indicators, to make them objectively verifiable requires a clear rationale behind their development (Hernández-Morcillo et al., 2013). To help ensure the results are replicable, the analytical framework and methodological protocol will be explained in detail later in this thesis, giving justifications for each value attribute included in the methodological protocol, as well as the process for mapping those attributes. The analytical framework has been developed as a “prototype model” to make transferability to other cases easier to assess and aims to promote transferability of concepts and comparability across cases.

Dependability; using a mixed methods approach is the main effort to address the dependability of this study, as having multiple methods can help in strengthening weakness of any single method (Bekhet & Zauszniewski, 2012). The strategic organization of methodology to support previous findings and strengthen the development of further methodologies to be used, as well as documenting what was planned and executed, is a straight forward way of addressing dependability (Shenton, 2004). To further add to this, reflecting on the outcome vs. intent, and discussing possible strengths and weaknesses will give insight to the overall effectiveness of the process (Shenton, 2004).

Conformability; objectivity in social science is an aim to reduce the investigator bias and derive conclusions that are represented by the experiences and the ideas of the informants (Shenton, 2004). To address the success of the methodological protocols ability to accurately capture the values present in the analytical framework, the last methodology used in this research is a validation questionnaire. This questionnaire was sent to the respondents to get their account of how well the participatory mapping protocol spatially expressed the values they hold for Oslomarka. This will help to reduce researcher bias on how successful the protocol was in its findings and to suggest further development to better capture these values (Shenton, 2004).

This study aims to address all the measures for insuring trustworthiness as presented in (Shenton, 2004), figure 4.2 and by this methodological process was this research used to achieve its objectives and ensure the ability of the study to answer the research questions. As shown by the flow chart, the field visits, stakeholder interviews, and the literature review all contributed to the development of the analytical framework. More specifically, the outlined boxes are their conceptual contributions. The analytical framework developed was the first half of addressing transferability, as it provided a clear rationale behind the value attributes and acted as a guide for the methodological decisions and development. Once a mapping protocol was developed it was tested in order to improve the quality of the prompting questions before use in data collection. Once the data collection was complete and the maps were digitized, validation surveys were conducted to assess the ability of the participatory mapping protocol to capture the values outlined in the analytical framework. These validation surveys provided reflection on conceptualization of the analytical framework and provided feedback on the methodological protocol, such as its limitations.

Methodological Flow Chart

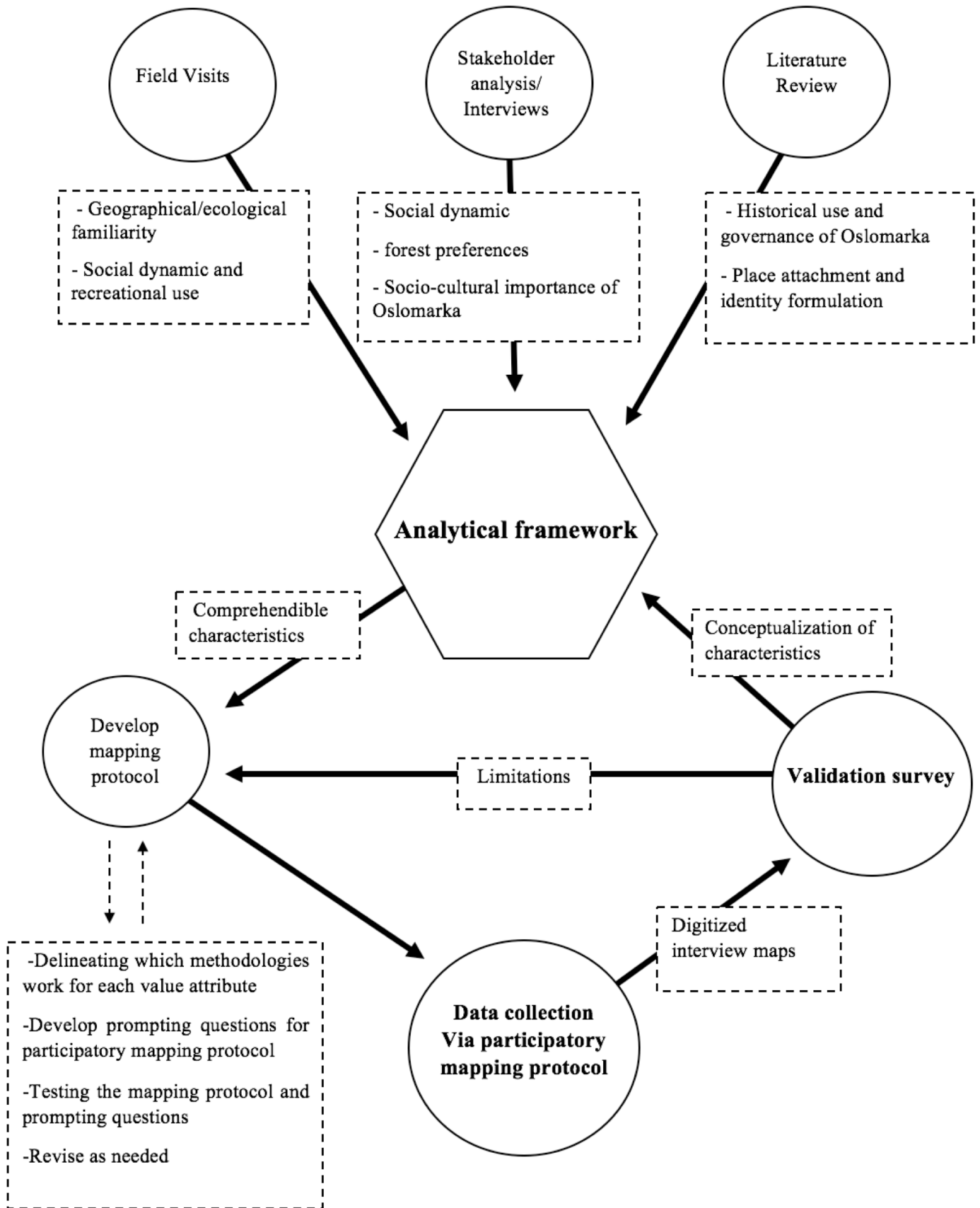


Figure 4.2) A flow chart showing the steps used during this research to ensure trustworthiness and achieve the research goals of this thesis

4.1) Field Visits

This step of the methodological procedure took place in conjunction with another research project which aimed at mapping trail density in Oslo's peri-urban forests. Field visits took place in the month of August, 2016 with a total of 15 days allocated to this data collection. Visits took place during the weekdays within the hours of 8:00 and 20:00, however most days only lasted until 16:00. During this time, the majority of field visits consisted of either heavy rain or scattered showers. Although this data collection protocol was not designed specifically for the purposes of this research, it was able to aid the research in two main ways. First, it provided the research with a first hand account of the landscape and its diversity within the study area. Second, it allowed for non-participatory observation, giving insight to how people are using the forest, the distribution of use, and who is using what areas. Specifically, there were 5 types of observational notes that were made in the field. *First*, locations of observations. *Second*, the social dynamic of users. Are people using Oslomarka in groups, pairs, or alone? *Third*, what types of activities people are doing. *Fourth*, what locations and area types are being used for specific activities, and *fifth*, the effect of weather on use of the forest. This type of observation did not only provide the researcher with a better comprehension of the socio-cultural context, but was used for complementing the data collected during the stakeholder interviews for developing suitable value characteristics (Cooper et al., 2004).

4.2) Stakeholder analysis

A stakeholder group as defined by Darvill et al, is “*any group of individuals that share common interests and who may be affected by land use decisions or outcomes*” (2015.p.153). This stakeholder analysis was conducted through a combination of semi-structured interviews and snow-ball sampling (Reed et al., 2009). Both the semi-structured interviews and snow-ball sampling was done simultaneously. Contact was first made with more prominent stakeholders, such as policy makers and representatives from organizations that work with Oslomarka. The logistics of when and where the interview took place, was chosen by the interviewee. At the end of the interview, they were asked about any groups that they have worked with or against in the past as well as any groups they think would have valuable input for this research. The groups mentioned at the end of the interview were then contacted, and if they wished to participate then the process was repeated.

The stakeholder analysis and interview process took place during the end of September and through October of 2016. In total, 22 organizations were contacted for interviews. The initial contact with organizations was through e-mail, giving a short introduction to this research and the purpose for contacting them. If there was not response to this first e-mail, then a follow up e-mail was sent after a full week's time period. If there was still no response, e-mails were sent to various contacts listed on the organizations webpage. There was a response rate of 50% from the organizations contacted, and from those who responded, there was an interview rate of 82%. All interviews were done at the convenience of the interviewee and interview lengths averaged 35 min. Interview locations varied from a café in Østmarka, interviewees homes, to interviewees offices.

The stakeholder analysis was used for two types of data input. First, a qualitative interview protocol with the aim of assessing their satisfaction with current policy, their ideal management of Oslomarka, the relationship they have with Oslomarka, and preferences of what is important to them as a stakeholder. The responses were used as input for the development of the analytical framework, as the respondents answers to these questions reflected on their definition of Oslomarka's socio-cultural importance (Gould et al., 2015). Second, it was used as a scoping technique to conclude which stakeholders to include in the participatory mapping portion of the study. As it is not possible to find and include all stakeholders (Reed et al., 2009), this thesis did not sample a statistically representative user group population of Oslomarka (Gundersen et al., 2016). Instead this thesis collected a high level of content diversity in relational values held by stakeholders for Oslomarka (V. Gundersen et al., 2016)

4.3) Analytical framework

The analytical framework presented in this section is the direct result of this research, and was developed using a combination of input from field visits, stakeholder interviews, and literature. Thus, all of the justifications and conceptualizations of the value attributes consist of all the modes of input. The diagram in figure 4.1 is designed to show the relationship between the specific attributes that define each value type and what relational characteristics each of these attributes hold. The aim of this diagram was to decrease the subjectivity of the three M98 values that were characterized as being 'fuzzy'. Part of this subjectivity is due to

the criteria for these values being very broad in the M98 manual. By defining characteristics of each of these values, they become easier to conceptualize and incorporate into a mapping protocol, producing maps that are more definitive in what they represent, and allowing those maps to be more easily interpreted and incorporated into a policy setting. The ability to operationalize this analytical framework was demonstrated through a participatory mapping protocol. The first step to operationalizing the value attributes was using their conceptualizations to determine if they can be linked to an ecosystem indicator. Further in this chapter, all ecosystem indicators and decisions on which value attributes that were included in the methodological demonstration are as presented in table 4.4.



Figure 4.1) The outer circle is the valuation criteria selected from the M98 manual on mapping outdoor and recreational landscapes (Norwegian Environment Agency, 2013). The characteristics listed within the bounds of that value criteria are the defining features of those criteria, and the number's listed in each characteristic is the relational values that are linked to that characteristic.

4.3.1) Special natural or historical experience qualities

The first M98 value in the diagram is the easiest to conceptualize out of the three, as it shares many of the same types of characteristics as locations with a high instrumental value, such as the M98 function, suitability, and facilitation values. Some areas will be transformed from locations with high functional value, to an area classified as having special natural or historical experience qualities, due to the social impact those locations have, such as social responsibility and cohesion. These social impacts can be direct byproducts of its high functional value. Other areas will be transformed as a result of the special natural or historical experience qualities that surround the functional attributes that contribute to the overall experience, and not only its ability to facilitate a specific recreational use. As discussed by multiple stakeholders, when climbing in a climbing gym or running around a track, the focus on the activity is the climb difficulty or how many laps you want to complete. When doing those activities outdoors, the goals and satisfactions that are involved with climbing a certain difficulty or running a certain distance remain, but the sense of naturalness and isolation adds an extra element that is not felt within the confines of a gym or man made landscape. This element within a natural landscape enhances the experience with unexpected variables. It makes the overall experience more than just the sum of the activity, but being a part of the landscape and a part of something “bigger” than one’s self. In all, the value type of special natural or historical experience qualities, was broken into four defining characteristics that will help in the participatory mapping protocol in formulating questions and coding responses.

1) Interaction between and well-being of other creatures

During the stakeholder interviews and as seen during field visits, Osломarka is a popular place for walking dogs. Walking dogs in Osломarka is publically acknowledged and often advertised, not only for the health of the animal, but also for the fitness of the dog owners (Cutt et al., 2007). However, dog walking is not just for fitness, there is a very strong social atmosphere to dog walking, for the dog and for the dog walker. Dogs are social animals and during interactions between animals, owners will often talk to one another for at least a short period of time. People also interact and meet up at dog parks to let their dogs play off leash and to socialize with other dog owners. Whether its only small talk for a moment or as a

regular meet up for groups of likeminded individuals, these areas and interactions between the dogs and between the owners are an essential part of this stakeholder group (Cutt et al., 2007).

During an interview with a member from an umbrella organization for the horse riding clubs around Oslo, the interviewee stressed the importance of the relationship between the horse and the rider. They make it a point in their riding schools to not only educate students on the techniques of riding a horse, but also learning more about horses in general and to develop a respect for the animal. Horse riding in Oslomarka, because of restrictions and the high demand for space, is not as common. However, the interviewee expressed that they would not want to keep their horse in a stable that had poor access to Oslomarka, as it is beneficial for the animal to be taken out for tours in nature. Mental health is commonly argued for as a reasons for preserving the forest border because, as pointed out by the interviewee, its not only good for the mental health of people but also for the mental health of animals.

In both dog walking and horse riding groups there is a strong sense of community, based around the love and affection for animals. With this community comes a great deal of education and knowledge sharing about those animals and what is important for those them. It also brings people together that may otherwise not have met, as owning a dog transcends many other social factors. Even if certain areas carry a high functional use for animals, because of the importance on the social environment surrounding this function, it ties closely to the social cohesion relational value. This social cohesion is based around the wellbeing of those animals, which is why this value classification is assigned moral responsibility to non-humans.

2) Facilitation of interaction between user groups

For recreational use this pertains to rest areas, such as trail heads, outlooks, trail signs, and parking lots. During a stakeholder interview with a member from the horse riding umbrella organization, user conflicts were discussed as they had some issues in the past with cyclists going too fast on the walking/biking paths and scaring the horses. She recognized that the cyclists were not trying to scare their horses on purpose but by the time the horses were calm, the cyclists were already long gone, and none the wiser of the issues they had caused. Rest areas are important places for different activity groups to interact with one another and get the opportunity to learn about each other, which enables discussions about and resolutions to issues such as those regarding the interaction between horses and bikes.

A current topic within the political setting of Oslo is the potential for using Osloomarka as an outlet for better assisting the integration of non-native Norwegians into Norwegian culture. This can be used in the same way as the example concerning conflict resolution between user groups by allowing for interactions between non-native Norwegians and native Norwegians through common space for the break down cultural and language barriers. The aims of these projects and their associated social benefits have a striking similarity to the aims and social benefits of community gardens. Community gardens are much less about the actual production of food, and much more about educating people in urban areas about where their food comes from and getting people from different backgrounds to socialize and learn about each other which strengthen the bonds within a community through social interaction (Flachs, 2010). A few example characteristics of the functional values within these areas are the close proximity to town with the possibility to access by public transportation, and recreational infrastructure, such as a docks for swimming at a lake, ropes courses for kids, or open picnic areas with restroom and trash bin facilities. These areas are very important for social cohesion and social responsibility because they allow for many different user groups to share a similar space and participate in the same activities, facilitating the interaction between user groups. This type of social education can help mitigate inequalities between groups (Kingsley & Townsend, 2006) and help establish place attachments (Twigger-Ross & Uzzell, 1996).

3) Idealized activity or experience

This value attribute is more about the specifics of the chosen activity and is subjective to the desired experience. More generally, for people that may not be apart of any specific user group, these can be associated with some sort of trip “reward”, such as an outlook or particular type of ambiance of a location. These types of “rewards” can also be goal oriented, such as making it to a particular peak that is hard to access, or a completion of a particular hike. In essence this is what will be remembered or idealized when reminiscing about a location or experience.

The experience and locations can be much more specific for people that fit into a particular sub-group, where the activity is perceived as more than just recreational, considering this chosen activity to be more of a hobby or lifestyle. What sets these sub-groups apart from recreational activities, is doing an activity in a specialized way or having a specific type of experience in mind that is different from the norm. Some of these subgroups are separated by

a purist type of mindset; meaning that by doing an activity in a way that is not the easiest, most efficient, or even safest way can give a sense of accomplishment or pedigree. Some examples of this type of activity were discussed during the stakeholder interviews, such as fly fishing. During a conversation with a local fly fisher he described the technique of getting the cast to go exactly where you want it, and being able to see a fish swim up and take the hook, not only giving the sensation of being more involved in the interaction with the activity but with the fish as well. Yes, you can catch a lot more fish with a net but if the experience isn't judged by the total number of fish caught, which can add to the overall satisfaction, it becomes ultimately about how the fish was caught that makes it memorable. Another example of doing an activity for a specific experience is choosing to do things in a traditional way, disregarding technological advancements and abiding by the technologies used during a certain time period. This can also add to a level of difficulty and give a sense of connection to people in the past and to the landscape. Over time, these interactions with a location through a specific activity comprise the primary experiences that add to a sense of self and sense of place, in turn influence the perception of personal and cultural identity (Knez, 2005). Location can be conducive to the experience, as it may add to the level of difficulty and increase the pedigree, or be a place where a type of traditional activity took place giving increased sense of closeness to the location.

4) Desired experience with high accessibility

Accessibility is the key factor in this value attribute. As discussed by a stakeholder who works with providing recreational opportunities to under privileged children, despite the fact that there is a high level of accessibility to Oslomarka through public transit, someone whose native culture and environment are different to that of Oslo's, may not have the knowledge of how to properly access and use Oslomarka. This can be exemplified by knowledge of the appropriate attire and gear to use and knowledge of local environmental conditions which define how comfortable and therefore enjoyable the tour into forest can be. The effects of this end up being a multigenerational problem and as stated in multiple stakeholder interviews, parents were often cited as introducing their children to outdoor life. If someone does not use Oslomarka because they don't know how to, it can deprive the benefits of Oslomarka to the dependents of those people. There are some groups in Oslo, such as FRIGO and OXLO, that are taking groups of people who otherwise do not have the same opportunities and access to proper equipment and the knowledge about where to go, what to wear, and the norms on how to act, on trips into the forest. These types of programs do not start by taking people deep into

Oslomarka and many of the activities planned by these groups start at well known access points for recreational use. The recreation development in these areas, as discussed in some stakeholder interviews, does not give the interviewee the sense of “nature”; however, these areas are important as an introduction area or “safe space” for familiarizing people with Norwegian nature and the how one should act within the nature according to social norms.

There is a desire expressed by each of the interviewees to increase accessibility to more groups; however, it is still important for some areas close to the city border to have a higher degree of naturalness. These locations, in actuality, may not be hard to access, but can give the sensation of wilderness and isolation in areas that otherwise do not fit the classifications for either. From a social justice point of view, these areas serve two very important social functions. First, once a person who is not accustomed to Norwegian nature becomes comfortable with the more developed access points, these locations become the second stepping stone in familiarizing oneself with the more natural landscape. Second, the locations are important for frequent access to areas more commonly perceived as nature. On a weekly basis, the majority of the public do not get the opportunity to journey deep into Oslomarka. Some may also have physical limitations putting restrictions on time and mobility. However, the desire to escape into nature is possible with the undeveloped areas close to the city that feel farther away but are still accessible and therefore the public can reap the the benefits that are attributed to time spent in nature. Even if the development of these areas does not significantly effect the majority of the population, it would severely effect those with limitations. Thus, the development of these areas is not only a question of what types of recreational infrastructure should be allowed, but also of the social justice implications of that development.

4.3.2) Knowledge values

The second M98 value in the diagram looks at the possibilities for providing educational benefits related to natural systems, use, history, and culture. This type of place based education is also referred to as community-based learning, service learning, environment as an integrating concept, sustainability education, and project-based learning (Powers, 2004). This type of education’s main focus is the past, present, and future of the local environment and community (Gruenewald, 2005). These areas and the education they provide have an array of social benefits, such as improving the quality of local environments and the increase

in achievements by students who have access to this type of local knowledge learning vs. those who do not (Powers, 2004). This type of learning has further reaching potential than just getting people more informed and engaged in the local environments. There has been research supporting claims that this “hands on” type of approach to learning about local landscape and history, is more successful than learning about the same subjects while sitting in a classroom. This is not limited to the study of the physical surroundings, but as shown within a more socio-cultural context, when teaching foreign peoples the local language and culture, it is more engaging and gives an inside perspective instead of being on the outside looking in (Kyle & Chick, 2007; Powers, 2004).

This type of knowledge sharing can effect behavior outside of these specific areas. As presented by Vaske & Kobrin, (2001) when people are being taught about environmentally responsible behaviors in a context setting, such as youth work programs in the forest, it encourages them to make environmentally responsible choices in their every day life, such as taking public transit, buying locally grown foods, and recycling. It has been shown that there are strong links between experience learning about the local environmental and cultural contexts and the participation in community matters (Powers, 2004). In an example by Bögeholz, (2006) it shows that environmental activists will often regard their childhood experiences with nature as being decisive for their mentality. However, one doesn't have to be considered an environmentalist to care for the local environment, as all types of people with very diverse backgrounds can have this type of place attachment and want to keep to preserve it (Gruenewald, 2005), and these types of areas can help people learn to do just that. As with special natural or historical experience qualities, these areas have specific functional values that play into their ability to be used for place based education. However, the effect this knowledge has on the public, such as environmentally responsible behavior, is the focus of importance for this value type. Knowledge value was also broken down into four different attributes, and dealt with the full range of relational values.

1) Local Knowledge about wildlife, biota, and red list species

Understanding the direct and indirect effects that the local wildlife has on the wellbeing of local communities, can create emotional ties based on the understanding of the human dependence on and connection to the local ecosystem (Vaske & Kobrin, 2001). This type of place based learning and understanding is what Vaske & Kobrin, (2001) credited for influencing environmentally conscious behavior in every day life. In turn, areas that have the

functional abilities to help people visualize and comprehend the natural cycles of their local ecosystems, and all the organisms involved in making that cycle function, may have outreaching benefits that are not tied physically to that area, but to the knowledge gained and decisions made because of those functions. Due to these natural functions having a wide reaching effect on many people and surrounding wildlife, these areas are tied together with social responsibility and the moral responsibility to non-humans. As the relationship between people and the local ecosystem are dynamic, the relationship is two sided and areas mapped as containing this value attribute play a role in not only learning about how people are dependent on the local ecosystem but how the ecosystem is affected by different types of use. Part of the social responsibility that comes with recreational use is taking care of all the wildlife that inhabit these areas. Thus, in some of these areas, conservation by limiting access to people and reducing the impact that recreational use has on an area is key. Even if these areas have restricted use value, it is the reach of the social consequences through knowledge about the importance of keeping certain areas “pristine” that make these areas valued beyond their biological functions.

2) Physical traces of history

Cultural heritage can often be attached to physical objects that are remnants of the past, either single events or physical indications of how life once was (Tengberg et al., 2012). Though this history can be learned in a classroom by connecting to a place through images and text, having direct physical contact to the past adds a level of authenticity in the learning experience and provides a more personal connection between people and their ancestors (Szczepanski, 2011). This type of physical representation of the past, when directly linked to cultural history or a specific user group, can be defining characteristics of a local group, and can be a key factor for place attachment and place identity (Knez, 2005).

3) Technical Skills

This value attribute is extremely diverse and can be very specific to a particular use or interest group. Technical skills encompass everything from skills required for a particular activity, such as safety for climbing outdoors or learning how to cross country ski, to nature survival skills such as foraging, starting a fire, or building shelter. With this value attribute having such a diverse list of possibilities, every location has the potential to be marked under this value attribute. To narrow down to areas within this value attribute, and not only considering the physical potential a place has to provide suitable conditions for learning, areas are

specifically linked to the social aspects of learning. With this specification, the value attribute will most often be linked to some sort of formal institution within a specific user group, such as ski schools, orienteering practice areas, speidere (scouts) meetings and events, etc. During stakeholder interviews, these types of group gatherings were equally, if not more, important for the social aspects than it was for the knowledge itself, yet the activity and physical surroundings had an effect on the social atmosphere. Same as the relationship between landscapes and people, the activity and the social atmosphere are interlinked with one another and are equally important for teaching technical skills and social bonding, creating the communities within a user group.

4) Rights and responsibilities

In addition to Allmensretten governing how people use Oslomarka, there are informal rules within user groups that attempt to facilitate a coexistence between multiple users by avoiding conflicts. As discussed during multiple stakeholder interviews, these rules can become fairly specific, such as delineating who has the right of way on trails and in which circumstances. In most cases these rules help to avoid conflicts, but occasionally some rules can be subject to individualistic interpretations of the definitions of terminology, such as what is considered “fast”, and whether or not specific rules are important to follow. For this reason, some conflict should always be expected, as these norms are set in an effort to minimize that conflict.

This type of conflict was discussed during one stakeholder interview. When discussing the accepted recreational opportunities allowed by Allmensretten, it was brought up that “just because you can, does not mean you should”, which showed a level of interpretation between people’s rights on how they use Oslomarka and the responsibilities people have for the areas they use. This interpretation is further influenced by what an individual values Oslomarka for, whether it be for a specific recreational use, sensational qualities such as stillness or naturalness, or both. It comes down to an individual’s idealistic view on why Oslomarka should be managed for recreational use, and this value attribute is aimed at gleaning where different users gained their individual interpretations on their rights and their responsibilities to Oslomarka from.

4.3.3) Symbol value

Symbolic value is viewed as being one of the most abstract values to map in the M98 manual, as it can be interpreted on an individual basis and it is at risk of being characterized as nostalgia, giving little value for policy decisions (Aasetre & Gundersen, 2012). However, at earlier time, locations that were assigned as having symbolic value were only valued instrumentally. As pointed out by Vaske & Kobrin, (2001) the functional attributes of these locations are transcended by person place relationships that were initiated by the functional attributes. With that being said, the motivations for going to these places may still have a strong instrumental influence behind them. But with a history of use and interaction, the potential for creating an emotional bond to the setting increases, creating place attachment (Knez, 2005). The bonds people have with the areas they use, and the preconceptions about how those areas should be governed, are influenced by their dynamic relationship. It's this relationship between people and place that goes beyond the scope of nostalgia (Aasetre & Gundersen, 2012). As it takes time to build any relationship, the three value attributes within symbol value reflect the ritual use of, or historical connection to a place. This entails, but is not limited too, places that have some historical significance to current cultural, institutional, social, etc. norms, whether it be personal reflection and identity, or a more tangible link to social networking within a community that lead to their current social situation.

1) Associations with regular or ritual use

People may start going to specific locations because of functional attributes, such as being easily accessible or or a location being particularly well suited for a specific recreational use. But, over time people can develop emotional attachments to these areas (Knez, 2005). As symbolic value may stem from regular or historical use, it will be closely tied to the M98 value of use frequency. This, over time, eventually shifts the perceptions of a location from being valued for its functional attributes to reflection upon the socio-cultural meanings ascribed to that location that would not otherwise have been there without the functional attributes. These symbolic values are individually developed, thus the attached value is not directly linked to any specific physical characteristics, even if the physical surroundings play a key role in the reasons a particular area is valued. Individual physical attributes do not dictate if people will assign it symbolic value, as the value comes from the interaction between person and place.

As an example, if an area is well suited for skiing, it will attract people who ski, but the attachment to that area is not because of specific physical attributes, but is based off the personal gratification from skiing in that specific location. With continuous use of an area because of the gratification derived from use, can lead to assigning symbolic value to that location. This is exemplified by the historical review on shifting preferences for Olsomarka, which preserves it for recreational use under markaloven. If this were to happen on a larger scale, among the majority of people within a community, norms then would become dictated based on common interest and use of a specific location. Locations frequently used by a community can become a defining characteristic of the community and the landscape, in essence becoming part of the place's identity. In this regard, those outside of a user group can assign symbolic value to an area by associating it with a specific user group. In the context of Oslo, an example would be associating Holmenkollen with skiing, as this is where the ski jumps are built and where all variations of skiing can be done.

As discussed with multiple stakeholders during interviews, connections to a place can be strengthened if there is a social attachment to it, such as weekly dog walking groups or an annual cabin trip with family. Just as physical attributes can be a factor for experiences that produce personal gratification, other users and user groups can either add or take away from the gratification of the desired experience. It all depends on expectation. If someone wished to experience solitude in nature, encountering others in the forest could take away the value placed on a specific location. However, if someone looks forward to a weekly social event in Oslomarka, the people attending can become just as much of a draw or more than just the physical attributes of the event's location. If these social events happen at the same location or same general area periodically, then the emotions attached to these events can get transferred onto the location. Thus, locations can be assigned symbolic value based on the emotional ties to the social happenings within a location.

2) Historical connection to foundation of user groups

When discussing foundation, the exact location where the user group was formed may not be of the greatest importance, as most user groups can not trace this back to one location at any one point in time. More generally speaking, the recreational activity stakeholder groups interviewed could trace back to either a small group of people that had influence in defining their user group. For example, within a time period or succession of time periods there are

generally a few people within a user group who progress the perception of what was possible, either allowing them to go places they have not gone before or do something that was otherwise thought impossible. This can entail doing a particular activity in a unique way, such as the progression from cross country skiing and Telemark skiing to ski jumping and alpine skiing. These points in history can be associated with defining some of the norms that guide the ideology of a user group and can be symbolic to the identity of such a group.

For interest groups, such as conservation groups, instead of the progression of an activity and developing norms and values that fit that progression, this can be associated with a point in time when people with similar values banded together for a specific purpose. Either inadvertently creating a new user interest group, or strengthening their group to a level they have not experienced in the past. Even if there is not a specific location, there is a general area in which these events took place. For example, the creation of Markaloven has roots to OOF as historically they have been pushing for the protection of Oslomarka since the late 1930's. This banding together because of shared values and interests was instrumental for developing their community, and the locations that were historically linked to these events are symbolically valuable for the identity of the concerned user group.

3) Historical connection to success or struggle

Sharing the weight of struggle to overcome adversity can be a unifying experience, and can strengthen the social ties within a community long after a struggle has passed. Adversity has a way of shaping identity, as overcoming adversity can be a defining accomplishment in someone's life that helps to develop a concept of one's self (Knez, 2005). Locations tied to a particular struggle can then become symbolic of the ability of a user group to unite and overcome. However, adversity is not mandatory in the linking of symbolic value to the success or implementation of a cause. Different user groups have different goals and work to implement their own projects, but in an area with relatively limited space and a lot of users and user groups representing different activities or areas of concern, competition for space is just one of the many challenges these groups face. Thus, when a user group does achieve a one of its goals, such as the development of a project or implementation of a specific type of zoning, the success of the group over these hurdles becomes symbolic of its achievements.

4.4) Participatory mapping

With most CES not fitting into the economic ES valuation models, the inclusion of socio-cultural values into a policy setting demands alternative types of valuation approaches (Plieninger et al. 2013). The M98 manual stresses the importance of using local knowledge in the mapping and valuing of outdoor and recreational landscapes (Norwegian Environment Agency, 2013). And as a key aim of participatory mapping being the incorporation of public values into spatial planning (Darvill et al. 2015), a participatory mapping protocol was used. A maps ability to integrate the spatially complex and sometimes contradictory nature of values of ecosystem services, has been a valuable tool for landscape policy (Potschin et al. 2013). Participatory mapping can visually represent ecosystem service used across the board by stakeholders on a regional scale (Darvill et al. 2015), and because of this visual representation it has shown to not only be an effective way to represent stakeholders' needs to policy makers, but it also facilitates communication between different stakeholder groups (Potschin et al., 2013).

This methodology was able to spatially show the diversity of stakeholder ecosystem relationships, and that areas do not have to be either instrumentally or intrinsically valued, but encompass value plurality at an individual and communal level. This was visually represented using the concept of service provision hotspots (SPH), which were developed to allow ecosystem service mapping to be done using a participatory mapping methodology (Potschin et al., 2013). As defined by Potschin et al., (2013.p.105) "*The 'hotspot' simply defines any locale that is important for generating a service.*" Though this definition is inline with the classical ES framework of viewing ecosystems from a utilitarian perspective, hot spots in this study represent areas of overlapping importance to multiple users, allowing the results to express a more diverse relationship of Oslomarka as presented in the theoretical framework developed in Fish, R. et al, (2016).

According to Plieninger et al. (2013) there are 3 common ways of conducting a participatory mapping study. These are: 1) having respondents use a pencil or pen to mark areas with different shapes or colors to represent types of use or preferences, 2) using color-coded stickers and having respondents place stickers on maps to show use, and 3) pre-selecting a map with numbers and have respondents answer a series of questions referring to the numbered areas. As done in Klain & Chan, (2012), this study attempted to have participants

spatially express special natural or historical experience qualities, knowledge value and symbolic value as they perceive them. Predefined borders and placing points would limit that spatial expression, which is why this study let participants draw the boundaries of their responses using markers that were color coded with the different value types.

In total, there was five different data types mapped during the interview protocol, as seen in table 4.2. The first thing mapped was the respondents neighborhood, this gave context to the rest of the locations marked in the interview because it delineated which was the closest forest area to their neighborhood. The second thing mapped was use frequency, which is one of the value types in the M98 manual that is not considered as being “fuzzy”, however; it is important to use in the analysis, in order to compare the responses of where they frequently go, with the responses of where they place the other three value types during the mapping protocol. For mapping use frequency, in addition to being color coded, participants scored areas that they mark to represent its relative amount of use. This was done using a simple scoring method, the more they use a particular location compared to another, the higher score it received. The last three data types that were collected were special natural or historical experience qualities, knowledge value and symbolic value. In order to elicit these value types from respondents, prompting questions were developed based on the value attributes derived from the analytical framework. The purpose of the prompting questions was to elicit responses from the participants that pertain directly to the value characteristic in question. In turn these value characteristics were then spatially summed up from all the interviews, and represented as hot spots for the particular value type it is connected to in the M98 manual.

Stage	Mapping Value	Data collection form	Scoring
1	Residence area	Point	Yes, No
2	Use Frequency (past year)	Polygon	Relative use (Out of 100 total)
3	<u>Opplevelseskvaliteter</u>	Polygon	Yes, No
4	<u>Kunnskapsverdier</u>	Polygon	Yes, No
5	<u>Symbolverdier</u>	Polygon	Yes, No

Table 4.2) This chart shows the five different types of data mapped during the interviews as well as their shapes and scoring for digitizing in QGIS.

In an effort to make the results of the mapping protocol useful to the M98 project, participants included in this research were people that would be considered for the M98 mapping project group. Thus, the contact person in Bymiljøetaten who is in charge of the M98 project for Oslo municipality, gave input pertaining to the participants of the stakeholder analysis, and which groups were of interest. Furthermore, a list of contacts within Bymiljøetaten that would be considered for the project group were also provided. In all, there were three categories of participants considered.

- A. Public health coordinators or others in similar positions that work in areas such as the outdoors, nature or outdoor physical activity
- B. Managers in Bymiljøetaten
- C. Representatives of nature and outdoor recreation organizations associated with Osломarka.

In all, 18 people of interest were contacted for interviews. As with the stakeholder analysis interviews, participants that did not respond were sent follow up e-mails as well contacted by phone if a valid phone number was available. There was a total response rate of 72% and out of those who responded, 38% expressed that they either were not familiar enough with the study area or were too new to their positions to give meaningful responses or input, and thus declined to participate. In total a demonstration of the analytical framework was carried out with seven participants. From that group, one consisted of participant category A, one consisted of participant category B, and five consisted of participant category C.

The majority of the participants lived near Østmarka. Thus, the demarcation of locations concerning the value attributes was more represented in Østmarka than in Nordmarka. This resulted in an overlap between participant answers and produced a much richer analysis in Østmarka. As interviews were held at the convenience of the participants, interviews took place in a variety of locations, such as an office, their home, and a café. Interview lengths varied from 31 minutes to 94 minutes, with the average interview length of 75 minutes. In total, there was 189 polygons drawn between the value attributes during the participatory mapping data collection. 65 for use frequency, 50 for special natural or historical experience qualities, 38 for knowledge value, and 36 for symbol value.

4.4.1) Value attributes to be included in mapping protocol

Due to in-depth interviews taking a considerable amount more time in comparison to other types of data collection (Bryman, 2012), figure 4.3 was used to decide the most efficient way of mapping each value characteristic. This diagram thus decided which value attributes were included in the participatory mapping protocol. The aim of this flow chart was to separate the characteristics that have some physical or institutional connections that could be used as an ecosystem indicator, from the characteristics that are more individually based and abstract. This has allowed the researcher to focus on, and to better capture the more abstract value characteristics. This also reduced the time needed to complete the in-depth interviews, in turn reducing participant fatigue and avoiding misrepresentation in the responses (Bryman, 2012).

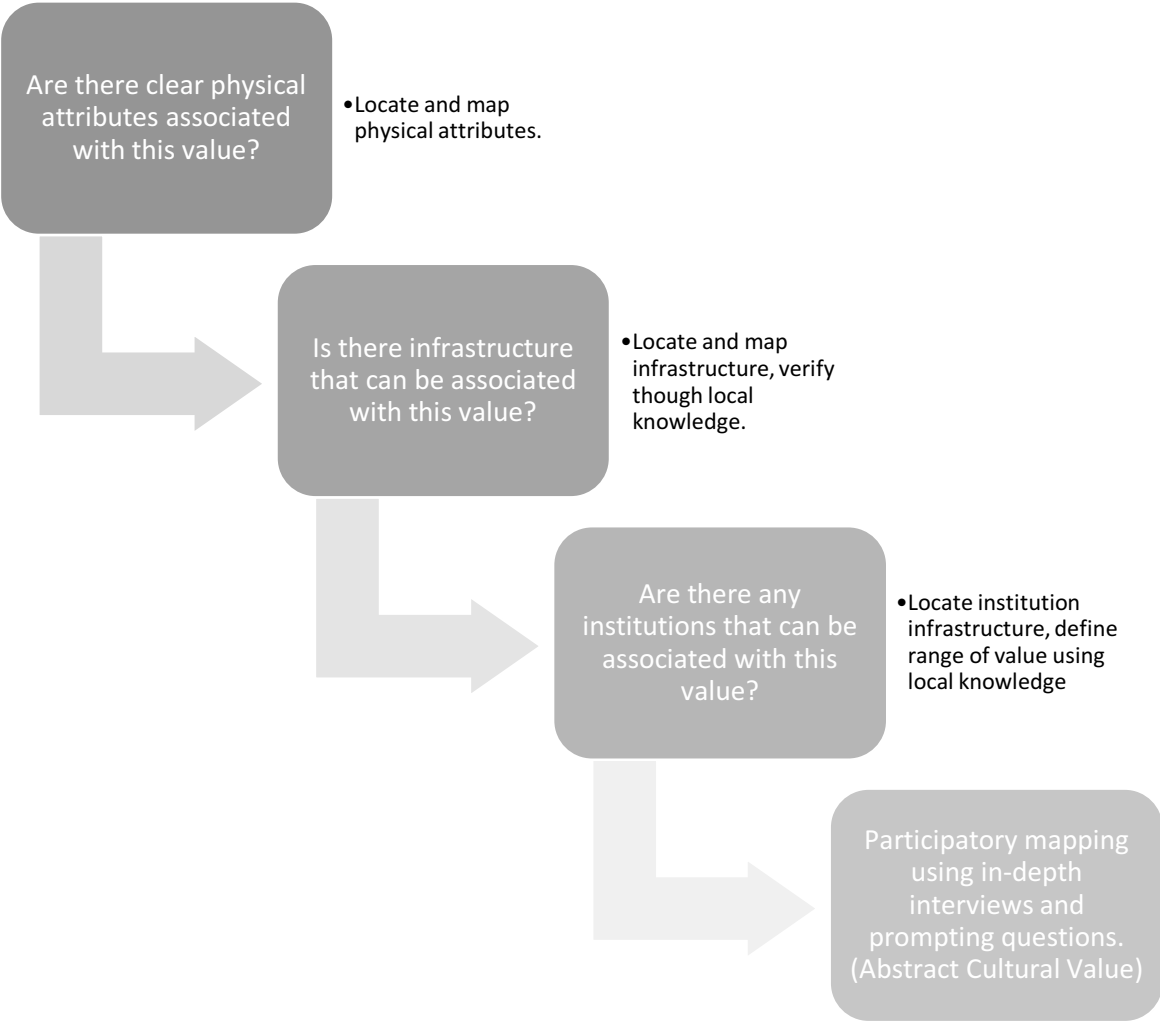


Figure 4.3) A flow chart used for deciding how to map each of the value attributes.

The selection made can be seen in figure 4.4, as the attributes that could otherwise be mapped using ecological indicators were left out. However, the attributes that can be linked to ecosystem indicators can be improved upon with in-depth interviews. It is stressed that once they have been mapped using ecosystem indicators, to include those maps during the local knowledge stages of the M98 manual validates what has been mapped and gives insight to what may have not been captured by the ecosystem indicators used. However, with the scope and time limitations of this research, the more abstract attributes were the focus of this research as they are the ones most likely to be missed by current mapping protocols.

Value Type	Value Attribute	Mapping
Special Natural or Historical Experience Qualities	Cultivation and facilitation of idealized activity or experience	Participatory mapping
	Facilitation of interactions between user groups	“Rest areas”; e.g. Parking lots, trail signs, outlooks, swimming areas, etc.
	Desired experiences with high accessibility	Participatory mapping
	Interaction between and wellbeing of other creatures	Dog parks, equestrian trails, small farm areas, etc.
Knowledge Values	Physical traces of history	Heritage sites, eminence of WW2, cabin foundations of those who use to work in Oslomarka, old forestry mills, etc.
	Local Knowledge about wildlife, biota, and red list species	Ecological indicators; e.g. Red list species, berry and mushroom types, fish stocking areas, etc.
	Technical skills	Formal educational programs; e.g. ski schools/clubs, scout group meeting locations, Orienteering club practice areas, etc.
	Rights and responsibilities	Participatory mapping
Symbol Values	Historical connection to success or struggle	Participatory mapping
	Historical connection to the foundation of a particular user group	Participatory mapping
	Associated with regular or ritual use	Participatory mapping

Table 4.4) A table showing potential ecosystem indicators for value attributes, and the attributes that were included in the participatory mapping protocol.

4.4.2) Prompting question development for mapping protocol

To develop the mapping protocol and ensure the quality of the interview questions, the mapping protocol went through a series of test interviews that were not included in the results. These interviews were done with participants who come from different fields and did not fit the qualifications for being a participant in this research. However, they had different insights

that helped to improve the methodology and gave important feedback throughout the interview and critiques directly after. These participants were familiar with the study area, and thus were able to think meaningfully about the questions, their responses, and the feedback they gave. The aim of these interviews was to develop the prompting questions and adjust the

Value Type	Value Attribute	Prompting Questions
Special Natural or Historical Experience Qualities	Cultivation and facilitation of idealized activity or experience	<ul style="list-style-type: none"> • Out of the areas that you frequent, would you go to any of these places if you could not frequent them, and why? • Are there any additional areas that are important for doing these particular activities that you don't frequent? If so what makes them important and why don't you frequent them?
	Desired experiences with high accessibility	
Knowledge Values	Rights and responsibilities	<ul style="list-style-type: none"> • From where did you get the knowledge you have about your particular hobby, or ideals for the forest and how to act in it? • If you were to try and instill the same values, knowledge, or ideals to the next generation (e.x. kids or grand kids, ages 6-14) where would you take them?
Symbol Values	Historical connection to success or struggle	<ul style="list-style-type: none"> • If you were tasked to show people areas of Osломarka that represent ideals you have or even values that you hold, in essence areas that are reflective of you, where would you take them and why?
	Historical connection to the foundation of a particular user group	
	Associated with regular or ritual use	

Table 4.5; Table showing the prompting questions and which value attributes they are linked too.

mapping protocol to ensure its ability to spatially capture the attributes selected for this methodological demonstration in table 4.4. The prompting questions developed from these interviews can be seen in table 4.5. In the participatory mapping protocol, it was not necessary to develop a prompting question for each value attribute, as depending on how the respondent answered a prompting question, the area mapped could be assigned to one of the value attributes. The prompting questions in table 4.5 are simply the spatially explicit questions, and leading up to these was a series of conceptual questions and discussion to help the participant reflect on their own use and experiences of Osломarka. This was done to draw from the participants meaningful, spatially explicit answers. The full interview protocol concerning individual use can be seen in appendix E.

In total, the interview protocol was subject to three trial interviews. The subjects who were interviewed during these trial interviews consisted of an outdoor enthusiast who has grown up in Oslo and who employed at an outdoor nature based daycare and is also a rock climbing guide in Oslomarka. The other two trial subjects are a senior researcher at NINA who has previously worked with green space use and valuation in Oslo, and an ecologist at NINA who has grown up in the Oslo area and has been involved in local organizations orientated around mushroom foraging.

4.4.3) Mapping protocol

The entire mapping protocol aimed for a two hour timeframe. In response to this being in excess of what most social science handbooks recommend for interview lengths, citing respondent fatigue and quality degradation of responses, a comparison of four different studies using participatory mapping methodologies was done. This comparison looked at the research questions of each study as well as the research goal, in contrast to the lengths of the interviews. For the studies that used either in-depth or semi-structured interviews, there was a time variance of 54min to 3hours 30min. The longer interview protocols are more in line with the research objectives and methodologies of this study. Thus, the two hour time frame is reasonable for this type of protocol. The full comparison of studies can be seen in appendix D.

Participants of the interviews were given a copy of the interview guide as well as background information on the topic and definitions of terminology in advance. This allowed participants to begin formulating responses to the questions well before the interview, in the hope of eliciting better, more holistic responses. All the information sent to participants was in Norwegian; however, the interviews were conducted in English. Although English is widely used and spoken in Norway and Norwegians start learning English from a very young age, there was the potential for confusion due to a language barrier. To address this, interviewees were given the option to have a translator present if preferred and the Norwegian interview guide would be available during the interview so that participants can refer to any specific question. There was also a mobile device present for the ability to access Google translate when needed.

The protocol used for data collection, was broken into 4 different parts. The first part was done individually and turned into the interviewer. The second, third, and fourth parts were a continuous semi-structured interview, aimed at giving context and spatial awareness to the value attributes developed in the analytical framework. The four parts of the protocol were broken down as follows:

1) A short, one page survey collecting background information on the participant. These questions consisted of two descriptive questions and one question regarding the participants use of Olsomarka. These questions were taken from two e-mail surveys conducted by The Norwegian Institute for Nature Research (NINA) during the summers of 2015 and 2016. The e-mail survey samples consisted of over 1000 households throughout Oslo, and asked questions concerning peoples relationships with the greenery in and around Oslo. Using the descriptive questions from this survey, participants in this study were compared to the respondents of the survey. With these participants being representatives of organizations or people in local government, this short survey gave insight into the representivity of the participants used in this research.

2) Participatory mapping protocol used a semi-structured interview which gathered information on the participants individual perspective. This protocol started off by mapping the more easily comprehensible value categories to the most abstract. Thus, the semi-structured interview data collection followed the stages of table 4.2, starting with where the participant lived and which areas they frequently used. Then a series of prompting questions followed, aimed at spatially revealing the value characteristics connected to special natural or historical experience qualities, knowledge value and symbolic value.

3) With a possible connection between the conflict concerning the activity zone and the placement of socio-cultural value, there were three short semi-structured interview questions concerning activity zones. Interviewees were asked about their opinions on the activity zones, investigating points of conflict, as well as possible desirables from the activity zones.

4) Participatory mapping protocol used a semi-structured interviews which gathered information from their represented user group perspective. This process was methodologically identical to the second portion of this protocol. Thus, questions were reformulated to gain insight on the characteristics preferred or linked to a specific group instead of their individual

preferences. If interviewees had maps or other types of information concerning their user interest group then they were encouraged to bring it to the interview.

4.4.4) Mapping supplies

- DNT Oslo Østmark Turkart (2010) 1:50 000
- DNT Oslo Nordmarka Turkart (2016) 1:50 000
- Erasable markers
- Coffee beans (100 count)



Figure 4.6) A photo of the mapping supplies used to conduct the participatory mapping protocol

4.4.5) Data input

As discussed in Potschin et al. (2013), service provision hot spots are an effective way of presenting the findings of a participatory mapping data collection methodology for policy decision making. However, hot spots are normally derived from vector point data, showing clusters of points where many participants have placed the same value in a specific area. With the high number of responses needed to get a statistically significant analysis, this data collection is usually captured through surveys, as done in Sherrouse et al., (2011) with a total of 684 respondents. With the scope of this study wanting participants to place value in a way

they perceive it being spatially distributed through in-depth interviews, and selecting participants by non-proportional quota sampling, the number of participants included in similar research for a hot spot analysis is 31 to 56 participants (Darvill & Lindo, 2015; Raymond et al., 2009). Unlike the survey data, by sampling a percentage of the total population, the non-proportional quota sampling will only be statistically significant to the respondents who answered, and can not be extrapolated to the views of value placement for their local community (Bryman, 2012).

Due to the time needed to develop the analytical framework in this research within the constraints of a 60 credit thesis, there were major time limitations for gathering the quantity of data needed to derive a statistically meaningful hot spot analysis. Even if this research gathered the quantity of data needed, the hot spot analysis tool only processes vector point data. The methodological decision to use polygons to spatially express value, does not allow for the use of the hot spot analysis tool in Qgis. To get a visual representation similar to the hot spot analysis without the statistical component, a 250m² grid was laid over the study area. This grid captures how many polygons are present, for a particular value, within in each grid cell, as shown in figure 4.7 for special natural or historical experience qualities. This overlapping of the same value in a specific area between participants is then visually represented as a hot spot.

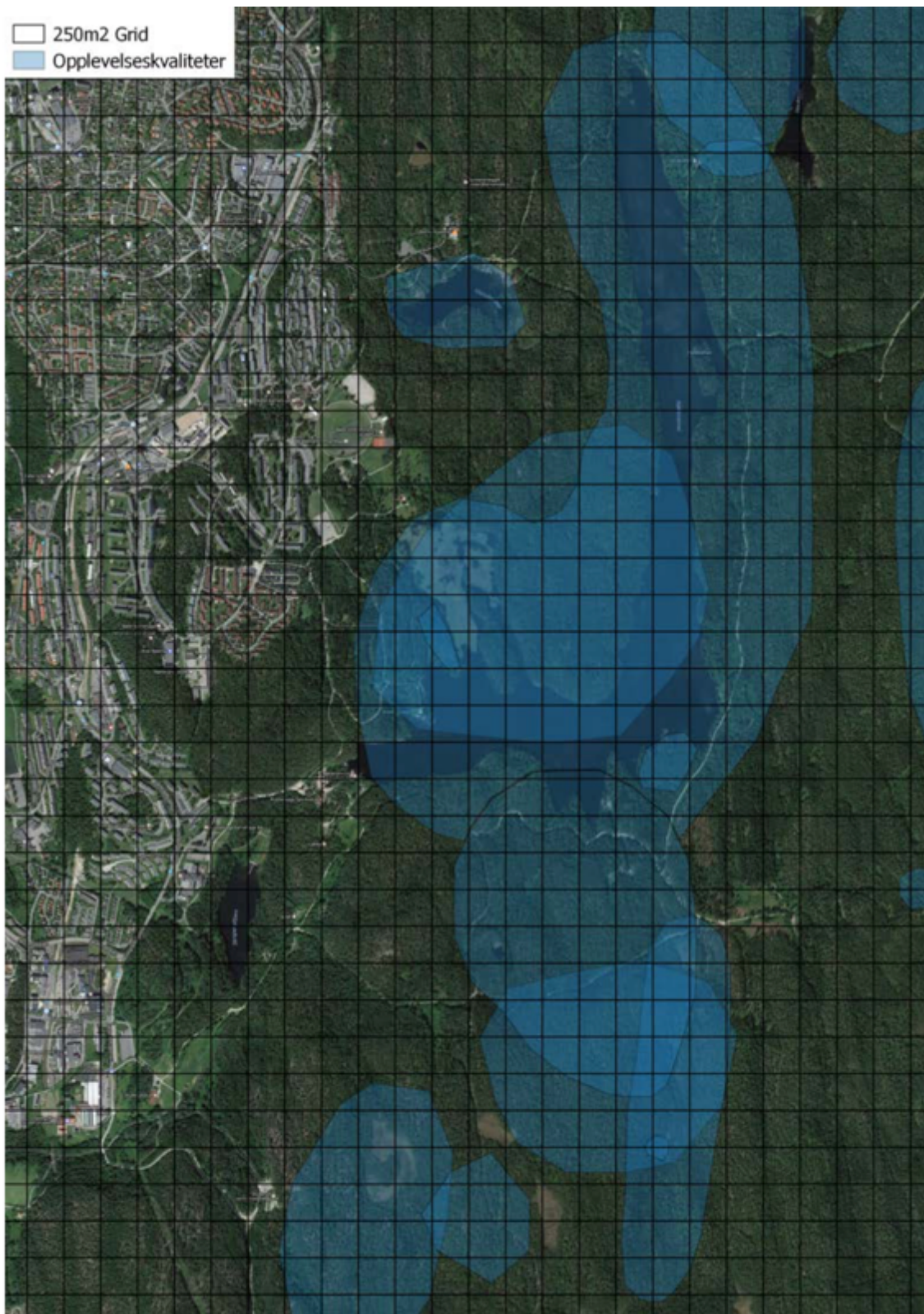


Figure 4.7) A visual of the raw GIS data overlay that derived the special natural or historical use quality hot spot map in figure 5.3

Each of the hot spot maps were digitized using the same methodology apart from the use frequency map. Participants were asked to use a simple scoring method to rate the relative

amount of use between the different polygons which they marked on the maps. To score the area, participants placed any number within the allotted 100 coffee beans into the polygon. There was no limit to the number of places they could mark or the size of the polygon itself. The score was based on “the more you go to a place, the more points it will have”, therefore, the more beans placed within a polygon, the higher the score. By dividing the area of a polygon by the score placed within, this relative use frequency is also reflective of use intensity. This is represented in the use frequency heat map in section 5.2.1, and though within this research there was less representation in Nordmarka, the participants who did mark locations used very large tracts of land. In some of these large areas marked, there were only one or two beans. The reflection of use intensity by dividing its area by the number of beans within, gave them very low relative use frequency scores. The more specific a place was, and the more beans placed within, culminated in sometimes very high relative use scores. As done for the other values whose hot spots were developed by strictly representing overlap in polygons, the relative use scores from overlapping polygons were summed together.

4.5) Mapping validation survey

The last methodological approach in this mixed methods research was a validation survey. The purpose of this survey was to achieve the third research objective of assessing the methodologies ability and accuracy of capturing the abstract cultural values in the analytical framework. As previously stated, only the participants can assess how well these values were spatially captured, as the aim of this mapping protocol was to allow participants to give spatial recognition to the value attributes as they perceived them. This survey was created specifically for each participant from the participatory mapping protocol, using the digitized maps produced from their interview. A map for special natural or historical experience qualities, knowledge value and symbolic value was present in the survey as well as the map of their use frequency. The maps were sent back to the interviewee via a short questionnaire that was designed to take 5-10 min to complete. In total, 6 out of the 7 participants from the participatory mapping protocol completed and returned the survey. In the questionnaire, the maps derived from their interview were presented in the same order in which they were mapped. The questionnaire asked participants to rate the maps based on how spatially representative they were to the specific value in each map. Using a 10 point Likert scale, these ratings were easily transferred into a percentage. For example, if the participant gave a mark

of 9 then that would be converted to 90% representative or 3 being 30% representative. This allowed the participant to rate how well the map, derived from their interview, represented the totality of each individual value type. These numbers are relative to each participant but could be compared between participants to produce a mean, median, and mode of how well each value type was captured by this methodology. To allow for further feedback of the mapping protocol and data collected, a comment section was presented under each Likert scale question. This gave participants the chance to explain why they give the score they did, to assess what worked in this methodology and bring to light any shortcomings. Adding a deeper context to why the maps look as they do, and to improve further development of mapping cultural values.

Chapter 5: Results

5.1) Participant representativity

The Norwegian Institute for Nature Research (NINA) has conducted two large scale e-mail surveys, one during the summer 2015 with a total of 340 respondents and the other during the summer 2016 with a total of 1157 respondents, which were concerned with the relationship people have with the greenery in and around Oslo. Certain questions from these survey were used to compare the participants in this mapping study, with the rest of Oslo. These questions, available in the appendix A, were given to participants as stated in the first step of the methodology protocol. Figure 5.1 is derived from those questions and through histograms, it is a visual representation of the comparisons between the survey respondents, and the participants of this thesis research. With the participants being interviewed in this research consisting of those that will be considered for the project group in the M98 project, this comparison gives some insight to who is being chosen to allocate where the values in the M98 mapping project are present.

With the participants in this research being representatives for an organization, some of which were voluntary positions, or those who hold higher positions at Bymiljøetaten, the age characteristic reflects the experience of these people who have worked their way up into these positions. This is also further reflected by the participants in this research having at least a vocational degree specific to their position, but overall having a higher percentage of completion of four plus years of higher education than both surveys conducted. With most of the participants in this research having occupations and responsibilities that are directly tied to Osloomarka, they responded using Osloomarka daily or weekly for personal use and work year round. This places the majority of the respondent group in this study as part of the very small percentage of the population in the 2015 and 2016 surveys that marked they use Osloomarka either weekly or daily.

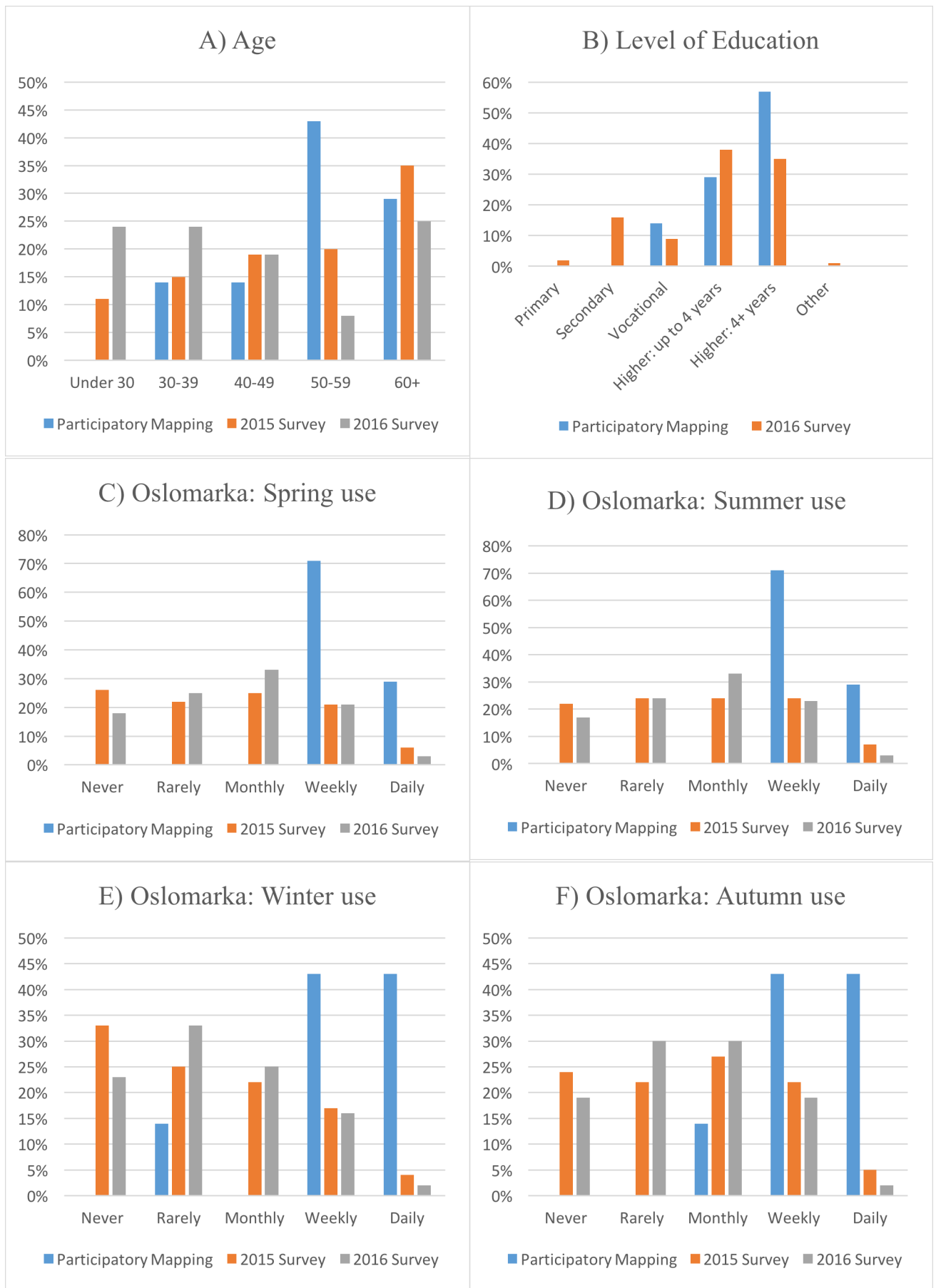


Figure 5.1) Comparisons between the respondents of the two surveys conducted by NINA and the participants in this thesis research

5.2) Hotspot analysis

5.2.1) Individual perspective

Use Frequency

This overlap of the use frequency scores is quite apparent in map B of figure 5.2, as participants are living in much closer proximity to one another and sharing the same nærområder (closest forest area to where they are living) than those in photo A. From a geographical standpoint, these use frequency maps are indicative of the differences in landscape. In Nordmarka, it was mentioned in multiple participatory mapping interviews that the landscape is “bigger”, as also discussed in the results of site visits. It was discussed in detail by one participant who is very involved in cross country skiing, regarding the steady terrain of Nordmarka with less variation being easier to ski and the possibility to go much further, faster. Whereas farther west, right along the border of Bærum municipality and in Østmarka, there is more variation in a smaller area, and with this technical aspect it takes more effort and skill to go farther out. One of the areas farther up in map A, showing a relative use score of moderately low is associated with a DNT cabins that is a popular place to ski too. The other areas showing up as medium to moderately high near the forest border is Holmenkollen and Sognsvann. Undoubtedly, if there was more representation for use in Nordmarka, these locations would have very high scores as they are well known entry points into Nordmarka with a high degree of access, via public transportation and with ample recreational opportunity present.

For Østmarka in map B, the hot spots are not only the nærområder for participants in this research but are also well known entry points into the forest. Similarly, in map A, some of the locations that show up as moderately low to middle are associated with a café in Østmarka that is popular for people to walk to and socialize with friends over a coffee and pastries. Other hot spots are associated with water as there are some prominent lakes no further than 1km into the forest with walking paths surrounding them. Taking into account the geography of Østmarka, most of the trails and paths go from north to south, coinciding with the movement of the glacier that formed the landscape. The two medium tracts that go from east to west are some of the only trails that go in that direction. There are two medium locations that show up on the east side of the map and those are associated with parking lots that are used to either access the nature reserves or as a meeting point for camping trips. Overall use

frequency has a gradient like distribution, with variations in locations that are close to public transit or parking lots getting a higher relative use frequency score. This is not to say that places with low relative frequency scores are not important for frequency use and these maps reflect the amount of use over the size of the area marked. Areas that have low frequency use scores may be extremely important for annual trips but that importance is not reflected by the use intensity in these maps.

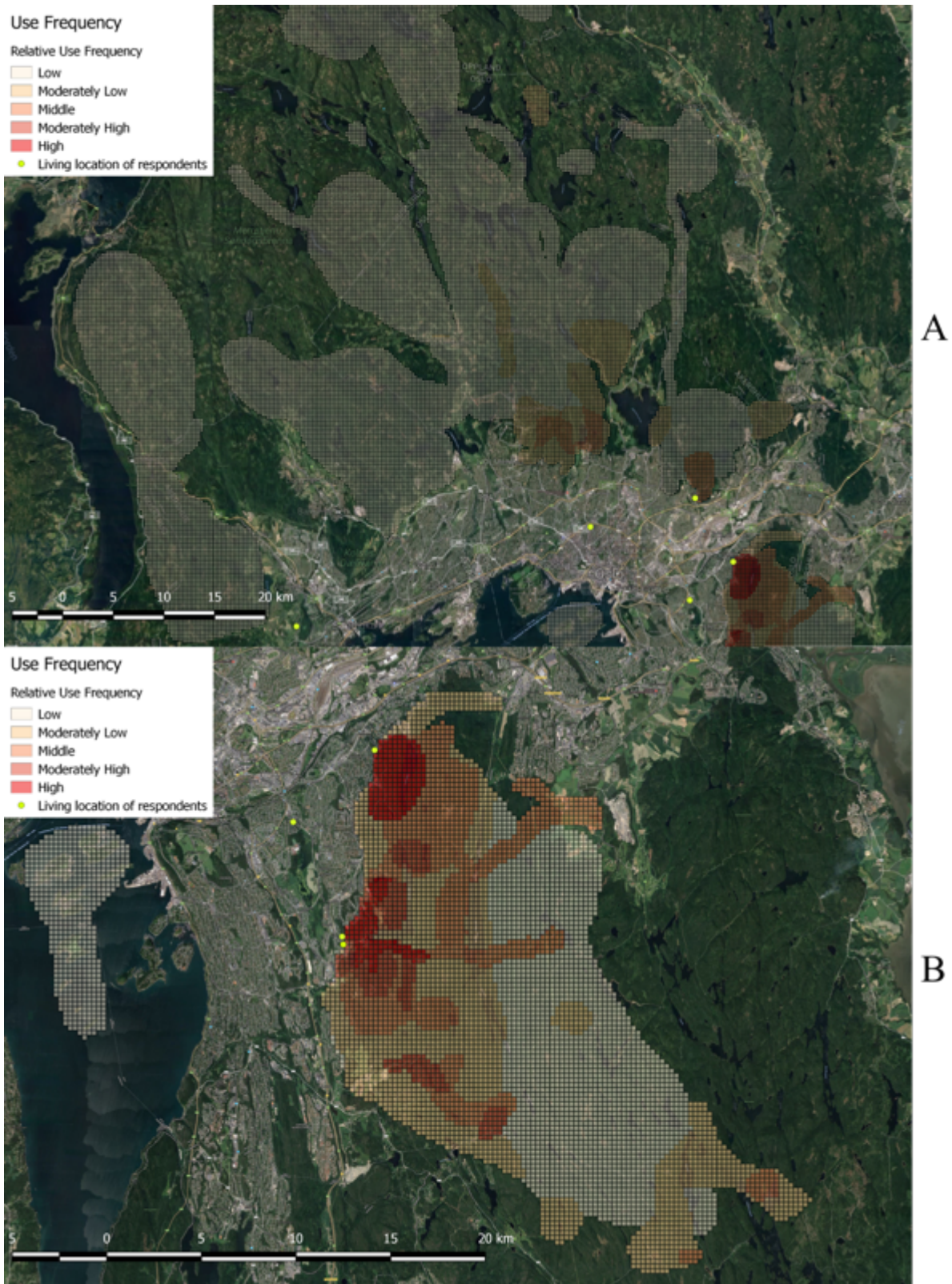


Figure 5.2) Following the data input in section 4.3.5, these maps show the relative use frequency of the participants in this research. Photo A is Nordmarka and Photo B is Østmarka.

Special Natural or Historical Experience Qualities

Unlike use frequency, figure 5.3 does not have as clear of a distribution. With this value characteristic, one of the factors that played into how participants conceptualized this value was to think of about specific reasons why they go to a specific place and reflecting on their reasoning for choosing to go there. Some of the answers associated with this value type were very specific physical attractions, such as a look out at the top of a peak or a café within the Oslomarka boundary where they meet with friends. Other reasons were sensation and feeling based, such as describing the ambiance of a location or the feeling of isolation. If a specific location was not the full purpose of a trip, then often it would serve as resting location where they could take a break as well as “take in” the experience.

Another factor was access and how they defined an area as being easy or difficult to get to. Within both maps in figure 5.3, participants had circled or marked locations that give the feeling of isolation without actually going very deep into Oslomarka. These locations were often within the areas that were marked with relatively high use frequency scores. These areas were also discussed as places that are easy to access by those who have a limited range, such as young children or those who have limited time, or the ability to give visitors from out of town a memorable experience. Oppositely, participants located areas that were difficult to access and that are often associated with being goal oriented end points. These locations were usually much farther into Oslomarka and if the location was frequently used, it wasn't more than a few times a year. These locations also serve as a perceptual base line that can alter their sense of what isolation feels like. One of the big differences between locations that are easier to access with a high degree of naturalness and those far away, along with the the physical attributes and overall ambiance which is largely due to the location itself, is the sense of accomplishment. This is a good example of the dynamic relationship between people and landscape with the placement of value being ascribed based on personal sensation of accomplishment or isolation, alongside the other physical attributes.

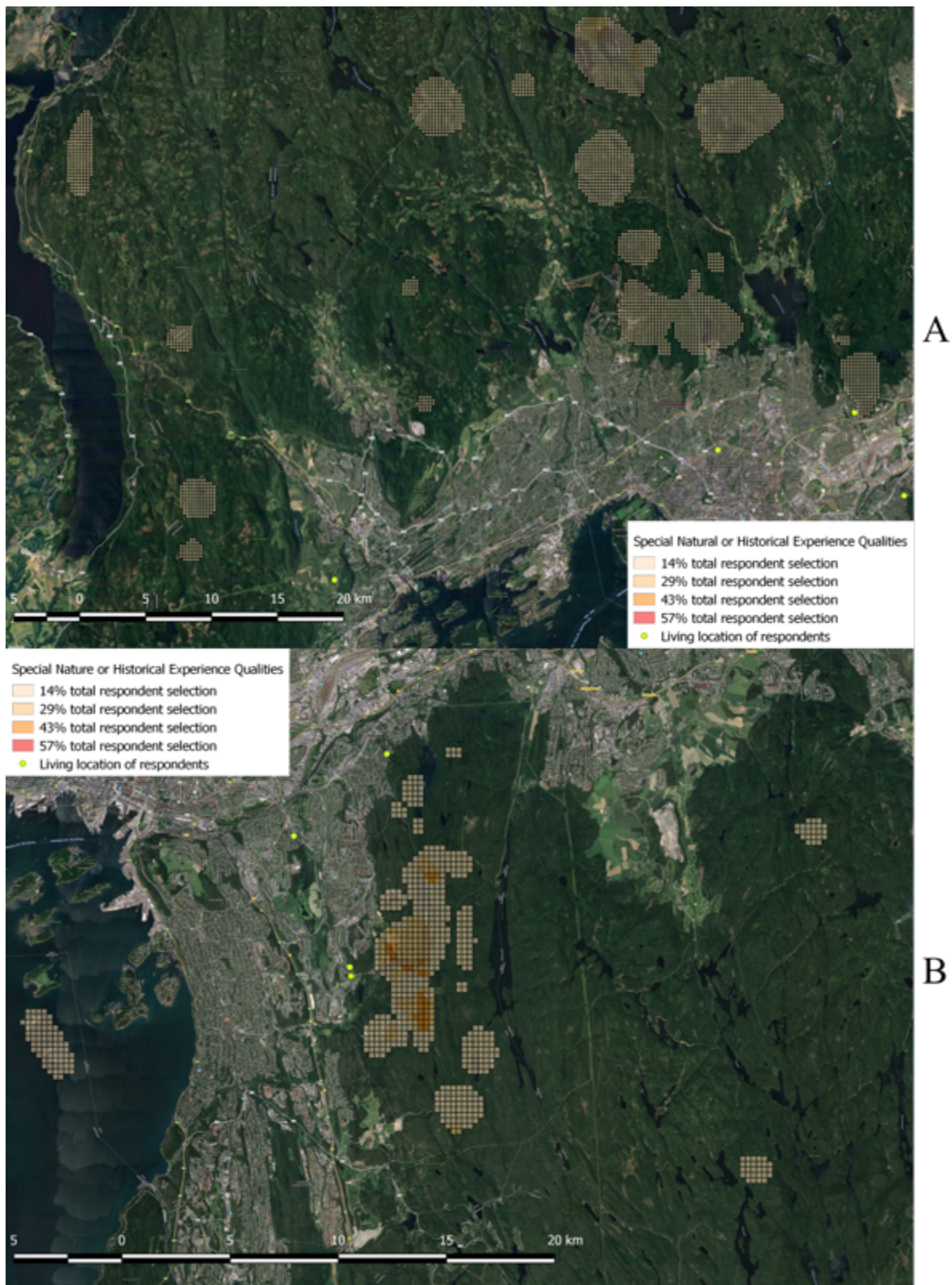


Figure 5.3) Following the data input in section 4.3.5, these maps show where *Opplevelseskvaliteter* was ascribed to Oslomarka and where there was overlap between participant answers. Photo A is Nordmarka and Photo B is Østmarka.

Knowledge Value

Similar to special nature and historical experience qualities, knowledge value does not have a clear distribution. Participants chose locations for much of the same reasoning as well, resulting in the identification of cafes, camping areas, swimming spots, and areas that gave a sense of wilderness. As discussed in Vaske & Kobrin, (2001) environmentally conscious behavior is heavily influenced by the appreciation of nature. Thus, when participants discussed teaching the next generation about Oslomarka, the focus was essentially on places and experiences that they would remember. The more they learn to enjoy being in Oslomarka and what it takes to enjoy it year-round, which includes proper attire and knowledge of the area, the more likely they will be to take care of it later. One difference between the locations chosen in special nature and historical experience qualities is instead of focusing on an end location, some of the participants viewed the whole trip as being apart of the knowledge value. It wasn't only the end location but also the journey which was important. This is visible in map A of figure 5.4. The other variation of locations marked were historical places. Around Oslomarka there are spots which still have remnants of historical uses and livelihoods of the forest, such as a place that was once an ice factory or old wood processing machinery. However, there were not a lot of these locations marked and the majority located were experience based.

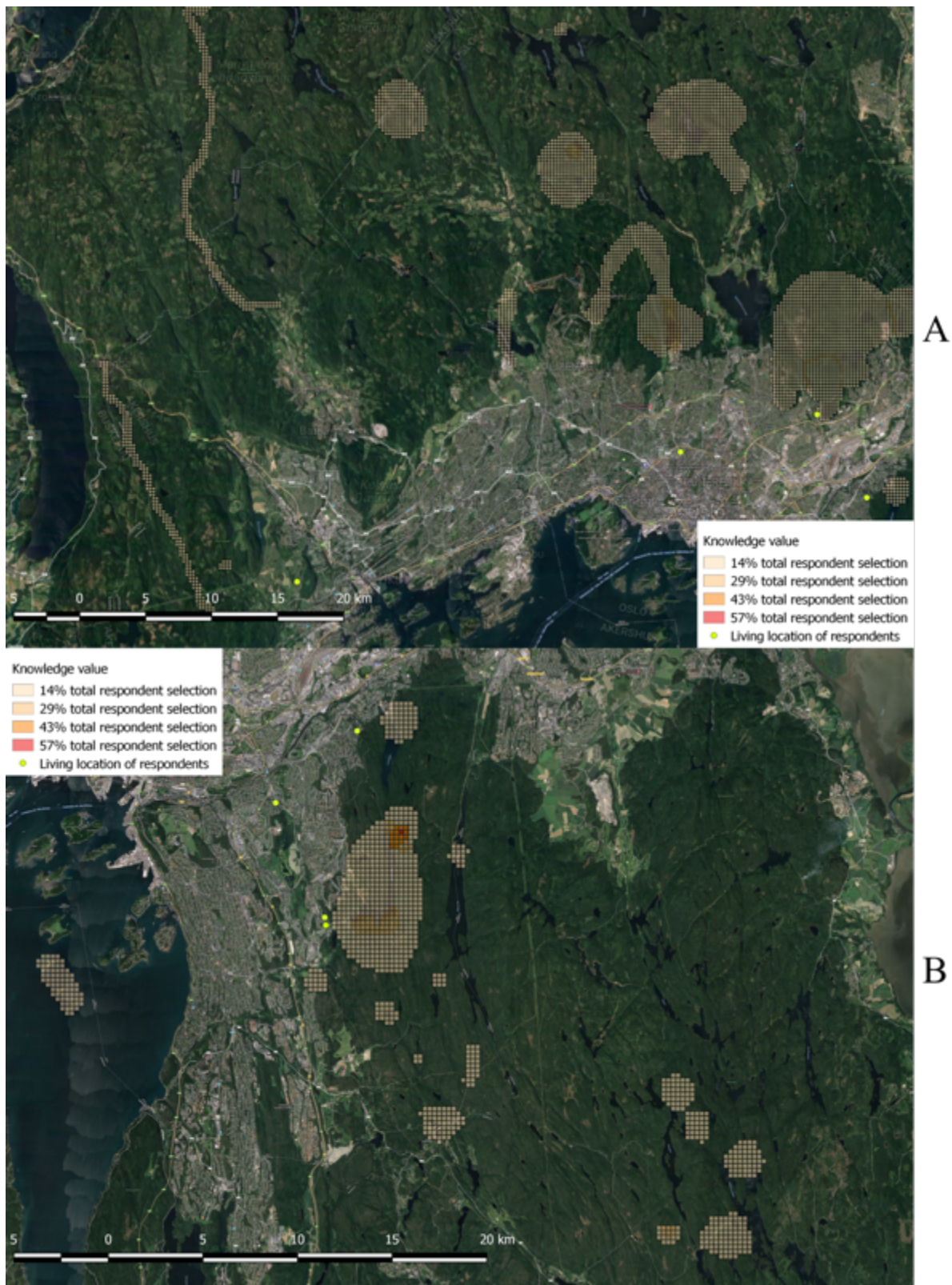


Figure 5.4) Following the data input in section 4.3.5, these maps show where Kunnskapsverdier was ascribed to Oslomarka and where there was overlap between participant answers. Photo A is Nordmarka and Photo B is Østmarka.

Symbol Value

Generally speaking, symbol value was tied to social experiences that go beyond the attributes of the landscape. Locations functionality has a role in the reasons the participants choose to go to these areas, such as it being easily accessible, well suited for a specific activity, or aesthetically pleasing. The tying of social factors into the associated benefits of a location are what causes it to be symbolically valuable. This is especially true if these social factors are reflective of personal or cultural identity. A good example of this is a location in map B of figure 5.5, which is a small lookout from one of the many lakes near the Oslomarka border. This particular outlook was symbolically valuable to a participant because they could see the area in which they lived, the building in which they worked, and the district in which their job position was dealing with. They discussed that their reasoning for taking people there was not only because it was a good outlook, but essentially because they could show friends or family their “world”. The one thing in common between all participants was that the locations they marked were linked to either a history of previous use and experiences or tied to regular, re-occurring use. An example of such use is like that of one participant who has been living next to the same spot in Oslomarka for the past 20+ years and using that part of the forest almost daily throughout this time. Some locations were associated with trips taken with friends or family which were especially treasured the participant rarely visited those locations or seldom spent quality time with these people. Additionally, these were often areas where the participants took their children, grandchildren, or other family members.

Another factor that can be linked to symbolic value is the sense of “putting your mark” on the landscape. This does not have to mean literally altering the landscape, but creating connections as to how the landscape looks today. For example, one participant had connections to preserving the existence of two lakes that were threatened by the development of a tunnel that would put these lakes at risk of drainage. The participant was very active in the efforts to stop this development for this reason and helped their organization in making sure this did not happen. Those lakes are symbolically valuable because the participant can be directly linked to a physical attribute that will succeed them, and in doing so they will be forever linked to the efforts in protecting what was already there. This can also mean the development of infrastructure that many people can use. Many of the participants have links to projects they have worked on, culminating in the development of something that benefited a large group of people, such as a bike trail or ski track. Symbolic value can be attached to

these projects because they are physical embodiments of a participant’s efforts in bringing a goal or a plan to fruition. In this sense, the value for the end product is not limited to the sum of its physical attributes, but can represent the the process in which it took to achieve that product. In some cases, this can be more important than the final project itself.

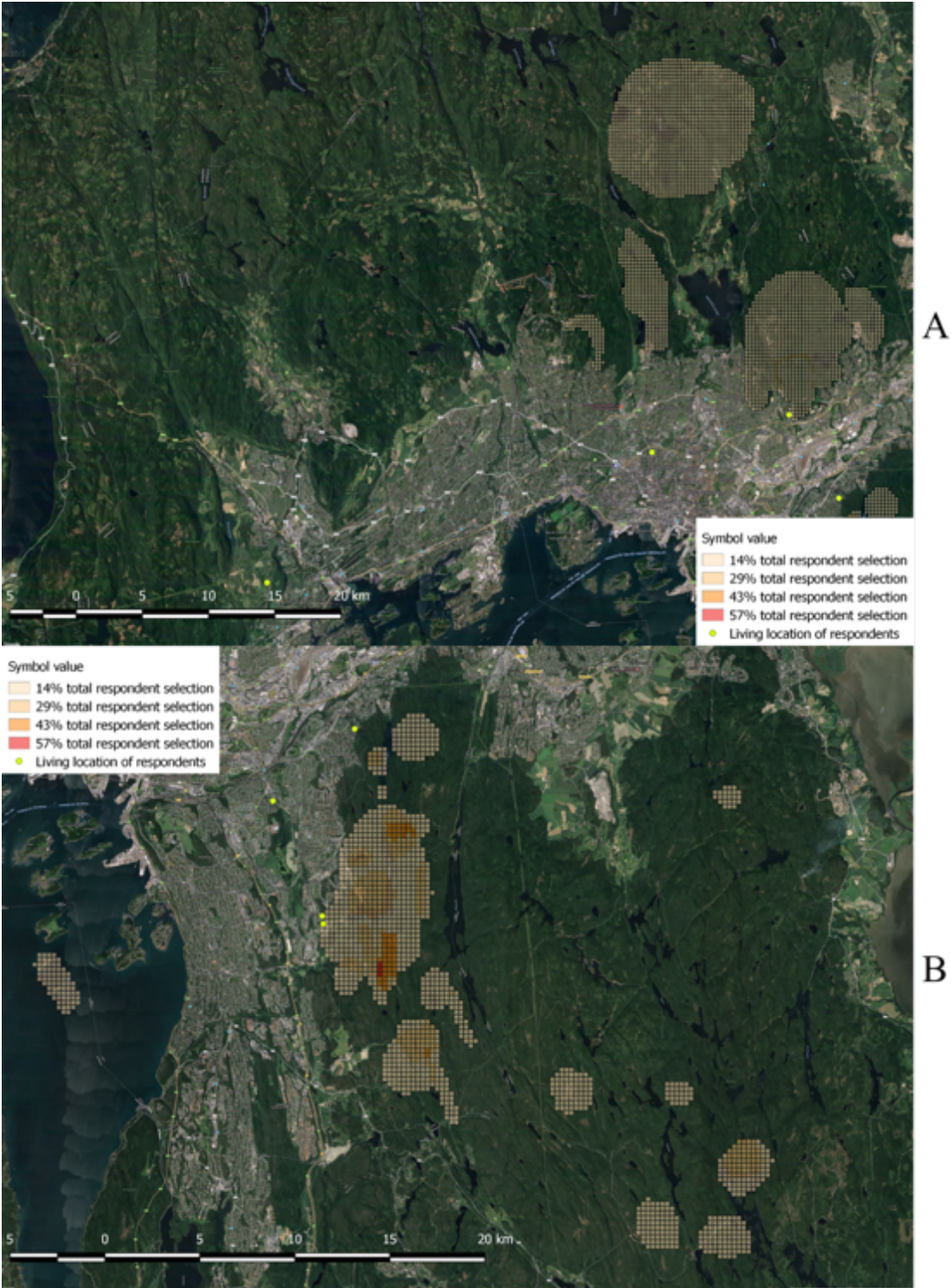


Figure 5.5) Following the data input in section 4.3.5, these maps show where Symbolverdi was ascribed to Oslomarka and where there was overlap between participant answers. Photo A is Nordmarka and Photo B is Østmarka.

5.2.2) Group perspective

As participants were able to formulate answers from their own perspective on where they placed value, to place value on behalf of their groups was far too ambiguous of a task for the majority of the prompting questions. For knowledge value and special natural or historical experience quality preferences of individual group members were far too varied to be generalized. This was especially true for those who represented a conservation group, as the interests of the people involved varied immensely because of participation within the group from all age groups and all user groups with a common interest in the conservation efforts of Osloomarka. The same goes for anyone who was a public health coordinator or in similar position that work in areas such as outdoors, nature or outdoor physical activity, and managers in the Norwegian Environmental Agency, as they don't represent any specific user or interest groups. For the groups that would perceivably have a definitive user group, such as skiing, the preferences were too individualistic, and if all the different types of preferences were to be mapped then effectively the whole of Osloomarka would be marked.

When asked about the use frequency of their respective user interest group, other than the well know spots such as Holmenkollen, "nærområder" was often cited with being the deciding factor on where people frequent most. They broadly described use frequency as being somewhat of a gradient, becoming less frequent the farther away from the city, but without marking anything on the map. There was limited success when discussing symbol value from an organizational perspective, as they could mark areas to which the organization had successfully implemented projects or areas that they saw themselves as having an active presence in. However, this symbolic value may not reflect on the group itself but the identity of the organization and those working within that organization. Thus, nothing significant could be derived from the group level as the majority of participants could not place anything on the maps.

5.3) Mapping validation

There were two instances where the interviewee did not place any marks on the map for a specific value. In the first case, the participant felt that the questions concerning special nature or historical experience qualities were far too broad as it largely depends on what you are looking to experience. This was coming from a participant who marked that they go into the forest daily and had a very broad range of activities that they liked to do in Oslomarka. They remarked that different parts of the forests can fall into this category depending on the activity and preferences can change depending on the objective for going into Oslomarka. They also didn't consider any of the specific activities as a defining characteristic of who they were. Thus, thinking in general terms they felt it was too broad to answer because they could mark the whole forest. In the second case, the participant expressed a general confusion about what symbol value was. During the interview they referred to areas that held fond memories to them because of moments they had with their families or areas where they learned about a specific recreational activity that they still do today. However, they did not feel as though these areas had symbolic value. Even when referring back to the Norwegian text provided in the interview guide, they did not seem to grasp the concept and thus did not mark any locations.

In both cases, a blank map was provided in the questionnaire for that value characteristic. It is not, however, expected that everyone conceptualizes value in these terms and assigns these value types to place. In both questionnaires, they did not give a value to these maps because there was still a general confusion about the understanding of those specific value characteristics. Thus, in table 5.6 these values are represented as a 0, as they did not capture that specific value for that person. If these zeroes were turned into null values, it would bring the mean of special nature and historical experience quality up to 78% and the mean of symbol value up to 92%.

	Mean	Median	Mode
Use frequency	85%	80%	80%
Special nature or historical experience qualities	65%	80%	100%
Knowledge value	77%	75%	80%
Symbol value	77%	90%	90%

Table 5.6) This table shows the representativity of the data collection given by the participants about their own maps.

Chapter 6: Discussion

6.1) Mapping variations

By allowing participants to draw freely was intended to reduce the methodological limitations on the perceptions of the participants. It also allowed them to freely express their placement of value which can be hindered by some methodologies, such as placing a point on an area. In some cases, the polygons drawn by participants were understood as having “soft edges”, while not specifically excluding the areas outside of the polygon it was intended to give a general idea of where they place the specific value. When mapping use frequency, there were two main ways of expressing these areas. The first, as seen in photo A of figure 6.1, the participant was quite specific about the places they frequent most and often these areas were linked to a specific activity, such as walking the dog or rock climbing. The second was drawing a larger, more general area, and stacking polygons to give a gradient to their use, as seen in photo B of figure 6.1. In the interviews, these methods were not exclusive to one another as some participants were very specific in areas closest to their homes and broader in the less frequented use areas.

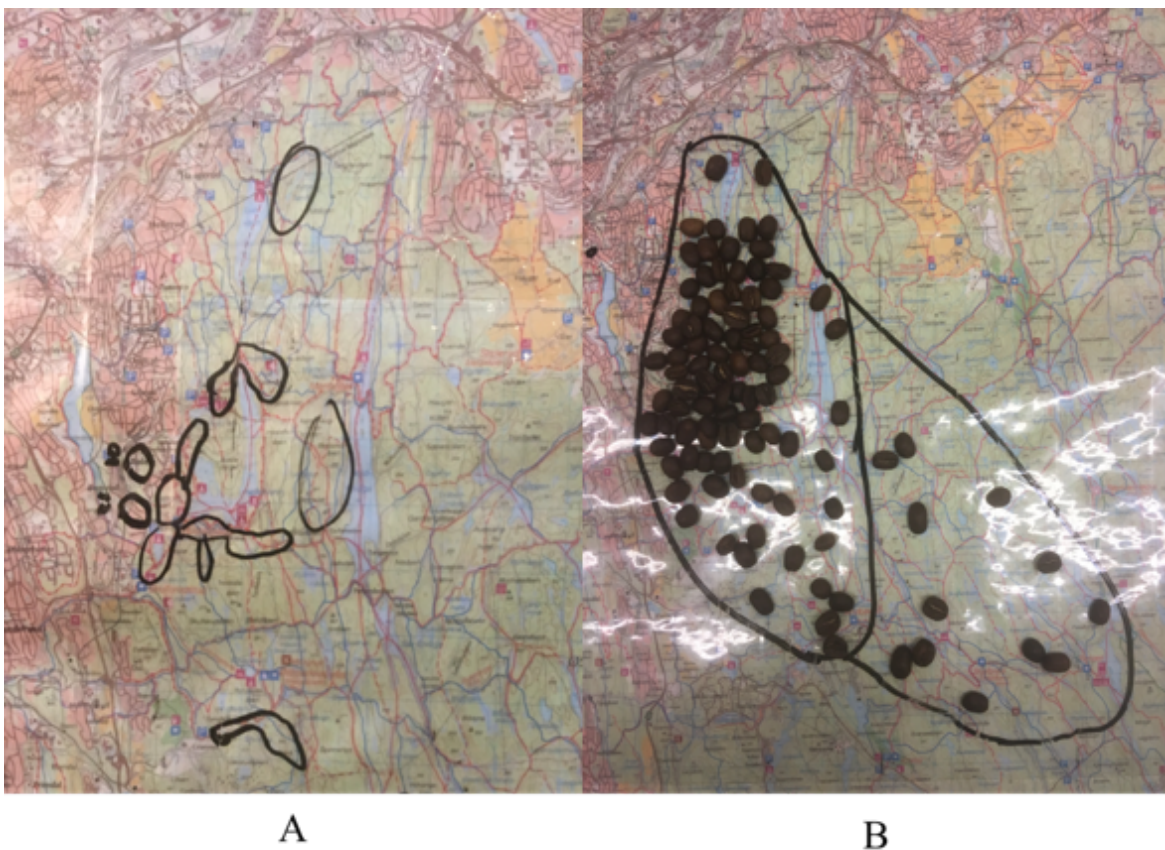


Figure 6.1) Photo examples of how participants marked use frequency

Although the mapping protocol was fairly specific on demarking locations with markers, some respondents deviated from this based on their interpretation of how to spatially express their perceptions in their placement of use frequency. The use of markers to delineate areas for use frequency was too defining, as they expressed that it was more of a “general” area that did not necessarily have a “boundary”. As shown in photo A of figure 6.2, multiple participants used the beans to express where they frequently use and discussed the distribution similar to that of a gradient. As a result of this, challenges arose during the digitizing of these maps. As shown in photo B of figure 6.2, the extent of the digitization of this value was coincided with the placement of the beans rather than delineated borders drawn with the marker. The participants who chose this method of expression would spread the beans out to cover a “general” location. This also caused challenges during mapping, leaving spatial interpretation of these example in the hands of the researcher, and the uncertainty regarding these interpretations was later addressed during the validation surveys.



A



B

Figure 6.2) Photo of use frequency as placed in one of the interviews and its digitized representation

Another method of representation of use areas of value came when a participant began to focus on a very specific point on the map. As shown in figure 6.3, a few participants marked a location with an X instead of either circling it or specifically defining an area. Generally, these areas were linked to a physical attribute that would show up on a map, such as a cabin where they get coffee or a specific peak. A few of the participants noted in their feedback of

the digitized interview maps that these very specific locations marked with an X looked too small, inferring that the representation did not fully encompass how the participant perceived value to be placed in that area. During the digitizing process, these areas were limited only to the border of the X that was drawn, which did not seem to capture how the surrounding area may factor into the value given to that point as perceived by the participants. The majority of these very specific locations have been marked under the special natural or historical use qualities value category, from the analytical framework, which could be the reason that this map's mean representativity validation score is lower than both the knowledge and symbol values mean scores.

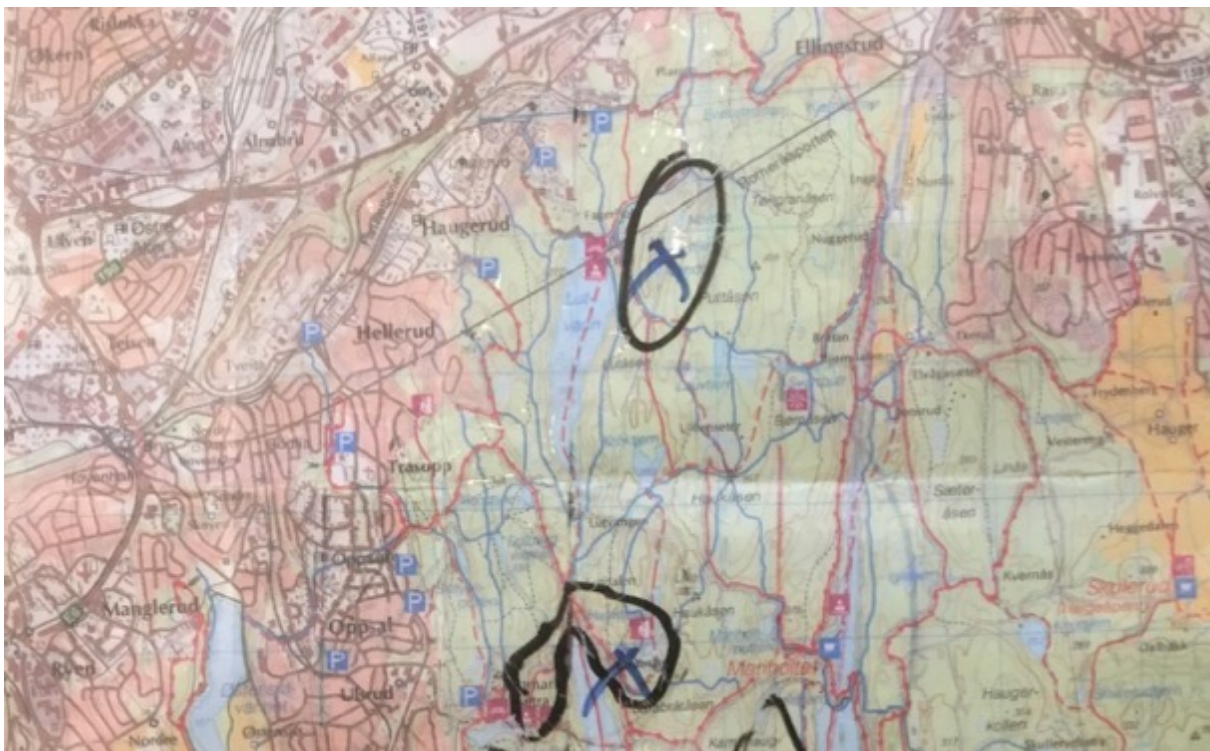


Figure 6.3) Photo example of points marked as having special natural or historical experience qualities

For some of the participants, a specific location or experience was not associated with any singular point, but instead a specific trip or route. This generally occurred when the participant did an activity that drastically increased their mobility and increased the range of accessibility within a timeframe of a few hours. This allowed for much longer trips to be more feasible with less planning and effort. The majority of these polygons came from activities such as cross country skiing or cycling. As shown in figure 6.4, participants represented this by marking the route of the trail or path that they use. Throughout the participatory mapping data collection, it was common for participants to mark one specific location for multiple

values or one general location for a single value attribute. Then going on to very specific locations within the more general area for other value attributes. There were a few cases where a participant marked all the value attributes in one location, expressing the importance of that area to them and showing the value plurality ascribed to a location.

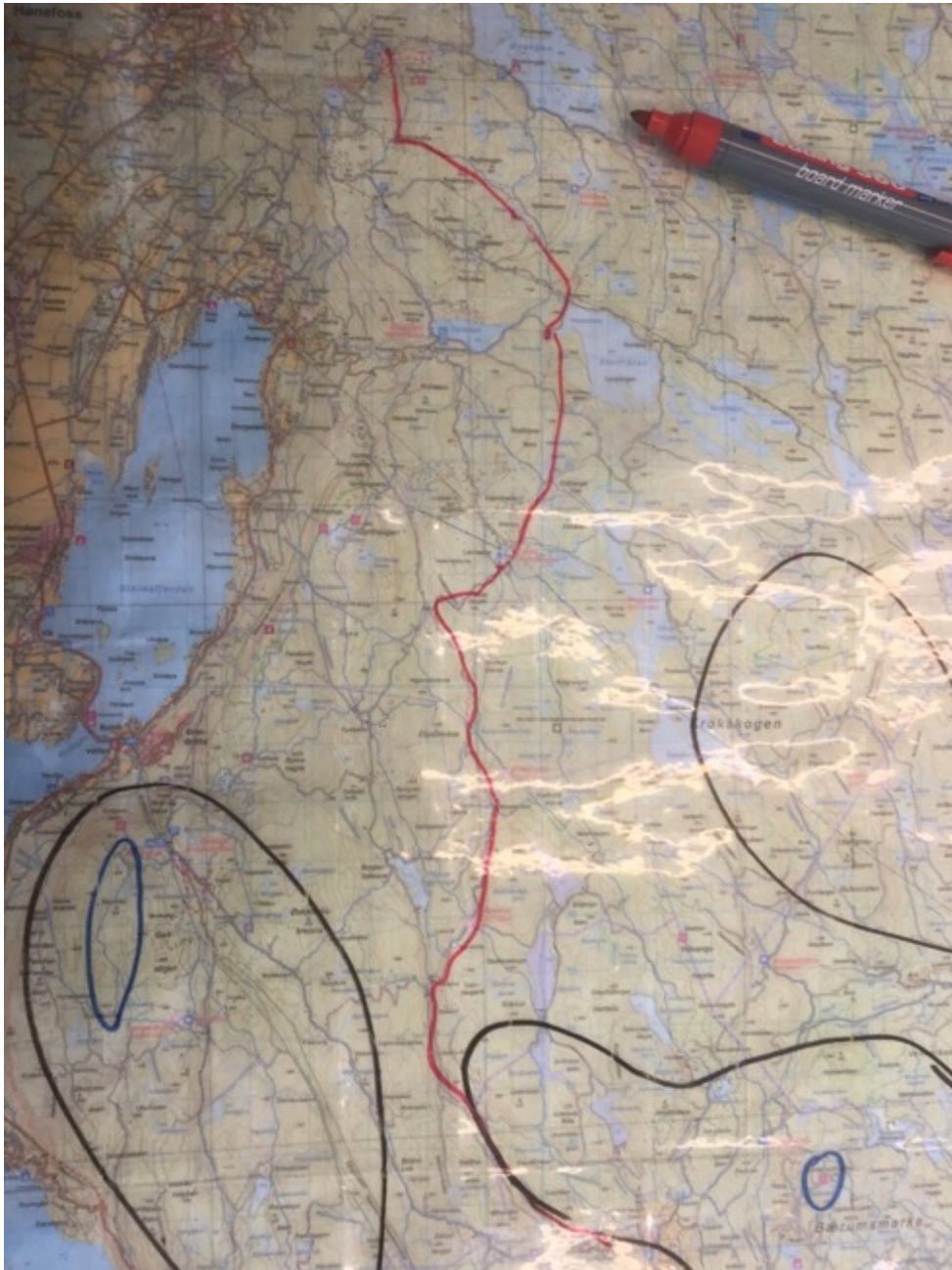


Figure 6.4) Photo example of a specific trip that holds knowledge value for a participant

The majority of the comments about the digitized maps in the questionnaires were concerns regarding the size and placement of polygons, such as a polygon needing to expand or slight adjustments in location. These issues concerning the digitized results being misplaced or

misrepresenting their value placement, often occurred when the respondent didn't use the marker to place locations for use frequency and decided to just use the beans. Overall the participants expressed that they were very satisfied with the maps generated from their interviews. The final step would have been to send the maps back to the participants after they had been digitized and allow them to make changes they had noted in order to better represent the accuracy and values of the maps. This final edit would allow the participants to reflect back on their answers to the interview questions and enable the maps to better encompass these values as they perceive them. However, due to time limitations, this was not possible.

6.2) Participant representativity

By aligning the participants in this research with those who would be considered for a project group in the M98 mapping project, figure 5.1 brings up an interesting discussion on representation and the effects of that representation on policy. One of the main questions when discussing representivity is: who is chosen to represent the values of their interest user group and what qualifies these people to do so? During any given time of the year, table 5.1 shows that the majority of respondents in this research are within the 18%-26% of the population that use Oslomarka at least weekly if not daily. It also shows that all the participants had at least a vocational education pertaining to their position, but the majority had 4+ years of higher education. The majority of the participants in this research were representatives of nature and outdoor recreation organizations associated with Oslomarka, all of which were either in leader or managerial positions within their organization. Many of them having worked their way up through the organization over many years to be in the position they are in now. The fact that most of the participants have careers that are directly related to Oslomarka, being in the forest at least weekly is a major part of the duties of their jobs and thus is reflected by this participant group being apart of the small percentage of the population who are able to spend this amount of time in Oslomarka.

Because the pool of participants are generally leaders of such organizations, the people asked to distribute value for the M98 study are generally in their 40's, 50's, and 60's. They are educated in the field in which they work. The majority have reached a master's degree or higher and have a vast amount of experience working in their field. It also shows that these participants spend a considerable amount of time in Oslomarka, for work and for pleasure. Statistically, when discussing use and knowledge of Oslomarka, the participants are not in the

same classification as the average user of Oslomarka. They are, however, the representatives of organizations that average people join because of similar interests, ideals, and values. As the participants are leaders of their respective communities, they should also personally reflect the values of their organization. When it comes knowledge about Oslomarka, these representatives are the experts and thus they are qualified to answer in-depth questions on this topic and should therefore be included in research pertaining to the use of Oslomarka.

This research was focused on the use of Oslomarka and looks at how the public ascribes values to different areas and how those values are spatially perceived by conducting interviews with those that not only use Oslomarka, but those who use it frequently. And although the representatives are well chosen for their particular interest or use group, this research does not reflect on those among the population who are considered non-users. As table 5.3 shows, at any given time of the year 41%-56% of the population never or rarely go into Oslomarka. This can have drastic effects to what Oslomarka means to them or the role that it plays in their life as compared to people who use it very often. With no lack of access to the forest areas, it brings up the question as to why such a large percentage of the population is not taking advantage of this natural resource which has preserved and protected for the benefit and enjoyment of all, including future generations. This is a known issue with research concerning forest preferences as it was pointed out by Gundersen et al. (2008) that within survey data, the elderly, handicapped, and youth were severely underrepresented. This shows that there is a very large portion of the population that are not represented and furthermore, a large portion that are not gaining the full benefits that are offered to them. These gaps in data must be further researched to avoid any conflicts of environmental justice in the preservation of Oslomarka, and create access for all rather for only those privileged enough to use it.

Oslo municipality and this research attempted to account for this when deciding on the participants to be included in the project group. This was done by including organizations that are working with non-native populations living in Oslo and under privileged children who are generally counted among the non-use group. These organizations work to create the same opportunities for those with less access by, for example, organizing guided trips into Oslomarka as an introduction to the forest and what it has to offer them. Organizations working in this field were contacted for interviews during the stakeholder analysis and the participatory mapping portions of this research to attempt to include their perspective into the

M98 mapping results. There was very limited response, however, and this research was fortunate enough to receive a response from and include a single organization that works with underprivileged youth by using the green space around Oslo as well as Oslomarka. The number of organizations in this category are more scarce than user interest groups. They are also extremely under represented when considering the percentage of the population that fall within this category.

The interest in including groups like these into the M98 mapping project shows awareness and concern about environmental justice issues from those in charge of the M98 mapping project within Oslo municipality. However, there is uncertainty about how the totality of their inclusion would effect the policy formulation. Even if these groups have a limited representation in the policy making process, their inclusion does not reflect the amount of the population that fall into the non-use category. However, representing these groups through the mapping of value ascribed to Oslomarka may not be the answer to addressing this issue for land management, as the value for a location is often tied to how people use it, which may result in a perceptual lack of value for non-users (Vaske & Kobrin, 2001). To include more of the public within this non-use category, more research needs to be done in what separates those who are using and those who are not using Oslomarka, as the difference may be more institutional than individual. Additionally, more effort needs to be made in providing opportunities for the public to use Oslomarka and educate them about its importance ecologically and culturally. As the more people are educated about these topics, the more likely they will be to actively try and preserve it (Powers, 2004; Vaske & Kobrin, 2001).

6.3) Policy relevance

6.3.1) Activity zones

Figure 6.5 was developed to add context to the activity zone conflict. As shown in appendix B, the activity zones were set in place to promote the use Oslomarka through increased recreational infrastructure as well as allow the “transition areas” to withstand increased use. The developments proposed for activity zones reflect the activity opportunity view of forest use, stating that these zones will allow for more outdoor recreational activities and to adapt some of these areas to fit non-traditional “Marka activities” in order to better suit more age groups and shifting activity preferences. Map A in figure 6.5 defends a portion of the justifications made by *Oslo mot 2030: Smart, trygg og grønn* (2015) for the activity zones, as

the placement of the activity zones are generally within areas that have a relatively high frequency of use. These justifications of re-zoning for increased use are further defended during the interviews with participants, as they described the locational choices for frequency of use being dependent upon the nærområder of the user.

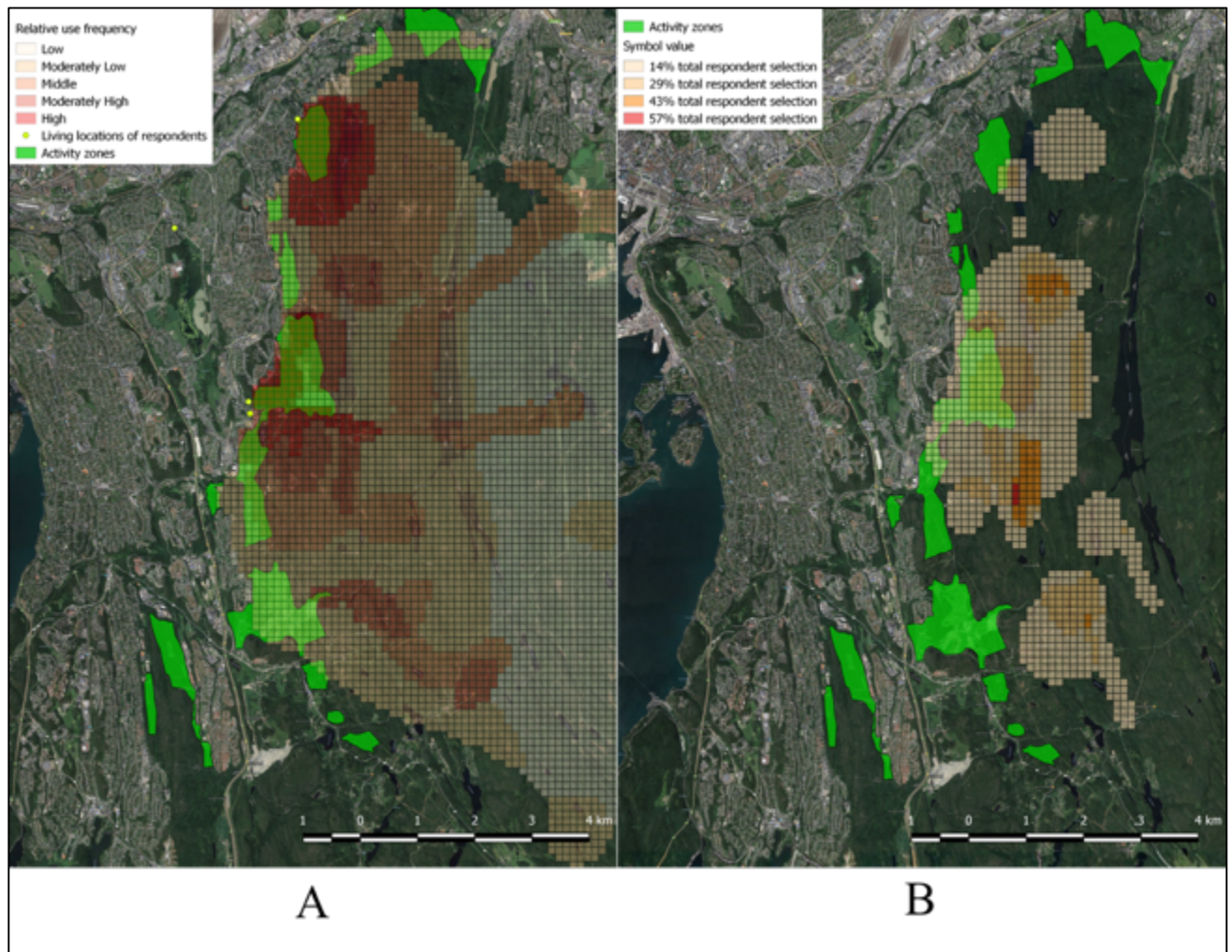


Figure 6.5) This map is a comparative overlay between relative use frequency and symbolic value with the Østmarka activity zones in Oslo mot 2030: Smart, trygg og grønn (2015).

In figure 6.5, map B shows that although these areas are important for the facilitation of recreational use, value plurality exists within the activity zone boundaries. One point which highlighted by multiple respondents about the activity zones was the size and distribution of these zones. The zones were viewed as being too big and participants did not understand why they encompassed a continuous stretch down the city borders. Various respondents explained that it was highly important for them to have areas nearby that had very little development. This would allow them to have places they could frequent, where they could also experience

the sensation of “stillness” and “nature”. Each of these qualities are not necessarily associated with the perceptions of frequently used areas.

This highlights some interesting concerns about how the activity zones aim to include those who are currently considered non-users, by getting them to use Oslomarka through the facilitation of increased access and recreational opportunity. The justification for this development is to adapt forest infrastructure with shifting preferences (*Oslo mot 2030: Smart, trygg og grønn*, 2015). My assumption behind this type of rationale is the notion that because less people are frequenting Oslomarka, there must be something wrong with the current forest areas and that it's up to a location itself to attract use through the development of infrastructure more in line with the desired preferences. However, what if the problem is something fundamentally different? Many respondents voiced concerns about people only using gravel roads and kids being more interested in video games than exploring the forests. This caused me to question whether the problem is a dwindling knowledge about forest areas and the benefits that they have to offer. As well as desire to experience the ties to local and cultural history and the full range of activities that can be enjoyed, apart from strictly sporting activities in a more natural setting. This is not to say that shifts in preferences are not important and shouldn't be considered in land management, as historically recreational use was a shift in preference and became the dominating discourse that led to Markaloven. Some participants in this research voiced concerns about the shifts in forest use. A few that have lived in the Oslo area for 20+ years stated that they noticed more people only venturing as far as the walking paths rather than going off trail and thus, using much less of the forest area available. As more people become accustomed to this type of infrastructure, along with groomed ski tracks, cycle paths, and cafes in Oslomarka, it contributes the idea that people need infrastructure to enjoy nature. It must be said that these types of infrastructure are ideal for getting those who are currently considered non-users as a jumping off point to their use of Oslomarka and be included in the social atmosphere of those who frequently use the forests. This was also further discussed by respondents who stated that they encouraged the development of more walking paths and handicap accessible infrastructure, as all participants were very upfront about their goals to extend access to Oslomarka, and that the development of certain amenities is key for being able to accomplish that goal.

The Oslomarka border has been suggested as early as 1938, and has over time adapted to different types of livelihoods and uses. This shows the importance of adaption of policy to fit

the changing needs of a population. However, as stated by Stephenson (2008), inappropriate landscape planning can degrade its historical and cultural connection to the local population. For this reason, it is important to not hasten development because of current fads, and keep in place the institutional bureaucracy that has been protecting Osloomarka from rash decisions since the border's proposal. Though this bureaucracy can be seen as an inconvenience, it is this inconvenience that has been the primary defense for the preservation of Osloomarka (Naturvernforbundet, 2015), and this view was represented by the majority of respondents stating that, they are not against development but they don't want to "make it easy". By considering also the fact that it took Markaloven nearly a century to be established into legislation, it shows the cynical view of the activity zones by those interviewed regarding the intention to re-zone part of what took so long to establish.

6.3.2) Norwegian Environment Agency, M98 manual for mapping and valuing recreational areas

Oversikt over områdetyper:		
Kode	Forklaring: Områdetyper	Kartfigur
NT	Nærturterreng	Flate
LR	Leke- og rekreasjonsområde	Flate
GK	Grønkorridor	Flate/kurve
MA	Marka	Flate
SS	Strandsone med tilhørende sjø og vassdrag	Flate
KL	Jordbrukslandskap	Flate
UO	Utfartsområde	Flate
TM	Store turområder med tilrettelegging	Flate
TU	Store turområder uten tilrettelegging	Flate
SK	Særlige kvalitetsområder	Flate
AF	Andre friluftslivsområder	Flate

Table 6.6) This is the classification of different area types to be sorted according to the M98 handbook.

In the M98 manual, the first step to assigning value to an area is to define that area. In the M98 guidebook, as shown in table 6.6, is a classification list for the demarcation of different area types. The majority of green space within a municipality is dissected into small discernable patches that are segregated by various types of infrastructure. The area type classification is also fairly specific, which helps reduce the amount of interpretation of area type by the municipality, allowing consistency between the maps produced from the all municipalities working on the same project. However, the Marka category does not fit well

into this classification. As shown in figure 6.7, the various classifications help to discern the type of green that is common in the different areas of east Oslo. Looking to the east of these small polygons, there is the area classification of Marka. Compared to the other classifications in table 6.6, Marka is considerably bigger, and with the size difference comes the daunting task of trying to ascribe value to the whole of “Marka”.

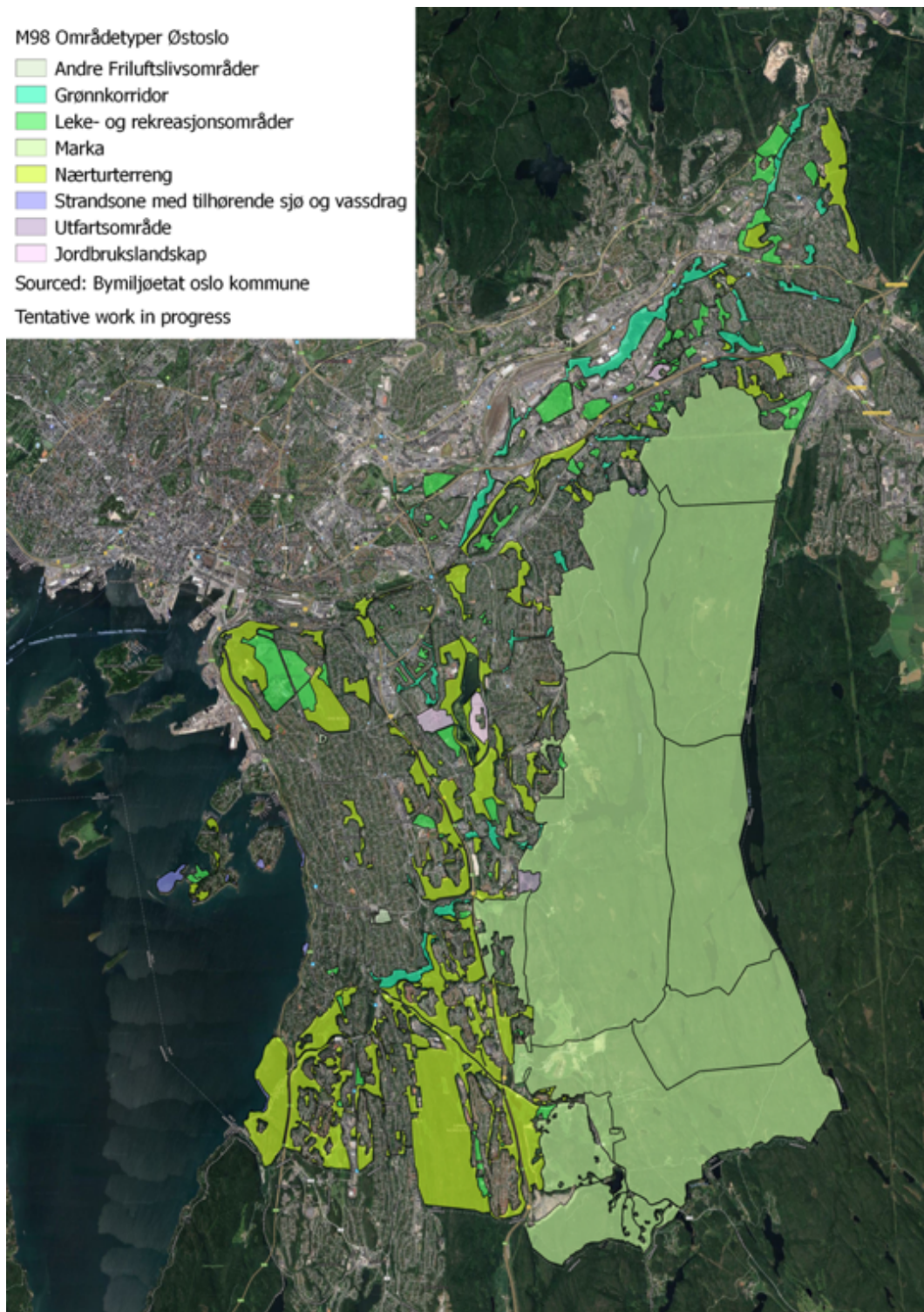


Figure 6.7) Tentative area type classification of east Oslo, using the M98 area type classifications. Provided by Oslo municipality.

In the tentative map provided by Oslo municipality, Marka is sizably bigger, but the delineation of Marka in figure 6.7 only shows the area that falls within the eastern Oslo boundaries. There are many smaller areas within Oslomarka that have varying qualities that make them unique to their surroundings. To assign a single value for any one of the value categories would be to conclude that Oslomarka is highly important for all value categories. This would not give any information on distribution of the different value categories and thus would not add any useful information to the M98 mapping project or to any landscape planning policy in the future.

A solution to this would be to do that same with Oslomarka as the M98 manual does with the other area type classifications. This could be done by a clear and concise rationale to highlight defining physical characteristics that would result in a clear segregation of Oslomarka. The data available for this type of segregation is vast and could include land cover, infrastructure, topography, distance from access points, discernable historic features, etc. However, with the endless possible variations for segregating areas within Oslomarka, there is the difficulty of quality assurance once the different areas have been segregated. The hot spot maps derived from this research have applicability for this dilemma, as the results were derived by reversing the order of operations to that of the M98 manual by having participants place value as they perceive it, free of spatial delineations. These maps reflect the placement of value by the participants and can give insight on how people place value relative to the physical attributes that normally define these areas. One way this research could be applicable for policy is to overlay the hot spot maps with the delineated areas produced from physical characteristics, as shown in figure 6.8. This would effectively act as a quality check for deciding which values work better then others when segregating Oslomarka into different parts.

Using the tentative map classifications from Oslo municipality, there was an attempt to segregate the east Oslo Marka classification into distinct areas. By using the hot spots from map A and B, there are some visible issues with the segregation, as some of the boundaries cut directly though hot spot areas, while other hot spot areas are encompassed quite well. The second way the heat maps can aid to delineating different areas is by the hot spots themselves. Instead of first delineating areas based on physical strata and then using the maps as a quality assurance tool, the boundaries are created in conjunction to the hotspots, delineating

Oslomarka by cultural values instead of physical attributes. This insight can help to improve the delineation of areas within Oslomarka for a more accurate picture of value distribution and act as a quality assurance for future policy decision support.

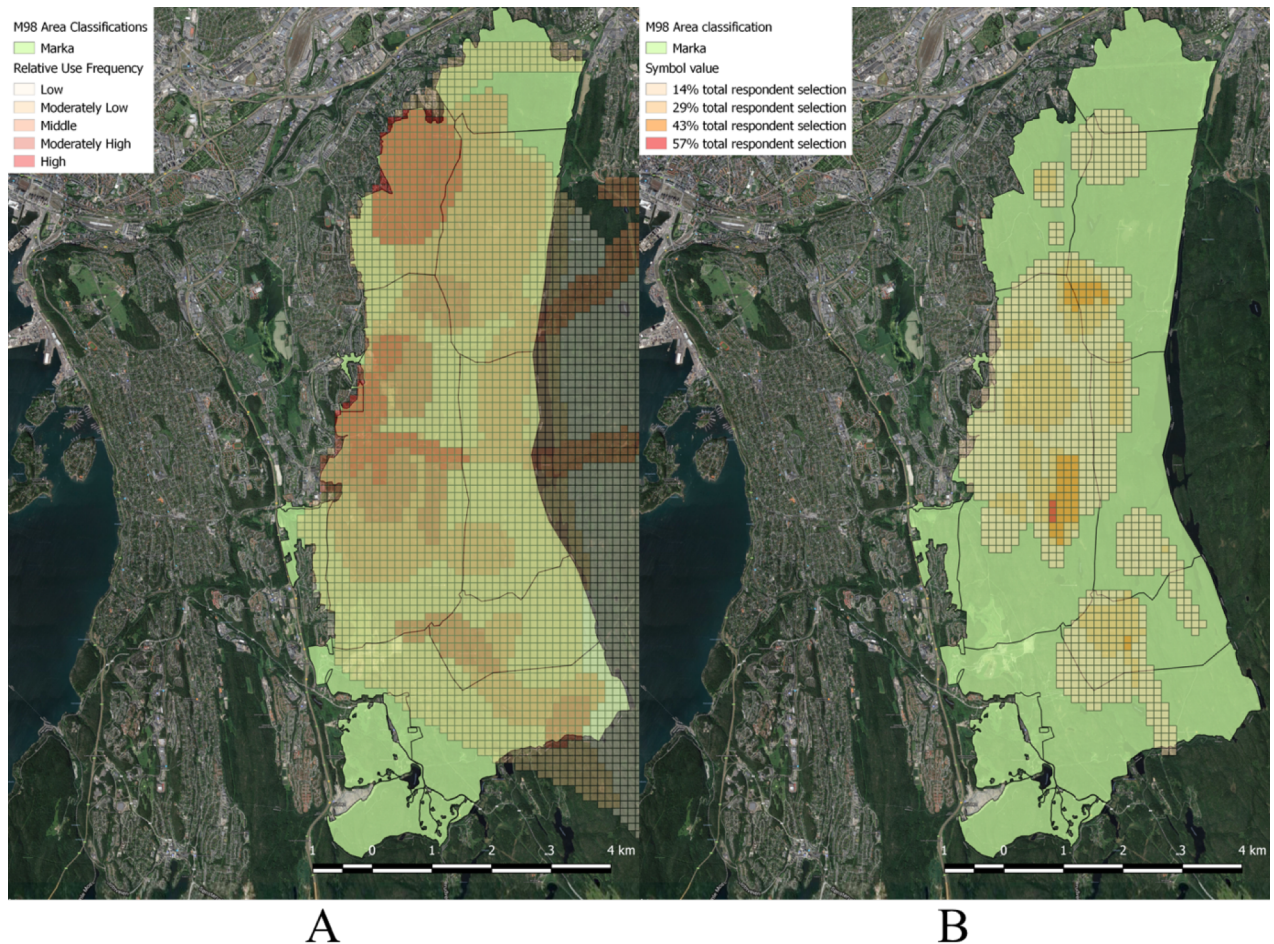


Figure 6.8) This map is a comparative overlay between relative use frequency and symbolic value with the tentative segregation of Østmarka, to check the quality of the strata used for the segregation.

One possible concern for delineating different areas in Oslomarka is similar those concerns discussed during the activity zone conflict. A potential cause for skepticism in regards to the division of Oslomarka into smaller pieces, could be considered an attempt at testing the boundaries of Markaloven. However, to adapt land management to handle the evolving needs of the population and stresses of increased use, there needs to be a better understanding of the spatial distribution of benefits and importance that Oslomarka has for the local population. This can help to assess environmental justice issues, in the attempt of inclusion for all groups of people, and by understanding how and where cultural values are placed, better support is available to develop policy that more accurately reflects these values. Allowing for the

adaption of land management without compromising cultural and social values. This is not suggesting new zoning of Osloomarka, but only to get a better understanding of the distribution of benefits by highlighting the specific importance of different areas for aiding policy and land management decisions.

6.4) Mapping relational values

By using the analytical framework in this thesis, the polygons that are placed on a map are also representative of the relational values attached to their specific value attribute. Similarly, by re-coding the polygons to those relational value categories the overlaying polygons will produce heat maps representative for each of the relational value categories. Figure 6.9 was derived using the data collected during the participatory mapping portion of this research. The hot spot map represented shows the locations that hold importance for individual and cultural identity. The hot spots in this map are indicative of areas that have overlapping influence on developing “sense of place” between the participants in this thesis (Jorgensen et al, 2001) and furthermore, influencing environmentally conscious behavior and working to get people actively involved in their local communities (Vaske et al, 2001).

By utilizing the relational value connections to attributes, maps like figure 6.9 can be derived for all of the relational value categories. These types of maps highlight the deeper socio-cultural roles the landscape plays in the community. And by representing these dynamic relationships through maps, policy support tools will have the knowledge needed to better reflect these relationships between people and place. Although this research has shown some potential applications of mapping socio-cultural values, the full scope of policy influence and potential application from spatially capturing relational values is unknown. This is because the perceived difficulties of applying CES into a policy context has limited their influence up to this point. However, within the research and political communities there is expressed desire for the inclusion of these values and their perceived applicability for policy support (Tengberg et al., 2012).

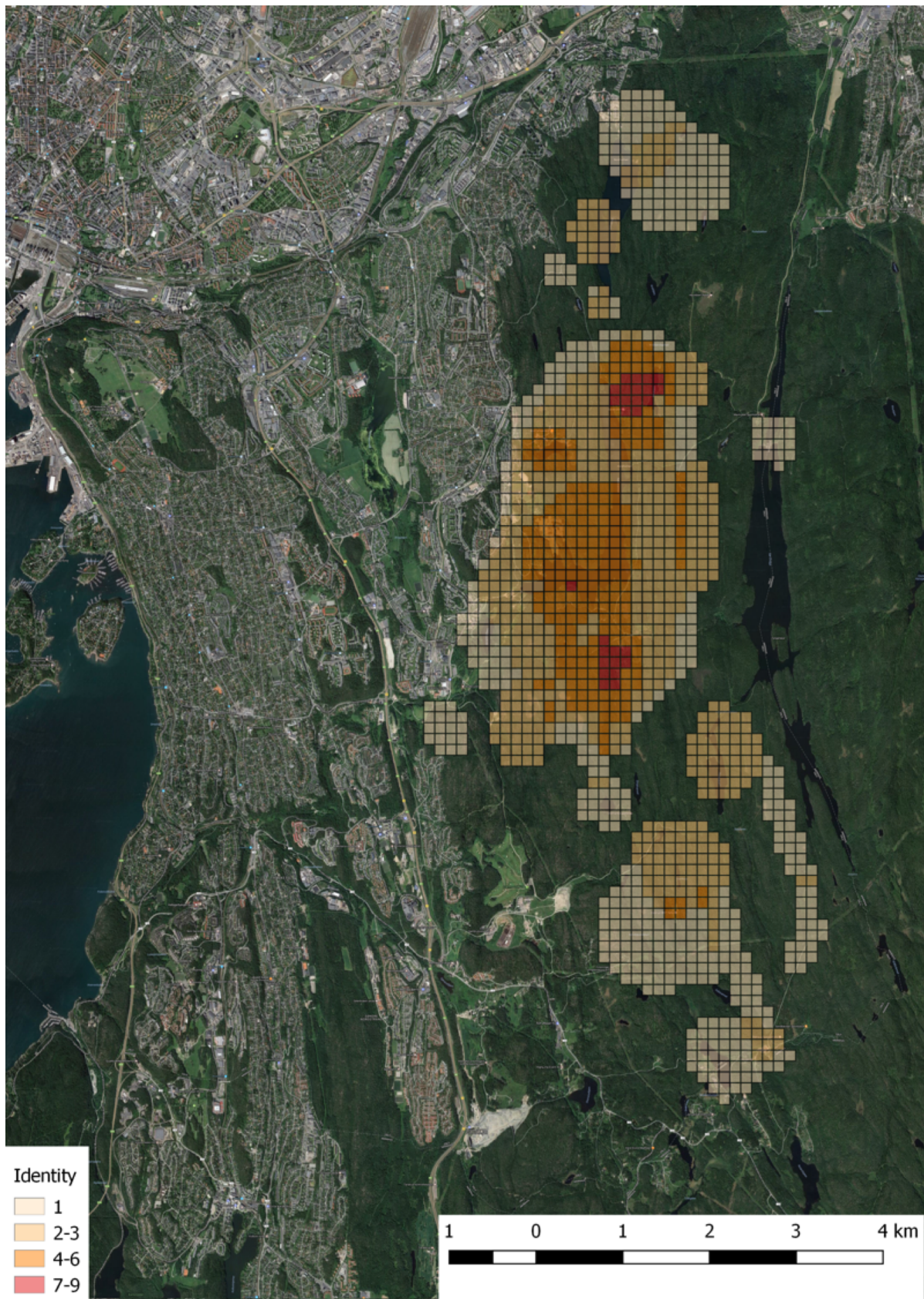


Figure 6.9) This map was produced using the value diagram and overlaying all polygons that were marked with a link to identity

6.5) Potential for Quantitative data collection

With the goal of this thesis to spatially capture cultural values for the M98 mapping project, participatory mapping using an in-depth interview protocol was utilized for data collection. This allowed the researcher to capture a deeper understanding and enabled better conceptualization of the value attributes and thus, producing a higher quality data collection. With the time needed to organize and conduct in-depth interviews (Bryman, 2012), the results of this study are not representative of the population of Oslo. Rather, the interviews are a demonstration of the analytical framework, giving insight into the possibilities and practicalities for mapping socio-cultural values. Nevertheless, this research has shown that participants were able to map special natural or historical experience qualities, knowledge values, and symbol values from a personal perspective. Ideally, a response rate that is normally associated with quantitative methods is needed to derive a much more detailed and representative interpretation of exactly how value is placed over Oslomarka.

The number of responses needed to derive statistically meaningful results are beyond the scope of in-depth interviews. As discussed by Crossman et al. (2013), 18% of all ecosystem services mapped are cultural ecosystem services, and the majority of those are aesthetic and recreational values. The majority of research done on mapping CES utilizes some form of interview structure, and selects respondents using a non-proportional sampling approach, which produces the same dilemma of lacking statistically representative results. As shown in Sherrouse et al. (2011), surveys have been incorporated in mapping CES for capturing aesthetic and recreational values, providing a much larger response base. With advancements in online GIS enabled survey platforms, the methodology used in this research could be adapted to a GIS survey platform which would increase the the potential number of respondents and allow for a more representative and statistically rich data set. The surveys that were used from NINA to analyze the representativity of the participants in section 5.1, were developed using the customized web-survey that included a map interface. These surveys allowed participants to freely place spatially explicit responses to questions on a large scale. Another example of a GIS enabled survey platform is Maptionnaire.

Traditionally, a draw back to the online survey platform was its limitations on the depth of questions that could be asked, as there is no interviewer who can probe for richer responses during discussions and give clarifications to concepts. The success of this type of platform is

dependent on the quality and clarity of the questions that are asked. Thus, it is essential to test the quality and effectiveness of the prompting questions first. This will not only give feedback on the question itself, but will also give insight in to what types of supplementary information would be provided for the survey. Supplementary information can minimize the need of an interviewer by as giving clarification to concepts and helping the respondent to comprehend questions. As exemplified in this thesis research, the Maptionnaire platform would allow respondents to spatially express value as they perceive it, and has the ability to provide supplementary information for any particular question, such as a glossary to the relevant terms in a question. It also allows for open ended responses and in-depth commentary to explain the respondents' answers in a similar fashion to the participatory mapping protocol used in this research. By incorporating these additions to a regular survey protocol, it reduces the deliberative role played by the interviewer, allowing for a simultaneous quantitative and qualitative data collection in a single methodology.

The ability to collect a representative socio-cultural value data set through these GIS survey platforms would not only allow for a hot spot analysis such as the example seen in section 5.2.1, but also for further statistical analysis between cultural value placement and supplementary GIS data. This could potentially reveal spatial correlations between specific types of value placement, and physical attributes. There is a precedence established for the understanding of very detailed preference information on the physical attributes of forest areas. One such example, is the review conducted by Gundersen et al, (2008) on quantitative surveys that collected forest preference data in Norway, Sweden, and Finland. Understanding the preferences for physical attributes is an essential criteria for choosing supplementary GIS data, such as tree density, topography, and infrastructure. This can then be overlaid and statistically compared with a quantitative, spatially explicit cultural value data set. Even if cultural and social values are ascribed to a landscape, and not necessarily the result of the physical attributes of a location, the relationships between people and landscape are dynamic (Antrop, 2005). The functional value of an area can be a reason for frequenting a specific location. But it is the emotional response or connection to that place that shifts the perceived value of a location from the sum of its physical attributes to cultural and social values mapped in this research (Kyle & Chick, 2007). Conducting a statistical analysis could show correlations between some of the physical attributes and specific cultural values.

If correlations exist between where people ascribe cultural values and certain physical attributes, GIS analysis could be used to map areas that have physical characteristics that are likely to invoke the emotional ties associated with socio-cultural value, resulting in maps similar to the hot spot analysis in figure 6.9. The locations present in these maps could then be verified, discarded, or added to, using local knowledge as described in the M98 manual. One benefit of large scale survey data, is a reduction in the time needed to obtain a large quantity of spatially explicit responses. This would give ecosystem valuation access to current and representative, spatially explicit data to better aid policy support. It would also give a deeper understanding of the dynamic relationship and interdependence between people and landscape. These results ultimately are dependent on a qualitative data collection and the Maptionnaire platform could be a possible solution to collecting this type of data due to its ability to reduce the necessity of an interviewer to capture complex responses. However, this data collection is highly dependent on the quality and the formulation of survey questions, supplementary information, and cultural context. Without an interviewer present, there is no reflection on the quality of the data collected in the interview setting. Although there is a reduction of the interviewer's role, a higher rate of respondents not knowing how to answer should be expected, as there is no interviewer present to adapt the data collection to incorporate unforeseen scenarios or questions. This could simply be accounted for in the results with a calculation of uncertainty in a statistical analysis.

6.6) Limitations

Although this research was carefully developed to strategically utilize a mixed methods approach, within the scope of a 60 credit master thesis, each mode of data collection was conducted within an insufficient amount of time, limiting the amount of methodological development and data collection possible. The time associated with organizing and conducting in-depth interviews limited the participant group to those who are in leadership positions and would be considered for the M98 project group. With more time, it would have been beneficial to expand this group to include people from all levels within these organizations and get a sense of how well these representatives, actually represent the views of their respective interest or user group. Increasing the amount of interviews would be beneficial for assessing the quality of the analytical framework and the ability of the protocol to capture these values. However, because of the time limitation, the participant group was limited to those who would allow the results to have the most impact, and that consisted of

representatives to be included in the M98 project group. The ability to extract quality data through conducting in-depth interviews and probing for qualitative data is a skill. As this research is for a master's thesis, the lack of experience as a researcher is considered a limitation. In the two occasions where a value type was not mapped by a respondent, an experienced researcher could have probed to find out why the respondents found it difficult to map those values on those occasions, giving more reflection on the analytical framework and methodological approaches for mapping socio-cultural value.

Chapter 7: Conclusion

This research was inspired by conflicts over land management policy, caused by the misrepresentation of cultural values and how a population ascribes these values to a landscape. Even when importance is placed up socio-cultural values by these populations, these values are often sacrificed in policy decision-making contexts as a result of their inability to reflect economic indicators (Milcu et al. 2013). The weight of socio-cultural values within policy decisions is further reduced because they are often characterized as being “intangible” and “subjective” (Daniel et al., 2012). This leaves policy-makers with policy valuation tools that are ill-equipped to capture dynamic relationships between communities and landscape (Fish et al. 2016), thus creating inappropriate landscape policy that can result in conflict (Gould et al., 2015). These types of conflicts and perceptions are indicative of a knowledge gap, and as discussed in empirical reviews on CES mapping, such as Hernández-Morcillo et al. (2013), there is little research on the capturing of socio-cultural values and their links to physical indicators.

In conjunction with the first objective of this thesis, an analytical framework was developed to conceptualize the cultural values that were included in the M98 project manual. This framework conceptualized three different value categories into unique attributes and provided clear rationales behind the value attributes, and furthermore, the values themselves. This framework acted as a basis for decision making throughout the research process. To fulfill the second objective of this thesis, the analytical framework was used to develop a participatory mapping protocol, allowing participants to spatially place values as they perceive them over Oslomarka. For the third and final objective of this thesis, participants rated the maps developed from their interviews based on how well it represented the totality of spatial distribution for each value category mapped.

To answer the first research question, activity opportunity is important to all groups, as it is a way to entice more people to use Oslomarka and is essential for frequent visits. However, to oversimplify the value of Oslomarka as a purely recreational opportunity, is to misrepresent the value plurality ascribed to areas within the peri-urban forests. If this misrepresentation of value is built into policy, as seen with the activity zones, conflict will occur. Respondents appreciated the forests closest to their neighborhoods because of ease of access. But they also ascribed many other socio-cultural values to these areas, reflecting a more diverse relationship

between people and their local landscapes. Just as there is an interdependence between landscape and people (Antrop, 2005), there is an interdependence between activity-opportunity and socio-cultural value. Thus, recreational-opportunity does not sum up how the majority of stakeholders feel about Oslomarka. Stakeholders understand the importance of activity-opportunity and even the conservation groups are not against recreational infrastructure, but are instead trying to avoid the “park” ambiance and enjoy all of the benefits of having substantial access to an area with a relatively high degree of naturalness in close proximity to the city.

Unlike economic valuations, this research looked at the social connection to place instead of the sum of physical attributes. To answer the second research questions, a participatory mapping protocol using in-depth interviews showed to be an effective, but time consuming method for mapping socio-cultural values. The values that were included in the participatory mapping protocol were sufficiently captured, but with the amount of time associated with in-depth interviews, only a small number of interviews were conducted. To answer the third research question, an analytical framework allowed a participatory mapping protocol to spatially identify special natural or historical experience qualities, knowledge value, and symbol value from a participant’s individual perspective. The maps produced and the verification from participants are indicative of abstract cultural values not being “intangible” as they have been previously characterized. However, with such a small sample of participants, no statistical correlations could be made with physical features.

To answer the fourth research question, this thesis has also shown the possibility of organizing this data into heat maps, enabling the data to be used as a quality check for further zoning considerations of peri-urban forests. The analytical framework is not the totality of value attributes that can be assigned to the value categories in the M98 manual as it was developed as a “prototype model”, and also to make transferability to other cases easier to assess. Additionally, it was developed to promote transferability of concepts and comparability across cases. In the end, this research has given insight into the practicalities and possibilities for mapping socio-cultural values and has provided knowledge that can be built upon. The aims of this research were achieved by contributing to the capabilities of ecosystem valuations, and addressing the knowledge gap of mapping socio-cultural values.

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Appendix

A) Representativity questionnaire

Organization:

Job Title:

1. **What is your age?**
2. **What post number do you live in?**
3. **How often have you taken a trip in Oslomarka in the past 12 months (all areas)?
Put a mark for each season.**

	Daily	Weekly	Monthly	Rarely	Never
Summer 2016: June- August					
Autumn 2016: September-November					
Winter 2015/16: December- February					
Spring 2016: March-May					

4. **What is your highest level of education?**

- Primary education (up to 10-year compulsory education, 7-year folk school or similar)
- Secondary education (general education, vocational or other)
- Vocational education after high school or vocational school
- Higher education with up to 4 years duration
- Higher education with more than 4 years duration
- Other

B) Activity zones

Oslo mot 2030: Smart, trygg og grønn (Høringsutkast del 2, P.54-55)

10.2 Activity Zone - Active recreation and sport goal

Goal

- Facilitate an active outdoor life, sports and good scenery

Background

In line with the expected population growth Marka will be subject to increased wear and stress on the environment, and the areas closest to the building plan will be the most vulnerable. Rand zone until the building plan should be considered a diverse transition zone, "activity zone", where the city residents can be offered a more suitable use than the rest of Marka. This may contribute to increased outdoor recreation to various consumer and neighboring areas where people live. Delimitation of the activity zone is based on an analysis of various characteristics of Marka, whose purpose has been to define areas that can withstand a certain facilitation laying without compromising important natural areas or areas for recreation where nature experience is substantially. Provisions for the zone opens recreational, outdoor activities, even those that have not traditionally been perceived as "Marka activities" in order to meet different age groups' needs and take account of changes in activity preferences. In order to facilitate greater use of Marka it needs to improve and expand the trail and footpath network. It is desirable to interconnect routes, establish more all routes and upgrading trails. It is stated Therefore, future expansions and new larger trail/touring routes on the plan map. The areas to Huken quarries in Lillomarka with it. localization at the fringes of the forest and close to large populations, suitable for outdoor activities related to sports, culture and outdoor activities. Municipal the plan provides for such re-use. On Grønmo landfill, which is in liquidation, be it in the same way up to a large proportion of outdoor activities of varying degrees. This is stipulated in own retail zoning.

Measures contained in the plan

- On the plan map indicated activity zone, bordered with determination limit, with the corresponding provision and guideline allowing for adaptation measures for outdoor physical activity and sport, having regard the landscape and natural values ETC.
- The development plans for Huken quarries up raised and the area indicated as green structure with the resident decision
- The development plans for Grønmo landfill up raised, and areas indicated as green infrastructure, with provision which allows incorporation of plant for municipal technical activities, which will be close more determined in detail zoning
- Future extensions and new larger trail/footpath routes are indicated on the plan map.
- Sports facilities at Haraløkka determined to green structure.

C) Markaloven

Lov om naturområder i Oslo og nærliggende kommuner (markaloven)

Dato LOV-2009-06-05-35 (Lovdata.no)

§ 1. Purpose

The purpose of the Act is to promote and facilitate outdoor recreation, nature adventure and sports. The law should ensure Markas borders and preserve a rich and varied landscape and natural and cultural environment with cultural memories.

It shall also be considered sustainable use for other purposes.

§ 4. Area purpose

Marka is agriculture, nature and recreation area (LNF area) under the Planning and Building Act, the clarifications and exceptions set out in §§ 5 and 6.

§ 5. Prohibition of construction work

Construction work is prohibited in Marka. With construction work means measures mentioned in the Planning and Building Act § 1-6, such as construction, demolition, alteration, including facade changes, change of use and other actions related to buildings, structures and installations, as well as human encroachment and creation and modification of property.

The prohibition in subsection does not include agricultural measures and measures mentioned in the Planning and Building Act § 1-3 second paragraph or included in the decision pursuant to § 6-4 third paragraph of the same Act.

§ 7. Exemption for measures in municipal or state plans

Notwithstanding §§ 4 and 5 municipal plans open for the following measures in Marka:

1. Measures in agriculture, including buildings and the terrain
2. Paths and trails under § 9
3. Sports facilities that can be accommodated within the legislative intent
4. Public infrastructure such as roads, railways, dams, water supply systems, power lines, etc., as well as areas for ongoing exploitation

§ 11. Special protection of outdoor areas

It can no action be taken in outdoor recreation area that may substantially alter the area's value as outdoor recreation area. The Ministry will decide in cases of doubt whether an action can change the area's value substantially as outdoor recreation area.

§ 12. Considerate use of Marka

The Ministry may issue regulations concerning considerate use of Marka. The provisions of the regulation will help to maintain and develop good relations between users of Marka within respectively outdoors, sport and commercial activity as well as cabin owners and residents. It should be emphasized that multi-use in Marka to take place within the framework of sustainable use.

D) Interview lengths and purpose

1. (Darvill & Lindo, 2015)

Interview range:

20 min-150 min.

Interview average:

76 min

Process:

1st) General background info; Age, gender, residency, familiarity, education, and association with location.

2nd) Using 16 pre-defined ES indicators, participants were told to circle areas of “current use” (within previous 5 years) for each of the indicators that are applicable to them.

Research Goal:

Delineating the use of ES (Cultural and provisioning) to locate ES hotspots, and what stakeholder groups are using these areas?

2. (Klain & Chan, 2012)

Interview range:

54min- 3 hours and 30 min

Process:

Semi structured interview protocol, allowing participants to relate value and threats base on how they perceive it.

1st) Open ended questions on relation and dependence to study area

2nd) Circle areas of financial dependence to study area with relative weight

3rd) Open ended questions on CES

4th) Circle areas of importance for non-monetary reasoning with relative weights

5th) Circle areas of perceived threats to the ES presented above with relative weights

Research Goal:

To investigate the extent to which people are able to assign special locations to these kinds of values, and to investigate which categories of non-monetary benefits were most important to people and how they correlated with the monetary values.

3. (Plieninger et al., 2013)

Interview average:

20 min-30 min

Process:

Distributing surveys consisting of 25 questions about services and dis services that were based from 8 CES (defined by MA 2005) with a pre-sectioned map of the study area. Each section being numbered and the number of the section being written down next to the survey question. (Note: They started with 10 but could not characterize “cultural diversity” and “knowledge systems” so they were dropped.)

Research Goal:

Investigate what CES and disservices emerge from diverging perceptions and how they can be explained though socio-demographic determinants. They also looked at investigating what cultural disservice do people relate to different land cover types and the spatial disservice distribution.

4. (Raymond et al., 2009)

Interview range:

1.5 hours- 3 hours

Process:

In depth interview process with mapping task to allocate values and threats to specific local regions.

1st) Open ended questions

2nd and 3rd) Natural asset and ES based prompting by asking participants to describe their values using the MA 2005 natural capital and ES typology to guide conversation.

4th) Spatial prompting to map values discussed in parts 2 and 3. Additional questions on specifics of each location mapped.

Research Goal:

Asses the ability of the natural capital and ES framework to quantify community values.

Using participatory mapping to identify hotspots of value alignment and conflict.

E) Interview protocol for individual use

Topic	Categories	Questions
Biography		1) Where did you grow up? (If Oslo place on map) 2) Would you locate on the map the neighborhood that are currently living in? 3) How long have you lived in that area?
Brukerfrekvens (user frequency) Egnet Het (areas well suited for a particular activity or activities that can not be found in other areas)/ Tilret telegging (sites adapted to specific activities)	<ul style="list-style-type: none"> - Preferences, principles, and virtues associated with relationships to nature - Ideal areas or uses of interest - Mental and physical health - Activity opportunity Use and Conflict of Osломarka 	4) *Can you place on the map areas that you use frequently? Explain the importance of each area placed on the map and the purpose for going to those areas? (Example; use for running, walking, dog walking, cycling, berry picking, ect.) 5) *Distribute beans based on your relative frequency of use, the more often you go there the more beans it gets.
Opplevelseskvaliteter (special nature or historical experience qualities)	<ul style="list-style-type: none"> - Preferences, principles, and virtues associated with relationships to nature - Ideal areas or uses of interest - National and personal Identity - Wellbeing of non-humans - frilufsliv and allemannsretten 	6) Out of the activities stated in the above section, would you consider any of them to be more than just a recreational activity? Such as a “hobby” or “life style”? 7) If yes, what has made this more than just a recreational activity? Did your location preferences change from when it was just a recreational activity to when it became more of a “hobby” or “life style”? If so, how did it change and why do you think it changed? 8) If no, do you have any hobbies that are not part of the areas that you frequent? If so what are they and why are they not frequent? 9) *Out of the areas that you frequent, would you go to any of these places if you could not frequent them, and why? 10) *Are there any additional areas that are important for doing this particular activity that you don't

		<p>frequent? <i>If so what makes them important and why don't you frequent them?</i></p> <p>11) Why do you go to certain places to do these activity's? For example, is there any special nature/landscape or cultural history experience qualities? If so what are they?</p>
<p>Kunnskapsverdier (knowledge values)</p>	<ul style="list-style-type: none"> - Marka for future generations - Awareness of the dynamic importance of Oslomarka -Place based education - friluftsliv and allemannsretten 	<p>12) From where did you get the knowledge you have about your particular hobby, or ideals for the forest and how to act in it? How old were you when when it really had an influence? (Example, learning from a parent, influenced by surroundings of local area, awareness raising from local organizations, exc.)</p> <p>13) What was it about these experiences that made them have the impac they did? <i>Did the natural surroundings have a big part? If so how and why? Or was is it more social based?</i></p> <p>14) * If you were to try and instill the same values, knowledge, or ideals to the next generation (e.x. kids or grand kids, ages 6-14) where would you take them?</p> <p>15) <i>What kind of experiences, knowledge, and/or skills would you hope they would get from being taken to these places?</i></p> <p>16) What characteristics would these areas contribute to making sure they got the desired experience?</p>

<p>Symbolverdi (Symbol value)</p>	<ul style="list-style-type: none"> - Preferences, principles, and virtues associated with relationships to nature - National and personal Identity - frilufsliv and allemannsretten 	<p>17) * If you were tasked to show people areas of Osloomarka that represent ideals you have or even values that you hold, in essence areas that are reflective of you, where would you take them and why?</p> <p>18) If linked with a historical connection, did the physical surroundings influence this connection or play a role in the the outcome of that historical connection? If so what are they, and how have they done so?</p> <p>19) If linked to regular use, are there other areas that are very similar? What separates this area from using others?</p>
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