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When you happen to know a good spot

A study on recreational anglers' relationships to angling settings in Sweden

LOTTE VAN DEN HEUVEL

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Abstract
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Careful, responsible use of nature is required to halt the continuing degradation of ecosystems while fostering the invaluable relationships between humans and nature. Recreational angling (i.e. recreational fishing with rod and reel) can be a way for people to shape meaningful connections to nature, to other people, and to oneself, but if performed irresponsibly, the activity can pose a threat to already vulnerable ecosystems. In the search for responsible recreational fisheries, researchers have identified angler stewardship as a promising way forward that could safeguard the meaningful relationships between anglers and nature, while minimizing ecological impacts. One of the potential pathways from angling participation to angler stewardship that researchers have identified is sense of place, or the relationships between anglers and angling settings. In this thesis, I present an empirical examination of this pathway.

I used psychometric measurement scales, administered through quantitative, online angler surveys at two recreational fisheries in Sweden, to test the associations between various dimensions of angler diversity, anglers' sense of place, and their intentions to support the angling setting through acts of loyalty and stewardship. I present my findings through four research papers. **Paper I** revealed the implications of angler diversity to anglers' perceptions of fish stock trends at a river-fishing destination. **Paper II** showed how angling experience and residency status influenced the meanings and attachments anglers held for an island destination. **Paper III and IV** confirmed structural relationships between the anglers' interpretations of the angling setting, their attachment to the setting, and their willingness to support the angling setting through acts of loyalty (**III**) and stewardship (**IV**).

Based on my findings, I conclude that the responding anglers were attitudinally and behaviorally diverse, and that this diversity spilled over into their relationships to the angling setting. The angling activity, and their relationships to this activity, acted as a lens that shaped their interpretations of the angling setting and their sense of connectedness to this setting. The thesis shows that angling settings are meaningful places to which anglers can form lasting bonds that may motivate place-based supportive intentions. However, I found that these intentions depended on the anglers' interpretations of the angling setting, which are subjected to (environmental) change. Overall, the thesis expands our knowledge of the role of sense of place as a potential pathway towards promoting angler stewardship and shaping responsible recreational fisheries.

Keywords: recreational fishing, angling tourism, angler heterogeneity, sense of place, destination loyalty, stewardship

Lotte van den Heuvel, Department of Earth Sciences, Natural Resources and Sustainable Development, Villavägen 16, Uppsala University, SE-75236 Uppsala, Sweden.

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To all the inspiring women who help me find my place

List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.

I. **Van den Heuvel, L.**, Rönnbäck, P. (2023) What you see isn't always what you get: On how anglers' fish stock perceptions are influenced by motivations, satisfaction and engagement. *Fisheries Research*, 258: 106519

II. **Van den Heuvel, L.** Nothing can substitute experience? Sense of place in permanent residents, periodic residents and tourists engaging in recreational angling at an island destination. *Submitted*

III. **Van den Heuvel, L.**, Blicharska, M., Stensland, S., Rönnbäck, P. (2022) Been there, done that? Effects of centrality-to-lifestyle and experience use history on angling tourists' loyalty to a Swedish salmon fishery. *Journal of Outdoor Recreation and Tourism*, 39: 100549

IV. **Van den Heuvel, L.**, Björkvik, E., Blicharska, M., Rönnbäck, P. Effects of recreational anglers' sense of place on their stewardship intentions in private and social contexts. *Submitted*

My contribution to the papers included in this thesis was as follows:

As lead author of **Paper I-IV**, I had the main responsibility for the study design, data collection and analyses, and the writing of the manuscripts. The co-authors of **Paper I, III and IV** have been involved in the conception and design of the studies, and provided valuable comments and text suggestions to the manuscripts. **Paper II** was written entirely by me, with guidance from my supervisory team.

Other papers not included in this thesis

i. **Van den Heuvel, L.**, Blicharska, M., Blyth, S., Rönnbäck, P. (2020) Catch reporting in recreational fishing: Swedish anglers' attitudes and preferences, and the effect of social factors. *Fisheries Research* 223: 105444

ii. **Van den Heuvel, L.**, Blicharska, M., Masia, S., Sušnik, J., Teutschbein, C. (2020) Ecosystem services in the Swedish water-energy-food-land-climate nexus: Anthropogenic pressures and physical interactions. *Ecosystem Services* 44: 101141

iii. Blicharska, M., Smithers, R.J., Kuchler, M., Munaretto, S., **Van den Heuvel, L.**, Teutschbein, C. (2023) The water-energy-food-land-climate nexus: Policy coherence for sustainable resource management in Sweden. *Environmental Policy and Governance* 1-14

iv. **Van den Heuvel, L.,** Aas, Ø., Agnarsson, S., Björkvik, E., Blicharska, M., Blyth, S., Gundelund, C., Husa, M., Olaussen, J.O., Pellikka, J., Rönnbäck, P., Stensland, S., Vehanen, T., Skov, C. Future trends in angler behavior – lessons from a Delphi study in the Nordic countries. *Submitted*

v. Blyth, S., **Van den Heuvel, L.**, Blicharska, M., Bergström, U., Ovegård, M., Rönnbäck, P., Sundblad, G. Beyond asking the right questions: Accounting for biases in a recreational fishery survey. *Submitted*

vi. Golden, A.S., Arlidge, W.N.S., Crandall, C., Ehrlich, E., **Van den Heuvel, L.,** Klefoth, T., Kochalski, S., Lorenzen, K., Sbragaglia, V., Skov, C., Venturelli, P., Arlinghaus, R., Shephard, S. What is(n't) environmental stewardship? Eliciting unspoken assumptions using fisheries as a model. *Submitted.*

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Abbreviations

C&R	catch-and-release
PLS-SEM	partial least squares structural equation model
WEIRD	western, educated, industrialized, rich and democratic

Introduction

Rationale

Human beings are inextricably linked with natural environments, but these environments are degrading rapidly. Centuries of intensive industrial activity and extensive resource extraction have left many of the world's ecosystems unable to sustain themselves and the living beings that depend on them. The call to care about and care for nature continues to grow louder (UN General Assembly, 2019).

Care for nature is particularly relevant in the context of natural resource management, which shapes the way humans use nature's contributions to people. Initially, natural resource management research mainly involved cases of industrial use of natural resources, such as industrial forestry and fisheries (as exemplified by the influential work of Elinor Ostrom, 2007, 2009), but it has become more commonplace to consider the social-ecological implications of other, recreational uses of nature as well (e.g. Holmgren & Lindkvist, 2016; Stensland, Dugstad, et al., 2021). One such case is recreational angling.

Recreational angling constitutes all fishing activities with rod and reel that are performed primarily for leisure purposes. The activity is especially popular among people from WEIRD (i.e. western, educated, industrialized, rich, and democratic) countries (Arlinghaus et al., 2020). Moreover, according to the lifecycle of fisheries theory (Cowx et al., 2010), recreational fishing participation is expected to increase (to a certain point) with rising economic development, which is now starting to show in developing countries (Bower et al., 2020).

The study of recreational angling provides valuable insights into human interactions with nature and addresses a unique combination of challenges and opportunities related to the management of natural resources. For example, while recreational fisheries may provide many socio-economic benefits to people, ranging from income (e.g. Hyder et al., 2018) to mental wellbeing (Wolsko et al., 2019), there are also concerns about the ecological impact of recreational angling on aquatic ecosystems, fish stocks and individual fish. In addition to contributing to the mortality of individual fish through harvesting and lethal damage, recreational angling can cause population level effects through selective harvesting and damage habitats through the loss of fishing tackle (Lewin et al., 2006, 2019; Post, 2013; Radford et al., 2018). The cost-benefit duality is often inherent to natural resource use, but the environmental costs associated with recreational angling are increasingly seen as problematic in western societies due to its arguably non-essential, recreational nature (Arlinghaus et al., 2012). On the other hand, researchers argue that recreational angling might be crucial to promoting environmental virtues and nature connectedness in a society that is increasingly disconnected from nature (Shephard et al., 2024).

Another challenge to the management of recreational fisheries is the attitudinal and behavioral diversity of anglers. Recreational fisheries managers have a wide-range of tools available to them to promote responsible angling behavior and thereby minimize the negative ecological effects of recreational angling. For these tools to be effective, managers need to understand both the fish and the fishers (Arlinghaus et al., 2017; Haapasaari et al., 2012; Hilborn, 2007). Several decades of recreational angling studies indicate that anglers differ significantly in how they practice recreational angling, and that anglers' thoughts and feelings about the activity are highly diverse (see Hunt et al., 2021 for an overview). The average angler does not exist, and as a result, a one-size-fits-all solution for creating responsible recreational fisheries does not exist either.

Despite the lack of a single solution to tackle recreational fisheries management challenges, there does seem to be a common vision among fisheries researchers that identifies angler stewardship as an avenue towards responsible recreational fisheries. Several scholars argue that anglers' potential for adopting responsible behaviors and acting as stewards of aquatic ecosystems is high (Cooke et al., 2019; Shephard et al., 2023). Under the right conditions, recreational angling events can be a deeply emotional, embodied experience that facilitates connections to nature, to oneself, and to other people, which may foster environmental values and virtues that are foundational to responsible behavior in nature (Shephard et al., 2024). While several pathways from engagement in recreational angling to responsible angler behavior have been hypothesized (Shephard et al., 2023), empirical evidence to support these pathways is currently scarce. With this thesis, I aim to explore one of these identified pathways, namely sense of place.

Similar to other sites of recreational significance, angling sites are more than a set of physical attributes; they are meaningful places that facilitate the aforementioned connections to nature, to oneself and to others (Kaltenborn & Williams, 2002; Moore & Graefe, 1994; Wynveen et al., 2012). Sense of place, the umbrella-term for meaningful relationships to place, is an important relational value of nature that contributes to human wellbeing (Arias-Arévalo et al., 2017). Nevertheless, many recreational angling studies focus on catch- or activity-related aspects, such as satisfaction with the angling event or activity-specific preferences (e.g. target species, gear type), while the angling setting and its attributes, are often reduced to a set of quantitative predictors (e.g. accessibility, catch probability, fish size, lake size). A focus on physical attributes, as is common in so-called "site choice studies" (see Hunt et al., 2019 for a review), may be useful to steer management efforts towards maintaining or improving preferred attributes, but it overlooks the subjective and relational aspects of anglers' experiences and decision-making processes in particular angling settings. Acknowledging the relational values associated with recreational angling, such as sense of place, is crucial for fostering sustainable relationships between humans and nature (Arias-Arévalo et al., 2017; West et al., 2018).

A few studies recognize the importance of anglers' relationships with angling settings and found that various aspects of angling involvement, such as activity preferences or specialization, may influence these relationships (Hunt, 2008; Oh et al., 2012). While these findings imply meaningful relationships between people's connections to angling and their connections to angling settings, such relationships have not yet been explored much further. In addition, studies on other nature-based recreation activities have already found connections between sense of place and responsible behaviors, including management support (e.g. Wynveen et al., 2021) and stewardship (e.g. Larson et al., 2018). However, such studies remain largely absent from the recreational fisheries literature.

The need for a relational, place-centered approach to recreational fisheries research is underlined further by two developments that have been observed in recreational fisheries. First, angling places are changing. Climate change, habitat destruction, and overfishing threaten aquatic ecosystems and their subsequent ability to facilitate recreational angling activities (Costa et al., 2021; Townhill et al., 2019). Anglers' sense of place appears to play an important role in how anglers' perceive these changes and their vulnerability to them (Conley & Diamond, 2024). People-place relationships have important implications to how people respond to place changes (Masterson et al., 2017), for example through acts of support (e.g. Lokocz et al., 2011), opposition (e.g. Devine-Wright & Howes, 2010) or substitution behavior (e.g. McCreary et al., 2024).

Second (and related to the previous point), anglers are becoming more mobile. In line with general tourism trends, various parts of the world are reporting an increase in both domestic and international angling tourism (Bower et al., 2020; Solstrand, 2013). While tourists are capable of forming strong bonds to the places they visit (e.g. Kaltenborn & Williams, 2002), their relation to the place as a tourist destination is different in nature from a resident's relation to their home (Kianicka et al., 2006). The recreational angling literature has recognized angling tourism as an emerging topic of interest (Arlinghaus et al., 2016; Hall, 2021) and place scholars are increasingly engaging with the topic of mobility (Di Masso et al., 2019; Gottwald et al., 2024), but research on angler-place relationships in the context of angling tourism and angler mobility has thus far remained scarce.

Aim and research questions

The aim of my doctoral thesis is to bridge the recreational angling literature and sense of place scholarship by examining the relationships between anglers and angling settings. By acknowledging the angling setting as a meaningful place that individual anglers interact with and connect to, I aim to expand our understanding of the importance of context to anglers' experiences, attitudes and behaviors. Vice versa, I contribute to sense of place scholarship by presenting recreational angling as a meaningful activity that constitutes a specific type of people-place interaction with its own unique character as both an appreciative and an extractive activity, thereby adding to previous work on sense of place in the context of nature-based recreation activities. Considering the meaningful activity and the meaningful place in tandem helps to deepen our understanding of the relational nature of recreational angling.

Exploring the relationships between angling people and angling settings is no straightforward task. Various social science disciplines attempt to explain pieces of the people-place puzzle, each focusing on a different level of social organization. My thesis focuses on the individual angler as the unit of analysis and builds mainly on theories and methods from environmental psychology and social-ecological systems research. One critical assumption described in these literatures is that people's relationships with place are subjective, but vary systematically based on person, place and experience characteristics (e.g. Masterson et al., 2017; Stedman, 2016). With this thesis, I aim to examine this systematic variation through testing various hypotheses about the relationships between person, place, and experience characteristics in a recreational angling context.

To guide the comprehensive summary of my research, I have formulated two research questions (Figure 1):

1. *Are there associations between dimensions of angler diversity and anglers' relationships to angling settings?*

This research question considers cognitive, affective and behavioral dimensions of angler diversity, and their influence on anglers' interpretations of different aspects of the angling setting and their attachments to this setting. In addition, I explore how the anglers' residency status (i.e. being a permanent/periodic resident or tourist to the angling setting) influenced their interpretations and attachments related to the angling setting.

2. *How do anglers' relationships to angling settings influence their intentions to act in support of these settings?*

This research question focuses on anglers' intentions to promote, improve or protect angling settings through acts of loyalty and stewardship, as a result of their views of the setting and their relationships to the setting.

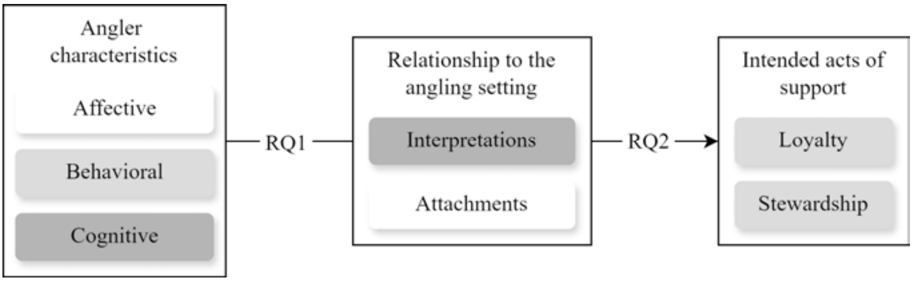

Figure 1. Overarching research questions (RQ). Affective dimensions in white, behavioral dimensions in medium grey, cognitive dimensions in dark grey.

I answer the two research questions through synthesizing the findings from the four research papers that make up this compilation thesis (Table 1). **Paper I** explores the effects of various angler characteristics on anglers' perceptions of fish stock trends (i.e. setting interpretation) at a popular salmonid angling destination in the south of Sweden, Mörrums Kronolaxfiske (from here on also referred to as "Mörrum") (RQ1). **Paper II** examines the relationships between angler characteristics, (angling) experiences, and anglers' interpretations of and attachment to Gotland (RQ1), the largest island in the Baltic Sea, which offers a range of different angling activities. This paper also takes into account the anglers' status as (periodic) residents or tourists on Gotland. **Paper III** returns to Mörrum and explores the structural relationships between angler characteristics, the anglers' image of and satisfaction with Mörrum (i.e. interpretations), their attachment to Mörrum, and their willingness to stay loyal to Mörrum through revisiting or recommending this destination (RQ1 +

RQ2). Finally, **Paper IV** tests the effects of anglers' interpretations of and attachments to Gotland on their intentions to engage in stewardship actions on the island (RQ2).

Table 1. Overview of the papers included in this thesis and the research questions they address.

Paper	**Title**	**Research question(s) addressed**
I	What you see isn't always what you get: On how anglers' fish stock perceptions are influenced by motivations, satisfaction and engagement	1
II	Nothing can substitute experience? Sense of place in permanent residents, periodic residents and tourists engaging in recreational angling at an island destination	1
III	Been there, done that? Effects of centrality-to-lifestyle and experience use history on angling tourists' loyalty to a Swedish salmon fishery	1 + 2
IV	Effects of recreational anglers' sense of place on their stewardship intentions in private and social contexts	2

Outline of the thesis

In the chapters that follow, I guide you through the findings of my research. First, in the **Background and theory** chapter, I introduce you to the activity of recreational angling and the existing social science research on this topic. This chapter also lays the theoretical foundation for this thesis. The chapter on **Research approach** describes the study sites and the methods I used to gather and analyze data. I end this chapter with some reflections on my (academic) background and scientific worldview, to contextualize not just this thesis, but also myself as a person. In the next chapter, I describe my **Key findings** from Paper I-IV, based on the two research questions introduced in the previous section above. In the **Synthesis** chapter, I explain how my research fits into the existing literature on recreational angling and people-place relationships. Moreover, I describe how my findings address the broader developments in recreational angling identified in the introductory chapter. I end my thesis with some **Future perspectives** to guide new research on recreational anglers and angling places, and a **Conclusion** that summarizes the most important take-home messages of my research.

Background and theory

In this chapter, I present the background and theoretical foundation of this thesis. The chapter starts with a concise overview of the history of recreational angling in Western societies, as well as its present status in Northern Europe. I then proceed by describing some of the social science literature on recreational angling on which this thesis builds.

The last three sections of this chapter describe the key theoretical themes that served as the backbone for my thesis. First, I discuss literature on recreational angler diversity, and distill from it various cognitive, affective and behavioral angler characteristics that may be relevant to the relationships between anglers and angling settings. Second, I describe sense of place as a concept more generally and draw connections to the recreational angling literature. I explain how people's beliefs about what a place is feed into the relationships they may form to that place, and I introduce recreational angling as a potential vehicle for developing a sense of place. Finally, I describe the behavioral dimension of sense of place, and show how people's relationships to meaningful places may promote their intentions to protect or improve that place through acts of loyalty and stewardship.

A brief introduction to recreational angling

The first evidence of humans fishing with hook and line (i.e. angling) as a food provisioning activity dates back to about 42 000 years ago (O'Connor et al., 2011), but the origins of angling for recreational purposes are more difficult to trace. The first written mention of angling as purely a recreational activity stems from 15th century England, by the hand of noblewoman Dame Juliana Berners ("A Treatyse of Fysshynge wyth an Angle" 1496). In addition to her detailed descriptions of various angling gears and techniques, she also discussed the contribution of angling to establishing personal morals and virtues, and she emphasized the angler's responsibility to protect fish stocks for future generations, which aligns remarkably well with contemporary ideas of sustainable natural resource management). In the introduction to Berners' book added in 1880, M.G. Watkin captures this sentiment:

"Nor should a man ever carry his amusement to excess, and catch too much at one time; this is to destroy his future pleasure and to interfere with that of his neighbours. A good sportsman too, she adds, will busy himself in nourishing the game…" (Watkins, 1880)

Angling, during Berners' time, was an elite activity, reserved for the upper classes of society. However, as western societies increased their welfare (notably at the expense of the welfare of others), and more time and resources became available for leisure activities, recreational angling gradually became accessible to members of the general public. This positive relationship between economic development and recreational angling participation has also been described in the lifecycle of fisheries theory (Cowx et al., 2010). The same theory also postulates a decrease in participation when industrialization transitions into urbanization and societal concerns for animal welfare and nature conservation grow. Nevertheless, in many economically developed countries today, the micro- and macroeconomic contributions of the recreational angling industry through angler expenditure and job security are still substantial (Hyder et al., 2018; Tufts et al., 2015), specifically in fisheries that attract non-resident anglers through fishing tourism (Strehlow et al., 2023). In addition, recreational angling holds great socio-cultural value, especially in communities with a long history of fishing activity (e.g. Kelty & Kelty, 2011; Liu et al., 2019).

Contemporary recreational angling practices (i.e. fishing with rod and reel) can involve a variety of different gear types and strategies, ranging from coarse angling with live bait to game-angling using fly fishing techniques and artificial lures. Recreational angling can take place in any type of waterbody that holds fish (either by nature or by human introduction) and is accessible either from shore or with a boat. Anglers target a diverse range of species, depending on their preferences for a certain type of experience, challenge or food taste. Similar to the diversity in angling preferences, motivations for engaging in recreational angling activities vary from angler to angler. In his discussion of the work of 17th century angling enthusiast and writer Izaac Walton, Tom Mordue describes the attraction of angling as "the ability of angling to offer a counterpoint to everyday life, through direct immersion in nature in the company of angling friends" (Mordue, 2009, p. 532).

Management and governance structures for recreational fisheries exist in many shapes and sizes around the world. The development of such structures often follows a country's economic development, resulting in well-defined management and governance structures in industrialized countries (e.g. in North America and Europe), as compared to the limited integration of recreational fisheries into aquatic resource management in less economically developed countries (Potts et al., 2020). In most cases, fishing rights and subsequent management responsibilities are held by either a public institution or a private owner. Within the European Union, recreational fisheries are covered by the Common Fisheries Policy, which aims to ensure the long-term sustainable of all fishing activities in European waters (European Commission, 2023).

While this thesis focuses exclusively on recreational angling practices, I want to acknowledge the existence of other forms of recreational fishing, including netting, trapping and spear fishing, among others. Throughout this summary, I cite studies that focus on these other fishing styles, in which cases I will refer to "fishing" rather than "angling". In **Paper I and III**, I occasionally use "angling" and "fishing" interchangeably, but these studies exclusively involved recreational anglers.

Fishers and fisheries

Fisheries management has long been a biologist's occupation, but as the awareness of anthropogenic impacts on aquatic ecosystems grew, so did the call for incorporation of the social sciences into fisheries research and management. Extensive monitoring programs are reducing uncertainties related to the ecological status of fisheries, making fisher behavior one of the most crucial sources of uncertainty for fisheries managers (Fulton et al., 2011). In the past, recreational fisheries research has looked towards economics to provide models that could explain or predict angler behavior based on a utility function (see Fenichel et al., 2013 for a bibliometric analysis). The general idea of these models is that angler decisions aim to maximize utility under given constraints (e.g. rules and regulations, limited resources). While commercial fisheries studies typically equate utility with economic gain, recreational fisheries models often use satisfaction as a measure of utility (Birdsong et al., 2021). Regardless of how utility is operationalized, models based on utility-maximization have been widely criticized for their inability to capture behavioral diversity or present a realistic representation of the social-ecological complexity in fisheries (Wijermans et al., 2020).

Other studies have attempted to explain rather than predict angler attitudes and behaviors through the application of theories and methods from environmental and social psychology. Examples include studies on angler specialization (originating from Bryan, 1977), motivations to fish (e.g. Beardmore et al., 2011; Magee et al., 2018), angling site choice (reviewed in Hunt et al., 2019), and attitudes towards management (e.g. Garlock & Lorenzen, 2017; Mackay et al., 2020), as well as angler satisfaction (reviewed in Birdsong et al., 2021). One of the earliest human dimensions studies used indicators of emotional and behavioral engagement (centrality-to-lifestyle and avidity, respectively) to categorize anglers into casual anglers and avid/specialized anglers (Bryan, 1977). Since then, our understanding of the attitudinal and behavioral diversity of recreational anglers across different angling contexts has expanded tremendously, and the concept of angler heterogeneity has become commonplace in the recreational fisheries literature (e.g. Hunt et al., 2021; Magee et al., 2018; Matsumura et al., 2019).

While the vast majority of recreational angling studies use quantitative methods and have been published in economic or fisheries science journals (Fenichel et al., 2013), an increasing number of qualitative studies explore recreational angling as a social phenomenon (e.g. Mordue, 2009). Such studies include descriptions of people's lived angling experiences (Bear & Eden, 2011; Bull, 2011), and studies using a feminist approach to provide perspectives on gender (Burkett & Carter, 2022), ethnicity (Waitt et al., 2021) and more-than-human aspects of angling (Mordue & Wilson, 2023). Moreover, scholars discuss ethical and philosophical aspects of recreational angling (de Leeuw, 1996), and particularly catch-and-release angling (C&R; Arlinghaus et al., 2012). These studies allow us to see past catches and quotas, and bring forward the inextricable links between humans, fish and water.

Characterizing recreational anglers

The vast and diverse literature on recreational angling illustrates that the average angler does not exist. Anglers differ greatly in how they practice the angling activity, their knowledge and beliefs about angling, and their emotional connection to angling (Hunt et al., 2021; Figure 2). Uncovering patterns in these cognitive, affective and behavioral dimensions of angler diversity is of scientific and practical relevance, because it might help to categorize anglers and their experiences, and explain anglers' preferences for particular settings or management actions. In this section, I present a short overview of some of the different concepts and theories that have made their appearance in the recreational angling literature to characterize anglers and describe the diversity in anglers' attitudes and behaviors.

Figure 2. Dimensions of angler diversity (Original illustration: Irasutoya).

The idea of angler diversity is perhaps easiest to illustrate through the wide variety of different types of angling activities that are being practiced throughout the world. Behavioral angler diversity can be described in qualitative terms, based on when and where anglers fish, the species they target, and the types of angling gear they use (Fisher, 1997). In addition, researchers often use quantitative behavioral indicators such as avidity (i.e. time spent engaging in angling activities), to distinguish between anglers that dedicate large amounts of time to the angling activity and more casual participants that do not fish frequently (Bryan, 1977). While behavioral characteristics can be useful as a proxy for a person's connection to a recreational activity, scholars question whether studying behavior alone, particularly in the form of mere quantitative time investments, allows us to capture the more subjective aspects of people's connection to recreation (Kuykendall et al., 2015). Behavioral outcomes are shaped by a complex interplay of cognitions and emotions, which may be overlooked when researchers focus on behavior only. To overcome this issue, the recreational angling literature frequently refers to recreation specialization, to capture the multidimensional nature of people's relationship to angling (Bryan, 1977).

Recreation specialization has been defined as “a continuum of behavior from the general to the particular, reflected by equipment and skills used in the sport and activity setting preferences” (Bryan, 1977, p. 175) or “the selective channeling of interests and abilities into a specific area” (McIntyre & Pigram, 1992, p. 4 referring to Little, 1976). In addition to the behavioral dimension of avidity, specialization has cognitive and affective dimensions. For example, cognitively, specialization towards a particular angling style is reflected by the angler’s knowledge and skills related to that particular type of angling activity, with specialized anglers showing a more developed knowledge system and skills than less-specialized anglers or anglers who only fish occasionally (Little, 1976).

The affective dimension of specialization is often described through the concept of enduring involvement. Scholarship on enduring leisure involvement posits that people create lasting affective relationships to leisure activities that align with their values and help them meet personal goals (Kyle et al., 2007). While leisure involvement in itself is a multidimensional construct, angling studies often limit the measurement of the affective dimension of specialization to centrality-to-lifestyle, which reflects the position of the angling activity within the context of the angler’s private and social life (Kyle et al., 2007). Beardmore et al. (2013) identified centrality-to-lifestyle as the best predictor of angling preferences.

While recreation specialization has become a popular framework for angler characterization, the angling literature describes additional dimensions of angler diversity. For example, early research recreational angling identified recreation experience preference (REP), based on motivation theory, as an important driver of angler behavior and a source of diversity (Fedler & Ditton, 1994). The REP concept is based on the idea that anglers prefer particular types of angling activities because they believe that the experience will help them fulfil particular needs or reach certain goals (Driver & Knopf, 1976). This cognitive strand of leisure motivation research aimed to inform managers about the best strategies to meet recreationists’ demands for particular types of experiences and avoid user conflicts (Manfredo et al., 1996). In addition to activity-general motivations for angling, such as being with friends or experiencing nature, researchers identified experience preferences specific to recreational angling, relating to aspects of the catch (referred to as either “consumptive orientation” or “catch orientation” in the literature). For example, some anglers appeared to prefer experiencing a challenging fight with a trophy-sized fish, whereas others preferred to catch fish for consumption (Fedler & Ditton, 1986; Graefe, 1980). While motivations and catch orientations are distinct cognitive dimensions of angler diversity, they have been found to correlate with recreation specialization (e.g. Aas & Kaltenborn, 1995).

The cognitive, affective and behavioral dimensions of angler diversity discussed in this section have all been found to explain various angler attitudes and behaviors related to fisheries and their management, but studies continue to produce mixed results. For example, concerning the association between angler specialization and management acceptance, some studies provide empirical evidence for a positive association (Oh & Ditton, 2008; Salz et al., 2001), while others observed that more specialized anglers were less likely to accept certain management tools (Dorow & Arlinghaus, 2012). The ambiguous relationships between angler attitudes and behaviors suggest that, to understand these relationships, we might need to look beyond the angler and the angling activity, and consider the setting that facilitates the activity. In this thesis, I explore anglers' relationships to the angling setting as a novel, relational perspective on angler diversity.

Angling settings as meaningful places

In much of the recreational angling literature, the angling setting is considered to be no more than an aquatic ecosystem that could be described through its physical attributes and subsequent "angling quality". The observed heterogeneity in anglers' site-specific attitudes and behaviors is often explained through angler diversity, arguing that angler characteristics (e.g. motivations, preferences) determine how anglers respond to various (physical) setting attributes (Hunt et al., 2019). In this section, I expand this idea by considering angling settings as meaningful places and applying the concept of sense of place.

The literature on people's relationships to places ranges from phenomenological studies focusing on people's lived experiences in a particular place to positivistic approaches that aim to explore the relationships between people's connections to place, and other (place-specific) attitudes and behaviors. I consider a place to be a physical space that people imbue with meaning through experiences, i.e. through being in that space (Tuan, 1977). Similar to the cognitive, affective and behavioral dimensions of angler diversity described in the section, people's relationships to places are characterized by their beliefs about what a place is, their emotional bonds to that place, and their behaviors related to that place (Masterson et al., 2017; Figure 3). In this section, I present recreational angling as a specific type of "being-in-place" that shapes these relationships.

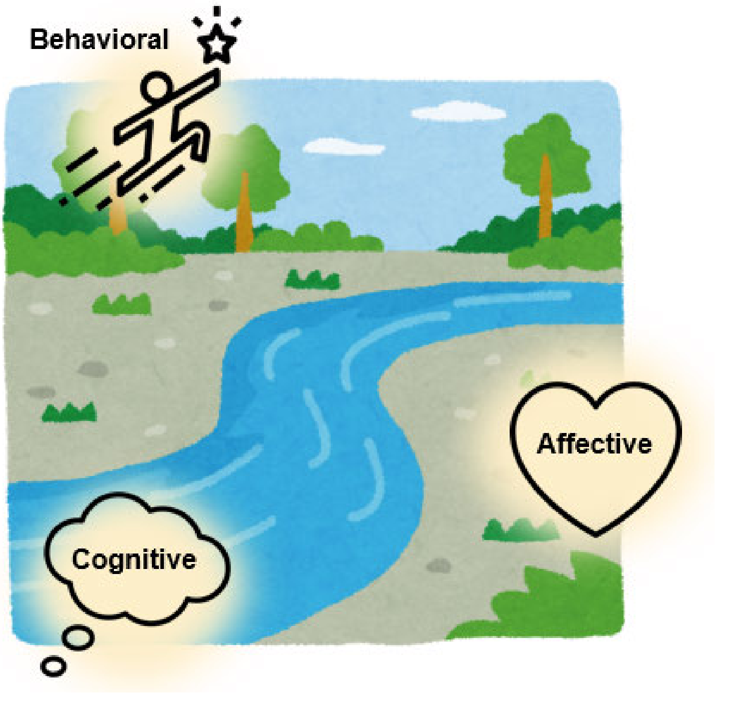

Figure 3. Dimensions of people-place relationships. (Original illustration: Irasutoya).

One of the main conclusions from decades of research on people's relationships to places is that people have the capacity to create profound bonds to the settings they interact with throughout their lives. Place attachment forms through a complex interplay between person and place, shaped by personal characteristics and experiences, physical and social place attributes, and psychological processes such as memory and meaning making (Scannell & Gifford, 2010). A person's attachment to place is generally considered to be multidimensional, emerging from the various needs that (interacting with) the place fulfills (Droseltis & Vignoles, 2010). Similarly, as described in the previous section, recreational angling can fulfill people's needs and may thus act as a vehicle for shaping people's connections to the places that facilitate angling and its subsequent fulfillment of needs. For example, people may be attached to a place because its physical attributes afford a specific type of desired angling experience that would help them achieve certain goals (e.g. catching a particular target species) and cannot easily be substituted by another place, thus creating a functional form of attachment known as place dependence (e.g. Stokols & Schumacher, 1981). Attachment to place also has emotional or affective aspects. For example, people may feel attached to a place because angling in that place contributes to psychological needs such as social belonging or identity formation and self-expression (Hay, 1998; Twigger-Ross & Uzzell, 1996). Such an emotional bond between a person and a place is commonly referred to as place identity. Place dependence and place identity are often considered separately, as sub dimensions of place attachment, but unidimensional conceptualizations of place attachment are also common in the literature (Nelson et al., 2020).

People's attachment to a place relies on their cognitive interpretations of what that place is and what it means to them personally (Wynveen et al., 2012). Such place meanings can include literal descriptions (e.g. "this place is a river"), symbols (e.g. "this place feels like home"), or functions (e.g. "this is a place for angling"), among others (Rajala et al., 2020). Together, place meanings and attachments make up a person's sense of place, which develops and changes over time, and emerges through people's private and social experiences with a place, in which recreational activities, such as recreational angling, play an important role (Hansen, 2021). The experiences provided by places used for angling are unique in several ways. First, natural places, such as many of the aquatic environments that facilitate recreational angling, are seen as especially meaningful because of their ability to provide space for solitude, self-reflection and appreciation (Manzo, 2005), as well as the opportunity to connect to nature (Wolsko & Lindberg, 2013). Second, unlike the land-based places that provide the settings for people's everyday lives, the dominant medium in angling settings is water. Becoming a successful angler requires developing an understanding of aquatic environments that relies on a different type of engagement as compared to the visual engagement that often suffices in terrestrial environments (Eden & Bear, 2011). The interpretation of angling places thus demands a type of multisensory embodied engagement that is increasingly seen as vital to a person's sense of place (Raymond et al., 2017). Finally, recreational angling experiences, such as catching and killing a fish or experiencing a challenging fight, can be deeply emotional, memorable experiences, which play a key role in sense of place formation (Manzo, 2005).

If we consider recreational angling as a way of "being-in-a-place" that influences angler-place relationships, and if we also consider the anglers' diverse "ways of being" described in the previous section, then we would arrive at the conclusion that anglers' likely differ in how they interpret angling places, and how they connect to these places. Past research on the relationships between recreation specialization and place attachment in a recreational angling context supports this idea (Hammitt et al., 2004, 2006, 2009; Oh et al., 2012, 2013), but many aspects of anglers' sense of place, such as place meanings, are still uncharted territory. Moreover, the consequences of demographic and environmental change to anglers' sense of place remain largely unknown (but see Conley & Diamond, 2024 on anglers' sense of place and climate change as an exception).

There are, however, several concepts from the recreational angling literature that aim to capture anglers' interpretations of angling settings, which might prove insightful for exploring the relationships between anglers and angling settings. The concepts include angling destination image (González et al., 2021; Stensland, Mehmetoglu, et al., 2021), angling satisfaction (Birdsong et al., 2021) and ecological perceptions (Löki et al., 2021; Pita et al., 2020). Since this thesis aims to bridge the recreational angling literature and sense of place scholarship, I chose to cast a wide net and include these other types of place interpretations in my study (**Paper I and III**), alongside traditionally considered components of sense of place (i.e. place meaning and place attachment; **Paper II and IV**).

Supporting meaningful places

Behavior plays a central role in people's relationships to meaningful places, both as a driver and as an outcome (Masterson et al., 2017). I consider the link between people-place relationships and behavior to be particularly relevant in natural environments that are sensitive to (irresponsible) human behavior. While a person's relationships to place may cause them to care for that place and adopt responsible behaviors (Stedman, 2002), these relationships may also become a roadblock towards sustainable development or conservation when the place meanings that underpin a person's attachment are threatened or lost (N. M. Anderson et al., 2017). In this thesis, I focus on anglers' intentions to engage in two potentially supportive, place-based behaviors that I consider particularly relevant to the present and future of recreational fisheries in times of change, namely destination loyalty and angler stewardship.

Destination loyalty intentions reflect a person's willingness to revisit or recommend a tourist destination (Oppermann, 2000). Rather than spurious loyalty that results from convenience or a lack of alternatives, intentional loyalty emerges from a person's positive attitude towards the destination (Oppermann, 2000) and their attachment to the destination (Su et al., 2011). Links between components of people-place relationships and destination loyalty have been studied extensively, showing that positive interpretations of destinations (e.g. destination image or satisfaction) and (dimensions of) place attachment are vital to loyalty formation (T. H. Lee & Shen, 2013; Prayag & Ryan, 2012; Stylidis et al., 2020).

In the recreational angling literature, loyalty is primarily studied in the form of past visitation effects on angling site choice, which appear to be positive (Hunt, 2008). More recently, connections between place interpretations, attachments and angling destination loyalty were explored, yielding mixed results. While Stensland et al. (2021) found positive links between overall angling destination image, satisfaction, place attachment and angling destination loyalty, González et al. (2021) only found effects of catch satisfaction, not overall place satisfaction. Further exploration of these links, which I perform in this thesis, is thus warranted.

I consider destination loyalty to be a potentially supportive behavior for several reasons. The first reason is the economic support that loyal visitors provide. Through revisiting and recommending a destination, visitors' expenditures can provide continued economic support to the destination (Alegre & Juaneda, 2006; Darnell & Johnson, 2001). Second, the revisiting behavior of loyal visitors increases their exposure to the destination, which in turn is an important predictor of place attachment, thus creating a positive feedback loop between loyalty and attachment (Plunkett et al., 2019). The more experiences visitors gather at the destination, the more likely it is that they will form a lasting bond to that place. In turn, such a bond may inspire care for a place through supportive actions (West et al., 2018).

This brings me to another type of supporting behavior that has previously been linked to people's relationship to place (Daryanto & Song, 2021), namely environmental stewardship. In an environmental context, the term "stewardship" refers to the intentions and actions of individuals or groups related to the responsible use of nature, aimed at achieving both ecological and social outcomes (Bennett et al., 2018). Environmental stewardship is inherently place-based (West et al., 2018) and dependent on the efforts of local communities (Bennett et al., 2018), though operational scales may vary (see for example Chapin et al., 2022 on "Earth stewardship"). Sense of place is one of the relational values that is crucial to the emergence of stewardship, particularly because it can promote a sense of care for meaningful (West et al., 2018). The attachment-promoting quality of destination loyalty may thus have positive effects on stewardship behaviors as well.

Within recreational angling research, the proposition that anglers can act as stewards of aquatic ecosystems frequently enters the scientific debate. Proponents argue that participation in recreational angling promotes enduring connections to nature, which in turn can motivate people's actions to support or protect that nature (Shephard et al., 2023). Opponents, on the other hand, state that the relationship between anglers, fish and nature is of a more functional nature, and that angler stewardship is primarily aimed at securing exploitation of the resource, rather than protecting ecosystems or nature as a whole (de Leeuw, 2012). Following the opponents' argument, if a place's recreational angling experiences are altered or lost, then anglers might choose to leave rather than stay and steward. Research on resource or site substitution provides evidence for such "switching behavior", but again, anglers differ in why or when they would switch (e.g. Schuhmann & Schwabe, 2004). A recent perspective article by Shephard et al. (2024) considers both sides of the angler stewardship argument and concludes that, while the potential for stewardship exists among anglers, this potential cannot be realized through superficial angling experiences that disconnect the angler from natural processes (e.g. put-and-take lakes, or catch-and-release vs. catch-and-kill). Instead, the authors argue that stewardship emerges from intense, emotional angling experiences that are embedded within a social-ecological system, or within a place, and that confront anglers with their responsibility towards nature.

Research approach

This chapter provides a general overview of the research design and methodological considerations. Details about the specific procedures for each study can be found in the Methods sections of the individual papers.

Research design

The research presented in this thesis is based on a cross-sectional study design, collecting data from two different geographical locations (Bryman, 2008). The studies are characterized by a pragmatic, interdisciplinary approach, applying theories and methods mainly from environmental psychology and leisure and tourism studies to test the hypothesized relationships between the psychological constructs. The conception and design of each study emerged through a combination of my own expertise and the expertise of the co-authors of the papers, local stakeholders, and the supervisory team. While I had the main responsibility for drawing up the initial research design and measurement instruments, the other contributors acted as informants through verbal and written dialogue. Together, we aimed to develop research objectives that were fitting to the local or regional context of each fishery, and collect data of both scientific and practical relevance, in order to aid potential future comparative studies or management efforts. As a result, the study of Mörrums Kronolaxfiske addressed tourism-related concepts such as destination image, satisfaction and destination loyalty, whereas the study of Gotland focused more on angler stewardship and sense of place in residents and visitors. Through this process of working together with different academic and non-academic collaborators, I was inspired to consider a variety of perspectives and expand the relevance of this work beyond the academic realm.

Study sites

I collected the data for this doctoral thesis through quantitative angler surveys implemented at two different angling settings in Sweden (Figure 4). These places represent different management regimes (open access versus permit-based access), different waterscapes (coastal/island versus riverine), different target species (multispecies vs salmonids), and different types of tourism (general leisure tourism with angling opportunities versus angling tourism). While representing different ends of various spectra, these two places share a dependence on the Baltic Sea for the majority of their angling activities. Before describing the study sites in more detail, I provide some context regarding recreational angling in Sweden.

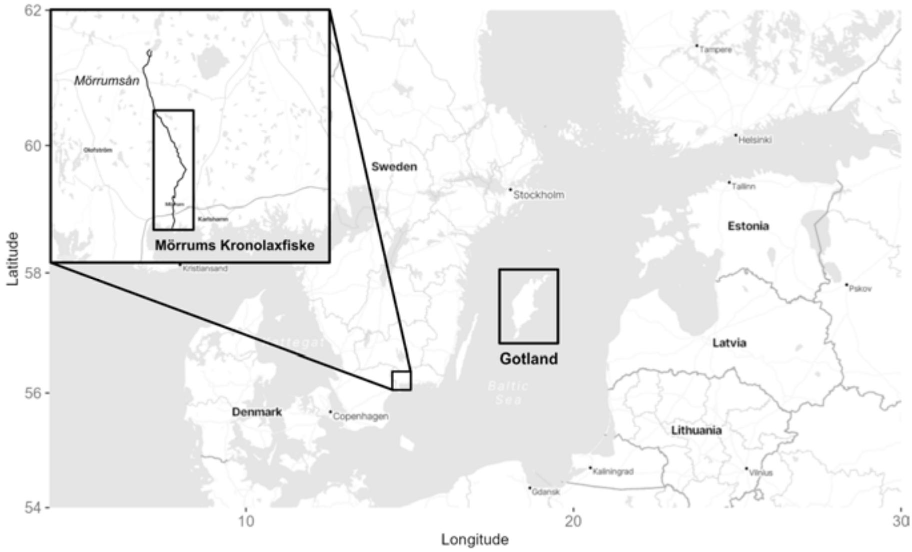

Figure 4. Map of the Baltic Sea and adjacent countries, outlining the two study sites (i.e. Mörrums Kronolaxfiske and Gotland) in black (image attribution: Stadia Maps, Stamen Design, ggmap)..

With over 95 000 lakes, 30 rivers and a coastline of more than 3000 kilometres, fishing has provided an important source of food and income to Sweden for centuries (Cederqvist et al., 2020). However, the scale and scope of the fishing activities in the Baltic Sea, in addition to ongoing pollution and climate change (Andersen et al., 2017), proved to be detrimental to many of the Baltic fish stocks and the commercial fisheries targeting these stocks (Aps & Lassen, 2010). The decline in commercial fishing has had, and continues to have, consequences for the many (coastal) communities whose livelihoods depended on these activities (Björkvik et al., 2020).

While commercial fishers struggle to stay afloat, recreational fishing remains a popular leisure activity in Sweden. According to the most recent statistics, about 10% of the Swedish population has been involved in recreational fishing in 2023 (i.e. 1.3 million participants), which is a slight decrease from the 2021 estimate of 1.5 million participants (Swedish Agency for Marine and Water

Management & Statistics Sweden, 2024a). While recreational angling with different kinds of handheld gear (e.g. spin fishing, bait fishing, fly fishing) is most popular, recreational net fishing for private consumption (i.e. "husbehovsfiske") is common as well.

Swedish recreational fisheries management in freshwater is primarily performed by local fishing rights holders, which often collaborate in collective organizations (i.e. "fiskevårdsområdesförening"). Exceptions include the country's five largest lakes, which are open access fisheries owned by the Swedish state, as well as various smaller, permit-based fisheries in waterbodies that fall under the ownership of Sveaskog, Sweden's largest forestry company (which is also state-owned). The state also governs the open-access coastal and marine recreational fishing activities through the Swedish Agency for Marine and Water Management.

Mörrums Kronolaxfiske

The first study site was Mörrums kronolaxfiske (also referred to as "Mörrum" in this thesis), located in the southern Swedish county of Blekinge (Figure 4). Mörrums kronolaxfiske is an exclusively recreational fishery owned by Sveaskog, the largest forest owner in Sweden. The fishery covers about 18.4 km of the Mörrum river ("Mörrumsån" in Swedish), divided over five separate stretches. The name "Mörrums Kronolaxfiske" refers to its historical connection to the royal families of Sweden and Denmark, who owned the fishing rights to this river since at least 1231 (Johansson, 2004). Commercial fishing for salmonids was common in this river up until the 1960s, after which commercial fishing activities were banned and recreational angling with spin or fly fishing gear (Figure 5), became the only form of fishing allowed.

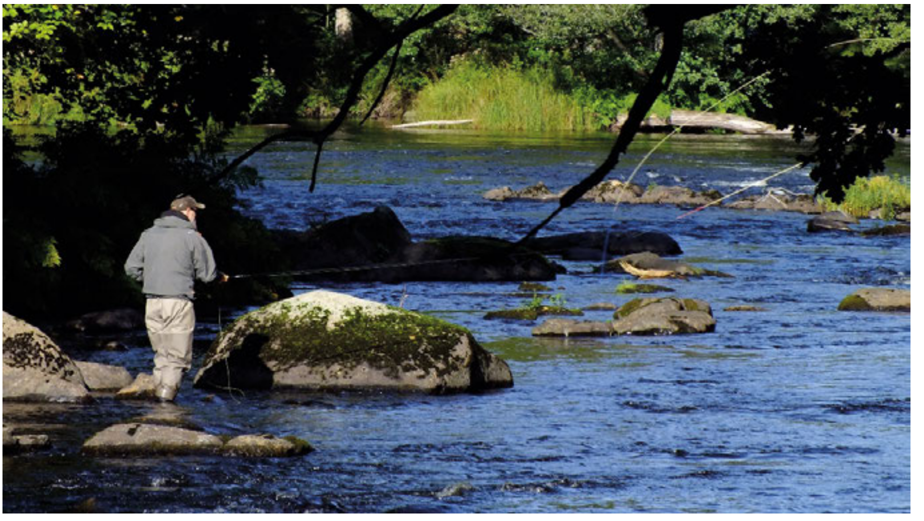

Figure 5. An angler fly fishing at Mörrums Kronolaxfiske (photo credit: Samuel Blyth).

Nowadays, Mörrums Kronolaxfiske is one of Sweden's most treasured angling destinations, referring to itself as "Sweden's crown jewel for sportfishing" (Sveaskog, 2022). Anglers from within and outside Sweden travel to the Mörrum river for a chance at catching an Atlantic salmon (*Salmo salar*) or sea trout (*Salmo trutta*), the species which Mörrum is most known for. The salmonid angling season lasts from late March to late September, and approximately 10 000 angling day permits are sold each year, demonstrating the popularity of this fishery among anglers. Despite its continued success as an angling destination, the fishery is likely affected by the overall poor ecological state of the Baltic Sea caused by climate change and pollution (HELCOM, 2023).

The data for **Paper I and III** was collected through an angler survey at Mörrums Kronolaxfiske.

Gotland

The second study site was Gotland, which is Sweden's largest island in the Baltic Sea. Gotland is located approximately 90 kilometers from the Swedish mainland and the island is home to about 60 000 permanent residents. Gotland has a rich fishing history, dating back to at least the Mesolithic era (Boethius et al., 2017). Currently, only 19 commercial (coastal) fishing vessels are registered on Gotland (Swedish Agency for Marine and Water Management & Statistics Sweden, 2024b), and the majority of the fishing activities are recreational, either angling or net fishing. Gotland offers both permit-based freshwater angling and open access coastal angling (Figure 6), where anglers can target a variety of different species depending on the time of the year. The coastal fishery for sea trout (*Salmo trutta*), open during spring and autumn, is particularly popular among angling tourists, attracting both domestic and international visitors (Blicharska & Rönnbäck, 2018). Similar to Mörrum, many of the fishing activities on Gotland are heavily dependent on the status of the Baltic Sea, which is, as previously mentioned, poor (HELCOM, 2023). In addition, Gotland has been facing severe droughts in recent years, which local managers fear will threaten the fish populations around the island (Sportfiskarna, 2022).

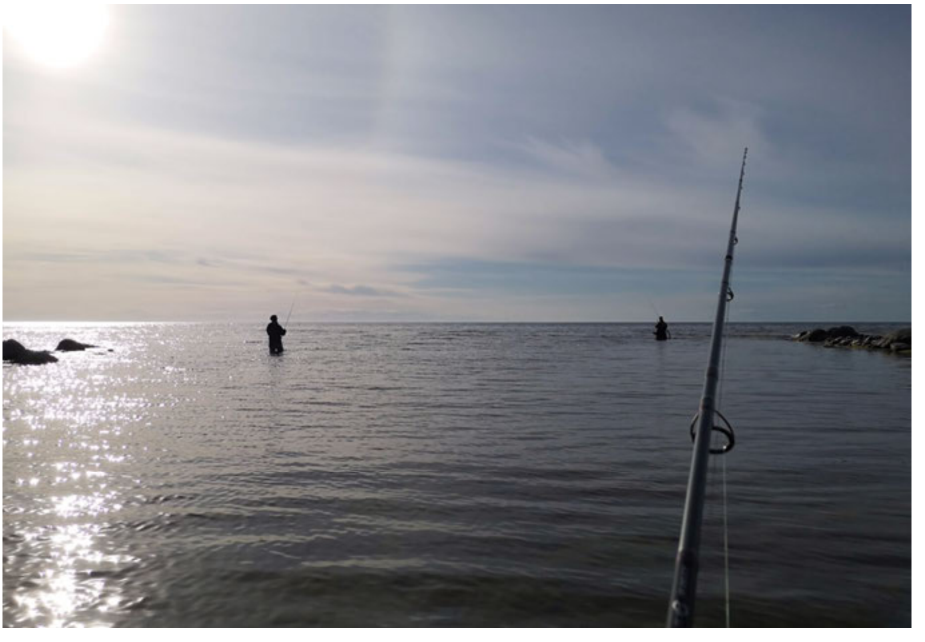

Figure 6. Anglers wading into the Baltic Sea near Brissund, Gotland (photo credit: author).

Angling tourism, however, is just a small segment of the tourism sector on Gotland, and official statistics are unavailable. The island is a popular destination for cultural and rural tourism, with over 1 million overnight stays registered for 2022 (Tillväxtverket & Statistics Sweden, n.d.). On top of that, about 12 000 properties on Gotland are listed as secondary residences or leisure homes, which are used mainly during the summer months.

The data for **Paper II and IV** was collected through an angler survey on Gotland.

Data collection and ethics

The angler surveys were administered through Alchemer online survey software. The recruitment procedure for Mörrums Kronolaxfiske was based on a convenience sample of all anglers who bought an angling permit for this fishery during the 2019 angling season (N = 2558). The survey took place at the end of this season (September – October 2019). Only anglers with a valid email address were contacted (N = 956), and 380 of them responded to the survey (response rate = 39.7%). Among them were 332 tourists, 29 periodic residents and 19 permanent residents. For **Paper I and III**, I used subsamples of the dataset, which excluded entries with missing values on the variables of interest. The subsamples contained slightly lower proportions of Swedish respondents than the sample population (46.9% for **Paper I** and 53.2% for **Paper III**, versus 56.1% in the sample population). While the official statistics for recreational fishing participation in Sweden (in 2019) estimated approximately one third of the fishers in Sweden to be female (Swedish Agency for Marine and Water Management & Statistics Sweden, 2021), the Mörrum sample included only six women.

For Gotland (**Paper II and IV**), the lack of a registration system for recreational angling activities on the island meant that there was no straightforward sample population to target. Instead, I implemented a snowball sampling procedure to recruit anyone with recreational angling experience on Gotland. Since one of the objectives of the Gotland study was to compare sense of place variables in residents, second home owners and tourists, I continued the recruitment until enough responses were gathered for each group to perform statistical comparisons (i.e. quota sampling; Bryman, 2008). Invitations for the survey were distributed via social and traditional media (e.g. local newspapers, Facebook group related to angling on Gotland), via local angler organizations and angling tourism operators, and through posters at various access points along the coast, at freshwater sites, and at angling-related events. I also promoted the survey during an interview about my research at the local radio station. Sampling took place between May 2021 and May 2022, and yielded 226 responses (including partials). The full dataset contained 66 tourists, 25 periodic residents and 90 permanent residents. Representativeness of the sample was difficult to assess due to the lack of information about the actual sample population. The ratio of permanent/periodic residents in the sample roughly resembled the ratio of permanent/periodic residents on Gotland as a whole. Out of the survey respondents who stated their country of residence, 90% resided in Sweden and the remaining 10% came from Denmark, Finland and Norway. Considering again that about one third of the (domestic) anglers in Sweden is female (Swedish Agency for Marine and Water Management & Statistics Sweden, 2021), it was apparent that women were underrepresented, with only three females (all of whom were residents) among the 103 respondents that chose to disclose their gender.

The two research questions guiding this thesis focus on four general themes: angler diversity, place interpretations, place attachment and place-based behavioral intentions. I gathered data related to these themes through multi-item psychological measurement scales that have previously been validated in recreational fisheries research or related fields. Since each paper addressed these themes from a different angle, operationalization varies (Table 2). In several cases, individual item wording was adjusted to fit the local context, or items were added or removed due to their perceived (lack of) relevance to the case study based on conversations with local stakeholders and co-authors of the individual studies. The full list of questions for each survey can be found in the Appendices at the end of the thesis (after the papers).

Table 2. Operationalization of the key constructs

Key construct	**Operationalization/ dimension**	**Reference**	**Paper**
Angler diversity (cognitive)	Catch orientation[a]	D. K. Anderson et al., 2007	I
	Motivation to fish[a]	Fedler & Ditton, 1994	I
	Perceived skills		II
Angler diversity (affective)	Centrality-to-lifestyle[a]	Dorow et al., 2010	II + III
Angler diversity (behavioral)	Avidity (days fished per year), years fished, primary target species	NA[b]	I
	Experience use history (EUH, incl. number of trips to target fishery, number of fish to other similar fisheries)	Hammitt et al., 2004	II + III
	Gear use, use of angling environments	NA[b]	III
Place interpretation	Stock trend perceptions (latest versus first trip), accuracy (perceptions versus actual stock trend)	Shephard et al., 2021	I
	Place meaning[a]	Stensland, Mehmetoglu, et al., 2021; Wynveen et al., 2012	II + IV

	Destination image[a]	Stensland, Mehmetoglu, et al., 2021	III
	Satisfaction[a]	Stensland, Mehmetoglu, et al., 2021	I + III
Place attachment	Place dependence[a]	Hammitt et al., 2009; Oh et al., 2012	II + III[c] + IV
	Place identity[a]	Hammitt et al., 2009; Oh et al., 2012	II + III[c] + IV
Behavioral intention	Destination loyalty[a]	Stensland, Mehmetoglu, et al., 2021	III
	Stewardship[a] (C&R, private-sphere, social-sphere)	Blyth & Bower, 2022; Landon et al., 2018	IV

[a] Items were measured on a 7-point scale of agreement, satisfaction (in the case of satisfaction) or willingness (in the case of stewardship), with 1 = lowest score.

[b] NA indicates that the measurement instrument was self-constructed based on a variety of relevant sources.

[c]In Paper III, place attachment was modeled as a second order construct, with place dependence and place identity as its first order constructs.

Data collection involving human participants (and informants) requires careful consideration of the ethical implications of the research process and its potential outcomes. The research conducted in this thesis was designed following the guidelines for Good Research Practice by the Swedish Research Council (2017) and Uppsala University's data protection policy (Uppsala University, 2024), which is in line with the EU's GDPR. The data used in this study was collected anonymously and stored on a secure university server. At the start of both surveys, a short introductory text informed the participants about the purpose of the survey and what the data would be used for. The participants were made aware that participation was voluntary, that their responses would be treated confidentially and that results would only be published in aggregated form, so that responses could not be traced back to individual participants.

Statistical analyses

I used two types of statistical software to analyze the survey data: R Statistics (R Core Team, 2022) for **Paper I, II and III**, and SmartPLS (Ringle et al., 2024) for **Paper III and IV**. Both datasets were subjected to a cleaning process (e.g. changed text to numbers, changed data class to fit with the nature of the variable) and, when appropriate, I performed a missing value treatment prior to the analysis (see individual papers for details).

In **Paper I**, I used binomial regression models to test for effects of various angler characteristics on the anglers' perceptions of the fish stock trends at Mörrum. I also used Spearman's rank correlations to compare the anglers' perceptions to the actual stock trends reported at Mörrum to assess the accuracy of the anglers' perceptions (Pouso et al., 2018). For **Paper II**, I compared permanent residents, periodic residents and tourists based on their angler characteristics, as well as their place meanings and attachments, using Kruskal-Wallis group comparisons followed by Dunn's post hoc tests. I then tested for correlations between each of the angler characteristics and the anglers' place meanings and attachments. Specific software packages for R Statistics are mentioned in each paper.

Partial least squares structural equation models (PLS-SEM) were used to test the relationships between the anglers' place interpretations, attachments and behavioral intentions. I analyzed the model for **Paper III** in SmartPLS 3.0, whereas the model for **Paper IV** was analyzed in the 4.0-version of the same software. I chose the partial least squares-based SEM over the covariance-based SEM, because of the presence of formative constructs in the models (i.e. destination image and satisfaction in **Paper III**, and place meanings in **Paper IV**). Moreover, the PLS algorithm produces more reliable results than the covariance- based algorithm when the sample size is small (Hair et al., 2019), as was the case for both surveys. Due to the small sample size for the Gotland survey, I was unable to reach sufficient statistical power in **Paper IV** using the standard significance level of $\alpha = 0.05$. Therefore, following the guidelines by Hair et al. (2017), I chose to deviate from the standard and run the analysis with a significance level of $\alpha = 0.10$ instead. I urge the reader to keep this in mind while reading the summary of the key findings in the next chapter.

The data visualizations (i.e. graphs) for **Paper I**, and the maps used in this summary and in **Paper II and IV** were created in R Statistics using the packages "ggplot2" (Wickham, 2016) and "ggmap" (Kahle & Wickham, 2013). I manually designed the PLS-SEM figures presented in **Paper III and IV** using the diagrams.net web application.

Reflections on my background and worldview

In this section, I briefly present some reflections on who I am and how I arrived at this doctoral thesis. The reason I present these reflections here is not to convince you that I am aware of all the potential cognitive biases that may or may not have influenced my choices and interpretations. I rather see these reflections as a point of departure for further discussions about some of the challenges and opportunities of interdisciplinary research, specifically in the environmental social sciences.

Working on this thesis, across disciplines, was an incredibly humbling experience. My training in biology, specifically aquatic ecology, taught me that objective reality exists, and that all you have to do to understand it is go outside and observe it. Measure flow velocity, test for pollutants, count the fish; and thou shall know the reality of the stream. And, more importantly, write a report and talk to the manager, so that we can maintain or achieve the exact reality we want to see.

Out of all the natural sciences, ecology is perhaps the discipline that is most concerned with the actions of people, as many of the world's ecosystems are subjected to these actions. As Ray Hilborn (2007) stated in the title of his article on fisheries performance measures: "Managing fisheries is managing people" (p. 285). But I know now that understanding people entails much more than simply exchanging ecological data for social data. It requires a complete rethinking of what reality is, or might be, and how we examine it. As I said, working on this thesis has been humbling.

Now that my time as a PhD student comes to an end, I believe it is time to take score and share some of my reflections around scientific worldview. The biologist within me believes that some form of objective reality could exist, but the interdisciplinary scientist that I have become doubts that we will ever be able to truly capture or define it. When I talk about who anglers are, what anglers do, and why, I will not state that there is any objective truth in what I state. I have made observations based on psychometric measurement, at a certain point in time and space. I have explored patterns in the *who*, the *how*, and the *why* of recreational angling by testing hypotheses based on previous studies in similar and dissimilar times and spaces. After publication of this thesis, my observations will reside within the ever-growing literature on angling people and angling places, presenting one out of many ways to approach these concepts. As I understand from Moon and Blackman (2014), who have kindly provided natural scientists peeking over the disciplinary fence with a comprehensive guide to the philosophical underpinnings of social science, this places me within the ontological realm of critical realism. For now, I will leave it at that, but I am eager to continue being humbled, inspired and shaken by the vast amount of ideas and worldviews that I will undoubtedly come across in the future.

Following my deliberations on subjectivity and reality, I feel that it is appropriate to end this section with a reflection on my personal relationship with angling. In contrast to many of the people that participated in my research, I would not describe myself as a recreational angler. However, for the purpose of better understanding anglers' experiences and learning "the fishy lingo", I have undertaken several angling trips together with colleagues, and I have even caught a few fish myself. While I have long considered myself an outsider to recreational angling, an observer rather than a participant, as I write these reflections I realize that no longer feels true. I realize that, however sporadic my angling career has been, the experiences changed me. I now know what it feels like to hook a fish, to feel the rush, the excitement mixed with a sudden sense of responsibility and a pinch of fear. Yet I most of all know what it feels like not to catch anything at all. To enjoy the company of my colleagues, my friends, my surroundings, and most of all, myself. I would not describe myself as a recreational angler, but I would feel obliged to fill out an angler survey whenever one comes my way.

Key findings

In the following two sections, I summarize the findings from the four papers included in this thesis based on the two research questions presented in the introductory chapter. Before doing so, I provide a short summary of the anglers' interpretations of the two studied angling settings (i.e. stock trend perceptions, destination image, satisfaction and place meaning).

Paper I presents the Mörrum anglers' perceptions of the changes in salmon and sea trout stocks at Mörrums Kronolaxfiske since their first angling trip to this fishery. While the historical catch data suggests that there have been several periods with lower catches than during the study period (i.e. 2019), the majority of the anglers perceived a negative trend for both the salmon and the sea trout stocks since their first angling experience in Mörrum, mostly independent of when that first trip actually was. These negative stock trend perceptions seemed to spill over into the catch-related components of their destination image and satisfaction, which on average scored lower (yet still moderate; 4-5 out of 7) than the other items in the image and satisfaction scales (**Paper III**).

Paper II and IV examined the place meanings that residing and visiting anglers ascribed to Gotland as a place for angling. Comparable to Mörrum, the meaning of Gotland as a place with healthy fish stocks received the lowest mean score (item mean < 5 out of 7). In contrast, other nature-related place meanings (e.g. beautiful nature, unique nature) scored higher (item means > 6 out of 7). In addition to the nature-related meanings, I also looked at meanings related to social and symbolic aspects of Gotland as a place for angling. The majority of the anglers experienced Gotland as an angling place that felt safe, relaxing and peaceful, and the average perception of the local atmosphere was positive (item means > 5/"slightly agree"). For the Mörrum anglers (**Paper III**), image items related to Mörrums (social) atmosphere provided the highest contribution to overall destination image, and satisfaction with the social atmosphere contributed the most to overall satisfaction compared to catch-related and management-related components.

Research question 1 – Angler diversity and relationships to the angling setting

The first research question guiding this thesis "considers cognitive, affective and behavioral dimensions of angler diversity and their influence on anglers' views of different aspects of the angling setting and their connections to this setting" (p. 14). **Paper I, II and III** each confirmed the existence of associations between various dimensions of angler diversity and anglers' interpretations of and attachment to Mörrum and Gotland (Figure 7). Because of the many sub dimensions involved in the analysis, the associations were complex. In this section, I highlight some of the main findings that exemplify this complexity.

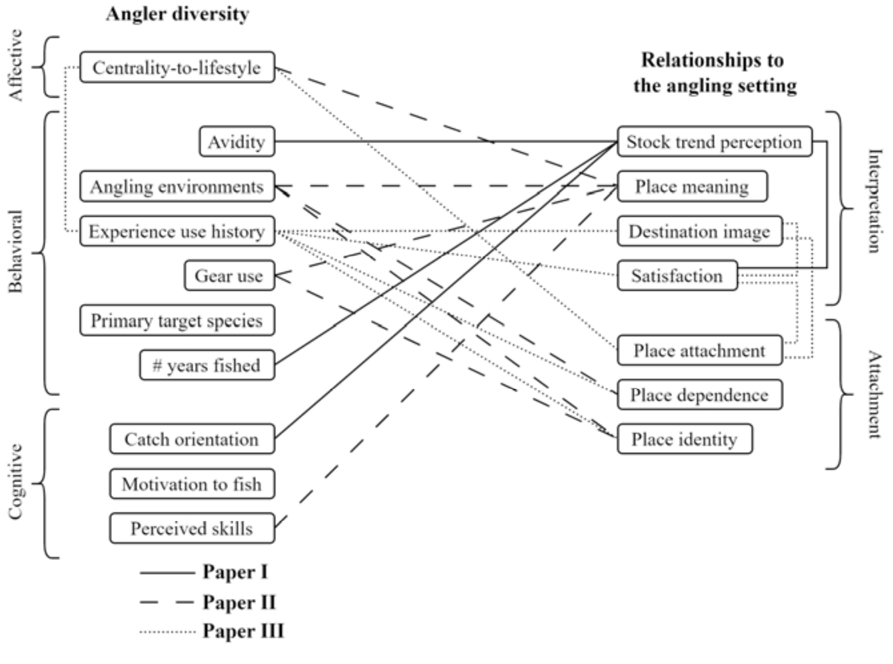

Figure 7. Significant associations between angler diversity and anglers' relationships to the angling setting found in **Paper I, II and III**.

Dimensions of angler diversity

I found the effects of cognitive dimensions of angler diversity on the anglers' place interpretations and attachments to be limited. While **Paper I** showed significant effects of various catch orientations on the accuracy of the Mörrum anglers' stock trend perceptions, general motivations to fish did not affect the anglers' perceptions. In addition, **Paper II** showed that perceived skills were related neither to place dependence nor to place identity, and the majority of the place meanings tested did not show a relationship to perceived skills either.

The anglers' affective connection to the angling activity (measured as centrality-to-lifestyle) appeared to influence both setting interpretations and attachments, but individual findings differed between **Paper II and III**. For Gotland, **Paper II** showed a positive relationship between centrality-to-lifestyle and several place meanings, indicating more positive and salient place meanings among high-centrality anglers versus low-centrality anglers. I did not find effects of centrality-to-lifestyle on place dependence or identity in this study. **Paper III**, on the other hand, revealed a significant, positive relationship between centrality-to-lifestyle and attachment to Mörrum, while the anglers' interpretations of Mörrum (measured through destination image and satisfaction) were not influenced by their affective connection to angling.

Finally, behavioral angler characteristics, which I examined through various stated past behaviors, showed relationships to the anglers' setting interpretations and attachments in all three papers. Findings from **Paper I** indicated that anglers who spent more time angling at Mörrum (both in terms of avidity (days/year) and number of years fished) were more likely to have a negative perception of the stock trends at this fishery. However, perhaps contrasting, the EUH results of **Paper III** showed that anglers who had gone on multiple trips to Mörrum scored higher on several of the catch-related image and satisfaction items than site generalists, who frequented salmonid rivers but only visited Mörrum once. Occasional anglers (i.e. anglers who had only fished in salmonid rivers once, which was at Mörrum) had the most positive image of the ecological state of Mörrum, but were least satisfied with their catches. Both **Paper II and III** also found positive effects of EUH on place dependence and place identity, indicating higher attachment among anglers who spent the majority of their angling time on Gotland or at Mörrum, respectively. In addition, **Paper II** considered the behavioral dimensions of gear use and use of different types of angling environments, which showed differential effects on place dependence, place identity, and place meanings, highlighting the importance of trip context to angling setting interpretations and attachments.

Residency status

In addition to the dimensions of angler diversity discussed in the previous section, **Paper II** acknowledged the potential effect of other personal characteristics, unrelated to recreational angling, on the anglers' interpretations of and attachment to Gotland. In this paper, I compared place meanings and attachments between permanent residents, periodic residents and tourists on Gotland, and I accounted for the number of years they had been living on or visiting Gotland overall, unrelated to angling.

While not having spent the highest number of years on Gotland, periodic residents stood out as the group with the most positive and salient place meanings, as well as the highest place dependence and place identity. The three residency status groups also differed significantly based on the amount of time they spent angling on Gotland, their use of different gears and environments, and their centrality-to-lifestyle. Some (but not all) of the correlations between these angler characteristics and the anglers' place meanings and attachments may thus be connected to differences in residency status.

Research question 2 – Supporting angling settings

In **Paper III and IV**, I examined the effect of the anglers' relationships to the angling setting, on the anglers' intentions to act in support of these settings, particularly through loyalty and stewardship actions. Table 3 provides an overview of the PLS-SEM results, on which I elaborate below the table.

Table 3. Effects of relationships to the angling setting (i.e. interpretations and attachments) on loyalty and stewardship intentions.

Paper	Independent variable	Dependent variable	Relationship[a]
III	Interpretation: Destination image	Place attachment	+
		Destination loyalty	+
	Interpretation: Satisfaction	Place attachment	+
		Destination loyalty	+
	Attachment: Place attachment	Destination loyalty	+
IV	Interpretation: Place meaning (nature)	Place dependence	Not sig.
		Place identity	Not sig.
		C&R intentions	+
		Private-sphere intentions	+
		Social-sphere intentions	Not sig.
	Interpretation: Place meaning (social)	Place dependence	+
		Place identity	+
		C&R intentions	Not sig.
		Private-sphere intentions	Not sig.
		Social-sphere intentions	+
	Attachment: Place dependence	C&R intentions	Not sig.

	Private-sphere intentions	Not sig.
	Social-sphere intentions	- (at α = 0.10)
Attachment: Place identity	C&R intentions	Not sig.
	Private-sphere intentions	Not sig.
	Social-sphere intentions	+ (at α = 0.10)

[a] "+" = positive relationship; "-" = negative relationship.

Support through loyalty

In **Paper III**, I assessed the structural relationships between destination image, satisfaction, attachment and destination loyalty among the anglers at Mörrums Kronolaxfiske. Overall, loyalty intentions were high among the respondents. Both setting interpretations (measured as destination image and satisfaction) and place attachment positively influenced the anglers' willingness to return to Mörrum or to recommend Mörrum to other anglers. Place identity appeared to be the largest contributor to overall place attachment (as compared to place dependence). Moreover, satisfaction and place attachment functioned as significant complementary mediators for the relationship between destination image and destination loyalty, indicating that part of the significant positive effect of destination image on destination loyalty could be explained by the positive effect of destination image on satisfaction and place attachment.

In addition, I would like to raise attention to the results pertaining to experience use history and destination loyalty. In the previous section, I described the various effects of people's history with Mörrum and with similar angling places on their interpretations and attachments to Mörrum. Here I would like to mention that experience use history also influenced destination loyalty, in particular willingness to revisit. As expected, Mörrum specialists, who had fished at Mörrum several times before, showed the highest willingness to revisit. However, surprisingly, the loyalty of occasional anglers, whose only angling experience in a salmonid river was one trip to Mörrum, was not significantly different from the Mörrum specialists.

Support through stewardship

Paper IV was also based on a structural equation model, which connected the meanings that anglers ascribed to Gotland as a place for angling (i.e. interpretations) and their attachment to Gotland, to their intentions to engage in various forms of stewardship action. The anglers' intentions to perform C&R angling and their intentions to engage in other types of private-sphere behaviors (e.g. avoid pollution) were positively influenced by biophysical place meanings related to Gotland's nature and ecological status, but not by place attachment's sub dimensions of place dependence and place identity. Intentions to engage in acts of stewardship in the social-sphere (e.g. collective habitat restoration activities), on the other hand, were influenced by sociocultural meanings related to Gotland's local atmosphere, feeling at home and feeling safe (α=0.10). Place dependence and place identity also had significant effects on social-sphere stewardship (α=0.10), which were negative for the former and positive for the latter.

Paper IV also explored the effect of place meanings on place attachment. Biophysical place meanings did not influence place dependence, nor place identity. Sociocultural meanings, on the other hand, did show a significant positive effect on both place dependence and place identity. Combined with the direct effects of the place meaning and place attachment subcomponents on social-sphere stewardship intentions, these results suggest a competitive mediation effect of place dependence and a complementary mediation effect of place identity on the relationship between sociocultural meanings and social-sphere stewardship.

Synthesis and discussion

In this chapter, I synthesize the key findings to provide a place-based perspective on recreational angling. In addition, I discuss the implications of my key findings in relation to the broader trends in recreational angling that I identified in the introductory chapter, namely environmental change and increased angler mobility. At the end of the chapter, I briefly touch upon the relevance of my findings to the management of recreational fisheries and angling tourism, and I reflect on my research approach.

A place perspective on recreational angling

The results of my research supported and expanded existing knowledge on people's relationships to meaningful places by presenting a place-based perspective on recreational angling. In this section, I draw several conclusions about anglers' relationships to the settings that facilitate the angling activity, based on the results of my research and insights from the literature.

First, and in line with previous research (e.g. Hunt et al., 2021; Ward et al., 2016), my findings illustrate the heterogeneous nature of angler populations. The anglers that participated in my research were diverse, representing different ends of various angler diversity spectra, and the anglers' relationships to the angling setting varied accordingly. Angling avidity and centrality-to-lifestyle, the behavioral and affective expressions of angler specialization, were both found to influence relationships to the angling setting, thus supporting previous studies identifying (dimensions of) angler specialization as an important predictor of angler attitudes, behaviors and attachment to place (e.g. Beardmore et al., 2013; Hutt & Bettoli, 2007; Hyman & McMullin, 2018; Oh et al., 2012). It should be noted, however, that **Paper II** showed that each angler diversity dimension displayed a unique relationship with place meaning and place attachment, which puts into question the ability of aggregate constructs such as specialization to fully reflect angler heterogeneity.

Second, my findings underline the importance of both physical attributes and social interactions to the formation of anglers' sense of place, thereby supporting past work on this concept (e.g. Amsden et al., 2010; Jorgensen & Stedman, 2011; Kyle & Chick, 2007; Stedman, 2003). More specifically, **Paper IV** provided additional evidence for previously identified associations between functional place attachment (i.e. place dependence) and interpretations of physical place attributes, as well as emotional attachment (i.e. place identity) and sociocultural meanings of place (e.g. Williams et al., 1992). By measuring destination image, satisfaction and stock trend perceptions, in addition to the traditional sense of place dimensions of place meaning and place attachment, I also showed how other aspects of setting interpretation differentially contributed to anglers' relationships to meaningful places. The overall negative fish stock trend perceptions (**Paper I**) in combination with the moderate scores for catch-related image and satisfaction at Mörrum (**Paper III**) emphasize the importance of disentangling the roles of perception and evaluation in the context of relationships to place.

Third, in addition to highlighting that the average angler does not exist, my results suggest that the average angling setting does not exist either. The most noticeable evidence to support this claim was the ambivalent role of centrality-to-lifestyle. Perhaps here we see the difference between, on the one hand, a destination with angling (Gotland) and, on the other hand, an angling destination (Mörrum). While Gotland is a jack-of-all-trades, offering a range of different angling activities as well as other (tourist) experiences, Mörrum is a master of salmonid angling tourism. Angling is central to Mörrum as much as it is central to its visitors. So much so that several people have been known to relocate to Mörrum (periodically or permanently) to be closer to the action (I-M Rigoll, manager Mörrums Kronolaxfiske. pers. comm.). In contrast, while Gotland also has a long history with fishing activities, Gotland was a (second) home to many of the anglers participating in the study. The permanent and periodic residents' experiences with Gotland are likely far more extensive and rich than those of the tourists, and their primary reason for being on Gotland probably extended beyond the island's angling opportunities. Despite the differences between Mörrum and Gotland, anglers at both places expressed a similar, high degree of attachment to the place (**Paper II and III**), which in both cases appeared to be fueled to a large extent by sociocultural interpretations. These findings suggest that, while the average angling setting may not exist, angling settings are meaningful places of both recreational and social relevance, in addition to their vital role as natural environments or ecosystems.

When you happen to know a good spot, but it changes

Many of the angling activities at Mörrums Kronolaxfiske and on Gotland depend on the Baltic Sea, which is currently in a poor ecological state (HELCOM, 2023). The need for responsible angling practices that minimize the ecological impacts of recreational angling and support fish stocks and ecosystems is high, but will anglers actually be there to act? Angling environments are changing, and anglers will come to face the age-old question: *should I stay or should I go?* (The Clash, 1981)

While loyalty intentions among the anglers fishing at Mörrum were high (**Paper III**), despite their negative perceptions of the fish stock trends (**Paper I**), my results also indicated that the anglers' loyalty would stand or fall based on their interpretations of Mörrum. Anglers appeared to be aware of the ecological problems in the Baltic Sea, but their positive image of Mörrum and their satisfaction with this fishery seemed to prevent them from intending to leave. My findings suggest that ecological change may not directly cause anglers to substitute their chosen angling setting, especially when anglers feel an emotional connection to that place. Nevertheless, angling settings and their associated social communities do, in principle, rely on recreational angling. If an angling setting changes to the point that anglers perceive it no longer fulfills their needs, for example because their desired angling activity is no longer possible due to environmental degradation or restrictive management, then even the attached angler may choose to seek salvation elsewhere (Conley & Diamond, 2024). An angling experience may be satisfying without a catch, but only as long as a catch can be anticipated (Arlinghaus, 2006). There is little use in hunting a prey that you know is not there.

Considering the effect of residency status on setting interpretations and attachments, the decision to stay or go is likely made differently for anglers who are functionally tied to the angling setting, such as (periodic) angling residents, as compared to angling tourists. The latter, as I revealed in **Paper II**, were less dependent on the angling setting and had more experience with angling at different places, which may cause them to perceive a lower threshold for site switching compared to anglers with less switching experience (Conley & Diamond, 2024). Differences between residents and tourists may be more pronounced in small island destinations, such as Gotland, because people inhabiting these kinds of places often display strong functional and emotional ties resulting from higher substitution costs and a strong sense of community (Hayfield & Schug, 2019; Nunkoo et al., 2010).

Where lies the angler's loyalty?

My results show that loyalty to angling settings exists in the form of repeat visitation and recommendation (**Paper III**), and that it may persist despite environmental change as long as the place continues to represent meanings that warrant loyalty and that satisfy anglers' needs. I also found that people's interpretations of the angling setting feed into their willingness to protect or restore this setting (**Paper IV**). The high stewardship intentions expressed by the anglers provide evidence for a meaning-driven, proactive expression of loyalty towards the setting that spans beyond economic contributions.

Stewardship intentions, similar to loyalty intentions, were conditional to the anglers' interpretations of the angling setting, and are thus susceptible to change. For example, anglers' biophysical place meanings, which are tied to (the perceived quality of) a setting's physical attributes, may lose their strength if a poor ecological status persists (Wartmann et al., 2021). In turn, this loss could weaken anglers' intentions to act as stewards, especially in the private sphere (**Paper IV**). However, place meanings are dynamic, and the loss of one meaning may create space for others to develop (Davenport & Anderson, 2005). A collective, place-based response towards environmental change, such as through habitat restoration activities organized by local angling clubs, facilitates social interaction and can thereby foster the sociocultural meanings that inspire loyalty and stewardship intentions (Patrick et al., 2022). I do need to reiterate, however, that a one-size-fits-all solution to promote stewardship does not exist, and that diverse angler populations require a diversified management strategy.

Regardless of whether or not an angler intends to engage in stewardship action, the question remains whether the angler's loyalty lies with the angling activity and the socio-psychological benefits it provides, or with the ecosystem (or place) that facilitates this activity (de Leeuw, 2012; Post, 2013). Previous studies have shown that, while anglers are generally supportive of size limits and other management tools with limited consequences to the angling activity, this support is considerably lower when management actions involve seasonal closures or other access restrictions (Dorow & Arlinghaus, 2012; Tweedley et al., 2023). The stewardship actions included in **Paper IV** would not likely limit the respondents' angling activities in a significant way, but rather ask them to invest additional time or resources during or outside the angling activity in a way that could yield social and ecological benefits. If I had instead asked the anglers about their support for management actions or regulations that could considerably alter their angling experience, the anglers' supportive tendency may have been lower.

Protection of the angling activity at the potential expense of the ecosystem might seem nonsensical. Do angling activities not require thriving ecosystems and healthy fish stocks? Interestingly, such a paradox has been observed before. Lee and Lee (2024) described a disconnect between recreation commitment and pro-environmental recreation behavior as a result of low perceived behavioral control. It appeared that recreationists who were strongly attached to the recreation activity experienced a higher difficulty to adjust their desired activity in favor of the environment. Similarly, Conley and Diamond (2024) found that anglers' with a strong attachment to the angling setting displayed a lower adaptive capacity to deal with environmental change, despite these anglers being more exposed to such changes. With the prospect of potentially losing valued angling opportunities in the short term, a person may perceive the angling component of their identity as threatened, which could overrule other identity components, such as identities related to place, environment, or nature (Udall et al., 2020). Future research on angler identities could provide useful insights to understanding the ambiguous nature of anglers' loyalty intentions in changing environments (Fielding & Hornsey, 2016).

Why should managers care?

Operating in an applied field that is strongly driven by sustainability issues, recreational fisheries researchers are often requested to address, or even solve, management challenges, or at least to explain the relevance of their research to fisheries management. At a conference I attended in the Spring of 2023, someone asked me "If sense of place is so subjective and takes such a long time to develop, why should fisheries managers care about it at all? It's not like they can do much to change it". Her comment took me by surprise, and I struggled to present a coherent argument at the time. Now, more than a year later, I believe I can answer her question in a way that does justice to my own research and the work of those who have ventured into the study of anglers and (angling) places before me, because my thesis in itself answers the question of why managers should care.

Facing declining angling participation rates and deteriorating ecosystems (Holder et al., 2020), fisheries managers in many WEIRD countries are dealing with complex problems, for which the solution to one might worsen the other. Many ecosystems may not need more anglers, they need responsible anglers, and invoking anglers' sense of place could be a way to bring forward that sense of responsibility and subsequent supportive actions. Such a strategy would need to go beyond sharing information about responsible practices (which on its own is rarely effective; van Valkengoed et al., 2022) and towards developing inclusive, engaging approaches to education and community building that are sensitive to local values and context. Through studying anglers' relationships to the angling setting, we can uncover these values and support managers in their decision-making process.

Research approach reflections

In this final section of this synthesis chapter, I would like to address some methodological challenges I encountered during my research.

Both of the samples, from Mörrum and from Gotland, were biased towards highly educated, avid, older, male anglers originating from either Sweden or elsewhere in Northern Europe. While many of the anglers fishing in the study areas would likely fall into this category, studies also show that angler populations in the Nordic countries are becoming more demographically and culturally diverse (Stensland et al., in press). Both gender and ethnicity have been found to influence angler attitudes and behaviors (Roop et al., 2020; Schroeder et al., 2006), and accounting for angler heterogeneity beyond mere angling-related characteristics is needed to better reflect the diverse views and values of recreational anglers in scientific research.

Another challenge I encountered was that many of the psychometric scales I used to measure the psychological dimensions of recreational angling needed adjustment, and in the case of place meaning there was no appropriate scale available at all. Most of the existing scales were created in North America, and while several of them had been proven valid in other WEIRD parts of the world, the angler stewardship scale (Landon et al., 2018) had not been used outside the USA before. Despite initial item adjustments to better reflect the Gotlandic context, the original scale performed rather poorly and needed additional adjustments (**Paper IV**). The place meaning scale was created by myself, based on a non-exhaustive review of the literature on place meaning and angling destination image. Unfortunately, there was no time to apply a mixed-methods design, nor was there a large enough sample to validate the scales on a subsample, which would be recommended in the case of newly created scales (Haws et al., 2023).

Finally, with both surveys I gathered data at a single point in time, which complicates drawing conclusions about the causality of the relationships between sense of place and behavioral intentions. I see a need and an opportunity to gather more longitudinal human dimensions data. While recreational catches are (or should be) monitored at somewhat regular intervals, social science data is not collected in the same frequency. The rapid technological developments in data mining and digital catch reporting provide an excellent opportunity for the simultaneous collection of catch data and social science data, which some colleagues have already started to experiment with (e.g. Gundelund et al., 2020; Sbragaglia et al., 2022). Longitudinal datasets acquired through these new technologies could be especially useful to assess the interlinked processes of person and place change over time.

Future research

While society often looks towards science to provide answers, it is usually questions we find. In this section, I present some of the questions that emerged as I conducted and synthesized my research, and I suggest strategies to address these questions in future research.

First, I believe that much remains to be explored about the social and emotional processes related to recreational angling, as well as the relational values associated with this activity. My research scratched the surface of this rich topic by providing evidence that anglers have the capacity to build emotional and ultimately supportive bonds to both the angling activity and the angling setting. Future research, for example based on in-depth interviews with anglers, could unravel the nature of these relationships and explore how particular aspects of angling experiences do or do not contribute to the deep emotional connections anglers feel towards nature and place.

Second, I see a need to expand research on the relationships between the intentions, behaviors, and outcomes of angler stewardship, as well as other angler behaviors. While my findings indicate that willingness to participate in stewardship action exists among anglers, there may be internal and external barriers that prevent anglers from acting out this willingness. Future research could, for example, focus on anglers' variable understandings of what responsible action and stewardship means in different settings, the structural barriers and enablers of stewardship action, or the social and ecological outcomes of different stewardship actions.

Finally, I would like to learn more about the "casual" side of recreational angling, the angling activities that take place close to people's homes and are part of their everyday lives. Both of my study areas were scenic in their own way and provided unique angling experiences that many of the (avid) respondents were willing to travel for, but the difference between (periodic) residents and tourists in terms angler characteristics and sense of place were apparent and deserve more attention in future research.

Conclusion

Considering meaningful place and meaningful activity in tandem, as I have done in this thesis, deepens our understanding of the relational, embedded nature of recreational angling. I revealed how various forms of engagement in recreational angling govern anglers' relationships to angling settings, and I showed how these relationships motivate place-based supportive actions. As such, I believe that my thesis provides compelling evidence to support the argument that angling settings are meaningful places. My research also shows that anglers have the potential to act as stewards, but that their willingness is conditional and may be sensitive to place change.

The outcomes of this study once again reveal that no two anglers are the same, and no two fisheries are the same. Through eliciting the unique local values that underpin anglers' sense of connectedness to the angling setting, fisheries managers may be able to transform connection into responsible action and shape resilient social-ecological systems. Moreover, my work underlines the need for adaptive governance and management approaches that are catered to anglers' diverse and dynamic belief systems in times of social-ecological change.

Svensk sammanfattning

Omsorgsfull och ansvarsfull användning av naturen och dess resurser krävs för att stoppa den fortsatta försämringen av tillstånden hos ekosystem och att stötta människornas viktiga relationer till naturen. Fritidsfiskeaktiviteter med spö och rulle (t.ex. flugfiske och spinnfiske) kan hjälpa människor att skapa betydelsefulla relationer till naturen, men det finns också en risk för ekologiska skador om fritidsfisket utförs på ett oansvarigt sätt. Att främja ansvarsfullt beteende bland fiskare, t.ex. genom engagemang i naturvård och miljöförvaltning (*stewardship*), kan vara en lovande strategi mot hållbart fritidsfiske som fostrar fiskares relationer till naturen och minskar deras ekologiska påverkan. Fritidsfiskares relationer till fiskeplatser (*sense of place*) har identifierats som en potentiell drivkraft bakom stewardship, men vetenskapliga bevis är knappa. Min doktorsavhandling utforskar *sense of place* och *stewardship* inom svenskt fritidsfiske.

Forskningen är baserad på enkätstudier med fritidsfiskare, som jag utförde på Mörrums Kronolaxfiske i Blekinge och på Gotland. Jag använde psykologiska teorier och koncept för att undersöka fiskares uppfattningar om fiskeplatsen, deras relationer till fiskeplatsen, och deras villighet att stödja platsen genom deras engagemang i förvaltningsaktiviteter, samt ansvarsfullt och lojalt beteende. Avhandlingen syftar även till att beakta mångfalden av fiskares attityder och beteende gällande fisket oberoende av platsen.

Avhandlingen består av fyra artiklar. **Artikel I** handlar om fiskares uppfattningar om Mörrums fiskbestånd, och hur uppfattningarna påverkas av andra egenskaper som fiskefrekvens, motivation för fiske, och fångsttillfredställelse. **Artikel II** fokuserar på hur fritidsfiskare på Gotland (inkl. gotlänningar, turister och människor med semesterboende på Gotland) upplever Gotland som en fiskeplats, och hur knutna dem är till fiskeplatsen. **Artikel III** testar relationerna mellan Mörrumfiskares uppfattningar om Mörrum som en fiskedestination, deras tillfredställelse med olika aspekter av destinationen och upplevelsen, deras anknytning till Mörrum, och deras lojalitet mot Mörrum. **Artikel IV** fokuserar igen på fritidsfiskare på Gotland och har som syfte att utforska relationer mellan deras platsuppfattningar, platsanknytning och olika former av ansvarsfullt beteende som stöttar fisket på Gotland.

Tillsammans visar artiklarna hur uppfattningar av olika aspekter av fiskeplatser bidrar till fiskares relationer till dessa platser. Dessutom låter artiklarna oss se hur uppfattningar och relationer tillsammans påverkar fiskares villighet att stötta fisket med olika beteenden, och hur vissa egenskaper hos fiskare påverkar platsspecifika uppfattningar, relationer och beteenden. Mot bakgrund av fortsatta förändringarna i miljö, klimat, och resebeteende förutser jag att relationer mellan människor och deras betydelsefulla platser kommer att bli ännu viktigare framöver för fiskeriförvaltning och naturvård. Fritidsfiskare kan spela en viktig roll i att skapa en hållbar framtid för fisk och vattenbaserade ekosystem, men om fiskeplatserna skulle förlora dem egenskaperna som binder fiskare till dem, så riskerar platsen också att förlora fiskare.

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