UiT The Arctic University of Norway

Department of Arctic and Marine Biology

Beyond Catching Fish: Exploring the role of Relational Values in Mobilizing Community-based Management Efforts in a north Norwegian lake

Kjerstin Andrea Mæland

Master's thesis in Biology BIO-3950 May 2023

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Master Thesis in Biology
Northern Populations and Ecosystems/Ecology and Sustainability
May, 2023

Supervisors:

Vera Helene Hausner, UiT -The Arctic University of Norway
André Frainer, NINA - Norwegian Institute for Nature Research
Máret J. Heatta, Sámi Allaskuvla

Cover photo: Smalfjordvannet in early November 2022. Photo taken by the author.

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Acknowledgements

I am grateful to everyone who supported me throughout this process. First, I would like to express my appreciation to my supervisors. Thank you, Vera, for your guidance and support, and for trusting and believing in me the whole way. Your passion and dedication to sustainability is truly inspiring, and I feel fortunate to have worked with someone so committed to make a positive impact on the world. Thank you, Máret, for your help and for accompanying me to Tana and supporting me during the interviews. André, thank you for ideas and support, and not least for your open-mindedness and curiosity in this field.

As a biology student, conducting a qualitative study has been a challenging experience. At one point I felt so inadequate that when I participated in a psychological research project that scanned my brain, I was surprised to see that I actually had a brain in there. I think I will put that photo on the wall, as a reminder.

However, I am glad I chose to expand my horizons and knowledge into the field of sustainability. I believe that working across disciplines, knowledge systems, and worldviews is one important step towards sustainability. Therefore, I want to express my special thanks to the participants of this study who generously shared their knowledge and experiences, making this research possible. I am humbled by your contributions, and I genuinely appreciate our interactions.

I am also grateful to the Arctic Sustainability Lab for being a supportive and welcoming community that provided a safe space to share ups and downs. I want to express my special gratitude to Xabi, who ALWAYS had an open door and an outstretched hand. Your support and help have been invaluable, and one day I want to become like you! Linn, thank you for your support, friendship, and for the many coffee breaks.

Thank you also to friends and family for your support. I would like to extend a special thanks to my sister, Ingrid, who through tough love helped me overcome my writer's block by forcing me to produce a page of text every day and checking in on me every day at 4 o'clock.

Finally, I want to thank Mathias. I apologize for all the disruptions and calls for help, but with a brain as massive as yours, it would be a waste not to exploit it.
No words can express my appreciation and love. I am forever grateful for everything you are.

Abstract

All over the world, local communities are actively engaging in the management and monitoring of natural resources. The underlying driver of most community-driven efforts goes beyond the direct utilization of natural resources to entail a deeper relation to the place or ecosystem they are managing. Relational values have been suggested as a potential driver of such initiatives, but empirical research remains limited. In this study, I explore the role of relational values underlying the volunteer engagement in a previously undocumented Community-Based Natural Resource Management project carried out by locals over ten years in a small subarctic lake. Through narrative analysis of semi-structured interviews, the study reveals that relational values served as both a driving force and the ultimate goal of the project. Especially the participants' personal connection to the lake, fostering relational values such as care, responsibility, and stewardship, seemed to play a major role in initiating and implementing the project, while the goal of improving fish quality indirectly served to promote and maintain relational values such as social cohesion, cultural identity, and knowledge-sharing. Furthermore, the lake has retained its cultural and social significance for the community in terms of relation values despite no longer being essential for subsistence. The lake is currently considered as having a good ecological status, and my study underscores the need to work with local communities to document the role of informal community-based monitoring and management practices for understanding the ecology of the lake. More generally, the study highlights the importance of recognizing the role of relational values in shaping people's behavior and actions towards nature, as this can be a crucial step towards fostering and achieving sustainability.

1 Introduction

Many indigenous and local communities have a strong connection with their land and waters fostering stewardship and sustainable management of their surrounding environments (Ostrom, 1990). There are multiple empirical examples from all over the world demonstrating how communities have taken action to monitor, manage, restore, or cultivate ecosystems (Berkes et al., 1989; McCay & Acheson, 1990; Ostrom, 1990). Such practices are far from new, with origins that can be traced back to prehistoric times, as early as the Paleolithic period of the Stone Age (Western et al., 1994). In Norway, where the first accounts of fish cultivation date to around 1100 AD (Halleraker, 2021), lakes have been appreciated and managed for supply of food and social gatherings long before the arrival of formal rules and laws.

Community-based Natural Resource Management (CBNRM) is an umbrella term for local initiatives where members in a local community with a personal stake in sustainable resource use, are empowered to control and share the responsibility for managing their local natural resources, such as lakes, forests or coastal waters (Brosius et al., 1998). Local management of natural resources has typically been more common in rural areas, where people are closely tied to their natural surroundings and utilize (and sometimes rely on) its resources directly through for example hunting and fishing (Svedäng et al., 2018). Because of their strong connection to nature, such communities are usually considered as more vulnerable to changes in the natural world (Díaz et al., 2019; Ford, 2012; Lal et al., 2011).

People – nature relationships go beyond the values derived from direct use of its resources and encompass relationships with nature that give rise to values such as cultural identity and heritage, a sense of place, and social cohesion. These values are commonly referred to as *relational values*: Pascual et al. (2017) defines relational values as the desirable, meaningful, and often reciprocal relationships - beyond means to an end - between humans and nature, and among humans (including across generations) through nature. Relational values therefore go beyond instrumental values (the benefits that nature provides to us) and intrinsic values (the inherent worth of nature) to include preferences, principles, and virtues concerning human-nature relationships (Chan et al., 2018). In the framework of "Nature's Contribution to People" (NCP), developed by lead experts in the IPBES global environmental assessment (Díaz et al., 2018), relational values and the contributions of nature to a good quality of life was emphasized as important for understanding the consequences of nature loss.

A key question for many scholars working with local management of lakes is what drives people all over the world to voluntarily engage and commit their time to such initiatives. Human actions and behaviors toward ecosystems are shaped by the multiple ways in which nature is important to individuals or social groups (Arias-Arévalo et al., 2018; Ives & Kendal, 2014; Jones et al., 2016; Pascual et al., 2017), and relational values are thus a key to understand why people care about their nearby ecosystems and are willing to invest money or their own time in protecting, restoring or sustainable managing ecosystems for shared interests (Jones et al., 2016; Mattijssen et al., 2020; Uehara et al., 2022; West et al., 2018). Several studies have shown that people with a strong connection to nature tend to act more environmentally friendly because of their increased motivation to protect and preserve nature (Frantz & Mayer, 2014; Kals et al., 1999). Thus, relational values can play a crucial role in people's engagement in local management efforts by fostering a stronger connection to nature and a greater willingness to invest in its preservation.

In many indigenous and local communities, relational values are inherently reciprocal. This means that engaging with nature through initiatives like CBNRM fosters a shared sense of responsibility for protecting and managing natural resources, as well as a sense of community among individuals and groups who share common concerns (Mould et al., 2020). In this way, values like care can promote other relational values, such as responsibility and social cohesion (Jax et al., 2018; West et al., 2018). Jax et al. (2018) argue that what could constitute a good life is tightly embedded in the reciprocal relationships between people and nature, in which caring for nature represents an important value on its own in terms of enhancing the quality of life. People’s willingness to participate in CBNRM initiatives can thus often be motivated by their desire to build or maintain relationships with people and places, rather than reaching ecological management objectives (Diver et al., 2019). As such, the value they place on these relationships is what motivates them to take responsibility for managing natural resources (Diver et al., 2019). Ultimately, this can foster a sense of shared responsibility for the well-being of the community and the environment (West et al., 2018).

Relational values have gained attention in the literature as they promote increased understanding of behaviors and actions toward management of the natural environment (Kleespies & Dierkes, 2020). Although there are indications that there are strong synergies between the effect of relational values on pro-environmental behavior (Chan et al., 2020; Riechers et al., 2021; Uehara et al., 2020), empirical studies remain scarce (Shin et al., 2022; Uehara et al., 2019). While there is a rich literature in CBNRM initiatives that touches upon

local culture and willingness to invest in sustainable management, there is a need to explore how relational values of nature motivate and nurture local initiatives and involvement in CBNRM projects.

Indigenous and Local Knowledge (ILK) plays an important role in CBNRM as it serves as the foundation for many community-based initiatives. Moreover, ILK is connected to both relational values and CBNRM, making it an analytical bridge between these concepts. ILK refers to "a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Díaz et al., 2015). Other terms used to refer to ILK include Indigenous, local, or traditional knowledge, as well as traditional ecological knowledge (Diaz et al., 2015). ILK can be a part of shaping people's perceptions and relationships with nature, or relational values (Cebrián-Piqueras et al., 2020). In CBNRM, people typically use ILK, along with other knowledge systems, to manage their resources (Roka, 2020). Therefore, ILK is an important component for understanding both the local people's values connected to nature and the knowledge base for CBNRM projects.

My study aims to investigate the connection between relational values and CBNRM by providing a theoretical overview of these two concepts and examine their interlinkages. I thereafter present a case study on the emergence of a voluntary initiative undertaken to cultivate the lake "Smalfjordvannet" in Northern Norway, where a group of local people have invested substantial amount of time to improve the quality of fish and the lake for the benefit of the whole community. Specifically, the study examines the various ways in which a nearby lake contributes to a good quality of life, with a particular emphasis on relational values of nature.

Whereas voluntary efforts to cultivate local lakes is a known practice in northern Norway (Aas et al., 2010), these CBNRM initiatives have not been well documented in the scientific literature. I therefore decided to allocate a substantial part of my study to describe the CBNRM project and how the locals organized themselves to manage the lake. I explored their reflections on the future viability of the CBNRM initiative as well as the role of such volunteer efforts for the management of lakes and freshwater fish. The thesis is based on semi-structured interviews with those who took the initiative to cultivate the lake, and their experiences serve as the foundation for the study. I originally planned to devote most of my

study to document local ecological knowledge about fish quality and lake ecosystems in an ecological context. However, already in the first interview, it was evident that the participants were more interested in talking about how they initiated and cultivated the lake and for what reasons, in a socio-ecological context. I therefore slightly shifted my focus in line with the stories and experiences that the participants were eager to share. I chose to focus on the relational values connected to the lake, as well as the CBNRM initiative.

To provide an overview of the case study, I will briefly summarize the story of the CBNRM project based on the interviews conducted for the thesis. According to the interviewees, the lake Smalfjordvannet has been managed and monitored by a community-based organization for about 10 years, between year 2000 and 2010. From the 1970s to the 1990s the locals experienced a gradual decline in fish quality in the lake until it eventually became overpopulated (meaning a lot of small, low-quality fish). To address this issue and restore the lake to its historically good fishing status, some enthusiasts from a local organization acquired a lease for managing the lake to implement a cultivation project. This project involved removing large amounts of small fish during the winter months. In addition, students from Tana High School (formerly Tana Agricultural School) were involved in fall monitoring activities of the lake. Thus, the project encompassed both monitoring and management aspects. This CBNRM project was self-initiated and self-organized by the local community.

1.1 Objectives

The aim of the thesis is to explore how relational values mobilize a local community to implement Community-based Natural Resource Management (CBNRM) in a sub-arctic freshwater lake. More specifically, the study seeks to gain a deeper understanding of why the community initiated such a project and how they self-organized to improve the quality of the fish and the lake. Additionally, the thesis explores the community´s perspectives on fish quality and fish management, seeking to uncover their perceptions and values related to these aspects. My research question is: what role do relational values of a fishing lake have in driving local engagement in management? I will address this through the following objectives:

1. Identify the values of a lake as perceived by the local community.
2. Provide insight into how and why a community engages in the management of a local lake.
3. Explore the participants' reflections about the future viability of CBNRM

1.2 Theoretical background and definition of concepts

Community-based natural resource management recognizes the important role that local people play in managing their common resources (Gruber, 2010). The term CBNRM has been defined in various ways, although all definitions share a central idea of promoting better resource management outcomes (i.e., long-term sustainability) through wide participation of local communities in decision-making activities and the incorporation of local knowledge systems in management processes (Armitage, 2005). At the core of the CBNRM approach is the devolution of power and authority to locals with a personal stake in sustainable use activities, allowing them to manage their resources through a bottom-up approach (Brosius et al., 1998). CBNRM is viewed as an approach that can address both ecological and socio-economic goals, by balancing exploitation and conservation of valued ecosystem components (Kellert et al., 2000). Successful CBNRM can potentially benefit 1) nature through effective environmental management, 2) local economy by generating revenue, and 3) empowerment of local communities by promoting good governance practices (Roka, 2020). Many CBNRM initiatives have been (and still are) informal and have existed within traditional societies that are located far away from research institutions, which has led to the scientific documentation of such projects being scarce (Berkes, 2017).

The level of public participation in CBNRM can vary significantly. Arnstein (1969) has proposed an eight-rung ladder for explaining the degree of citizen involvement in management, ranging from "manipulation" to "partnerships", "delegated power," and ultimately "citizen control". Working at the higher rungs of the ladder (e.g., citizen control) has shown most effective for successful CBNRM (Gruber, 2010). In addition to the higher empowerment of communities, the key factor for the success of CBNRM projects is that the project is initiated by the community itself. Therefore, understanding the motivations behind people's initiation and participation in CBNRM projects is (Measham & Lumbasi, 2013). These motivations can be based on how people perceive nature and the benefits they receive from their relationship with nature.

In the context of valuing nature, *values* refer to the various ways in which nature is important to individuals or social groups (Arias-Arévalo et al., 2017). According to Chan et al. (2016), relational values differ from instrumental and intrinsic values through their focus on the preferences, principles, and virtues associated with meaningful relationships people have with nature, rather than viewing nature as a means to an end (i.e., instrumental values) or valuing

nature for its own sake (i.e., intrinsic values). Additionally, relational values reflect relationships with nature that have significant personal or collective meaning and cannot be replaced or substituted, unlike instrumental values that may be substitutable (Chan et al., 2018). Such relationships have significant personal or collective meaning to people, and therefore cannot be replaced from the valuer's perspective. Although relational values in these terms are different from instrumental and intrinsic values, Pascual et al. (2017) describe a gradient that includes aspects of instrumental, relational, and intrinsic values, without strictly separating them. For example, Arias-Arévalo et al. (2017) found that instrumental, intrinsic and relational values often coexisted in people's narratives about the importance of ecosystems. Thus, while relational values are considered a broad category extending beyond intrinsic and instrumental values (Chan et al., 2016; Pascual et al., 2017), it is important to recognize that the relationships between these values can be complex and intertwined.

Although the term *relational values* are relatively new to the environmental science literature, Skubel et al. (2019) and Schulz and Martin-Ortega (2018) argue that similar concepts have been assessed previously in various disciplines, but with different terminologies. For example, environmental values, emotional attachments, morals, social and community identity, and stewardship and conservation ethics have all been analyzed through quantitative and qualitative methods. Similar, but not the same; relational values refer to values that contribute to desirable relationships, both among people and between people and nature (Pascual et al., 2022; Pascual et al., 2017). This means that a natural object does not *contain* relational values per se, these values rather derive from a relationship or responsibility to them (Chan et al., 2016).

In the past, the scientific literature has focused on instrumental valuation of ecosystems, with a dominance of monetary valuation methods over other approaches (Arias-Arévalo et al., 2017). However, there has been a growing recognition of the pluralistic values of nature beyond instrumental values. This is especially evident in the frameworks of "socio-ecological systems" and "Nature´s Contribution to People" (Arias-Arévalo et al., 2017; Chan et al., 2016; Jones et al., 2016; Pascual et al., 2017). The importance of recognizing the multiple values is also recognized by global initiatives such as the IPBES and the United Nations Decade for Ocean Science for Sustainable Development (Diaz et al., 2018; IPBES, 2022; Intergovernmental Oceanographic Commission, 2021). Recent studies have revealed that people with a holistic worldview often hold multiple values for the same ecosystem (Arias-Arévalo et al., 2017). This contrasts with the traditional division between intrinsic and

instrumental values, which are often cited as the main arguments for ecosystem conservation (Arias-Arévalo et al., 2017). Therefore, recognizing the plural values of nature, including the more intangible ones like relational values (Arias-Arévalo et al., 2017), might be a key to understand why people engage in local management, which in turn can lead to more sustainable management of natural resources.

There is a growing interest in how relational values, such as care, drive stewardship actions (West et al., 2020), as they have been shown to be linked to pro-environmental behavior and attitudes that promote the sustainable use of ecosystems (Abson et al., 2019; Jones et al., 2016; Kleespies & Dierkes, 2020; van den Born et al., 2018). Environmental stewardship refers to actions taken by individuals, groups, or networks of actors motivated to protect, care for, or responsibly utilize the environment to achieve environmental and/or social outcomes in various social-ecological contexts (Bennett et al., 2018). These stewardship actions can be diverse and range from local to global scales, including measures such as limiting the harvest from nature, restoring ecosystems, and creating protected areas (Bennett et al., 2018). A study by Raymond and Brown (2011) found that the extent of stakeholder´s connections with nature was a crucial predictor of their environmental concerns, such as being aware of the consequences of environmental issues. These concerns then influenced their personal norms regarding conservation and promoted pro-environmental behavior (Raymond & Brown, 2011). Their study highlights the significant role of a strong connection with nature in fostering environmental stewardship, potentially promoting transformative change towards sustainability.

2 Methods

I used a case study approach to document the community-based monitoring and management program, and I used interviews with four of the remaining participants in the cultivation project as the key source for documentation. A case study approach is a research inquiry that consists of empirical investigation into a specific phenomenon in a real-world context, such as an event, process, or a program, that is typically bound to a certain time period and activity (e.g., a CBNRM) (Ragin, 1994). The case study approach includes a description of the specific case (e.g., a CBRM-project) and an explanatory part where causal factors emerge through comprehensive empirical investigations (e.g., reasons for embarking in the CBNRM program). The aim of the case study methodology is to gain deep insights into the phenomenon (Yin, 2003), thereby emphasizing internal validity and consistency of the

storyline of the case rather than generalizability to a broader population. The main source for constructing the storyline of the CBNRM project described was semi-structured interviews with four of the remaining participants in the community-based monitoring and management. I emphasized active listening and iterative learning in the interview process as a key to constructing a narrative about the Smalfjordvannet and to gain a comprehensive and deep understanding about the local´s relations to the lake.

2.1.1 The smalfjordvannet CBNRM case

Smalfjordvannet is a lake located in Tana Municipality (Deatnu in Northern Sami language), in Troms and Finnmark county in Northern Norway (Figure 1 and 2). It is located outside of the municipal center of Tana Bru close to the fjord named Smalfjord. It is a clear and fairly shallow lake, located 55 meters above sea level, covering 2.8 square kilometers with a maximum depth of 30 meters (Schartau et al., 2020). The lake has mixed geology and is surrounded by sparse birch forest (Schartau et al., 2020). There are three fish species in Smalfjordvannet: three-spined stickleback (*Gasterosteus aculeatus*), Brown trout (*Salmo trutta*) and Arctic charr (*Salvelinus alpinus*).

Figure 1. *Smalfjordvannet in early November 2022.*

***Figure 2**. Map of Smalfjordvannet, located in Tana Municipality in Finnmark, Northern Norway*

The population number in Tana municipality is 2821 (by 2022) with a large Sámi population (Askheim, 2022). Historically, the most important activities in the municipality have been sea fishing, salmon fishing, agriculture, and reindeer herding, many of which remain significant today (Askheim, 2022).

A study of Rikstad & Gjessing (1983) found that almost 22% of the population paid fishing fees for fishing in freshwater in Finnmark as compared to only 6.5% nationwide. This confirms that freshwater fishing was practiced to a much greater extent by the people of Finnmark than by the population at large. The highest proportion of fishing fees was bought in Tana and Karasjok municipalities and was based on the large meandering Tana salmon river that meanders across the Finnish-Norwegian border (Rikstad & Gjessing, 1983).

Unfortunately, there are no more recent fishing statistics available, as residents of Finnmark no longer need to purchase a fishing license. However, overall participation in fishing in Norway has remained stable from the 1970s to the 2000s, although the proportion of young people who are fishing has declined (Odden, 2008). Also, according to Statistisk Sentralbyrå

(SSB, 2021), there is still a higher proportion of people fishing in freshwaters in Finnmark than the country average.

Since around the 1950´s hunting and fishing in Finnmark has been motivated by numerous factors. These include recreation, food gathering, tradition and economy (I.e., harvesting for sale) (See Figure 3)(Aas et al., 2010). However, nine out of ten county residents characterize their fishing primarily as sport or recreational fishing, although 1/3 also characterized their fishing as subsistence fishing. Only 3% of the residents of Finnmark used the term commercial fishing to describe their fishing (Aas et al., 2010).

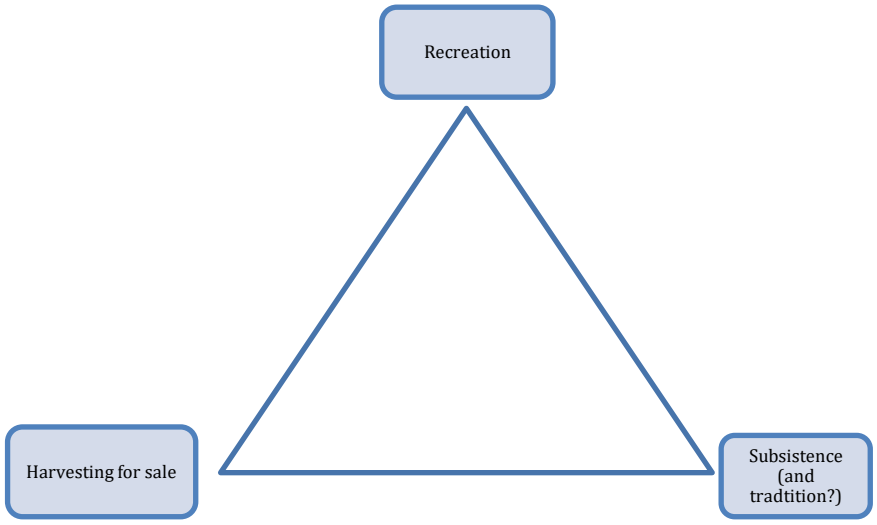

Figure 3. *Illustration of the utilization of outlying fields in Finnmark county, which can be broadly categorized into three main types – for recreation, for sale and for subsistence. It's important to note that these categories are not mutually exclusive.*

The Ecosystem Monitoring in Freshwater program (Økosystemovervåking I ferskvann, ØKOFERSK) has since 2009 regularly monitored lakes in Northern Norway to assess their ecological state and to verify the national classification system for quality parameters in accordance with the EU Water Framework Directive (Muladal et al., 2022). In 2017, 2019 and 2021, Smalfjordvannet was part of the monitoring program and assessed for various quality parameters, including physicochemical parameters, phytoplankton, aquatic plants, zooplankton, benthic fauna, and fish (Muladal et al., 2022). The ecological status assessment is based on all quality elements, and in 2021 the results indicated *very* good ecological status (Muladal et al., 2022) compared to *good* ecological status in 2019 (Schartau et al., 2020) and *very good* status in 2017 (Schartau et al., 2018).

2.2 Qualitative research

Qualitative research methods offer ways to provide rich, detailed descriptions of complex phenomena and capturing unique or unexpected events (Sofaer, 1999). These methods emphasize a comprehensive approach to understanding phenomena, in contrast to the reductionist approach often taken in quantitative research (Silverman, 2020). The primary aim of qualitative research is to uncover how individuals make sense of their experiences and the underlying assumptions that inform their behavior (Njie & Asimiran, 2014). Researchers use questioning, interaction, and observation to reveal underlying meanings and relationships between situations and settings (Njie & Asimiran, 2014), providing deeper insights that cannot be captured by numerical data alone. Sample size is less important in qualitative research than in quantitative research, as the depth and richness of the research can be covered by a small sample size.

In this thesis, I chose a qualitative research method for several reasons. First, because it allowed for a focus on words and content rather than quantification. Second, the small sample size available for the study made the qualitative method more suitable for exploring the perceptions, experiences, and attitudes of the informants in-depth. Third, this method allowed for a more comprehensive investigation of their understanding and thoughts on the research topic, providing valuable insights that would have been challenging to obtain using quantitative methods. Moreover, little was known about the case beforehand, making the qualitative approach more appropriate because it allowed for flexibility and the ability to adapt to changing research circumstances, which is crucial when exploring a new case. Overall, the use of a qualitative method in this thesis was essential to ensure a rich and detailed exploration of the research topic, particularly given the few participants that were actively involved in the CBNRM project.

2.3 Interviews

2.3.1 Semi- structured Interview

I used semi-structured interviews as a method to collect data. This is a widely used data collection method in qualitative research (Kallio et al., 2016) and involves preparing an interview guide that consists of a set of predetermined questions or topics, but also allowing for flexibility to adjust the questions or explore new areas that arise during the interview. It is used to gain a rich understanding of the study phenomenon and allows for more detailed and nuanced responses from the interviewee than a structured interview where only predetermined

questions are asked (Polit & Beck, 2010). This method is known for its ability to facilitate reciprocity between the interviewer and participant (Galletta, 2013) and allows for follow-up questions to be improvised based on the participant's responses (Brosius et al., 1998; Polit & Beck, 2010; Rubin & Rubin, 2011). This flexibility and adaptability showed highly important in my study, where little was known beforehand.

2.3.2 Interview guide

An interview guide serves to direct the conversation while allowing for additional exploration beyond the predetermined questions (Kallio et al., 2016). It covers the main topics of the study (Taylor, 2005) and offers a structured focus for the discussion during the interviews, while allowing for further scrutinization of the participant's answers to gain a deeper understanding of their experiences, attitudes, and beliefs (Mason et al., 2004; Rubin & Rubin, 2011). By providing guidance on what to talk about, the interview guide can collect similar types of information from each participant (Gill et al., 2008; Holloway & Wheeler, 2002).

I created an interview guide consisting of open-ended questions before conducting the interviews (Appendix 2). The guide consisted of five main parts, with the first part being background questions about the interviewees' relationship with the lake. The second part focused on their classification of fish and whether they had different names for distinct types based on size, quality, and other parameters. The third part was about their perception of fish quality and ecological connections. The fourth part was dedicated to their use of fish, while the fifth and final part explored changes they had observed.

My approach was mainly inductive, and I did not have many preconceived notions going into the interviews. Based on participant responses, I adapted the interview questions by adding, removing, and modifying them as necessary. Thus, the interview guide underwent some changes from its initial version.

2.3.3 Conduct of interviews

The interviews were conducted over three days from 29.10.22 to 3.11.22. My co-supervisor accompanied me to conduct Sami interviews, in case any of the participants preferred to speak in Sami. We gave them the choice of speaking either Norwegian or Sami, so that they could speak in the language they were most comfortable with and provide more nuanced answers. However, all participants preferred to speak Norwegian, which allowed me to lead the interviews. My co-supervisor was still present in the room and occasionally asked a few

questions. The participants were given the choice of where they wanted to be interviewed, and three of them chose to have the interviews conducted at their homes, while one participant chose to be interviewed at his workplace office. Each interview lasted approximately one hour, and we recorded them with a recorder placed on the table between us.

2.4 Recruitment

The goal in qualitative research is to find participants who can provide rich and varied insights into the research (Dörnyei 2007). Therefore, I established some criteria for participation in the study to ensure that the participants had in depth- knowledge of Smalfjordvannet and had utilized it in some manner. However, given the limited number of individuals living in the area, I could not have too narrow criteria.

Initially, I included Sami individuals as a criterion, but due to the lack of participants, I broadened the criteria to include anyone with knowledge and experience with the lake. To recruit participants, I used snowball sampling, whereby individuals familiar with the community or already recruited participants referred others (Parker et al., 2019). I began by contacting pre-existing contacts in the area and asking for referrals. Then, I contacted potential participants by phone and followed up with them after a few weeks to schedule an interview. To my knowledge, I have interviewed the individuals who held the key roles in the CBNRM project and possessed significant experiences and knowledge about Smalfjordvannet, who are still living (it should be noted that the project leader has passed away). Therefore, despite having a sample size of only four participants, the sample was saturated.

2.4.1 Participant Characteristics

All four participants were males in their late adulthood or old age and had a connection to Smalfjordvannet in some way. Most of them had a childhood relationship with the lake, frequently using it for fishing, except for one participant who lived further away and used other lakes during his childhood. Some adults continued to fish there, while others were involved with the CBNRM project. They had all had trout and Arctic charr from lakes as a part of their diet during their childhood, with many of them from Smalfjordvannet. Their interest in fishing for personal recreation and use varied, depending on their age and other factors. Nevertheless, all of them had participated in the management project and were enthusiastic about sharing their experiences. Some of the participants had Sami background

while others had Norwegian background. As it is a small community where people are easily identifiable, I will not provide further details about their personal characteristics.

2.5 Audio Recordings and Transcription

Prior to the interviews the participants gave their consent for audio recording of the interview. The interviews were carried out in person, with the recorder placed on the table between the researchers and the participant. After the interviews were conducted, I listened to the recordings and transcribed them. Transcription refers to the process of converting spoken words, in this case from audiotape, into written text (Eppich et al., 2019; Halcomb & Davidson, 2006). The methods used for transcription was mainly *intelligent verbatim transcription,* which involved excluding certain discourse fillers such as "uhm", "mhm", pauses and background noises, while still ensuring that the intended meaning of the participants was preserved (Eppich et al., 2019). However, some filler words and non-verbal elements were included when relevant. This approach was chosen to maintain the responses as accurate and true to the participants' voice and intended meaning, while ensuring the transcription in a reading friendly manner.

Once the transcription process was complete, I uploaded the transcripts to NVivo, a software program commonly used for qualitative data analysis.

2.6 Coding and Analyses

I chose to apply principles from narrative analysis to analyze the data (Riessman, 2008). According to Johansson (2005), it is important to determine whether to focus on the form or content of the story or narrative. For my analysis, I focused on the content of the stories, aiming to capture the holistic picture of the participants' perceptions and knowledge about Smalfjordvannet. My aim was to uncover their collective story, emphasizing their shared voice, while also considering their differences.

Before beginning the coding process, I thoroughly read each transcript to gain a full understanding of the data and identify broad patterns. I employed inductive coding techniques, with some broader topic codes predetermined. Throughout the process, I remained open-minded to ensure that I uncovered the core of their story. I coded each interview in NVivo by marking sections of text in a cyclic process. I began with broad categories and gradually progressed to narrower ones, followed by revising and relocating codes as necessary. My focus was on capturing the participants' intended meaning accurately, while

also creating meaningful categorizations and groupings of the data to identify themes or patterns in their stories. Given that I only had four interview samples, I avoided creating codes that were too narrow, as some codes would only have one instance. This allowed for a thorough analysis of the data and provided a more in-depth understanding of the participants' perspectives and experiences. In the end, several main categories and subcategories emerged, providing the foundation for their narrative (Table 1).

***Table 1**. Main-categories and sub-categories after coding*

Main Category	Subcategory
1. Background and History	**1.1.** Smalfjordvannet in the past
2. The importance of the lake: the values connected to Smalfjordvannet	**2.1.** Importance of fish quality **2.2.** Relational values 2.2.1. Social dimension 2.2.2. Learning arena
3. Fish Quality	**3.1.** What is Fish quality **3.2.** What affects fish quality
4. CBNRM: the local management project	**4.1.** Background and plan **4.2.** Objectives and motivation of the project **4.3.** Project Methods **4.4.** Catches (progress) **4.5.** Adaptations **4.6.** Reasons for ending the project **4.7.** Results of the project **4.8.** Smalfjordvannet today
5. Perceptions about the future viability of CBNRM	**5.1.** Times are Changing **5.2.** From Subsistence to Recreation

2.7 Validity and reliability

Whereas quantitative researchers rely on statistical methods to establish the validity and reliability of their research findings, qualitative researchers focus on designing and implementing methodological strategies that ensure the "trustworthiness" of their results (Noble & Smith, 2015). Therefore, validity and reliability must be assessed thoroughly while conducting qualitative research.

Validity refers to the extent to which a study accurately represents reality (Gibbs, 2018). To ensure the validity of my study, I made a conscious effort to avoid asking leading questions that could potentially bias the participant's responses during the interviews, and I always used open-ended questions. Another way to strengthen the validity of qualitative research is by engaging a second researcher in the data analysis process (Sandelowski, 1993). Although I didn't have a second researcher analyze the results, I had a second researcher present during the interviews who followed me through the entire process. This person can therefore to some extent strengthen the validity of the research by confirming that, in her opinion, the analysis and discussion of the data seems true to the participants' intended meaning and thus accurately represents reality.

Reliability, on the other hand, concerns the consistency and dependability of the results based on the data collected (Zohrabi, 2013). To ensure reliability, I aimed to ask clear and easily understandable questions, using a simple language free of scientific jargon. I practiced the interview guide with friends and family to identify any potential areas of confusion before conducting the interviews. In cases where the participants found the questions unclear, I rephrased or asked them in another way.

By prioritizing both validity and reliability, it is more likely that the interviews were trustworthy and accurate

2.8 Ethical Considerations

Qualitative research relies on voluntary participation, which can lead to ethical concerns. Compared to quantitative research, ethical issues are typically more prevalent in qualitative research due to the greater level of intrusion into the lives of informants (Dörnyei, 2007). Therefore, researchers must prioritize participants' well-being throughout the research process and be mindful of the potential impact on them. In this study, I took several measures to ensure ethical research practices before, during, and after the interviews.

Prior to the interviews, I visited the study area to become familiar with the environment and engage with locals. Although I would have liked to stay longer to better understand the culture, time and budget constraints for this thesis made it impossible.

During the interviews, I created a conversational, informal environment to put participants at ease. I was sensitive to their responses, adapting questions to allow them to express their thoughts freely by applying the active listening approach. After the interviews, I analyzed the

data carefully to remain true to participants' intended meaning. I used a close-to-verbatim transcription approach and categorized relatively large pieces of text into codes to preserve the holistic picture rather than splitting it into small pieces. In this way I also respected their local knowledge and learned from and explored it on its own terms rather than seeking to validate it from a Western science perspective. In addition to demonstrating respect for their culture, this approach helped me to maintain the authenticity of the participants' perspectives.

As a researcher, it is important to acknowledge the significance of participants' contributions and their vital role in the study. To give something back to the community, I intend to provide them with a detailed summary of the project in Norwegian. This summary will be personalized, comprehensive, and tailored to their interests. In addition, I will once again express my gratitude to the participants for their valuable time and effort and shared with them how their insights, perspectives and knowledge contributed to the study.

By taking these steps, I demonstrated a commitment to ethical research practices, respecting the privacy and knowledge of participants while conducting a valuable study.

2.8.1 Privacy policy

To protect the participants' privacy, I implemented a set of procedures throughout the project. I applied to Norwegian Centre for Research Data (NSD) for the project before conducting any interviews to ensure ethical and correct interaction with the participants. Before the interviews, I informed the participants of the project's details and privacy policy, both orally on the phone and before the interview through an information letter. Before we started the interview, they also had to sign consent to attend to the project. To maintain anonymity, I assigned ID numbers to the audio recordings in a dictaphone app called "Nettskjema-diktafon," developed by UiO, to ensure safe storage of sensitive information. To protect participants' privacy, I did not label quotations or connect them to individuals in the thesis, instead focusing on creating a common story of their voices. The transcripts are stored securely in Teams through my UiT account, and the audio recordings will be deleted after the end of the project. Through these measures, I was able to ensure that the participants' privacy was safeguarded throughout the project.

3 Results

3.1 Background and History

3.1.1 Smalfjordvannet in the past

According to the interviewees, Smalfjordvannet was a great lake in the past. By "great lake" they primarily meant that the lake was good for fishing, although they also emphasized that the size and the location of the lake close to the road made it accessible to the local people.

One participant talked about the great fish his father caught, when he was a little boy and a large part of their diet consisted of fish from Smalfjordvannet: *"This is where we have gotten our food from, and, I remember before, when we were kids, when my dad fished here and … such great fishes. With only 3-4 fish, we had dinner for a whole week"*. This suggests that the lake had an abundant supply of good quality fish. He also said that the previous generations had told him that it was a great lake, even before his lifetime.

The two participants that grew up close to Smalfjordvannet highlighted the importance of fish from the lake in their diet. One of the participants shared a detailed account of how people in the area used the lake in the past, including fishing activities throughout the year and conservation techniques employed to ensure a year-round food supply. According to the him:

> *In the earlier days many people lived here. And at that time this lake was important. Important for subsistence food. Because it was such a big lake with a lot of fish, it was very important for the people here. So, all the people living here- people lived permanently here you know (…), now it is only a few left. But they all had boats. Boathouse and boat. And they fished with nets, I remember. (…) and when this nylon net came, they fished all summer. But otherwise, it was during the fall, when it was dark, they had hemp net you know, they didn´t fish in the light, in daylight. But the whole fall they were fishing, and salting. That was winter food. Fishing for winter food. I don´t know if any of it was sold, but they fished for personal use, in large quantities.*

Today, there are few, or none, permanent residents in the area, but during the 1970s, many cabins were built, and the region is now primarily utilized for recreational purposes. Several participants suggested that the decline in fish quality that occurred over the following decades

was partly due to the influx of "cabin people," a term used to refer to cabin owners. However, they also emphasized that they held no ill will towards them.

According to the participants it was a gradual decline in the size and quality of the fish from about the 70´s to the 90´s. Eventually small, stunted fish became numerous, and the lake turned towards what they called an overpopulated lake. One of them described what happened during those years like this:

> *Yes, the quality was good, but then a period came… where it was built a lot of cabins along the lake, and people started fishing a lot with nets, large mesh sized nets, and then they took out the bigger - only the big fish. In the end the fish was really small. Like this [showing about 12-15 cm with his hands] (…). Only like this length, and not even that. I don´t know how much that is but maybe 50-60 grams only. (…). Tiny little fish.*

One of the consequences of the overpopulation was that many people stopped fishing there and using the lake, like one of them said:

> *(...) Cause I remember it. Well, it must have been in the 60´s or 70´s. Then we also tried, me and my brother, and we had nets, and in late autumn when the lake froze, we got really nice fish in Smalfjordvannet, but then they only got smaller and smaller. And then we stopped fishing."*

3.2 The importance of the lake: the values Connected to Smalfjordvannet

Finnmark has a lot of good opportunities to fish, both for sport fishing and subsistence fishing. The participants said themselves that they have so many good fishing lakes, so they don´t go for the "bad" ones. They meant that if one lake turned into a poor fishing lake, they could choose a better one. Nevertheless, Smalfjordvannet seemed to be important to them: in our conversations it was clear that the reason for choosing the lake was the accessibility of the lake and the importance of this lake as a social arena for the whole community to fish.

Historically, Smalfjordvannet had been important to the community for both subsistence and recreational fishing, as a social meeting place and a learning arena where the locals shared knowledge, especially from older to younger generations.

The social dimension is described by one of the paraticipants here:

> *We were fishing as long as it was possible to walk on the ice. And it was a lot of people there, old people had kicksleds and pushed them over the ice, sitting on the kicksled fishing. (…). On nice and sunny days in the weekend it was - in the weekdays as well - I remember it so well, old people, really old people that actually were sitting on the kicksled fishing. It was fun, because you were talking, right. Everyone loved to talk.*

In addition to people meeting on Smalfjordvannet to fish and talk to each other, the lake was also a place for transfer of knowledge where the elders and more experienced people taught the kids about fishing as explained here:

> *(…) and we asked for advice for fishing spots and fishing tools and… And they, they thought it was fun to share it with us. (…). So, it has been a very useful resource for the village. That you have a great lake like that so close by, located along the road. (…). So now a days it is, the neighbors use it both for food and social activity, now it is mostly social, and a little bit of food, such pan fish [i.e. fish that fits into a frying pan].*

These words also highlighted the significance of the accessibility of the lake which made it possible that both the oldest and the youngest could gather there and share knowledge and joy. The Lions Club Tana- Nesseby, a humanitarian service organization, had also built an outhouse, a floating bridge, and facilities to use wheelchairs some years ago, making the lake accessible to people with special needs as well.

3.3 Fish quality

3.3.1 How is fish quality perceived?

When I asked them about fish quality (in terms of quality of a single fish), they tended to answer in a more holistic ecosystem perspective, thinking of the quality of the whole lake and the whole fish stock rather than only the fish itself. However, when asking them more specifically some key features were frequently mentioned, illustrated in Table 2. These quality measures applied for both the Arctic Charr and the Brown Trout.

Table 2. *The participant´s perception of features characterizing good versus poor quality fish.*

Quality measures	Good quality	Poor quality
Meat color	Red color	White color
Size	From 300- 500 grams is ideal. They wanted "pan fish" (fits in the frying pan). One also mentioned that it should not be too big.	Less than 300 grams
		Stunted fish in overpopulated lakes
Body shape	It should be round and fat in the shape, like a "gildepølse"(a big sausage)	"Wrench-looking fish" ("skiftenøkkelfisk") = Large head, long and thin body. Thin in the belly and not fleshy. As one of them said, "these fish are living on a minimum of existence."
	Head/body ratio: small head and big body	
External appearance	Shiny and nice in the skin	Dull, light skin
Physical fitness	Fights hard on the hook, lot of energy	No fight in the fish (gives up easily). Tired and in bad shape.
Parasites	No parasites in the meat. Ok if they are only in the entrails	Parasites in the flesh
Other	Firm texture in meat Tastes good Sharp and nice fins Full stomach	Old fish = black around the head, black in the mouth, thick fins that look damaged.

It appeared that red meat color was highly prioritized as a measure of quality. One of the participants talked about a lake where the fish quality was good overall, except for the fact that the meat had a white color, which made it less visually appealing. As a result, he never went there to fish:

We have a lake further out in the fjord here where the access to nutrients is very good, but it doesn´t have the crustacean there. The fish is fat and nice and shiny, but it is white in the meat, so we leave it.

At the same time, many of them admitted that the taste probably was the same even if the fish meat was white, but as one of them said the visual part was important for how appetizing it was to them:

(...) this poor Arctic Charr which eats on a different diet, they get those parasites, don´t eat crustaceans, don´t get the red color in the meat. Well, this doesn´t mean that much, but we are visual when we catch that fish you know, and we want the red and nice fish; if you closed your eyes and had a taste I don´t think we would have felt the difference.

One participant said that they were picky about the meat color when he was a kid as well, and that they quickly learned where the fish in "prime quality" were.

However, it was the sum of the quality measures that it was important and prioritizing them from most to least important is probably not appropriate because, as mentioned, they tended towards thinking more holistically about the fish quality connected to the lake.

3.3.2 What affects fish quality?

The participants saw fish quality closely related to ecosystem balance. They also made it clear that humans can affect this balance by the way we are fishing. The overpopulation of Smalfjordvannet represented an imbalance in the ecosystem caused by humans, one of them explained:

(...) modern people don´t think management in general. You are putting out nets, 10 nets, and you get a lot - you get 100 fish. "Great!". We think… (…) When everyone does this very often, we are kind of fishing in a skewed way. In the end, there´s only small fish left. And then something happens that nature itself is to blame. To save itself it is starting to reproduce … it reaches sexual maturity at a young age, that small fish, and it´s starting to spawn as small fish. It´s a part of nature´s game to survive. And then it spawns, that small fish (…) and you select on those small generations. You are destroying the traits of the fish (…). And in the end, there´s only small fish! Growing slowly… Cause I remember these small fishes – they were one year old!

Here, he explained the concept of overpopulation of a lake where overfishing of big fish can lead to an imbalance in the ecosystem and an overpopulation of small sexual mature fish that spawn and age as small fish.

Another one explains that you need all sizes of fish in a healthy lake, and that the big ones regulates the population by eating the small ones:

> *(…)[overpopulated lakes] becomes the result when you are creating imbalance there, the way I see it. We are taking up the big fish and create imbalance. The big ones that should have eaten some of the little ones. Because in a normal lake, you have all sizes.*

They all agreed that fishing out too much of the big fish, mostly the big trout, led to an imbalance in the ecosystem causing an overpopulation of the small Arctic Charrs. All of them mentioned the big trout in particular as an important regulator of the fish population, and they said it was a healthy sign when the trout population grew bigger.

> *The trout is indeed a predatory fish, a lot more than the charr, so it takes out a lot of the charr population, the small charrs, so the ones surviving gets big. So, it gets fewer fish, but bigger fish. Both of the trout and the charr.*

Further he described the trout as *"a key species in keeping a good fish stock"*.

They all believed that too high fishing pressure on the big fish was the main reason for the overpopulation of Smalfjordvannet. The community organization therefore aimed to "replace" the trout's role in the ecosystem by fishing out the small arctic charr that the big trouts usually eat and keep at a sufficient level.

Even though they thought overfishing of large fish was the problem in this case, they also mentioned some other aspects that might impact fish quality in a lake. Clearly, diet was very important, and especially having crustaceans like amphipods in their diet, which makes sense because they wanted the fish to be fat and red colored in the meat. But they also mentioned insects and snails as important components in the diet to achieve high quality.

Some of them thought that transporting crustaceans from the shore and release them in lakes could sound like a good idea, even if they hadn´t considered doing it in Smalfjordvannet. According to two of them, it was common in the old days to collect crustaceans from the shore in straw sacks and carry them to freshwater lakes to increase the access and quality of

nutrients in the lake. And as already highlighted – red meat color is important to them, and has been important for the generations before them, and therefore they favor a crustacean-rich diet.

Parasites also affected the quality of the fish, but two of them mentioned that as long as it was in the entrails and not in the meat, they did not really care about it. One of the factors mentioned to affect the occurrence of parasites were "proximity to the sea" because seabirds transfer parasites (a tapeworm transmitted by seagulls) to lakes. Another factor mentioned was that *" (…) people are fishing and are a bit sloppy, then we throw things on the ice, and it´s a simple meal for a seagull"*. This spilling could lead to more seabirds and thereby more parasites. The same person also added that in a lake with bad conditions in general, the fish gets more vulnerable to parasites. At the same time, he also made clear that parasites followed cycles, and therefore it was natural with some fluctuations in parasite abundance. Because parasites were a natural part of the ecosystem it was not a goal to get rid of all parasites, but rather try to limit the occurrence.

Several of the participants had noticed that the climate has gotten warmer in the last years, which had led to a shorter ice season among others. However, they were not so sure whether it affected the quality of the fish directly. One of them mentioned that the Arctic Charr might be negatively affected by warmer temperatures, because they thrive in cold water. But all in all, climate change was not what concerned them the most regarding fish quality in freshwater lakes.

Other things they mentioned as possible factors impacting fish quality were spawning conditions, depth of water (light availability) and size of the lake. One of them also expressed his concern about the vulnerability of freshwater lakes, and how humans can have a large impact: *"It´s bad to say, but we´re the ones messing it up. Cause either we are releasing fish, or we fish too much, or we litter or spill things or…. It´s easy to destroy a small lake"*.

3.4 CBNRM: The local management project

3.4.1 Background and plan

The plan with the local management project was to remove large amounts of small Arctic Charr to improve the fish quality in the lake. When they told me about the project it was based solely on their recollection from memory, so they were not entirely certain about the

details such as numbers and dates. Therefore, this may not be an entirely accurate depiction of the events, but they all agreed upon the overall narrative and main story line of the project.

The project was initiated by Algasvarre Bygdelag, the local organization for the village (which is formed by the inhabitants in the village) in collaboration with Tana Agricultural School, today called Tana High School. According to one of the participants, it was a few enthusiastic souls that were the driving forces of the project and got it started.

Norwegian natural management organizations collaborated in the beginning of the project by assisting with advice, but most of the project was decided and implemented by the community. The local organization acquired a lease on the lake from the state-owned Land and Forest Company during the project. This meant that others were only allowed to fish with nets in the lake if they asked the local organization for permission.

The project was run on a voluntary basis. The local organization did not get any financial support except from the first year when they got some support from the Norwegian Nature Inspectorate, based on the assumption that Smalfjordvannet was connected to a salmon river. This support was removed the subsequent year due to the lack of connection of Smalfjordvannet to salmon populations.

The local organization oversaw the removal of fish from the lake, whereas the school was responsible for monitoring the lake by conducting a fish survey every fall. The school joined the project because one of the natural science teachers was interested in cultivation and saw it as an opportunity to involve more people in the project and teach students about practical management and monitoring techniques. Additionally, the proximity of the lake to the school made it convenient for them to participate.

Everyone emphasized that they put a lot of effort into the project, and that it was time consuming, and said things like *"We were tired of it many times".* One of the participants also said: *"In the beginning we were very skeptical, and it was a lot of work. But then, we got interested – something happened here!".* So, despite the hard work, they all expressed a strong interest and excitement for the project and seemed to remember it as a good time.

3.4.2 Objectives and motivation of the project

The goal of the local management was to get a fishing lake with good fish quality: *"We wanted a good lake again, that was det thing (…). It was just this genuine interest in trying to*

improve the lake". It seemed like all the participants shared this "genuine interest" – they were interested in management and thought it was an exciting project to do together.

When I asked them how important fish quality was to them, they said it was crucial. They would not use or taste a fish they assessed as a bad quality fish, and they would choose another lake to fish in if a lake had a lot of bad quality fish. Some mentioned that good fishing lakes are one of the main reasons why they enjoy living in this area: *"(…) that is one of the qualities of living here, that you have a nice fishing lake close by, which you can use for recreation, teach the kids, grandchildren, and things like that. And not least, use it for teaching purposes".* This highlights the various aspects of how having good fish quality in the lake is important for them.

3.4.3 Project Methods

The removal of fishing took place in winter with fish traps. According to them fishing was more effective in winter because it was too cumbersome and too time-consuming working with nets in the summer. As such, they fished from March until the ice no longer allowed for safe travel - typically in April. During this time, they emptied the traps every second day and worked on shifts.

They tested many sorts of bait in the beginning of the project and concluded that cod roe was the most effective. The bait was bought as frozen blocks and put into the traps

> *After all, there is knowledge that must be gained through the process. We learned how to do it, for example with the cod roe and so on. It attracts the fish, and we had fish that were so big that they couldn´t go through it and got stuck. They wanted to get in to eat the cod roe.*

To drill holes in the ice they used large ice drills, which according to one of them was 60 cm in diameter. This was transported on a snow scooter on the ice.

It seemed like they fished in many places, but primarily in the south end of the lake where they had figured that the spawning area and the most nutrient-rich area was. They found the optimal trap design and location by trial and error:

> *We had spread out a little bit, and we saw where it was a lot of fish, like small fish, so we moved over there and caught it. We drove snow scooters with the ice drill on top of the sled. So, we quickly figured out where the trout were. (…) but we didn´t want to*

catch the trout, so we just moved away from there, because the trout is there to regulate.

They wanted to avoid the trout because they see it as a regulator of the lake. Their objective was the small arctic charr, so they tried to put out the traps where the highest densities of the small arctic charrs were.

Every year they made reports from the removal fishing and fish surveys. It was one of the members of the local organization who wrote down everything carefully, according to one of the participants. All these reports were stored in a box, that was stored away, and was not available for retrieval. Although they had all data written down somewhere, it was not accessible: as one participant said: *"I try to keep as much as possible in my head – remember".*

3.4.4 The first harvest: 1,2 tons of "dog food"

The first year several of them told that they caught 1,2 tons of fish, with a mean size of 22 grams according to one of them. One of the participants described the overwhelming number of fish the first year:

Tiny, tiny fish. But they were measured, counted, so we got like the number (…). It wasn´t possible to count…. We counted how many there were in a ten-liter bucket, and then we just scooped, cause then we knew approximately how many there were in a ten-liter bucket, to figure out the number of fish. I don´t remember the number today, but it was a lot … hundreds, thousands!

There were efforts to count the harvested fish, but this task proved to be overwhelming. This first year they had 60 traps put out, and after 10 years, they had somewhere between 35 – 40 traps. One of them said that the mean weight at that time had increased to 53 grams (from 22 grams in the first year). Some of the participants said that they experienced a difference in a short time span. One participant mentioned that they saw that the fish got bigger after only 3 years, and another said that the harvest was about halved the second year they fished, with 700 kg, and then the next year it was down to 300 kg. In that case, the number of stunted fish in the traps decreased because many fish had increased in size and didn´t get into the trap, they said.

When I asked what they did with all this fish, they said they gave them to some local dog mushers, who appreciated getting some free dog food.

3.4.5 Reasons for ending the project

After about ten years the local organization ended the fish removal project. Several reasons for ending the project were mentioned. One participant said that the economic aspect was one of the reasons. As there was no financial support, they had to buy the equipment and bait themselves, and the cod roe was costly for the local organization. Another participant mentioned that *"Eventually we got a bit older too",* and that it was too challenging work to keep up with in the long run with only a few people. The school, on the other hand, lacked the capacity and time to continue with that project. However, they continued the fish monitoring and have done that in a continuous manner until the present date.

One participant mentioned that they shouldn't have stopped the project, but rather continued for maybe 10 more years to see more effect of it. Contrary to that, other participants thought that it wasn´t necessary to continue with the removal fishing, because the big fish had come back and could keep the water in balance – continue the job that they had done. However, they thought it was good that the fish survey continued so they could keep track of the status of the fish stock.

One participant also shared that even though the project has ended, he still does not release small fish when fishing in Smalfjordvannet today, even if he doesn't want to eat them: *"(...) we usually don't release fish. We take everything on land, the small ones too. Cause that's a part of the cultivation, you know".* This indicates that the cultivation ideology still resonates among some members of the community, even if the project has ended.

3.4.6 Results of the project

The disagreement on the need for continuity of the project was extended to their opinion of the project success. Two of the participants thought the project should have continued for a longer time and been even more extensive to see better results, while the other two thought it had given great results. One of them even described it as a "sunshine story": *"I would say that Smalfjordvannet – it became a little sunshine story when it comes to fishing. Like …. Maybe we were lucky… I don´t know … Or the circumstances were just right".*

Nevertheless, they all had the conviction that the project with removal of fish and the methods itself was necessary and a good way to manage Smalfjordvannet - some just wanted to do it on a bigger scale.

One participant said that the project participants received both positive and negative feedback from locals and cabin owners in the area. Initially, there was some skepticism around the decision to close the lake to net fishing. However, over time, people became more supportive and loyal to the ban as they began to witness the improvements of the fish quality in the lake.

Towards the end of the project, he described that they received overwhelmingly positive feedback:

> *Yeah, they're so happy you know… There has been an increase in cabin owners around Smalfjordvannet, and they come to us and say that "you have done a great job, now we get really nice fish there!" So that's the way it is.*

This highlights that the results from the project were recognized by the wider community as well.

3.4.7 Smalfjordvannet today

Most of the participants thought the fish quality in Smalfjordvannet today was very good. One said that nowadays people often catch fish on half a kilo to a kilo, and that there was an apparently higher density of larger fish than before (during the overpopulation). Some of them also mentioned that the fish had more crustaceans to eat today, and therefore they turned red in the meat again, even the small arctic charrs.

However, one participant expressed concerns about the quality of the fish in Smalfjordvannet, mentioning parasites as a major issue. He explained that some of the Arctic Charrs he had caught in some cases had their entrails attached to the stomach. *"Then you become a bit skeptical – at least I do"*, he said. For him, the fish was therefore in too bad quality for him to use it as a food source. However, he acknowledged that some fish were in good quality, and that he thought the fish had become somewhat fatter after the removal fishing. Nevertheless, he emphasized that he did not fish enough there to have the exact answers on how the quality was today.

3.5 The participants reflections on the future viability of CBNRM

3.5.1 Times are changing

The participants presented differing arguments about local people's ability to manage the lake effectively today. While some believed that people have more knowledge today and that fishing practices are more sustainable than before, others were skeptical, and some showed a mixture of both attitudes. In this context, the participants focused on people's perception of management and fishing practices, rather than formal management. Some of the participants implied that people have more knowledge today and that the fishing in Smalfjordvannet is more sustainable than before. They argued that this was both because people have seen and learned from the management project that it is possible to take care of a lake if you fish in a good way, and because people don´t fish for food the same way as people did earlier. About the cabin owners one said:

> *"Now, it is open to net fishing yes, but it is only a certain size of the mesh that is allowed to use. But it turned out that even the cabin owners over there, they have gotten careful with the size of the nets. They have seen that it is possible to take care of a lake too."*

By taking care of a lake, they meant fishing in the right way – with small mesh sized nets.

The participants emphasized that people's perceptions of management and fishing practices were influenced by their knowledge and experiences. Some participants indicated that increased knowledge and awareness had led to better management of the lakes. One participant explained that *"people have gotten much better, and now...enlightenment in general, biological enlightenment, those who are interested in that, know that you are not supposed to fish that tough in the mountain lakes anymore. In addition, (…), we have enough food in the fridge and freezer – we don´t need to freeze down 50 kg fish."* Another participant also noted that the combination of increased enlightenment and reduced reliance on fishing for subsistence had led to a decrease in fishing pressure on the lakes, stating that *"people have gotten more enlightened and don´t put out a lot of nets. So, the fishing for food like people do now, I just think is… that doesn´t matter. It does not do any damage.".*

On the other side some of the participants said that in the old days when people depended on the fish from the lake for food, they took better care of it (managed the lake better). Their argument for this was that when you depend on a resource you need to do what you can to

make it last. One also thought they were more knowledgeable: "*They probably knew a lot more than we do today, those that depended on it… I believe"*.

Another participant suggested that modern fishing methods and technologies have made it easier to overfish. He compared people in the old days vs. "modern people" as follows:

> *Yes ... cause they ... in the old days they fished with nets with large mesh size, and got… they only took big fish, like really big fish! But then these "cabin people" came with modern nets and took the medium sized fish as well. Because when the fish gets medium sized and larger, they eat small fish themselves. But these little fish, they don´t eat small fish, they only eat plankton, and crustaceans. So, they took … they harvested only the surplus yield, that was produced. They made sure that there were fish left in the lake the whole time. Plus, the nets they had were hemp nets, so not that strong, the fish sometimes broke free, and they only fished when it was dark, that was from late in August. But this "cabin people" generation that we belong to, they are fishing … as soon as the ice breaks!"*

Here, he also emphasizes that the high fishing pressure is not only due to the effectiveness of fishing tools, but also because people fish all year round nowadays.

Moreover, some participants expressed concern about the loss of knowledge and traditions related to managing the lakes. As one participant said, *"I think it's sad that such local lakes close by, that people living around here maybe don't completely understand how you are supposed to manage it to last for a long time."*.

The loss of traditional knowledge and practices related to lake management was a concern for some participants. One of them expressed this by saying that: *"Something has happened... it happens something there, that knowledge, those traditions, that I am not good at either, but I have tried to make something out of it, it disappears and (...). Those people disappear you know."*. He was concerned that something is happening in the modern society that makes the younger generations lose the outdoor background that people had before and that they don´t know where the food comes from anymore.

Despite the concern about people´s lack of understanding for management, some participants also suggested that some people may be satisfied with the current state of the lake, given that

their use has shifted from being primarily for subsistence to now being more focused on recreation.

Overall, the participants shared a diverse range of perspectives on lake management, and people's perception and knowledge on lake management, especially highlighting the difference in mindset between the older younger generations.

3.5.2 Moving from subsistence fishing to recreational fishing

Despite concerns about the declining knowledge of traditional fishing practices and management, many participants still value Smalfjordvannet for recreation and preserving cultural traditions, especially thinking about the children. Today, they said that the lake is primarily used for sport fishing and consuming fresh fish, with traditional methods such as net fishing becoming less common. One participant humorously noted that people today "harvest at Rema [i.e., the grocery store]".

Some of the participants noted that it is easy to catch fish in the lake, and implied that maybe that has become more important than the fish holding good quality. As one participant remarked, *"And that alone is fun, if you take your kids with you to go fishing and you catch something".* So, although the lake's significance for subsistence purposes has decreased, it remains a popular ice fishing spot, especially for families with small children and elderly people due to its easy accessibility and the ease of catching fish. As one participant explained the lakes popularity with *"It's nice for the kids, because they catch fish in that lake. It's easy to catch the fish. So it's attractive, you know. And the kids don't care too much about the size, whether it's small or big fish, as long as it's a fish that bites [laughing]".*

In short, the participants said that the use of Smalfjordvannet has shifted from subsistence to more recreational fishing. While some of the participant's concerns remain about the decline of traditional practices and management, they also highlighted that the lake continues to provide a source of enjoyment and cultural significance for many in the community. The participants expressed mixed emotions about this transition and talked about it both with joy and sadness.

3.5.3 Thinking forward: What could have been done to improve management?

To the question of what could have been done to further increase the fish quality of the lake today the participants had mixed opinions. One participant suggested continuing with

thinning fishing and potentially exploring methods for reducing parasites, such as managing the sea bird population. Another proposed enhancing the spawning grounds for trout in the stream by removing rocks and other materials. However, two of the participants felt that no further action was necessary, as they believed that the current state of the lake was satisfactory. In addition, they thought that their efforts had restored the ecological balance of the lake and believed that "nature fixes itself" from this point.

Overall, the participants presented a range of perspectives on potential strategies for further improving the lake's ecosystem.

4 Discussion

4.1 Identification of the values of a lake, as perceived by the local community

A fishing lake within a community is typically associated with one obvious value – the provision of food. This is also true for Smalfjordvannet. However, the community's reliance on fish for food had shifted over time. While fish from the lake was once a significant part of the diet and subsistence for some of the participants, it is no longer essential for their diet today. People still appreciate and enjoy the food, but they do not fill their freezers with fish like they did in the past. This is similar to Aas et al. (2010) who found the use of natural resources to move from subsistence to support recreation and a local cultural identity, a pattern which is consistent with the reduced dependence of modern societies on harvesting fish (and wildlife) wherein recreational values gradually replace subsistence (Glass et al., 2019).

It is worth noting that the boundaries between subsistence, culture, traditions, and recreation are often blurred, and these aspects are interconnected rather than mutually exclusive (Aas et al., 2010). Therefore, when referring to recreation in this thesis, it does not mean excluding subsistence, culture, and tradition. Aas et al. (2010) stated that many residents in Finnmark characterize their fishing as both recreation and subsistence, indicating that they are not mutually exclusive, but rather intertwined, as also illustrated in the triangle of the use of outlying fields in Finnmark (Figure 3). For instance, many people fish for recreational purposes, but they also consume the fish they catch. Thus, recreation is not “just” about fishing for fun, as it may be rooted in deeper aspects such as subsistence-culture and

traditions. Although the use of nature cannot always fit into one distinct category, for the sake of simplicity, I am using the term "recreation" in this discussion.

The value of using fish as a food source from a lake is typically viewed as an instrumental value. Nonetheless, fishing in Smalfjordvannet was linked to a range of other values that extend beyond its practical use as a food source. The results clearly demonstrate that the participants viewed the lake as a social arena where people come together, share knowledge and form connections. These relationships between people occurred through nature, more specifically through fishing, and are thus considered relational values (Chan et al., 2016). In other words, fishing can be seen as a vessel to promote social coherence in the community by creating bonds between community members, including across generations, and to the lake.

Through my research, I found that Smalfjordvannet offers not only leisure opportunities but also valuable learning experiences and knowledge acquisition. The informants described two forms of learning associated with Smalfjordvannet: informal knowledge sharing, such as among generations while fishing on the ice, and formal learning experiences for school classes, including the monitoring activities with Tana High School. Additionally, some informants mentioned acquiring knowledge through exploring the lake and fishing in various parts of it throughout all seasons since childhood. Schröter et al. (2020) suggest that learning and knowledge acquisition opportunities, along with leisure, are partially linked to relational values, such as cultural heritage, identity, and stewardship. Similarly, Uehara et al. (2022), suggests that environmental education potentially can enhance relational values, which in turn could promote behaviors that contribute to conservation of socioecological systems. Building upon these arguments, Smalfjordvannet's role as a learning environment may have fostered or strengthened relational values and could potentially be one of the driving forces behind peoples´ engagement in the CBNRM project.

The community's relational values with or through Smalfjordvannet seemed to be strongly tied to the accessibility of the lake. In several interviews, participants highlighted the importance of the lake´s proximity to the road and its available facilities, such as the floating bridge, which facilitated easy access for people of all ages and abilities. These findings are consistent with De Vos et al. (2018) that states that nature's contributions to people (or ecosystem services) are co- produced by nature and people and are strongly influenced by access to nature. Moreover, relational values are nurtured through interaction with nature.

Therefore, it is evident that many of the relational values associated with Smalfjordvannet are influenced by its accessibility and the fact that it attracts a diverse range of users.

There is a continuum or gradient from instrumental to relational values (and intrinsic values), which suggests these values cannot always be easily categorized into discrete groups (Pascual et al., 2017). For instance, fish holds an instrumental value as a food source for the participants, while simultaneously being culturally significant, as the way it is fished, processed, and prepared connects people to their culture and tradition. The participants' memories, stories, and knowledge about fishing in the lake indicated that it is an integral part of their cultural identity and heritage. Hence, there are plural values related to fishing, which are context dependent. The literature supports this notion, with studies indicating that many recreational activities centered around food, like fishing and berry picking, are integral parts of culture and tradition in numerous Western and Central European countries (de Aragón et al., 2011; Hansen & Malmaeus, 2016; Schulp et al., 2014). Consequently, it is not possible nor meaningful to depict clear boundaries between instrumental and relational values on the evaluated values from Smalfjordvannet - the boundaries are blurred and interconnected. Due to the qualitative approach of this study, which involved conducting semi-structured interviews, respondents did not categorize their values into discrete categories. This aspect might have been overlooked if quantitative methods were used.

The participants placed significant importance on the quality of fish in lakes and expressed that they would not fish in a lake with poor quality fish, then they would rather go to another lake. In other words: people tend to follow the fish. This highlights the essential role of good quality fish in maintaining the social dimension of the lake, as people's interest in the area is directly linked to its fishing opportunities. Without high quality fish, people will not go there, and thus the social dimension or knowledge exchange will be lost. This result is in line with the findings of Arias-Arévalo et al. (2018), Sheremata (2018) and Schröter et al. (2020), which suggest that instrumental values coexist with multiple relational values, and with the theory of biocultural diversity, which recognizes the tight links between local cultures, including ways of life, and their territories, ecosystems, and natural resources, suggesting that the loss of one can lead to the loss of both (Maffi & Woodley, 2012; Stevens, 2014).

4.2 Insights into how and why the community engaged in the management of a local lake

The CBNRM project aimed to achieve good fish quality and ecological balance in Smalfjordvannet, with the goal of recreating a good fishing lake. They recognized that achieving good fish quality was not possible without considering the overall health of the ecosystem. Therefore, they adopted a holistic approach and considered various factors, such as insect and crustacean populations, spawning grounds, size distribution, and fish demographics. The participants emphasized the interconnectedness of nature and the ecosystem and found it challenging to define fish quality without mentioning ecological connections and causalities. This perspective highlights the holistic nature of their worldview, a common trait among many Indigenous people and local communities (Choy, 2018).

The participants' reflections on the CBNRM project included both the costs and benefits. Since they were very self-driven, they recognized the significant investment of time, effort, and resources that the project required, including the demanding task of emptying traps every other day, and finding enough committed participants. The financial burden of using expensive cod roe as bait was also mentioned. Furthermore, the project faced some negative feedback and resistance from the community, particularly regarding the imposed fishing restrictions (ban on nets) during the early stages. However, despite these challenges, the project had significant benefits. As people started seeing the results, the wider community began to appreciate the project and expressed happiness and gratitude. The project fostered a sense of learning and collaboration among participants, who approached it with a trying and failing mentality, leading to an adaptive process. Additionally, the project had educational benefits, providing opportunities for teaching students and raising awareness of the importance of caring for natural resources. Ultimately, the participants believed that the benefits of the project outweighed the costs, expressing high levels of satisfaction with the outcomes and pride in their achievements. Hence, the CBNRM project serves as an important example of how a dedicated group of individuals with a strong connection to nature can mobilize and work towards a common goal, even in the absence of external support.

One underlying motivation for the participants' engagement in the CBNRM project appears to have been built on a desire to improve and maintain relationships with others and increase the well-being of the community. This illustrates the concept of reciprocity in relational values, where valuing such relationships can motivate individuals to take responsibility for managing natural resources and work towards building a sense of community with others who share the

same goals. By collaborating on a common project, community members experienced a sense of belonging and unity, as evidenced by the project's inclusive nature, involving both students and elders. People established connections through the project in a variety of ways, such as educating students about fish management and providing fish to dog mushers as dog food. As a result of their care for the lake, it appears that the participants promoted other relational values, such as a sense of community and social cohesion. This finding aligns with studies of Jax et al. (2018) and West et al. (2018), which suggest that values such as care can promote other relational values.

Overall, the participants expressed a strong connection to Smalfjordvannet. One even stated that nearby fishing lakes is what made living in the area worthwhile. Several studies support the idea that individuals with a strong connection to nature are more likely to engage in pro-environmental behavior and have a greater motivation to protect nature (Clayton, 2003; Frantz et al., 2005; Geng et al., 2015; Kaiser et al., 2008; Kals et al., 1999; Wells & Lekies, 2006). The participants connection to nature may therefore have fostered a sense of care and stewardship among the participants, which may have played an important role in their active engagement in the CBNRM project.

The project relied on a combination of ILK and Natural Science, and Tana High School was also involved in the project during their natural management classes, which focused on natural science. First, knowledge and practices transferred from earlier generations play a significant role. During the project the participants developed methods and tools with an adaptive trial-and-error process that aligns with ILK (Berkes, 2017). As one of them noted, it was a learning process. For example, the participants emphasized the importance of "fishing in the right way" as a management tool, which involved practices such as not only fishing out the big fish but also taking out the small ones. However, when talking about the different knowledge systems, it is important to note that these systems are not completely separate from each other, and they are increasingly influenced by each other. For example, the development of local knowledge is increasingly influenced by the creation and integration of scientific knowledge (Neis et al., 1999). This is also the case here, and the community connected to Smalfjordvannet is not isolated and is therefore influenced by different knowledge systems.

4.3 The participants reflections on the future viability of CBNRM initiatives

There could be difference in values between generations (Kleespies and Dierkes 2020), which could also be reflected in relational values that vary depending on context (Himes & Muraca, 2018; West et al., 2020). Human-nature relationships can evolve over time, leading to a shift in values and what is considered important (Uehara et al., 2022). Although the participants in this study considered fish quality to be essential, it is unclear if fish quality retains the same significance for the coming generations, when people no longer rely on subsistence. The participants observed that younger individuals appear to be more interested in fishing for fun, without being concerned about the size or quality of their catch. Understanding the implications of this potential shift could be vital for the future viability of local management efforts. A report conducted by Aas et al (2010) on the use of outlying fields in Finnmark also showed a significant shift towards recreational use from 1950 to 1970 (although households continued to rely on fish, game, and berries during this time). However, some study participants, noted that this shift towards recreation has resulted in people spending less time in nature, leading to a decrease in skills and knowledge about natural resources. Similarly, (Odden, 2008) observed a decline in the percentage of young individuals engaged in fishing activities in Norway in recent years. There is a global trend towards disconnection from nature (Kesebir & Kesebir, 2017; Louv, 2008), not only in urban areas but also in rural regions and to some extent also in remote locations such as the Arctic (Panikkar & Lemmond, 2020; Pearce et al., 2011; Tremblay et al., 2018). This growing disconnection may lead to a loss of Indigenous and local knowledge, because sustaining ILK requires consistent interaction between communities and their ecosystems (Gómez-Baggethun & Reyes-García, 2013), in addition to strong social networks (Folke et al., 2003). Also, a recent study conducted by Schmidt et al. (2021) in rural Alaska, found that people are concerned about the impact of technology such as social media and gaming on subsistence activities. Specifically, there are worries that technology is competing with subsistence activities and may be leading to reduced interest among the younger generation. As the concept of CBNRM is founded on the principle that people manage the natural resources they are connected to and are knowledgeable about, disconnection from nature and reduced knowledge could potentially pose a threat to the future viability of CBNRM (Benyei et al., 2022).

It is essential to interview other generations before drawing conclusions about this generational shift in values suggested by the study's participants. Nevertheless, these potential

changes could have implications for the future of community-based natural resource management (CBNRM). There are questions that need to be answered in a intergenerational context, such as: If fish quality is no longer a priority for people, would there still be motivation for CBNRM management? How would people manage natural resources if social values become more important than ecological values? Considering the future viability of CBNRM, these would be important questions to further explore.

However, as shown in the results, opinions on the issue were divided. While some participants expressed concerns about the younger generation's lack of knowledge and interest in fish lake management, others believed that modern society is more enlightened and has greater knowledge, thus reducing the likelihood of “destroying” lakes.

4.4 Contribution and limitations

The number of participants in the CBNRM that are still accessible for interview was low, and it might therefore be difficult to paint a picture of all aspects of the initiative. Second, the semi-structured interviews could lead to different interpretations of participants' intended meanings. I was accompanied by a colleague during my interviews which reduced the risk of misinterpretations, but to ensure a strong internal validity it would have been necessary to revisit the community to gain feedback on my results. Unfortunately, I did not have sufficient time or resources to travel back to co-interpret my results together with the participants. Third, due to the absence of written reports, the study relied solely on oral narratives, which may not have captured all the details accurately. Additionally, the events took place over ten years ago, which may have affected the participants' recollection of the events. Finally, the study's findings are context-specific, and its external validity was difficult to assess, given that there is not much published literature on such CBNRM initiatives in this region.

The interview guide used in the study was not initially designed for the research question that was eventually pursued. While I adjusted the questions along the way, it is possible that a different set of questions might have been more suitable. Furthermore, due to the time frame and scope of the study, it was not possible to conduct follow-up interviews to clarify any ambiguities or gain further insights. These limitations may have implications for the study's validity and reliability and should be considered when interpreting the results.

On the other hand, the study answers my research question by offering valuable insights into the case of Smalfjordvannet, providing an understanding of the lake's values and their

implications for community engagement in management. Although the sample size was small, it was considered sufficient for the purpose of the study since it encompassed all living participants that participated in the CBNRM project. The use of semi-structured interviews was particularly appropriate in capturing the nuanced and context-dependent nature of relational values. The interviews provided a rich and diverse picture of the project and its stakeholders' knowledge and beliefs regarding lake management. The small sample size allowed for a more in-depth exploration of the topic, revealing the multiple values the lake held for the community and the various groups involved in its management, including students and community volunteers. The study offers insights into the relational values of nature, beyond its ecological and instrumental value, and rather highlights how a lake connects people within a community, which is often an invisible aspect of its value. Finally, the research documents a CBNRM project that had not been previously published in the literature, which might be important to consider for monitoring and management of Smalfjordvannet today.

4.5 Management implications

Oral traditions are relied upon by Indigenous people and local communities to pass down knowledge and practices to future generations. However, this reliance on oral tradition can make such knowledge and practices invisible to outsiders, which makes them vulnerable to disappearing without notice. In the case study of Smalfjordvannet, the participants had actually reported detailed written reports, but these documents could not be found currently. As a result, the oral account remains the only available source of information at present.

The lack of documented cases of lake management like the one in this study raises questions about why such projects are not well-documented in the literature. It is unclear whether this is because such projects are not formally written down or if they are neglected or ignored. This lack of documentation highlights the issue of management becoming "hidden" or "invisible." When outsiders later monitor or manage a resource, they may do so under false premises if they are unaware of prior management efforts. For example, Smalfjordvannet (among other lakes) has been monitored through the Ecosystem Monitoring in Freshwater program (ØKOFERSK) to assess its ecological state and verify the national classification system for quality parameters in accordance with the EU Water Framework Directive (Schau et al., 2020). Despite being monitored in 2017, 2019, and 2021, the local management project was not mentioned in any of their reports, despite the project lasting ten years and potentially

impacting fish quality and ecological status of the lake. It is unclear whether Smalfjordvannet´s "very good ecological status" categorized by the surveillance in their recent reports is due to the CBNRM project or if it would have been the case regardless. Similar cases may occur in other places where communities voluntarily cultivate lakes. Therefore, it is essential to document projects like the CBNRM project to make invisible management visible and evaluate its ecological (but also social) outcomes.

5 Conclusion

The focus of this thesis was to explore how relational values influence local engagement in the management of Smalfjordvannet in Northern Norway. The study revealed that relational values were not only a driving force behind the community-based natural resource management (CBNRM) project, but also its ultimate goal. The participants' personal connections to the lake probably fostered values such as care, which seemed to play a significant role in initiating and implementing the project. Moreover, the ecological goal of improving fish quality indirectly aimed to promote relational values such as social cohesion, cultural identity, and knowledge sharing through fishing. Despite no longer being essential for subsistence, Smalfjordvannet maintained its cultural and social significance within the community by serving as a shared space for recreational activities and community gatherings, thereby promoting social cohesion and bringing people together. However, possible changing values among generations pose a concern that may impact the future viability of CBNRM projects, which requires further exploration.

Furthermore, the study documented the previously untold ten-year CBNRM project in Smalfjordvannet through the narratives of the locals involved. The insights gained from this documentation provide valuable knowledge about the project's motivation, implementation, and Local Ecological Knowledge, which can inform the development and management of similar projects in the future. To prevent such projects from being overlooked and to preserve knowledge and practices for future generations, more of them should be documented and further be acknowledged. It is important to recognize and respect the cultural and ecological values attached to natural resources, also the less visible ones, and promote community-based approaches that incorporate relational values to achieve sustainable development.

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Appendix

Appendix 1: Information letter and consent

Vil du delta i forskningsprosjektet

Kunnskapsberikelse om kvalitet på fisk i Finnmark

gjennom kobling av tradisjonell kunnskap og naturvitenskap?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å dele kunnskap mellom to kunnskapssystemer (lokal tradisjonell kunnskap og naturvitenskap), lære av hverandre og identifisere forskjeller og likheter. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål

Dette er et masteroppgaveprosjekt der formålet er å koble samisk tradisjonell kunnskap og vestlig naturvitenskap i forsøk på å skape mer helhetlig og bedre kunnskap om kvalitet på fisk i et vann i Finnmark.

Den naturvitenskapelige delen av prosjektet vil innebære å analysere allerede innsamlet data fra vannet, og ulike mål for kvalitet vil bli undersøkt. Den erfaringsbaserte tradisjonelle kunnskapen ønsker vi å samle inn ved å intervjue lokale som har brukt vannet over tid og kjenner det godt, og det er denne delen av prosjektet vi ønsker at du skal være med på.

Når vi både har naturvitenskapelig kunnskap og tradisjonell kunnskap skal det gjøres en sammenligning av resultatene for å undersøke hvordan de ulike kunnskapssystemene ser på kvalitet på fisk og hva de kan lære av hverandre. Masterprosjektet skal etter hvert inngå i et doktorgradsprosjekt. Dette prosjektet er en utdanningsforskningsoppgave der formålet er å se på overføring av tradisjonskunnskap mellom generasjoner ved å inkludere tradisjonskunnskap i naturfagundervisning.

Hvem er ansvarlig for forskningsprosjektet?

Sami Allaskuvla er ansvarlig for prosjektet. Masterstudent Kjerstin Mæland er tilknyttet UiT, og hun vil også ha tilgang til å behandle personopplysninger.

Hva innebærer det for deg å delta?

Å delta vil innebære å være med på et intervju der du blir stilt ulike spørsmål hovedsakelig knyttet til ditt bruk av vannet og kvaliteten på fisken i vannet. Vi vil ta lydopptak av intervjuene som deretter vil bli transkribert og oversatt til engelsk. Som deltaker kan du velge om du ønsker å snakke norsk eller samisk under intervjuet. Etter transkribering og oversetting vil du få mulighet til å lese over ditt eget intervju og gjøre eventuelle endringer og godkjenne det. Både masterstudent Kjerstin Mæland og doktorgradsstudent Maret Hætta vil være til stede under intervjuet.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Opplysningene om deg vil kun bli brukt til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Dine svar vil ikke merkes med ditt navn og de vil bli oppbevart slik at de ikke er tilgjengelige for andre enn prosjektmedarbeiderne. Prosjektgruppen med delprosjektledere og deltagende forskere vil ha tilgang til materialet. For å sikre at ingen uvedkommende får tilgang til personopplysningene, anonymiseres materialet før det brukes og lagres som datamateriale, og ved publisering vil deltagere være anonymisert.

Hva skjer med personopplysningene dine når forskningsprosjektet avsluttes?

Opplysningene anonymiseres når prosjektet avsluttes/oppgaven er godkjent, noe som etter planen er juni 2024. Resultater fra undersøkelsen kommer til å bli publisert i en masteroppgave, ph.d. oppgave og senere i artikler.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke. På oppdrag fra *Sámi allaskuvla* har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke opplysninger vi behandler om deg, og å få utlevert en kopi av opplysningene
- å få rettet opplysninger om deg som er feil eller misvisende
- å få slettet personopplysninger om deg
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger

Hvis du har spørsmål til studien, eller ønsker å vite mer om eller benytte deg av dine rettigheter, ta kontakt med:

Sami Allaskuvla er ansvarlig for prosjektet. Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Sámi Allaskuvla ved phd student Maret J. Heatta, maretjh@samas.no, tlf 4666 7571
- Masterstudent ved UIT, Kjerstin Andrea Mæland, kma096@uit.no
- Veileder UIT Vera Helene Hausner, vera.hausner@uit.no
- Personvernansvarlig: Joakim Bakkevold, joakim.bakkevold@uit.no tlf. 77 64 63 22 og 97 69 15 78.

Hvis du har spørsmål knyttet til Personverntjenester sin vurdering av prosjektet, kan du ta kontakt med:

- Personverntjenester på epost personverntjenester@sikt.no eller på telefon: 53 21 15 00.

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:

- NSD – Norsk senter for forskningsdata AS på epost personverntjenester@nsd.no eller på telefon: 55 58 21 17.

Med vennlig hilsen

Kjerstin Andrea Mæland

Maret J. Heatta *Student*

(Forsker/veileder)

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet Kunnskapsberikelse om fiskekvalitet av fisk i Finnmark gjennom kobling av tradisjonell kunnskap og naturvitenskap og har fått anledning til å stille spørsmål. Jeg samtykker til:

- ☐ å delta i *intervju*
- ☐ å delta i *feltstudie og observasjoner*
- ☐ *at forskere kan gi opplysninger om meg til prosjektet – hvis aktuelt*
- ☐ *at opplysninger om meg publiseres slik at jeg kan gjenkjennes hvis jeg har informasjon jeg ønsker å dele*

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

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(Signert av prosjektdeltaker, dato)

Appendix 2: Interviewguide

Intervjuguide Smalfjordvannet

Bosted/hjemsted:_____

Intervjuperson:_____

Den intervjuede ID: _____

Tid for oppstart av intervju:_____

Dato:_____

Tusen takk for at du kan bidra med din kunnskap om fiskekvalitet i Smalfjordvannet.

[Fortelle hvem vi er og hvor vi kommer fra, og gå gjennom informasjonsskrivet (formål, rammer for intervjuet, samtykke, anonymisering, rollefordeling osv.]

I intervjuet vil vi stille ulike spørsmål om din bruk av vannet, kvaliteten på fisken og endringer du har observert eller opplevd i og rundt Smalfjordvannet.

Er det greit at vi går i gang med opptak av intervjuet?

Spørsmål:

Bakgrunns spørsmål

1. Kan fortelle litt om ditt forhold til Smalfjordvannet?
    a. Har du brukt vannet over lang tid?
    b. Hvor i vannet pleier du å fiske?
        1. Hva er det som bestemmer hvor du fisker?
    c. Hvordan pleier du å fiske?
        1. Maskestørrelse på garn osv.
        2. Hvor langt fra land?
        3. Hvor dypt?
    d. Hvilken tid på året fisker du?

Om fisketyper (hvordan klassifisere fisken?)

2. Hvor mange typer fisk finnes det i vannet?
    a. Vet du om noen ord for ulike typer fisk i dette vannet som har blitt benyttet tradisjonelt? Vet du hva disse ordene betyr?
    b. Kan du fortelle litt om de ulike typene?
        i. Eks. hvor lever de, hvordan oppfører de seg, hva spiser de osv
    c. Var det flere eller færre typer fisk i dette vannet før i tiden?
    d. Hvor mange typer fisk brukte de før i tiden sammenlignet med i dag?

Spørsmål om fiskekvalitet

3. Hvordan er kvaliteten på fisken i Smalfjordvannet?
    a. Hvordan ser du dette?/Hvilke egenskaper ved fisken er det som gjør at kvaliteten er x?

4. Hva mener du er grunnen til at fisken er av denne kvaliteten?

5. Hvordan vurderer du hva som er god kvalitet på fisk?

    a. Hva er viktige egenskaper for god/dårlig kvalitet?

    b. (her kan man kanskje spørre spesifikt om ulike egenskaper og om de tenker det er viktig? F.eks. rødfarge på kjøttet, parasitter, feithet osv.?)

    c. Er det noen tid på året fisken er i bedre kvalitet enn andre?

    d. Kan du beskrive hva dårlig fisk er? Hvordan ser du det? Og hva kan årsaken være til at den oppleves som å ha dårlig kvalitet?

6. Kan du si noe om vannet generelt basert på fiskekvaliteten?

7. Har du merket/observert noen endringer på fisken i vannet i løpet av årene du har fisket her?

Mer om bruk

1. Beskriv en fangst du ville vært fornøyd med.
    a. Er det ulikt i ulike sesonger?
2. Hvilken type fisk er du interessert i å få?
        1. Fisker du etter store eller små, og evt hvorfor.
3. Vil kvaliteten på fisken påvirke hvordan du bruker fisken?
    a. Bruker du ulike typer kvaliteter til ulike ting
4. Vet du noe om hvordan fisket var før i tiden? Hvordan pleide folk å fiske før i tiden?
5. Spiser/bruker folk i familien din fisk mer/mindre/like mye som de pleide?
6. Hvor viktig er kvalitet på fisk for hvor mye du fisker i vannet

Om endringer

7. Har du blitt fortalt hvordan vannet var før din levetid fra tidligere generasjoner?
8. Har du observert noen endringer i eller rundt vannet som du tror kan ha påvirket vegetasjon, insekter og fiskesamfunnene som lever i vannet?

    1. F.eks. Endringer i elver, bekker, vegetasjon rundt vannet? Endringer i stedene og tidspunktene fisken gyter? Vanntemperatur, farge på vannet, vannstand, når det fryser og smelter osv.? Algevekst?

    2. Hva tror du er årsaken til disse endringene?

Avsluttende/oppsummerende spørsmål

11. Har du noen forslag til hva som kunne blitt gjort for å øke kvaliteten til fisken i vannet?
12. Er det noe annet du vil tilføye om fisk i Smalfjordvann?