

**Constructing nature on Marker Wadden;**  
an explorative case study on images of- and attitudes towards nature  
on a manmade ecosystem



Beach on the west side of Marker Wadden (Image via author)

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**Abstract**

Land reclamation for the sole purpose of developing nature is a novel practice in the cultural landscape of the Netherlands. Synthesising images of nature with the pragmatic focus on the role of humans towards their environment, this study contributes to understanding opinions on nature development as societal discussions escalated recently. By surveying visitors on Marker Wadden ( $N = 255$ ), the results demonstrate that the common understanding among respondents entails that nature and culture are intertwined and that management is not disapproved of. Whether this is the result of the visit to Marker Wadden or if they had these convictions before is unknown. Nevertheless, it can be concluded that the definition of nature is sensitive to context and that construction and management do not produce dissent among the consulted visitors on Marker Wadden. Moreover, cognitive dissonance between theoretical principles and practical interventions elicited. The alteration of nature is both condemned and supported. This, in combination with the unexpected similarity of opinions towards the role humans play in nature by the three nature-cognition groups, highlight the ambiguity of the concept “nature” and call for further research on the images of nature in unconventional contexts like Marker Wadden.

**Keywords:**

Images of Nature, Human-nature relationship, Nature development, Marker Wadden

## **Foreword**

First of all, I would like to express my gratitude towards Erik Meijles for both bringing the topic “nature in the Netherlands” to my attention in the course Nature, Landscape & Heritage and for his professional, inspirational and enduring supervision over the course of the project that followed. With my background in climate studies and urban planning, nature development in the cultural landscape of the Netherlands proved to be a fruitful subject for my master thesis. Moreover, I would like to thank Oscar den Ouden of Natuurmonumenten for making all of this possible. He arranged several field trips to Marker Wadden in exchange for the execution of their annual visitor experiences study in the form of added questions to the survey. The KIMA-conference on Marker Wadden that I was invited to by Oscar was an enriching experience as well. Other people of the organisation that I would like to express my gratitude to are Elsa Pater and Barbara Halverhout for the support on the island and Roel Posthoorn and Bart de Haan for the interviews. Furthermore, big thanks to my friends, Bob Leon Evenhuis, Jos Spijkerman & Simon Verboom for joining me on field trips to Marker Wadden and for their intellectual support in the open discussions on this topic.

On positionality, I grew up in the urban environment of Amsterdam. This geographical fact constructed my definition of nature as something that is "out there", away from the city. I think it is important to amplify this for the readers of this study. In addition, I would like to express that this research is western-centric and whenever the word people is used, this should be interpreted as people confined to a Western view.

Wibe Schoenmaker  
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## 1. Introduction

If we define nature as the antipode of humans and their artefacts, it is virtually non-existent in the selfmade land of the Netherlands. Definitions of nature, however, differ for people, place and time. Cultural differences create a variety of meanings attached to nature. Buijs, Elands & Langers (2008) showed how nature is defined differently by varying groups of people resulting in various landscape preferences. On geographical location, different preferences for landscapes between urbanites and rural residents were demonstrated in a study by Van den Berg & Koole (2005). The two authors showed how *inter alia* the factor "place of residence" defines cognitions of nature and consequently shapes preferences for natural landscapes. The factor time can be best illustrated by referring to the shifting baseline syndrome. This theory states that what is perceived to be the normal state of nature is different to each generation (Vera, 2010). What a new age group understands as the baseline, is ecologically different from the former generation (Pauly, 1995). Summarising, different definitions of nature exist and these are a product of both social-, physical- and temporal factors.

In this study, the focus lies on the development of nature in the Netherlands. Incited by an anthropogenically destabilising climate and the unfolding of the sixth mass extinction of biodiversity (IPCC, 2022; Ceballos et al., 2015), "building with nature", "nature-based solutions", and "rewilding" are emerging policy concepts (European Commission, 2015; De Vriend *et al.*, 2015). Compared to nature conservation, nature development is a more offensive approach in which the natural-values of the former environment were either absent or are completely transformed (Westhoff, 1970). In this field, however, the role of humans is explicitly spotlighted. Nature is not something that is conserved, but nature is now actively constructed by people.

Acknowledging that society is plural, different definitions, attitudes and preferences towards nature exist. Well-being of animals at Oostvaardersplassen and the conflicts over the role of humans in this affair speaks volumes (Weston, 2022). Or, more recently, whether or not productive agricultural land in the Netherlands also has natural value (Aan de Brugh, 2023). Each cognition involves (implicit) moral judgements and there is not one that is better or worse. The main problem in this study is consequently a political one, namely, the incompatibility of pluralist definitions of nature with the constructing of a single nature reserve. It must be noted that this study does not hold the illusion to solve the problem of pluralism, i.e. the final reconciliation of values (Mouffe, 1999). But, choices in the process of constructing- and the process of managing nature are highly relevant and should be executed with great care for the following reasons. Firstly, the development of nature involves a claim on the public pool of emissions, financial resources and land, in addition to the necessities for conventional nature conservation. Secondly, societal discussions on nature in the Netherlands experienced hardened attitudes in the last few years resulting in rangers being threatened for their work (Mattijssen, Breman & Stevens, 2019). Also, what "nature" is recently became a topic of political dispute (Aan de Brugh, 2023). Thirdly, the way nature is perceived is the basis for an engaged relation with the natural environment. Negative associations may produce environmentally disconnected people. This could result in a decrease of support for public funding, legitimacy for conservation and a decrease in personal willingness in contributing to the natural environment as voters, consumers and volunteers. Fourthly, as the sixth mass extinction of biodiversity is unfolding, nature development projects arouse hope. Support should consequently be created, preserved and expanded in order to realise similar projects.

All four reasons underline the need for a thorough study of the different definitions, attitudes and preferences towards nature. Nevertheless, the perceptions of people in the field of nature development remain understudied. Therefore, this study aids in mitigating the issue of dis-understanding of the



perspectives of others by contributing to understanding the variety of opinions of different groups of people and is applied to Marker Wadden, a newly developed natural area.

The diversity in definitions of nature that people hold, surfaces in both the images of-, and the consequent attitudes towards nature. In his doctoral research, Buijs (2009b) intended to provide clarification in the pluriverse of definitions of nature. Images of nature are an individual's cognition of nature and are directed and structured by “values”, “beliefs” and “value-orientations” (2009a). Attitudes towards nature have been researched by De Groot, Drenthen & De Groot (2011) in their work on the human-nature relationship. By issuing questions regarding a variety of roles towards nature in the Netherlands, France and Germany, the researchers found that the respondents deem different roles appropriate. The academic relevance of this study entails studying the yet understudied practice of nature development in the Netherlands. Besides illuminating how nature is understood by the visitors of Marker Wadden, the role of humans in this particular environment is assessed. This might provide useful information for planning other nature development projects. In addition, the images of nature framework is tested by applying it to a case and its explanatory capacities with regards to the role of humans in nature on Marker Wadden are examined.

The central argument of this paper is that because the development of nature in a pluralistic society involves different positions, it is insightful to know people's images of nature and their preferred role towards nature. Therefore, the research question reads:

*In what ways do people's images of nature explain attitudes towards nature on Marker Wadden?*

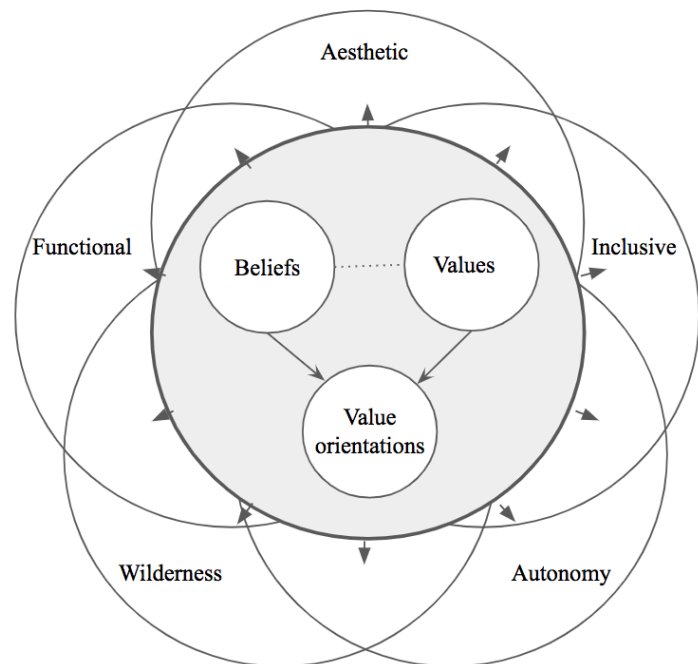
As such, the aim of this study is twofold. The first is to uncover what visitors of Marker Wadden understand as nature. This study will use the theory of Buijs (2009a) and test if-, and which of the five images of nature are shared among respondents on Marker Wadden. The corresponding sub- question reads: *What images of nature groups can be distinguished on Marker Wadden?* The second aim of this study is to identify visitors' attitudes towards nature. As managing naturally involves making choices, disagreements between different (groups of) people may arise. By presenting statements regarding both (1) principles on the role of humans in nature in general and (2) concrete interventions on Marker Wadden, theoretical and practical attitudes towards nature construction and -management will elicit. The corresponding sub-questions reads: *What attitudes towards nature do people share on Marker Wadden?*

## 2. Humans and their natures

“Nature” is a frequently mentioned concept in Western thought. Williams (1983) would go as far as naming “nature” as the most complex word in the language because of its variability in meanings which are at times opposed. The author provided three definitions and for this study I would like to stick to the definition of nature in a material sense. As such, nature is something that is concrete and can be touched. It is not interpreted as a mental framework (i.e. state of nature) or a quality and character of an object (i.e. natural - artificial). Focussing on the concept of nature in academia, dissension on "what" nature in the material sense often revolves around the supposed division between nature and culture. Research by Van den Born (2008) suggests that the extent of cultivation determines naturalness whereas others claim that no aspect of nature is not impacted by human agency (Lowenthal, 2005). The question of “why” or “for whom” to conserve nature, in its turn, incites debates on conflicting values. Some are anxious for the changing climate (Biermann & Kim, 2020), some focus on the psychological benefits of nature for humans (e.g. Attention Restoration Theory (Kaplan and Kaplan, 1998)) and others care for the wellbeing of animals (Langers *et al.*, 2013). The final example is the debate on “how” to protect nature and can be illustrated by referring to the recent developments in the academic field. The work of Büscher & Fletcher (2020) on revolutions in environmental conservation and the rise of the Rewilding Europe demonstrate that new insights are still to be found. All of these debates illustrate the vast differences in how nature is perceived by humans and how humans consequently ought to relate.

### 2.1 Images of Nature

To conceptualise the pluriverse of definitions of nature, Buijs postulated the concept images of nature (2009 a&b). The study fits a voluminous field of research in the Netherlands and the common denominator in these studies is the study object. Namely, the definition-, vision-, cognition- and the relation between man<sup>1</sup> and nature in Western countries (e.g. Buijs & Filius, 1998; Keulartz, 2000; Van den Born *et al.*, 2001; De Groot & van den Born, 2003; Van den Born, 2008; De Groot, 2010). Buijs departs from other scholars as his analytical framework is holistic whereas other studies are focused on one element of people’s understanding of nature (2009a). The author defined images of nature as that “which is understood as nature” (16, Buijs, 1998). Conceptually, images of nature are a product of (1) values, (2) beliefs and (3) value orientations (Fig. 1) and this is inspired by the value-belief norm theory (Buijs, 2009a; Stern *et al.*, 1999).

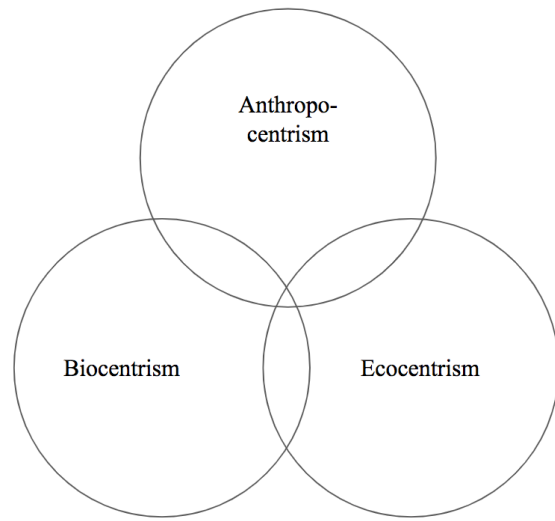


**Fig. 1** five images of nature (outside) and its constituents (inside) Conceptually, images of nature are a product of (1) values, (2) beliefs and (3) value orientations (Fig. 1) and this is inspired by the value-belief norm theory (Buijs, 2009a; Stern *et al.*, 1999).

<sup>1</sup> The word "man" is interpreted as ungendered. For the remainder of this study, *man* and *human* are used interchangeably.

### 2.1.1 Values

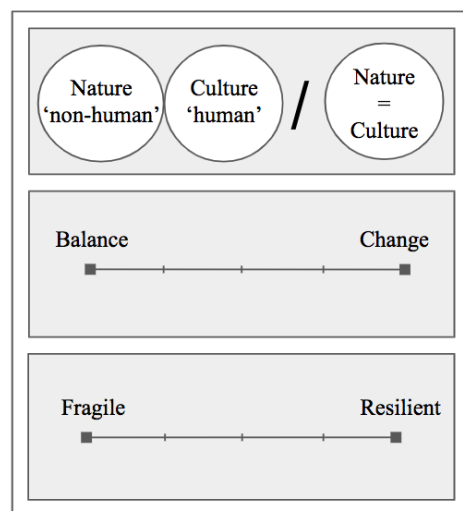
Values are defined as “guiding principles of what is moral, desirable or just” (Kempton et al. 1995, 12). This definition entails a form of ethics as it contains a reference to morality and justice. Values consequently involve a personal opinion on what is right. According to Buijs these ideas on justice are relatively stable as these are unaffected by specific objects and situations (2009a). The three value-systems identified in this study are “ecocentric”, “anthropocentric” or “biocentric” values (Langers et al., 2013; Buijs 2009b; Keulartz, 2000). The ecocentric position is characterised by the consideration of the whole (eco)system. Here, humans are not on top of the evolutionary ladder nor the sole source of value and meaning (Harbers & Koenis, 1997). In this systemic perspective, the interest of the collective overrules that of an individual. As such, the death of a few animals would not be considered problematic as long as the system is well-functioning. According to Van den Berg (1999), ecocentrism is becoming widespread in Dutch society. Anthro- and biocentrism share an approach focussed on individual well-being but differ in the point of reference. The former relates to human wellbeing and interprets all but humans as instrumental to humans (Kopnina et al., 2018; Keulartz et al., 2000). Biocentrists, on the other hand, define animals as individuals that need moral consideration accordingly (Keulartz et al., 2000). This value-system is premised on a reverence for *all* life similar to the reverence one feels towards one’s own will to live (Schweitzer, 1923). Where to draw the boundaries on what counts as life remains a topic of dispute in the non-anthropocentric values (Harbers & Koenis, 1997). In addition, Harbers & Koenis are sceptical of the “moral flatland” (111, 1997) the biocentric approaches create. They warn for the conviction that the suffering of an animal or tree should be treated with equal means as to that of humans. Despite the proposed differences in centrisms, Norton (1984) noted that overlap between the domains may occur. For instance, individual human needs may coincide with the needs of the system, e.g., humans benefiting from a healthy ecosystem (Fig. 2).



**Fig. 2** three "values" that define images of nature

### 2.1.2 Beliefs

By interviewing, Buijs (2009a) identified nature and culture as two opposing domains as one belief that an individual may hold. Beliefs are *associations* that people have with an object. In this case, nature and culture are believed to be separated or entangled. In their work on heritage and landscapes, Schepers *et al.* (2021) warn of the dichotomous framing of certain landscapes as "natural" or "cultural". In order to overcome this supposedly inaccurate binary framing of landscapes, the authors postulate a diachronic triangular model. In this model, each corner represents either cultural-, natural- and physical geographical processes in a particular period for

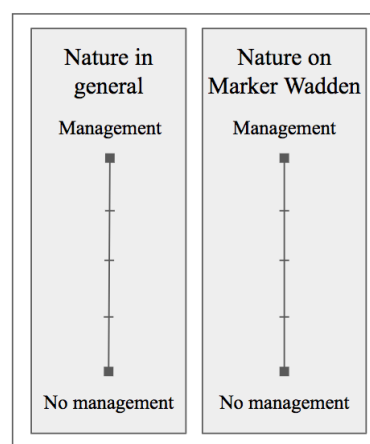


**Fig. 3** three "beliefs" that define images of nature

a landscape. By positioning on the triangle, the most dominant driving factors are identified and it is acknowledged that the three factors are always present in a different landscape in different yet intertwined factors. Hence, separation is not possible. This belief regarding nature and culture being separate domains or intertwined is the first of three categorising beliefs in this study (Fig. 3). In addition to the first belief, Buijs (2009a) identified nature as being either fragile or resilient. For instance, some people may believe that nature is very fragile, and consequently take action to mitigate the impact of emissions on system earth. The third belief defines nature as always evolving towards a state of equilibrium (balance) or in eternal motion (change) and is the last continuum that classifies respondents in the five groups.

### 2.1.3 Value-orientations

The last element of the framework are value-orientations. These are preferences in types of management and its results. According to Buijs (2009a) they are not necessarily directed towards individual species but are of a rather general view on nature management. For instance, rabbits could be considered not welcome on Marker Wadden but not for reasons of species-specific aversion but for the reason that it is a mammal and mammals would not fit the picture of the bird-paradise-island. Fig. 4 depicts how these range from "intensive management" to "no management" and are divided into "nature in general" and "nature on Marker Wadden".



**Fig. 4** two "value-orientations" that define images of nature

In inducing the images of nature, Buijs works with ideal types. Ideal types in this context are theoretical abstractions that should not be interpreted as empirical realities but rather function as a means to make sense of reality. For instance, the people that adhere to the functional image do not see a culture of bacteria, clay soils in South Limburg or a leaf of the plant in their living room as singularly productive. Rather, what characterises this group of people is their preference for- and evaluation based on the productive capacity of the soil, animals or plants. The five ideal types of images of nature and its characteristics are depicted in Table 1.

**Table 1** images of nature framework based on the work of Buijs (2009 a&b)

Ideal types of images of nature	Values	Beliefs			Value-orientation
		Nature-culture divide?	Fragile-resilient	Balance-change	Level of management
<b>Wilderness</b>	Ecocentric	N ↔ C	Fragile	Balance	No management
<b>Autonomy</b>	Biocentric	N ↔ C	Resilient	Change	No management
<b>Inclusive</b>	Biocentric	N + C	Fragile	Change	Minimal or moderate management
<b>Aesthetic</b>	Weak anthropocentric	N + C	Fragile	Balance	Minimal or moderate management
<b>Functional</b>	Anthropocentric	N + C	Resilient	Change	Intensive management

According to Buijs (2009a), the people that adhere to the *wilderness* image define nature as "not-culture" and human interference consequently diminishes the (natural) quality. People adhering to the *autonomy* image distrust management of- and see nature as self-organising and ever-changing. Individuals that see nature as *inclusive* stress the interconnectedness of all life and approve specific forms of management if it improves the well-being of plants or animals. The *aesthetic* image is characterised by support for enhancing the possibilities for recreation and -visual qualities. Individuals adhering to the *functional* image praise human interference because it increases utilitarian values and it would otherwise turn into a useless mess. These images and their characteristics will be studied on Marker Wadden. In doing so, the theory is tested and the way nature is understood by respondents in this context will be revealed.

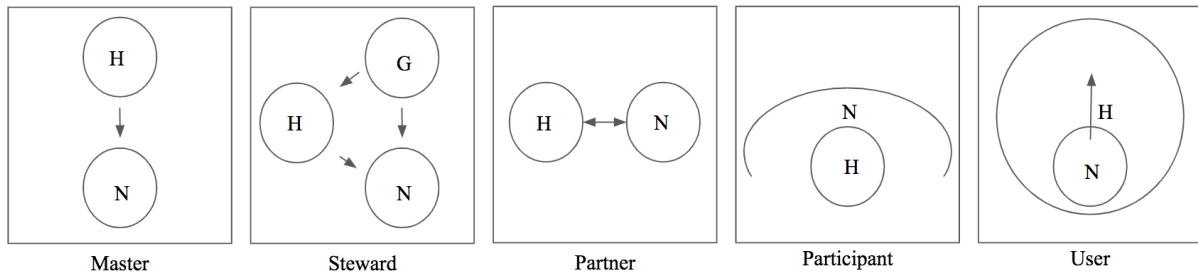
## 2.2 Human-nature relationship

By asking what the appropriate relation between humans and nature is, Van den Born, de Groot & Lengens (2001) identified four different relations people have with the natural environment. In a later study, De Groot, Drenthen & De Groot (2011) conducted a survey among respondents in the Netherlands, France and Germany. They identified four roles and found that the respondents deem different roles towards nature appropriate. Braito *et al.* builds upon that work and states that relationships with nature can be classified as *master*, *steward*, *partner*, *participant*, *user* and *apathy* (2017). The role of *apathy* has been removed as it was considered irrelevant to ask in a nature reserve. The user-role, on the contrary, is welcomed as it captures an aspect that the master role overlooks, namely its utilitarian capacity. The perceptions of the human-nature relationship are described in Table 2. Examples in the right column are added by the researcher to provide practical illustrations.

**Table 2** five roles that humans can have towards nature with a description and an example

Role	Human-Nature Relationship perception	Examples
<b>Master</b>	Has the right to alter nature. Technological progress enables taming and improving nature. Has the right and obligation to protect themselves from natural threats.	<i>Landscape-architect</i>
<b>Steward</b>	Thinks their actions may impact nature and feels responsible to protect nature. Thinks that mankind can be a threat to nature and would like technological interventions to be regulated to minimise its negative effects	<i>Extinction Rebellion</i>
<b>Partner</b>	Feels nature is important and enjoyable for them. Tries to understand natural processes to reflect on their influence on nature. Allows technological interventions only in case both humans and nature benefit. Equally values humans and nature.	<i>Building with nature advocate</i>
<b>Participant</b>	Feels as part of nature. Stresses the importance of the physical and emotional bond between self and nature. Thinks that too few humans recognize the power, value and beauty of nature. Disapproves of the right to use technology to alter nature.	<i>Green retreats</i>
<b>User</b>	Perceives nature as a provider for products and services. Natural processes enhance economic welfare. Thinks they have the right to use nature and enhance natural service provision with technology. Feels responsible to protect nature for today"s and future generation"s welfare.	<i>Miners</i>

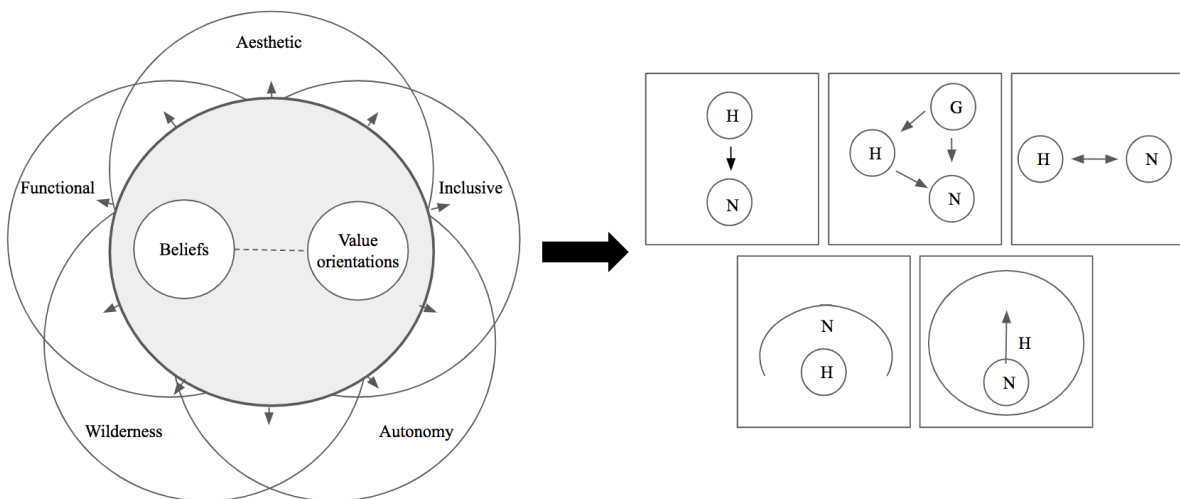
In order to adequately explain the five roles, schematic descriptions have been added (Fig. 5).



**Fig. 5** five roles of humans towards nature, "H" refers to human, "N" to nature and "G" to god

Former studies on the relation between humans and nature demonstrate that people reject the role of master because of reasons of morality and disapprove the role of partners on practical grounds (van den Born, 2008). Muhar & Böck (2018) underline this theory regarding the role of master. The authors emphasise that the role of master is individually rejected but argue that this role is societally implemented, resulting in a paradox. Based on the findings in this study, these theories will be accepted or rejected and visitors' attitudes towards nature will be identified.

The conceptual model as depicted in Fig. 6 is the result of combining the images of nature framework with the human-nature relationship. The thick black arrow represents the main research question, i.e. the relation between images of nature and the role of humans in nature. As these images have particular characteristics it is hypothesised that the different images find different roles towards nature appropriate.

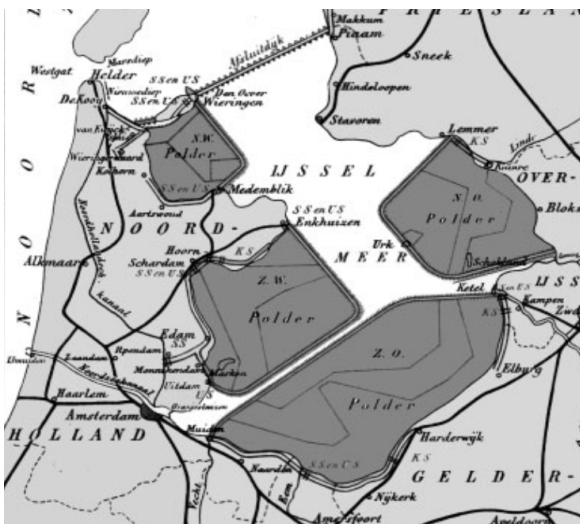


**Fig. 6** Conceptual framework of the study consisting of the three central elements that are (1) the five images of nature characterised by "beliefs" and "value-orientations" on the left, (2) the five roles towards nature consisting of master, steward, partner, participant and user on the right and (3) the black arrow is the main research question, i.e. the relation between these

### 3. Methodology

#### 3.1 Case study: Marker Wadden

To apply the concepts of the images of nature framework and the human-nature relationship, Marker Wadden is chosen as a case study. This is a group of islands located in the Markermeer that is constructed by humans and is part of the Nieuw Land national park in the province of Flevoland. The Markermeer is located in the delta area of the Netherlands, and has a rich history in terms of land reclamation. In 1891, Cornelis Lely designed an extensive plan to reclaim the Zuiderzee by cutting it off and creating several polders (Fig. 7) (Renes, 2019). The arguments for cutting off consist of the flood protection, the increase in land transportation routes, the creation of recreational opportunities and the gradual transformation into a freshwater lake. The loss for local fisheries would be compensated by the increase in local agriculture (Hoeksema, 2014). The Houtribdijk (1975) is akin to the Afsluitdijk (1932) and separated the IJsselmeer in two, creating the Markermeer in 1975 (Fig. 8). Initially, the plan was to reclaim the land south of the Houtribdijk to create the Markerwaard (Z.W. Polder in Fig. 7). This was never executed due to political dissension and this part of the plan was ultimately called off in 2003 (Rijkswaterstaat, n.d.).



**Fig. 7** initial plan for the reclaiming of land from the Zuiderzee by Cornelis Lely in 1891 (Hoeksema, 2014)



**Fig. 8** dikes, polders and the islands that were actually reclaimed from the sea marked by the year of completion (Province of Flevoland, 2019)

Due to the embankment by the two dikes, however, the current was impaired and the lake became turbid as suspended sediment accumulated (Fig. 9) (Noordhuis, 2014; Willems *et al.*, 2021). The issue of eutrophication had been solved after interventions were taken in the '80s (Noordhuis, 2014). In order to boost the ecological function of the lake but conforming to the tradition of land reclamation, the Marker Wadden were constructed in 2017 (700 hectares). Land reclamation used to be driven by economic (industry, agriculture) or social (housing) motives. This project is unique as it is motivated for the ecological purpose of nature restoration *solely*. Provided that the dikes furnish important economic and societal functions and this cannot be reordered, the construction of Marker Wadden resulted in a novel freshwater wetland ecosystem. The idea was initially launched by the Dutch Society for Nature Conservation (Natuurmonumenten) but was co-developed with the Dutch national government finishing the first phase of the project in 2021. The project would enhance the quality of



the water and boost ecological value to progress towards the goals of Natura-2000 and the Water Framework Directive. In the future, the province of Flevoland aspires to have ten percent of shallow waters and/ or riparian zones (7000 hectares) in the Markermeer in order to have an ecologically robust area (Province of Flevoland, 2019).



**Fig. 9** Marker Wadden in the Markermeer located adjacent to Houtribdijk. The colour of the surrounding water signals its turbidity (Google Earth)



**Fig. 10** Aerial photo of Marker Wadden in autumn 2021 (Google Earth)

Marker Wadden attracted international attention as a pioneer in the “building with nature” approach (Willems *et al.*, 2021). In this case, sediment from the bottom of the lake is used as building material for the islands (Saaltink *et al.*, 2016). Since it is defined as a design philosophy in which: “natural processes deliver a number of benefits, ...”, it is a vague principle (Interreg North Sea Region, n.d.). This approach is rising in popularity as it starts from the natural system and should be more sustainable and adaptive compared to traditional, more engineering-driven approaches (De Vriend *et al.*, 2015). Nevertheless, this project would not have been possible without the engineers of Boskalis relocating the 30 million cubic metres of sludge, clay and sand (Boskalis, n.d.). Elements in the construction of Marker Wadden that potentially necessitate periodic restoration such as soil subsidence are currently studied (Temmink *et al.*, 2021). In this research, the word “constructing” is used to describe the development of nature on Marker Wadden. This is a deliberate choice motivated by the fact that Marker Wadden is a novel ecosystem but (1) the process of the islands coming into being involved engineering and follows a blueprint (Boskalis, n.d.), (2) it has boundaries as it should not interfere with existing ecosystem services in this area (van Leeuwen *et al.* 2021) and (3) it needs periodic restoration (Temmink *et al.*, 2021). As such, the word “development” is considered to be falling short as this suggests that conditions are created for nature to evolve more freely. The other extreme is “building” nature but this is principally incorrect as nature is not makeable (Westhoff, 1970). On Marker Wadden, humans construct nature as it involves engineering, management and needs periodic restoration, i.e. humans confine nature to a particular structure.

### 3.2 Planning nature

From a planning perspective focussed on policy making, Marker Wadden similarly encompasses a novel approach. Natura 2000 targets are established quantitatively for certain species at a certain moment in time. This project, however, is aiming for the wider goal of ecosystem development. The



situation might consequently occur that some Natura 2000 species decrease during the ecosystem recovery. This policy-problem has been identified by several actors in the policy evaluation document (Rebel, 2022). Therefore, the policy objective of “bird-paradise” was adopted. In doing so, the strict quantitative approach for evaluation was loosened. With regards to the management of the island, several interventions are executed in order to actively stimulate the ecological value and maintain the preferred landscape. Fig. 11 depicts how reed vegetation is protected against grazing Greylag geese (*Anser anser*) in order to create a habitat for small waterbirds and Fig. 12 shows how willows (*Salix* spp.) are removed to maintain an open landscape.



**Fig. 11** reed protection for grazing Greylag geese (image via author)



**Fig. 12** removed willows (image via author)

### 3.3 Research Design

In order to investigate images of nature and the role of humans on Marker Wadden, two types of datasets were created. First, two interviews were conducted with experts in the field. Ecologist Bart de Haan and projectmanager and initiator Roel Posthoorn, both working for Natuurmonumenten, were interviewed semi-structured. The expert-interviews were executed in order to better understand the ecological and social background of the project (Appendix IV). Second, a survey was composed and conducted among 255 respondents (Appendix I). As the island could only be reached by boat, there was time for reflection on the ferry. The return-way was used for handing out the survey to the respondents as the visitors had just visited the island and could use this experience to fill in the survey.

The survey consisted of three parts. First, the images of nature framework consisting of nine multiple choice- and four open questions. Second, appropriate relationships between man and nature consisting of twelve statements with a Likert scale. Third, the Dutch society for nature conservation's questions concerning their annual study on visitors' experiences. The representatives of the organisation saw this as an opportunity to execute their annual study in exchange for allowance to conduct this research. Their questions can be found on the last three pages of the questionnaire in Appendix I but are irrelevant to this study and will therefore not be mentioned again.

**Table 3** dates of surveying and the number of respondents per day

Date	Monday 1st August	Wednesday 3 August	Tuesday 23 August	Wednesday 24 August	Friday 30 September	Sunday 2 Octobre
Number of Respondents	29	44	55	52	41	34

The survey was conducted by the researcher on 6 different days (Table 3). In order to compose a dataset that is as diverse as possible, different days of the week were chosen to collect the data. An explicit choice was made to confine the second dataset to visitors of the island. This was motivated by the idea that if an individual wants to participate in debates concerning nature development on Marker Wadden, a visit to the islands that are the topic of dispute would be a necessary condition for doing so. This choice, however, can be challenged. Confining the study population to people that visit the island is ignorant of issues regarding affordability and accessibility. Examples of other approaches are including citizens in the direct environment, i.e. Lelystad, or taking a random sample of the Dutch population. As a result of this choice, the mean age of the sample was 55 years, 82% were highly educated (following the definition of the Statistics Netherland (CBS)) and all respondents were able to pay € 25,50 for a return-ticket with the ferry (Table 4). With regards to ethics, all respondents were informed with what their data was used for and the data cannot be traced back to individuals. By filling out the survey they agreed to these terms. An option to comment on the survey and/ or method was provided as well.

**Table 4** number of respondents per age group

Age group	< 16	16-30	31-45	46-60	61-75	> 75	Missing
Frequencies	0	26	34	55	100	10	30

### 3.4 Research approach

The exposition of individual images of nature follows a constructivist ontological positioning as it starts from the understanding that individuals hold different cognitions of nature and that these are continuously revised. According to Bryman, constructivism is the ontological position that asserts that phenomena and their meanings are constantly revised and redefined by actors (2015). In other words, knowledge is not fixed but is based on personal experiences. As such, this nature development project, i.e. the construction of nature on Marker Wadden by humans, is understood as a re-defining object in what constitutes the definition of nature for humans. The adjective *social* in social constructivism is deliberately omitted as cognizing nature in this particular case is assumed not to be confined to the social domain. Here, it is expected that the physical environment similarly influences an individual's understanding of nature.

### 3.5 Operationalizing images of nature

Buijs (2009a) worked inductively by interviewing people and formulating a theory. In this part, this study applies a deductive approach as the theory of images of nature is applied and tested in the context of Marker Wadden. This was done by formulating questions on values, beliefs and value-orientations. The following step was to categorise the respondents by their answers. During the

research, it appeared that categorising respondents by values was not possible. The method of surveying limited the number of questions and curtailed necessary follow-up questions. Consequently, the "values" element in the images of nature framework was initially part of the survey, but eventually neglected in the results of this study. Another element that is missing from the framework of Buijs (2009a) is the "goal of management". This is due to the inapplicability of the element with this specific case. As Marker Wadden is appointed a nature reserve managed by the Dutch Society for Nature Conservation, management cannot be directed to "agriculture" and asking for this specific goal would consequently confuse respondents.

In order to identify what image of nature a respondent holds, a point-system was designed to assign points to the answers. As these are considered to be not-exclusive, respondents receive points for all the five images of nature. As such, the respondents receive five scores (a score for each image) on a scale of 0 - 60 and these represent levels of affinity. A high score means high affinity. Both the "beliefs" and "value-orientation" are worth thirty points in total because these are understood to be not hierarchically ordered. Table 8 shows what answers amount to what score per component of the image of nature. "Neutral" or "no opinion" received zero points because these answers do not express adherence to a particular "belief" or value-orientation. Also, where "Completely agree" or "Agree" are worth five points, the converse; "Completely disagree", "Disagree", are worth zero points. For example, if an individual agrees that something is not nature if it is constructed or managed by humans, defines nature as fragile and balanced, and expresses that we should have no management of nature in general and nature on Marker Wadden, the person receives  $5 + 5 + 10 + 10 + 15 + 15 = 60$  points for the wilderness image. The method of assigning points is used here as the framework of Buijs involves ideal images of nature. Because these are theoretical abstractions, very few respondents would fit the archetypes. With the point-system, it is possible to assign points to all the images of nature for each respondent and address the challenges of working with archetypes.

**Table 5** Operationalisation of the five images of nature. The answers to all components (beliefs and value-orientation) are linked to the corresponding images of nature and particular answers receive a number of points. All answers that are not mentioned in the table are worth 0 points (ELSE = 0)

\* "Agree" describes the Likert scale answers: *Completely agree* or *Agree*. Vice versa for *Disagree*

\*\* "Fragile" describes the Likert scale answers: *Very fragile* or *Fragile*. This is the same for *Balanced*, *Resilient* and *Unstable*

	Belief			Value-orientation		
	Nature-culture	Fragile-resilient	Balance-change	General	MW	
	<i>If it was constructed by humans, it is not nature</i>	<i>If it is managed by humans, it is not nature</i>	<i>Nature is:</i>	<i>Nature is:</i>	<i>Should we manage nature in general?</i>	<i>Should we manage nature on Marker Wadden?</i>
<b>Wilderness</b>	Agree * = 5	Agree = 5	Fragile ** = 10	Balanced = 10	No management = 15	No management = 15
<b>Autonomy</b>	Agree = 5	Agree = 5	Resilient = 10	Unstable = 10	No management = 15	No management = 15
<b>Inclusive</b>	Disagree = 5	Disagree = 5	Fragile = 10	Unstable = 10	Minimal- or moderate management	Minimal- or moderate management

	Belief			Value-orientation		
	Nature-culture	Fragile-resilient	Balance-change	General	MW	
	<i>If it was constructed by humans, it is not nature</i>	<i>If it is managed by humans, it is not nature</i>	<i>Nature is:</i>	<i>Nature is:</i>	<i>Should we manage nature in general?</i>	<i>Should we manage nature on Marker Wadden?</i>
<b>Wilderness</b>	Agree * = 5	Agree = 5	Fragile ** = 10	Balanced = 10	No management = 15	No management = 15
<b>Autonomy</b>	Agree = 5	Agree = 5	Resilient = 10	Unstable = 10	No management = 15	No management = 15
<b>Aesthetic</b>	Disagree = 5	Disagree = 5	Fragile = 10	Balanced = 10	Minimal- or moderate management = 15	Minimal- or moderate management = 15
<b>Functional</b>	Disagree = 5	Disagree = 5	Resilient = 10	Unstable = 10	Intensive management = 15	Intensive management = 15

For the categorisation into images of nature-groups, three rules apply. First, a minimum of thirty points is used as a benchmark for a respondent to be classified in a group. This benchmark is used as both “belief” and “value-orientation” each amount to thirty points. By applying this benchmark, to be classified means adherence to components of both the “beliefs” *and* the “value-orientations”. Second, the image of nature with the highest score is the group the respondent is classified in. Third, if one respondent has two identical scores the respondent will be grouped into none of the two groups. Instead, a new group will be created and the respondent will be classified into that group that is a combination of the two.

### 3.6 Operationalizing human-nature relationships

For the second part, the human-nature relationship, ten statements were presented to the respondents. The first five principle-statements were derived from the literature describing the five roles: master, user, steward, partner and participant. The roles and its description are set out in Table 6. The principle-statements are propositions that are not specified to a location. Instead, these entail a more fundamental proposition on relations between humans and their natural environment.

**Table 6** five possible human-nature relationship and their description in abstract principles

<b>Master</b>	Human beings have the right to alter nature radically
<b>User</b>	Nature exists primarily for our own wellbeing
<b>Steward</b>	Human beings have a responsibility to conserve the natural environment

**Partner** People and nature are of equal value

**Participant** Human beings are part of nature

---

The five concrete intervention-statements are composed by the author (Table 7). These are both fictional and non-fictional statements inspired by the five selected principles of the human-relationships and the expert-interviews. It should be noted that these are not tested on accuracy of description of a role.

**Table 7** five possible human-nature relationship and their description in statements specified to Marker Wadden composed by the author

---

<b>Master</b>	We should protect reed artificially against Geese in order to create a habitat for waterbirds
<b>User</b>	We should construct hiking tracks for people to be able to recreate
<b>Steward</b>	Because we made biodiversity decline, we should build islands to compensate nature
<b>Partner</b>	After a period of drought, equal shares of Markermeer-water should be given to drinking water facilities and the reviving of nature
<b>Participant</b>	We should make parts of Marker Wadden accessible for humans because here we can feel our connection to nature

---

All twelve statements were presented with a Likert scale in a random order. The provided options were "Completely disagree", "Disagree", "Neutral", "Agree", "Completely agree" and "No opinion" (Appendix I). In doing so, (1) attitudes on the human-nature relationship are studied, (2) attitudes towards interventions specific to Marker Wadden are examined. In the survey, no statements were formulated negatively. Therefore, no reverse coding was necessary when preparing the data for the analysis. Cronbach's Alpha is used to measure the internal reliability between two variables and this will elucidate if visitors' opinions regarding abstract principles and location-specific interventions are similar.

## 4. Results

### 4.1 Images of Nature

Using a benchmark of thirty points, it appeared that three of the five images were shared among the respondents on Marker Wadden. To provide more background on the respondents and their choices that led to the classification as such, Table 8 & 9 shows the populations for the two elements “belief” and “value-orientations” and its constituents for the images of nature in this study.

**Table 8** frequencies of respondents on the element: "belief". On the left the three constituents are set out. Each belief was presented with different answers and the possibilities and its frequencies are visible in the three rows

Nature - Culture	Complet ely disagree	Disagree	Neutral	Agree	Completel y Agree	No opinion	Missing
<i>If it was constructed by humans, it is not nature</i>	26	163	38	17	2	2	7
<i>If it is managed by humans, it is not nature</i>	29	130	60	25	1	1	9
Fragile - Resilient	Very fragile	Fragile	Neutral	Resilient	Very resilient	Don't know	Missing
	19	74	11	106	26	3	16
Unstable - Balanced	Very unstable	Unstable	Neutral	Balanced	Very balanced	Don't know	Missing
	8	106	56	64	6	7	8

The positioning of respondents on nature and culture being similar or divided was tested by presenting the two statements: “If it was constructed by humans, it is not nature” & “If it is managed by humans, it is not nature”. "completely disagree" or "disagree" signifies the belief that nature and culture are not separated domains but are hybrid and/or intertwined. "completely agree" or "agree" signifies the belief that the two domains are different. It is remarkable to note that the percentage of respondents that trivialise construction is higher than the proportion of respondents that trivialise management in defining nature (76% compared to 65%). In addition, of the respondents that problematize human interference, the management group (11%) is greater than the construction group (8%). In other words, the effects of construction are more trivial and less problematic compared to the effects of management on the naturalness of an area. It should be noted, however, that a lot of people are neutral with regards to management.

The second constituent of the beliefs, that is the continuum of nature being fragile or resilient, follows a double bell shaped distribution. The peaks are “fragile” and “resilient” and the latter is the highest. Apparently, the respondents have diverse opinions on this spectrum. Defining nature as fragile may responsabilize humans as nature is easily destroyed.

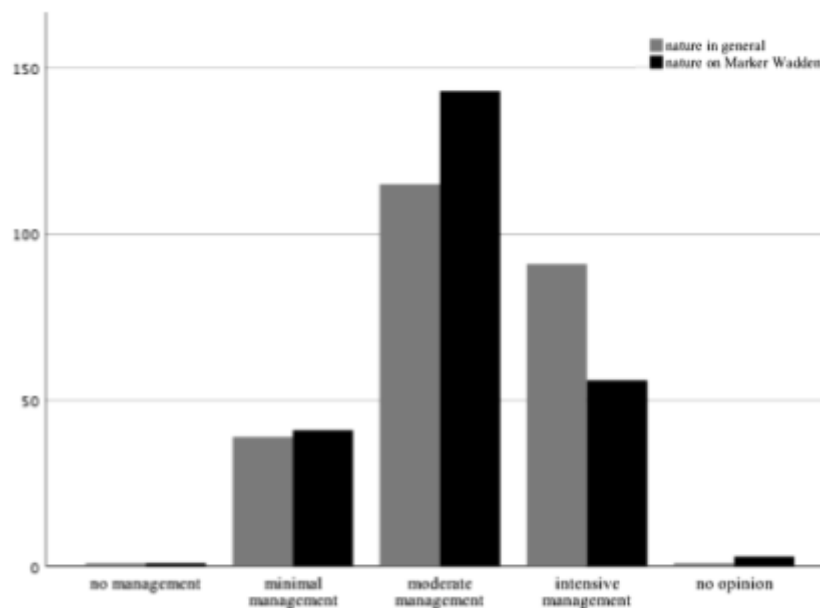
The third belief consists of nature gravitating towards a certain equilibrium, i.e. “balance”, or being in a state of constant motion, i.e. “evolving”. Almost half of the respondents (46%) state that

nature is always evolving. Another quarter of the people are neutral (23%) and the remaining quarter finds that nature is gravitating towards equilibria (28%).

**Table 9** frequencies of respondents on the element: *value-orientation*. On the left the two constituents are set out. Value-orientation was divided into "nature in general" and "nature on Marker Wadden"

Should we manage ...?	No management	Minimal management	Moderate management	Intensive management	No opinion	Missing
Nature in general	1	39	115	91	1	8
Nature on Marker Wadden	1	41	143	56	3	11

If- and the extent to which humans should manage nature was questioned by presenting the normative statement: "Should we manage nature in general/ on Marker Wadden?" This statement was split up in a specification towards "Nature in general" and "Nature on Marker Wadden" to test the implications of the factor context. Context, however, has two dimensions here. The first is the literal reference in the statement. The second is geographical as the location at which this study is conducted. In this question, the focus lies on the former and it appears that nature on Marker Wadden ought to be managed less intensively according to the respondents, compared to nature in general (Fig. 11).



**Fig. 13** graphical overview of the respondents their answers to the question: *To what extent should nature be managed?* This statement was directed toward "Nature in general" and "Nature on Marker Wadden"

With the use of the benchmark of thirty points it appeared that three of the five images were shared among the respondents on Marker Wadden. These are the images: inclusive, aesthetic and functional. These three images acknowledge the interrelatedness between nature and culture (Table 5).

*"It's quite straightforward to me that humans are part of nature."* Roel Posthoorn (23-9-2023)

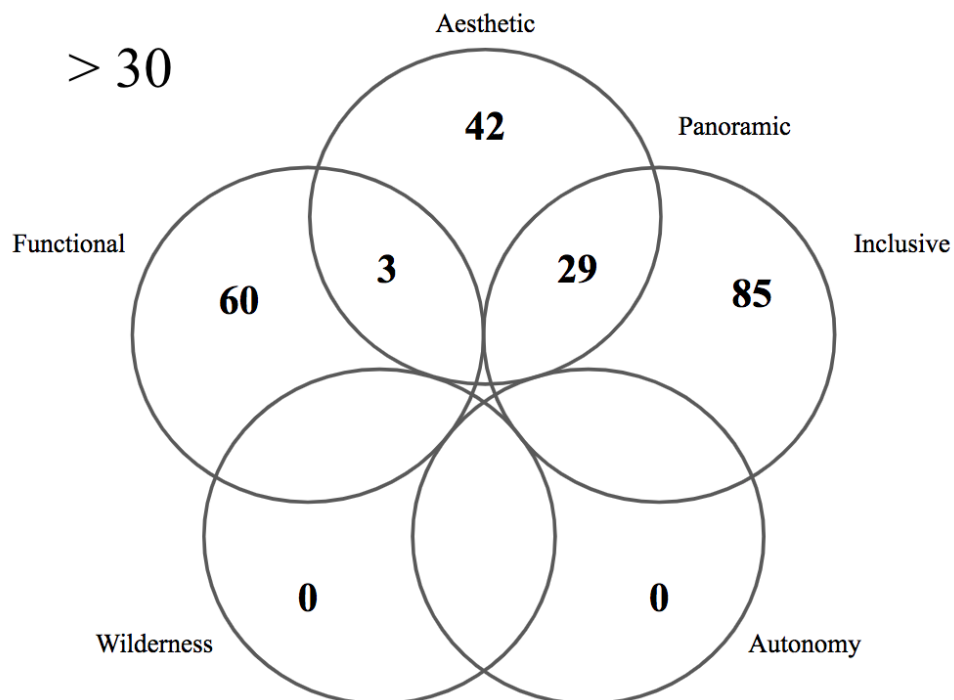
Although the initiator of the plan has not filled in the survey, he would be categorised in either of the three images that are identified among respondents on Marker Wadden provided that he acknowledges that nature and culture are not separated domains.

There is a substantial number of respondents that have identical scores for two groups. These individuals were grouped into the double-groups. Table 10 shows that if the benchmark increases, the groups decrease in numbers.

**Table 10** sensitivity analysis of the images of nature groups on Marker Wadden using different benchmarks, and their resulting populations

	Inclusive	Aesthetic	Functional	Inclusive & Aesthetic	Aesthetic & Functional	Total
> 30	85	42	60	29	3	218
> 40	69	35	36	7		147
> 50	26	4	6			36

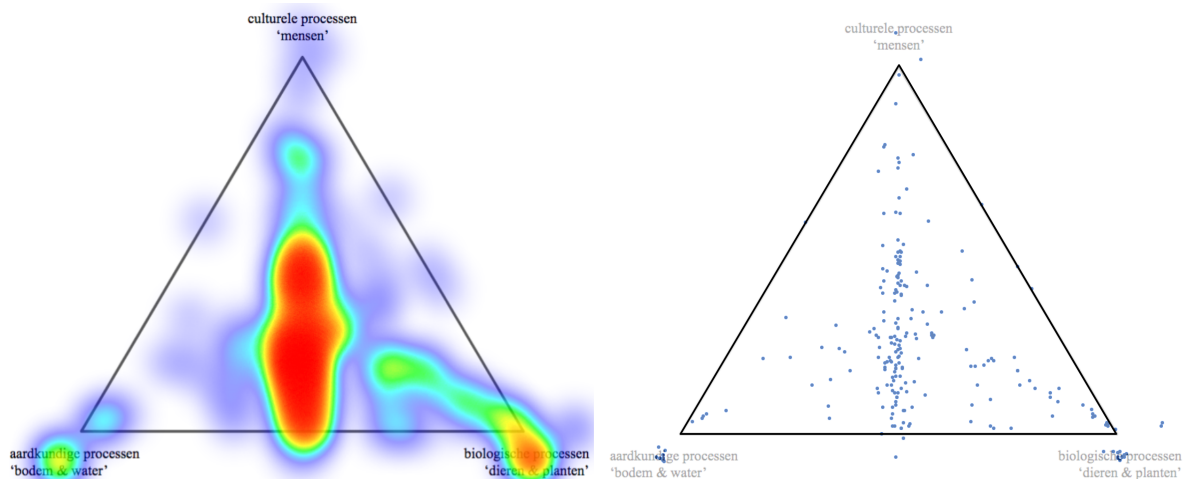
Fig. 14 depicts the different images of nature that are identified on Marker Wadden with a benchmark of thirty. For the analysis with the human-nature relationship, the “aesthetic & functional” group is neglected for the simple fact that it is too small (3 members). The double-group counting 29 respondents that will be part of the analysis, is called “panoramic”. This name was chosen because it combines the notion of beauty that is central in the Aesthetic-group and it describes seeing the whole picture which is the key characteristic of the Inclusive-group. In terms of opinions, however, the group is expected to be similar to the inclusive and aesthetic group because they share the same characteristics. This makes the group different in name, but not in substance *per se*.



**Fig. 14** visual representation of the five images of nature groups and their populations using a benchmark of 30 points



Now that the three groups are identified and one group is added, their key characteristics are set out and the results of the statements will be explicated. These will ultimately be combined in the last section where the image of nature groups are set out against the five different roles towards nature. Before doing so, the diachronic triangular perspective on landscapes is explored. In this study, respondents were asked to pinpoint which process- or combination of processes were dominant in the shaping of the landscape of Marker Wadden (Fig. 15 & 16).

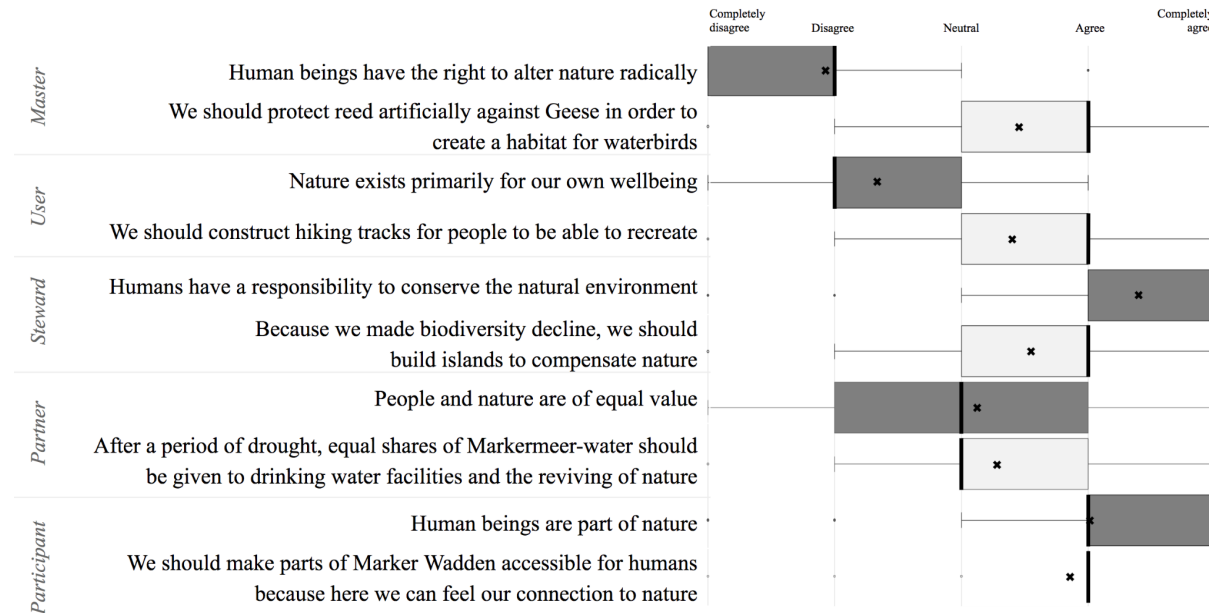


**Fig. 15 & 16** visual representations of which process or which combination of processes respondents perceived to be dominant on Marker Wadden by the respondents. The image on the left shows concentrations using colour and the right depicts all individual dots. The top corner denotes cultural processes or "humans", the left corner geophysical processes or "soil & water" and the right corner are biological processes or "animals & plants". The image on the right shows all individual dots ( $N = 224$ )

Although this model addresses the framing of landscapes as “natural” or “cultural”, it has not been used for the classification of individuals into the image of nature-groups in this study. Nevertheless, it is useful for this explorative study for a few reasons. First, the model shows what is perceived to be dominant in shaping the landscape. Here, the highest concentration of points is in the lower middle section of the triangle. Focussing on the x-axis, most respondents perceive physical-geographical or biological processes as equally dominant. This demonstrates that both soil, water, animals and plants are recognized for their impact on the landscape by the respondents on Marker Wadden. Focussing on the y-axis, the majority points in the lower section. This demonstrates that the shaping of the physical environment of Marker Wadden is perceived to be not dominated by anthropological processes. Second, the model sheds light on the discrepancy between expert- and lay cognitions. Approximately ten percent of the respondents (24) pinpoint a process outside of the triangle whilst this model is precisely developed to highlight that these three processes are intertwined. Apparently, these respondents do not share this cognition.

## 4.2 Human-nature relationship

The five roles: master, user, steward, partner and participant were described by one abstract principle and one location-specific intervention (Fig. 17 & Table 11). To study the human-nature relationship on Marker Wadden, the opinions of respondents regarding these five roles were examined with a Likert scale. As two statements refer to the same role, similar answers are expected.



**Fig. 17** boxplot of the Likert scale of ten statements in pairs of principle (dark) and concrete location-specific intervention (light)( $n = 255$ )

Fig. 11 presents the Likert scales ("1 - completely disagree" to "5 - completely agree") and their results in a box plot. The boxplot reads as follows: (1) the thick vertical line represents the median, (2) the vertical line on the boundaries of the boxes are the first and third quartile, the box accounts for 50% of the respondents, (3) left and right of the box are whiskers which account for 25% of the respondents, (4) the small dots correspond to outliers and (5) the "x" is the mean for this population. When the box is missing, the first and third quartile coincide with the median.

In contrast to the expectations, the boxplot in Fig. 11 demonstrates how different opinions regarding the same role elicited. With the role of master for example, 75% of the respondents chose "completely disagree" or "disagree" to the principle whilst 50% of the respondents chose "neutral" or "agree" to the location-specific intervention. This difference can be similarly observed for other roles and demonstrates that the two statements describing one role elicited substantially different answers.

To provide statistical evidence for these findings, Cronbach's  $\alpha$  analysis was executed. This method was chosen because it measures internal consistency and thereby shows if multiple items may be combined to create one scale. In this case, it is examined if two statements describing one role are reliable, i.e. consistent. Five analyses were run, one for each role.

**Table 11** Statistical analysis of the internal consistency of the five roles each described by two statements

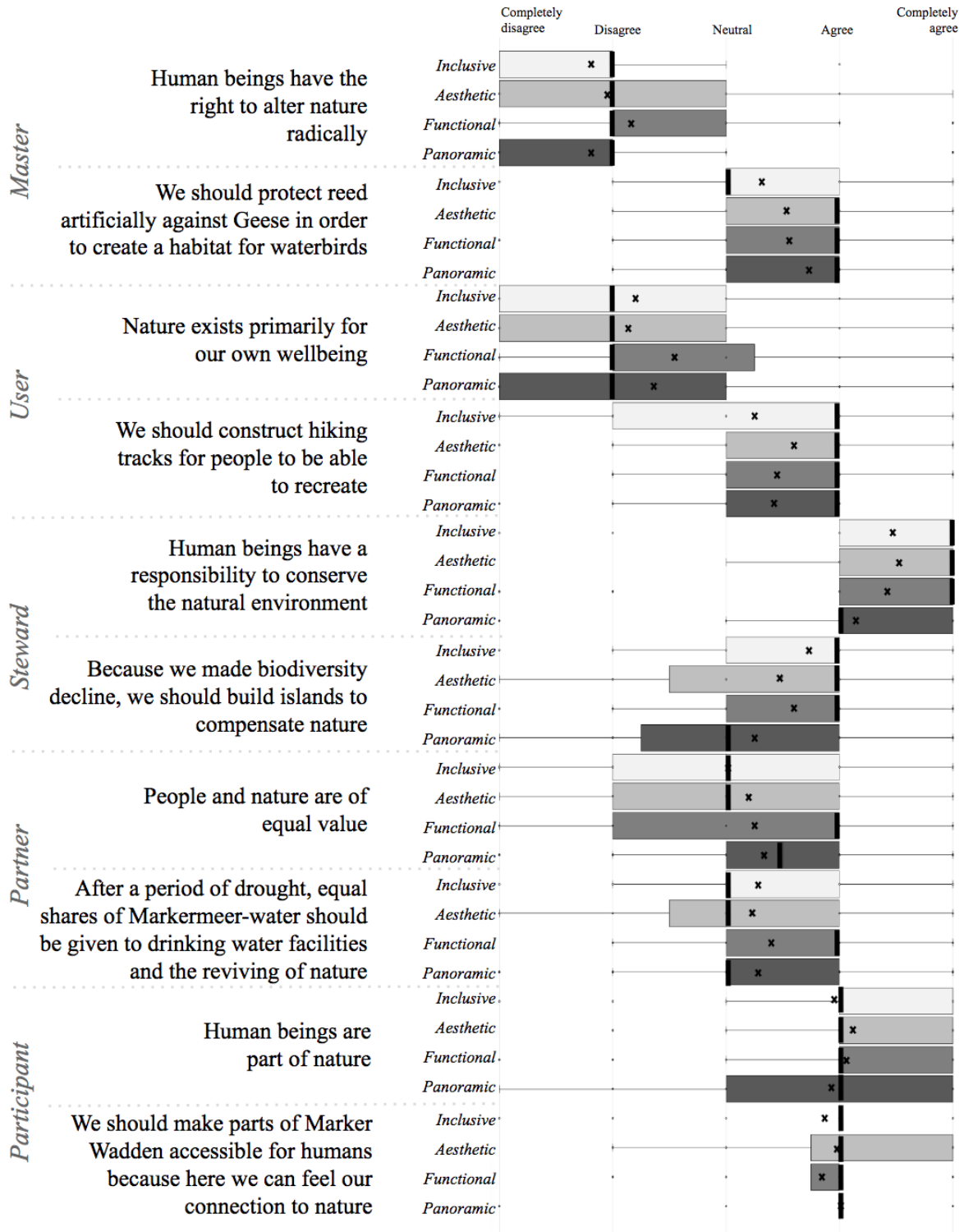
	Abstract principle	Concrete intervention	Cronbach's $\alpha$	N
Master	Human beings have the right to alter nature radically	We should protect reed artificially against Geese in order to create a	0.217	240

		habitat for waterbirds		
User	Nature exists primarily for our own wellbeing	We should construct hiking tracks for people to be able to recreate	0.205	239
Steward	Human beings have a responsibility to conserve the natural environment	Because we made biodiversity decline, we should build islands to compensate nature	0.230	243
Partner	People and nature are of equal value	After a period of drought, equal shares of Markermeer-water should be given to drinking water facilities and the reviving of nature	0.009	242
Participant	Human beings are part of nature	We should make parts of Marker Wadden accessible for humans because here we can feel our connection to nature	0.176	243

Cronbach's  $\alpha$  appeared to be very low for all pairs of statements. All values are of  $\alpha < 0.50$  meaning that the internal consistency is unacceptable (George & Malloney, 2021). For the master role, for example, it demonstrates that the variance between the two statements is not consistent and the test is 78% unreliable (Brown, 2002). Therefore, it can be concluded that respondents do not answer comparably to the two statements representing one and the same role. Relating this to the sub-question, there is not one role that is either accepted or rejected by the respondents following the arrangement in this study. The arrangement being the paired statements that jointly describe one role. Nevertheless, the single statements do provide interesting information regarding the appropriateness of the principles and location-specific interventions according to respondents on Marker Wadden. Based on the medians for 255 respondents, humans should: intervene to create habitats, enable recreation, bear profound responsibility for the conservation of the natural environment, build islands to compensate for biodiversity loss, see humans as part of nature and make parts of Marker Wadden accessible. In contrast, humans should not: radically alter nature and reduce nature to human interest only. Seeing nature as equal and treating nature and basic human necessities equally in times of crisis is open to debate with the respondents.

### 4.3 Kruskal Wallis

The four groups that were identified on Marker Wadden are: inclusive, aesthetic, functional and panoramic. In this section, these are set out against the ten statements that describe five roles of humans in nature and this synthesis provides an answer to the main research question: *In what ways do people's image of nature explain attitudes towards nature on Marker Wadden?*



**Fig 18** paired statements on the left are plotted with a box and whisker per image of nature: inclusive ( $N = 85$ ), aesthetic ( $N = 42$ ), functional ( $N = 60$ ) and panoramic ( $N = 29$ )

Fig. 18 connects the images of nature of respondents on Marker Wadden with the human-nature relationship by plotting the statements with a box and whisker plot ranging from the Likert scales "1 - completely disagree" to "5 - completely agree". Apart from the four-tiered division per statement, Fig. 18 follows the same logic as Fig. 18 and it therefore needs no further explanation.

To find out whether the four identified image of nature-groups: Inclusive, Aesthetic, Functional and Panoramic have statistically different attitudes towards each of the statements, a Kruskal Wallis test was executed. The hypotheses for the analysis read:

H0: "attitudes towards the statement: "... are the same across four groups"

HA: "attitudes towards the statement: "... are not the same across four groups"

Rejecting H0 means the conclusion can be drawn that it is plausible that the groups have significantly different attitudes towards the statements. The data demonstrates, however, that this can only be concluded in one case, namely statement two (Table 12). In the other nine cases, the  $p$ -value exceeds the threshold of  $p < 0,1$ . Meaning that the probability of making a Type I error, or incorrectly rejecting H0 is higher than 10%. In other words, the evidence is weak for rejecting H0 in nine of the ten cases. Summing up, it is plausible to assert that attitudes towards nine of the ten statements are not different across the four groups inclusive, aesthetic, functional and panoramic.

**Table 12** Overview of the data for the Kruskal Wallis analysis of the ten statements across the four groups: inclusive ( $N = 85$ ), aesthetic ( $N = 42$ ), functional ( $N = 60$ ) and panoramic ( $N = 29$ )

	Kruskal Wallis H	N	Median (Md)	Degrees of freedom	Asymp. sig.
Human beings have the right to alter nature radically	5.118	207	2, 2, 2, 2	3	<b>0.163</b>
We should protect reed artificially against Geese in order to create a habitat for waterbirds	6.733	199	3, 4, 4, 4	3	<b>0.081*</b>
Nature exists primarily for our own wellbeing	4.024	210	2, 2, 2, 2	3	<b>0.259</b>
We should construct hiking tracks for people to be able to recreate	5.028	212	4, 4, 4, 4	3	<b>0.170</b>
Human beings have a responsibility to conserve the natural environment	2.292	209	5, 5, 5, 4	3	<b>0.541</b>
Because we made biodiversity decline, we should build islands to compensate nature	4.666	205	4, 4, 4, 3	3	<b>0.198</b>
People and nature are of equal value	2.595	206	3; 3; 4; 3,5	3	<b>0.458</b>
After a period of drought, equal shares of Markermeer-water should be given to drinking water facilities and the reviving of nature	0.960	190	3, 3, 4, 3	3	<b>0.811</b>
Human beings are part of nature	0.949	213	4, 4, 4, 4	3	<b>0.814</b>
We should make parts of Marker Wadden accessible for humans because here we can feel our connection to nature	2.163	209	4, 4, 4, 4	3	<b>0.539</b>

\* This is significant with a level of  $p < 0,1$

The only statement that proved to be statistically different is the location-specific intervention describing the master-role: "We should protect reed artificially against Geese in order to create a habitat for waterbirds". This is an exception as it is the only statement that is significant with a level of  $p < 0,1$ . The Kruskal Wallis test revealed a statistically significant difference in attitudes towards the artificial protection of reed for the creation of a waterbird-habitat across the four image of nature groups,  $\chi^2(3, N = 199) = 6.733, p = 0,081$ . The inclusive group was the least in favour ( $Md. = 3.00$ ) compared to the functional ( $Md. = 4.00$ ), aesthetic ( $Md. = 4.00$ ) and panoramic group ( $Md. = 4.00$ ). To find out which specific groups are different, a post-hoc Mann Whitney U analysis was run. The hypotheses for the analysis read:

H0: "attitudes towards the statement: 'We should protect reed artificially against Geese in order to create a habitat for waterbirds' are the same between two groups"

HA: "attitudes towards the statement: 'We should protect reed artificially against Geese in order to create a habitat for waterbirds' are not the same between two groups"

The Mann Whitney U test revealed that attitudes towards the artificial protection of reed for the creation of a waterbird-habitat were significantly less approving in the inclusive-group ( $Md = 3.00, n = 77$ ) compared to the functional-group ( $Md. = 4.00, n = 55$ ),  $U = 1723, z = -1.966, p = 0.049$ , with a weak effect size  $r = .17$  and the panoramic-group ( $Md. = 4.00, n = 26$ ),  $U = 719.5, z = -2.301, p = 0.021$ , with a weak effect size  $r = .23$ .

**Table 13** Overview of the Mann Whitney U analysis of the one statements across the three groups: inclusive ( $N = 85$ ), Functional ( $N = 60$ ) and Panoramic ( $N = 29$ )

	Mann Whitney U	N	Z	r	Median	Asymp. Sig.
Inclusive ~ Functional	1723	132	-1.966	0.17	3, 4	0.049
Inclusive ~ Panoramic	719.5	103	-2.301	0.23	3, 4	0.021

Using a  $p < 0.05$ , it can be concluded that for both pairs of groups, the null hypothesis can plausibly be rejected based on the data. The effect size, however, is weak for both pairs of groups.

#### 4.3.1 Interpreting Kruskal Wallis

In relating the findings to the theory, a few discrepancies between expectation and outcome come to light. First, individuals that see nature as inclusive stress the interconnectedness of all life and are characterised by biocentrism. Therefore, the form of justice that is scrutinised by the partner-principle: "People and nature are of equal value" is expected to be agreed to. In the results, however, the median is "neutral" for this group. In Fig. 18 it is visible that the median of both the functional and panoramic group are even higher compared to the inclusive group. Despite this observation, these groups have proven to be not statistically different. Being premised on valuing all life equally, this "neutral" median and the statistical convergence to the other groups is surprising for the inclusive image of nature. Looking for an explanation, the respondents that "agree" put man and nature on equivalent value. Disagreement, on the other hand, rejects equality of man and nature but it is unclear which of the two is more valued. It could as well be that non-human life is valued more. Linking this to the partner-intervention: "After a period of drought, equal shares of Markermeer-water should be given to drinking water facilities and the revival of nature" does not provide clearance. The inclusive-group

still has a neutral median and thereby does not equally value human- and non-human nor embrace hierarchy.

The second discrepancy regards the aesthetic image which is characterised by support for enhancing the possibilities for recreation and -visual qualities. The participant-intervention: "We should make parts of Marker Wadden accessible because here we can feel our connection to nature" is agreed to by most respondents as the median is "agree" and the upper quartile is "completely agree" for the aesthetic group. The statistical evidence, however, does not underline that the four groups differ in attitude for this statement. This same statistical convergence applies to the user-intervention: "We should construct hiking tracks for people to be able to recreate". As such, whilst the aesthetic image of nature-group in theory supports recreational possibilities, they are not significantly more supportive compared to the other groups.

The third discrepancy regards the individuals adhering to the functional image. In theory, these people support human interference in nature because it increases utilitarian values. For the master-principle: "Human beings have the right to alter nature radically", however, the median for this group is "disagree". This is surprising for a group that is characterised by supporting intensive management, valuing nature for its productive capacity and anthropocentrism. A potential explanation could be that stimulating biodiversity - the prime aim of Marker Wadden - is not interpreted as utility. Regardless, the radical alteration of nature is disagreed upon despite the support of human interference in nature. In other words, the management of nature is approved of but this should not be done radically. At least, it should not be framed as "radical".

The fourth discrepancy regards the user-intervention that describes the artificial protection of reed for the creation of a waterbird-habitat. The Mann Whitney U test revealed that attitudes were significantly less approving for the Inclusive-group. In addition, Fig. 18, depicts that the median is "neutral" for the intervention-statement of the master-role. Individuals that see nature as inclusive, however, stress the interconnectedness of all life and approve specific forms of management if it improves the well-being of plants or animals. Therefore, intervening to create more diverse habitats would be expected to be approved by this group.

## 5. Discussion & Conclusion

This study demonstrated the presence of three images of nature groups: inclusive, aesthetic and functional (and added the group: panoramic) and explored how these groups explain attitudes towards nature by presenting ten statements consisting of principles and location-specific interventions on Marker Wadden to 255 respondents. Before coming to a conclusion, the two sub-questions are answered and critically reflected upon.

### 5.1 Images of Nature

The first sub-question reads: "What images of nature groups can be distinguished on Marker Wadden?" The results from the point-system with a benchmark of thirty points show that the three images of nature: inclusive ( $N = 85$ ), aesthetic ( $N = 42$ ) and functional ( $N = 60$ ) were shared among the respondents on Marker Wadden. The panoramic-group ( $N = 29$ ) was added to this list because some respondents demonstrated to hold an image of nature that resonated with both inclusive- and the aesthetic-groups. Four findings and critical notes are of importance here.

#### 5.1.1. Nature-culture

In defining nature, the degree of naturalness appeared to be moderately dependent on human interference among the respondents on Marker Wadden. Over two-third find something "natural" if it is constructed or managed by humans. This finding is in sheer contrast with the theory by Van den Born (2008) who states that the degree of naturalness is dependent on human interference. On Marker Wadden, most respondents trivialise the element of construction- and de-problematize the management of nature by humans in defining nature. In other words, the division between nature and culture is rejected as human interference (i.e. culture) does not diminish the natural qualities (i.e. nature). In congruence with this acknowledgement of harmony, the value-orientation of "hands off management" was rejected. As only 1 out of 255 respondents favoured "no management" (Fig. 13), human interference by managing nature is similarly de-problematized.

These two findings combined explain the absence of the images of autonomy and wilderness provided that these are characterised by a belief in nature and culture as divided domains. In these images, nature is something "out there" and is untouched by humans. In the province of Flevoland however, everything is touched by humans. In fact, the province would not have existed without humans. The artificiality of this region potentially repels people with these images of nature but this theory cannot be substantiated by this data. Nevertheless, it might provide an interesting suggestion for further research. The hypothesis would be that Flevoland attracts people that are proud of human artefacts and might repel others that do not share this thought. Regardless of this study and its outcomes, it can be concluded that images of nature are very sensitive to context.

This element of context, however, brings the dilemma of the chicken and egg to the fore. As this study followed a constructivist ontology, images of nature are interpreted as constantly influenced by experiences. As such, the physical environment of Marker Wadden is expected to influence an individual's understanding and image of nature. The construction of Marker Wadden consequently constructs the images of nature people hold. So, what is the cause and what is the effect? The respondents' images of nature premised on hybridity between nature and culture or Marker Wadden re-defining nature. For this reason, an element of time would have been a welcome addition to this research and this might as well provide an interesting pathway for further research. For instance, determining whether images of nature have been altered by the physical appearance of Marker



Wadden. This could be executed surveying on both the way there as well as on the way back. Such studies would shed the necessary light on the fluidity of images of nature.

### 5.1.2 Ideal types

Second, With a benchmark of minimally thirty points, approximately 40% of the respondents (216/255) were allotted to the groups inclusive, aesthetic and functional or panoramic. As this is a theoretical model on *ideal* types, these images are overdramatized archetypes. Consequently, the classification can be used as a description for the way in which humans perceive nature but should not be interpreted as a strict and exhausting representation of reality. The link of the images of nature framework with the attitudes towards nature should consequently be made cautiously. Thus, the observation that the differences in attitudes towards statements based on this archetypal explanatory variable are weak or non-existing, does not solely infer that these differences are weak or non-existing. It also highlights the methodological shortcomings of this deductive approach since both the element "value" and the "goal of management" of the element "value-orientation" were left out in the identification of images of nature compared to the study by Buijs (2009a). The former was left out because the deductive method of surveying proved to be inadequate. The latter, the "goal of management" on Marker Wadden was left out because the area is designated to be a natural reserve, other choices were simply not available and would only confuse respondents. Although some adjustments were made by, for example, splitting the "value-orientations" into "nature in general" and "nature on Marker Wadden", the study deviates from the theory by Buijs (2009a).

### 5.1.3 Meta-images

A weakness of this study is that Marker Wadden is constructed with a particular idea of how nature should be materialised, namely that of Roel Posthoorn and the Dutch society for nature conservation. It must be noted that pre-construction participatory processes occurred and that it was not just one person or one organisation in power, but this is not the point. The point is that Marker Wadden is constructed by people who themselves have an image of nature. Because these people have a particular image of nature they make particular choices. The result is an archipelago that is constructed following the logic of many elements such as technological capabilities, available resources, popular policy objectives and historical and geographical effects, but most importantly, the construction adheres to the logic of the image of nature of the developers. It should be noted, however, that all landscapes are the result of dynamic interactions between natural and cultural forces. As such, all landscapes to a certain extent follow the logic of the images of nature and the appurtenant attitudes of the people that are responsible for the management. On Marker Wadden at this point in time, however, this layer is relatively novel. Compared to Oostvaardersplassen, where fifty years of natural and cultural forces layered the landscape, Marker Wadden is relatively intelligible. This novelty potentially influences the cognitive possibilities for the visitors as this landscape is constructed following the logic of the image of nature of the developers.

## 5.2 Human-nature relationship

The second sub-question in this study reads: “What attitudes towards nature do people share on Marker Wadden?” Five roles were described by pairs of statements that consisted of one abstract principle and one location-specific intervention. Following this arrangement, there is not one role that is either accepted or rejected by the respondents. Two findings are of importance here.

### 5.2.1. Cognitive dissonance

First, it can be concluded that respondents do not answer comparably to the two statements representing one and the same role based on Cronbach’s  $\alpha$  analysis and by reading Table 11. There is a substantial difference between the principles and the location-specific interventions. This discrepancy has multiple potential explanations. First, the intervention-statements are based on the principles from De Groot, Drenthen & de Groot (2011) but the formulation is not the same. They comprise different words, inferences and examples. Second, the interventions are directed towards nature on Marker Wadden whereas the principles deliberately lack a reference to a particular natural area. This discrepancy illustrates that this bundling has low validity and could have been solved by asking a handful of people if the location-specific intervention was an accurate formulation of the principle before handing out the survey. This could have increased the reliability, which is now lacking in this part of the study. The effects of this low validity on the results of this study, however, are tolerable as the ten statements can be individually assessed in the following section, for the main research question. Moreover, the low validity demonstrates that a difference in attitudes for the pairs exist and that the principles were divisive and the interventions raised more coherent answers. Four of the five medians for the location-specific intervention are "agree" whereas the medians for the principle-statements range from "disagree" to "completely agree". The low validity can consequently be used as proof for cognitive dissonance, albeit the blurring by formulation and object of reference. Cognitive dissonance is understood here as having two conflicting cognitions. For instance, with the *user* role, the general conviction is that nature does not exist primarily for human wellbeing but humans should be provided the option to access nature for recreation. This conviction involves an inconsistency as the principle suggests that nature is worthy independent of human valuation and the location-specific intervention advocates for human accessibility driven by value for humans. The second example is the master role where the general conviction is that nature should not be altered radically but humans should interfere in nature to create habitats. Here, intervening is both despised and supported. This aligns with the research by Muhar & Böck (2018) in which a discrepancy between the concept- and praxis of mastery is described.

### 5.2.2. Ambiguous natures

Second, although respondents defined "nature" by the images of nature framework, it remains impeccable what people mean by "nature" in the different statements. As the images of nature are archetypes, they do not provide exhausting definitions. Do respondents have a particular (combination of) landscapes, process, area, geology, soil, and/ or animals in mind when they answer the statements? This ambiguity, however, has implications for the validity of the results as every context raises different images of nature and consequent attitudes towards nature. For example with the master-statement regarding the radical alteration of nature, respondents might not see "abiotics", i.e. physical geographical processes and landforms as “nature”. Radically altering this soil and water could be deemed as not-problematic as this is not understood as “nature”.

### 5.3 Images explaining attitudes

The main research question in this study reads: “In what ways do people’s images of nature explain attitudes towards nature on Marker Wadden?” Based on the statistical analysis, it is plausible to assert that attitudes towards nine of the ten statements are not different across the four groups inclusive, aesthetic, functional and panoramic. Although the images of nature have different characteristics in theory, they do not produce statistically different attitudes towards nature. The four most striking discrepancies between expectation and outcome will be mentioned and critically evaluated here. Despite the inclusive group being in theory characterised by biocentrism, i.e. equally valuing all life, it has a neutral median for the statement regarding man and nature being of equal value. Moreover, it is statistically convergent to the other groups. As such, the group does not equally value human- and non-human nor embrace hierarchy. Second, whilst the aesthetic image of nature-group in theory supports recreational possibilities, they are not significantly more supportive compared to the other groups for the statements regarding accessibility and the construction of hiking tracks. Third, the radical alteration of nature is disagreed upon by the functional group despite their characteristic support of human interference in nature for productive ends. Fourth, despite the support for interfering if life is stimulated in theory, the Mann Whitney U test revealed that attitudes towards the artificial protection of reed for the creation of a waterbird-habitat were significantly less approving for the inclusive-group. Summing up, attitudes of the four groups for nine out of ten statements were statistically not different whilst expectations based on theory suggest otherwise. Moreover, with the one statement that demonstrated to be statistically divergent, the theoretical expectations similarly failed to be met. These discrepancies will be reflected upon in the next three subheadings.

#### 5.3.1 Indifferent images

In looking for an explanation for the discrepancy between expectation and outcome, the explanatory factor, that is the images of nature framework, logically comes to the fore. Two elements should be mentioned here. First, a sensitivity analysis has not been executed. Making the groups more strict could have provided clarity as more characteristics need to be met to be classified. This has not been done because the effect of the sensitivity analysis proved to be marginal in an earlier phase of the study and because it would result in smaller groups and thereby neglects a number of respondents. Second, ideal types are overdramatized archetypes and in reality these might not differ that much. These ideal types, and the omitted elements of the images of nature framework, however, have been mentioned in section 5.1.2 and this will therefore not be repeated here.

#### 5.3.2 Abstracting theory

Another variable for the discrepancy between expectation and outcome concerns the method of deduction. This study worked deductively by applying the theory of Buijs (2009a) to the case of Marker Wadden. Buijs (2009b) deduced these ideal images of nature based on interviewing people, coding the data, and searching for commonalities. The result is a framework consisting of three elements: "values", "beliefs" and "value-orientations" with the constituents: "-centrism"; "nature-culture", "fragile-resilient", "balance-change"; "management" for each of the images of nature. Consequently, the constituents are the differentiating factors. It could, however, be the case that these constituents are not addressed by the statements presented in this study. The statements are based on the human-nature relationship whilst the constituents are based on cognitions of nature. If these two do not share the same variables, a lack of effect could be the result.

### 5.3.3 Sample

In this study, overrepresentation of a particular group of people is substantial and this applies to all three elements. Only visitors who deliberately choose to visit the area themselves were consulted. Confining the dataset to people on the island was motivated by the idea that if an individual wants to participate in debates concerning nature development on Marker Wadden, a visit to the islands that are the topic of dispute would be a necessary condition for doing so. This, however, resulted in an overrepresentation of highly educated older adults that were able to pay the price for this trip. As such, the results of this study are not generalizable because the respondents are not representative of the demography of the Netherlands. This homogeneity might provide an explanation for the absence of two images of nature and the lack of diversity in opinions towards the presented statements.

### 5.3.4 Constructivism

A critical note to- and weakness of this study regardless of the unexpected results, concerns the constructivist ontology. More specifically, the social domain. The physical domain has been taken into account by executing the research on the archipelago and asking respondents on the topic of Marker Wadden. The social domain, however, has been completely neglected in this study. Images of nature have been measured on the individual level but the social context, i.e. interactions between people, social desirability bias, what group(s) an individual belongs to and/ or cultural aspects, have been neglected. In addition, institutions like the media and the image that the Dutch Society for Nature Conservation wants to convey with their campaign or the tours offered with rangers have similarly been neglected. This has implications for the generalisability of the results.

## 5.4 Recommendations

The central proposition in this study is that images of nature structure the role of man towards nature. In other words, how an individual images nature has implications for the roles of humans in nature. Marker Wadden was chosen as a case for the obvious merging of nature and culture. The research demonstrated that three images of nature inclusive, aesthetic and functional were shared among the respondents on Marker Wadden. The common denominators in these perceptions are the hybridity of nature and culture and that of approving human interference in nature. The absence of the wilderness and autonomy images demonstrate that the respondents do not hold cognitions that contrasts practice on Marker Wadden. This infers that images are highly sensitive to context and that choices in construction and management do not produce dissent among respondents. The latter does not mean that conflicting opinions are non-existing. A more diverse sample is recommended to study this.

The cognitive dissonance demonstrated by the pairs of statements for the roles, however, prove to be a fruitful subject for further research as there appears to be a statistically significant cognitive discordance between abstract principles and location-specific interventions among the respondents. This gap between, on the one hand, the theoretical role of humans in nature and on the other, the interventions in practice, is highly relevant for managerial choices in natural affairs and the reception of nature development projects by the public.

Following the results, it can be concluded that the images do not create statistical differences for nine out of ten of the statements. Relating this to the central proposition, how individuals on Marker Wadden image nature has little diversifying implications for their opinions on the roles of humans in nature. Rather, the image of nature groups that were identified demonstrated divergence from the theory in their relative convergence. Hence, further research on the images of nature in unconventional contexts like Marker Wadden is recommended.

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## 7. Appendices

### 7.1 Appendix I: Survey

Link to the survey: [https://rug.eu.qualtrics.com/jfe/form/SV\\_esQ0ne1r8ECdQfY](https://rug.eu.qualtrics.com/jfe/form/SV_esQ0ne1r8ECdQfY)

*Note that the survey is only available in Dutch. This has not caused problems during the research as no non-dutch-speaking visitors were encountered.*



**rijksuniversiteit  
groningen**

**faculteit ruimtelijke  
wetenschappen**

### **Onderzoek natuurontwikkeling in Nederland**

Beste lezer,

Voor mijn studie planologie aan de Rijksuniversiteit Groningen doe ik onderzoek naar natuurontwikkeling in Nederland, specifiek over Marker Wadden. Middels deze enquête bestudeer ik de natuurbeleving van mensen. Het onderzoek leidt tot een masterscriptie, en wellicht worden de resultaten gepubliceerd in een vakblad.

#### *Privacy*

Het invullen van de vragenlijst is vertrouwelijk, uw gegevens en antwoorden worden zorgvuldig en anoniem verwerkt. Dit betekent dat een ingevulde vragenlijst nooit te herleiden is tot personen. Door antwoorden in te vullen geeft u toestemming om deze te gebruiken voor mijn masterscriptie en bovengenoemde publicaties. Mocht u hier niet mee instemmen of er op terug komen, kunt u de vragenlijst nu links laten liggen of mij later op de hoogte brengen via [w.n.schoenmaker@student.rug.nl](mailto:w.n.schoenmaker@student.rug.nl).

Ik stuur u graag een samenvatting van de resultaten van het onderzoek toe. Als u daar belangstelling voor hebt, kunt u dit in de laatste vraag laten weten door uw mailadres achter te laten.

De vragenlijst bestaat uit drie delen die tezamen ongeveer 15 minuten kosten. U kunt de vragenlijst ook invullen via de QR code.

Alvast bedankt voor het invullen van de vragenlijst!





De eerste 4 vragen gaan over het beeld wat u heeft van natuur in de brede zin. Denk hierbij niet aan een specifiek gebied maar aan **natuur in het algemeen**.

1. Natuur is

Erg onstabiel	Onstabiel	Neutraal	Stabiel	Erg stabiel	Weet ik niet
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Erg fragiel	Fragiel	Neutraal	Veerkrachtig	Erg veerkrachtig	Weet ik niet
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Erg onvoorspelbaar	Onvoorspelbaar	Neutraal	Voorspelbaar	Erg voorspelbaar	Weet ik niet
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Wat is volgens u de belangrijkste reden om natuur te beschermen?

.....

.....

.....

.....

3. Waarom is dit volgens u de belangrijkste reden?

.....

.....

.....

4. Tot op welke hoogte zouden we natuur moeten beheren?

Niet	Zo min mogelijk	Hier en daar	Uitgebreid	Geen mening
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Vier stellingen over **natuur in het algemeen**. Beoordeel deze door een vakje aan te kruisen.

	Helemaal mee oneens	Mee oneens	Neutraal	Mee eens	Helemaal mee eens	Geen mening
<i>Het is belangrijk om natuur te beschermen</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Als mensen natuur beheren, is het geen natuur</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Als mensen natuur aanleggen, is het geen natuur</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Schoonheid is een belangrijke factor in het beheren van natuur</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

De volgende 4 vragen gaan over **Marker Wadden**.

5. Welk aspect van Marker Wadden vindt u het meest waardevol?

.....

.....

.....

.....

6. Waarom is dit aspect het waardevolst volgens u?

.....

.....

.....

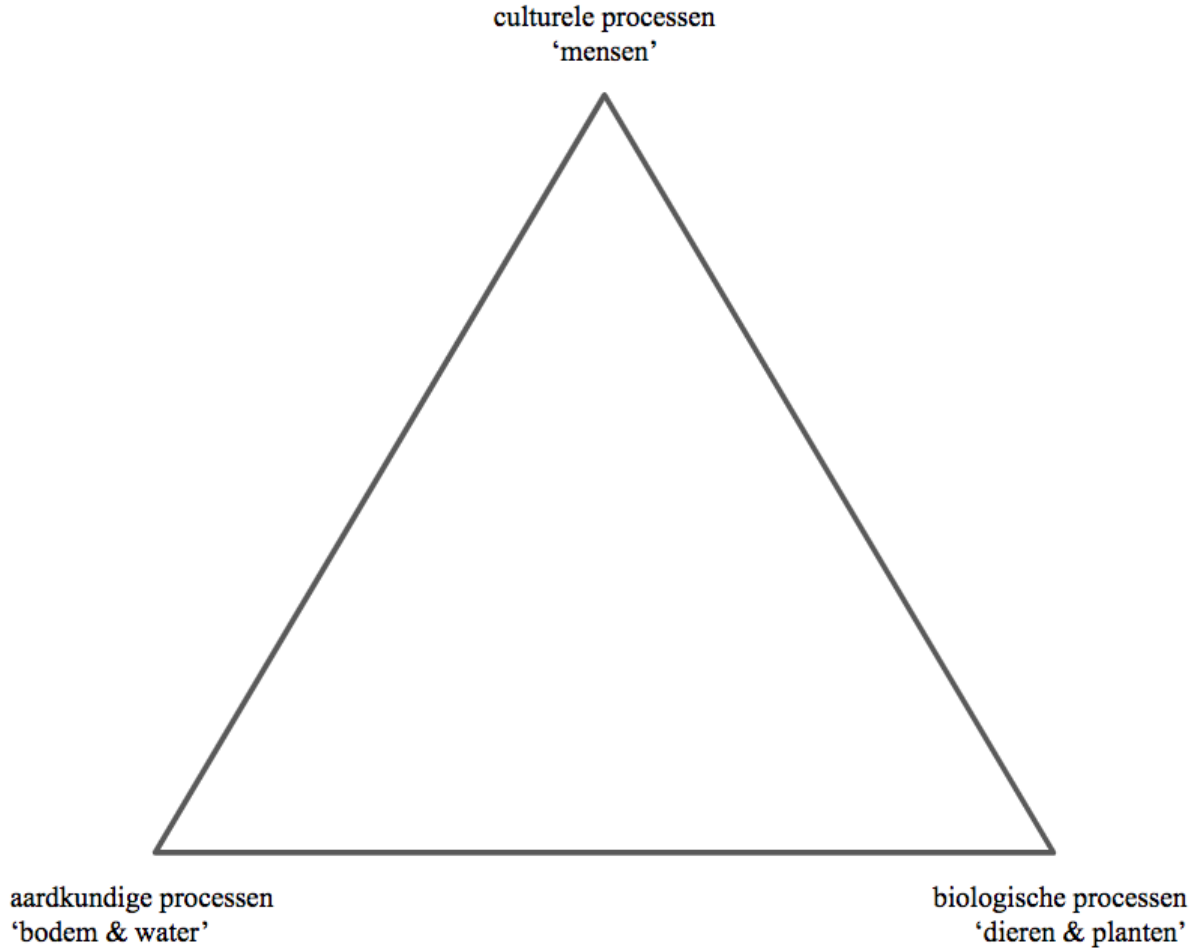
.....

7. Tot op welke hoogte zouden we natuur op Marker Wadden moeten beheren?

Niet                      Zo min mogelijk                      Hier en daar                      Uitgebreid                      Geen mening

O                      O                      O                      O                      O

8. In onderstaande driehoek staan drie sturende factoren die van invloed zijn op het landschap. Waar zou u Marker Wadden plaatsen?



De volgende stellingen gaan over **onze rol voor/in/tot Marker Wadden**. Beoordeel deze door een vakje aan te kruisen.

	Helemaal mee oneens	Mee oneens	Neutraal	Mee eens	Helemaal mee eens	Geen mening
<i>Mensen zijn onderdeel van de natuur</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>We moeten wandelpaden aanleggen zodat mensen kunnen recreëren</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<i>Eigenlijk interesseert het me niet zo veel wat er gebeurt op Marker Wadden</i>	0	0	0	0	0	0
<i>Mensen en natuur zijn gelijk in waarde</i>	0	0	0	0	0	0
<i>Mensen hebben het recht om de natuur radicaal te veranderen</i>	0	0	0	0	0	0
<i>De natuur is vooral bedoeld voor ons eigen welzijn</i>	0	0	0	0	0	0
<i>Doordat we de biodiversiteit hebben doen kelderen, moeten we nu eilanden bouwen als tegenprestatie voor de natuur</i>	0	0	0	0	0	0
<i>Er bestaat geen connectie tussen mijn welzijn en dat van Marker Wadden</i>	0	0	0	0	0	0
<i>Na droogte moeten gelijke delen water uit het Markermeer geschonken worden aan drinkwatervoorziening en herstel natuur</i>	0	0	0	0	0	0
<i>We moeten riet kunstmatig beschermen tegen ganzen om zo een habitat voor watervogels te creëren</i>	0	0	0	0	0	0
<i>Mensen hebben de plicht om natuur te beschermen</i>	0	0	0	0	0	0
<i>We moeten Marker Wadden niet afsluiten voor mensen omdat we hier onze connectie tot de natuur kunnen voelen</i>	0	0	0	0	0	0

Tot slot wat vragen over uw ervaring vandaag op Marker Wadden. Ook is er ruimte voor uw vragen en/of opmerkingen.

9. Geef naar aanleiding van uw bezoek een rapportcijfer aan Marker Wadden. Een 10 is zeer goed en een 1 is zeer slecht.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Hoe heeft u de aanwezigheid van andere bezoekers op Marker Wadden ervaren?

- Positief  
 Negatief, te druk  
 Negatief, overlast  
 Anders, namelijk .....

11. Bent u van plan Marker Wadden nogmaals te bezoeken op basis van uw ervaring van dit bezoek?

- Ja  
 Nee  
 Weet ik niet

12. Op welke manier(en) bent u bekend geraakt met Marker Wadden? Meerdere antwoorden zijn mogelijk.

- Via communicatiemiddelen van Natuurmonumenten (bijv. website, ledennieuwsbrief etc.)  
 Via TV/radio  
 Via Google  
 Via krant/tijdschrift  
 Via social media  
 Via websites met overzichten van dagjes weg (bijv. ANWB.nl of dagjeweg.nl)  
 Via familie, vrienden of collega's  
 Anders, namelijk: .....

13. Heeft u tijdens uw bezoek een vrijwilliger of boswachter van Natuurmonumenten gesproken?

- Ja  
 Nee  
 Weet ik niet

14. Vindt u het een goed idee om Marker Wadden uit te breiden met meer natuureilanden om het Markermeer gezond en toekomstbestendig te maken?

Heel goed idee	Goed idee	Neutraal	Slecht idee	Heel slecht idee	Weet ik niet
O	O	O	O	O	O

Vervolg op vraag 14: Waarom wel of waarom niet?

.....

.....

.....

.....

15. Stel dat er nieuwe eilanden bijkomen, wat zijn volgens u dan aspecten waar Natuurmonumenten rekening mee dient te houden? Meerdere antwoorden zijn mogelijk:

- Dat er veel rust en ruimte is voor de natuur
- Dat er voor mensen voldoende recreatiemogelijkheden zijn
- Dat het een open landschap blijft/ zo min mogelijk bos
- Dat het belang van de natuur centraal staat en niet de mens
- Anders, namelijk:

.....

.....

.....

16. Ik ben een: (meerdere antwoorden zijn mogelijk)

- Bezoeker van Marker Wadden via veerdienst Lelystad
- Bezoeker van Marker Wadden via charterdienst (bijv. Abel Tasman)
- Bezoeker van Marker Wadden via eigen boot
- Vrijwilliger van Natuurmonumenten
- Expert op het gebied van natuur
  - Welk veld?

.....

17. Geboortjaar: .....

18. Hoogst genoten opleiding:

.....

19. Door hier uw mailadres achter te laten kiest u ervoor om op de hoogte gehouden worden van de resultaten van dit onderzoek. Laat deze regel leeg als u dat niet wilt.

.....

20. Vragen of opmerkingen kunt u hier noteren of u kunt contact opnemen via [w.n.schoenmaker@student.rug.nl](mailto:w.n.schoenmaker@student.rug.nl).

.....

.....

.....

.....

Dit waren de vragen, hartelijk dank voor het invullen!  
Wibe Schoenmaker

## 7.2 Appendix II: Sample description

### Sample description

#### Number of respondents per age group

Age group	< 16	16-30	31-45	46-60	61-75	> 75	Missing
Frequencies	0	26	34	55	100	10	30

#### Education of respondents

Education level ( $N = 217$ )	Low	Middle	High
	1 (< 1%)	37 (17%)	179 (82%)



## 7.3 Appendix III: Statistical analysis

### 7.3.1 Boxplot of the likert scale statements ( $N = 255$ )

	Master		User		Steward		Partner		Participant	
	Principle	Intervention	Principle	Intervention	Principle	Intervention	Principle	Intervention	Principle	Intervention
Minimum	1	1	1	1	1	1	1	1	1	1
Q1	1	3	2	3	4	3	2	3	4	4
Median	2	4	2	4	5	4	3	3	4	4
Q3	2	4	3	4	5	4	4	4	5	4
Maximum	5	5	5	5	5	5	5	5	5	5
Mean	1,92	3,45	2,33	3,39	4,40	3,54	3,13	3,29	4,02	3,85
Range	4	4	4	4	4	4	4	4	4	4
IQR	1	1	1	1	1	1	2	1	1	0
IQR x 1,5	1,5	1,5	1,5	1,5	1,5	1,5	3	1,5	1,5	0
Lower limit	-0,5	1,5	0,5	1,5	2,5	1,5	-1	1,5	2,5	4
Upper limit	3,5	5,5	4,5	5,5	6,5	5,5	7	5,5	6,5	4

### 7.3.2 Cronbach's analysis of the five roles each described by two statements

**Table 11**, Statistical analysis of the internal consistency of the five roles each described by two statements

	Abstract principle	Concrete intervention	Cronbach's $\alpha$	N
Master	Human beings have the right to alter nature radically	We should protect reed artificially against Geese in order to create a habitat for waterbirds	0.217	240
User	Nature exists primarily for our own wellbeing	We should construct hiking tracks for people to be able to recreate	0.205	239
Steward	Human beings have a responsibility to conserve the natural environment	Because we made biodiversity decline, we should build islands to compensate nature	0.230	243
Partner	People and nature are of equal value	After a period of drought, equal shares of Markermeer-water should be given to drinking water facilities and the reviving of nature	0.009	242
Participant	Human beings are part of nature	We should make parts of Marker Wadden accessible for humans because here we can feel our connection to nature	0.176	243

7.3.3 Box and whisker per image of nature: Inclusive (N = 85), Aesthetic (N = 42), Functional (N = 60) and Panoramic (N = 29)

<b>Inclusive</b>										
<b>N = 85</b>	pmaster	mwmaster	puser	mwuser	psteward	mwsteward	ppartner	mwpartner	pparticipant	mwparticipant
Minimum	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Q1	1,00	3,00	1,00	2,50	4,00	3,00	2,00	3,00	4,00	4,00
Median	2,00	3,00	2,00	4,00	5,00	4,00	3,00	3,00	4,00	4,00
Q3	2,00	4,00	3,00	4,00	5,00	4,00	4,00	4,00	5,00	4,00
Maximum	4,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00
Mean	1,80	3,31	2,20	3,25	4,47	3,73	3,03	3,28	3,96	3,87
Range	3,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00
IQR	1,00	1,00	2,00	1,50	1,00	1,00	2,00	1,00	1,00	0,00
IQR x 1,5	1,50	1,50	3,00	2,25	1,50	1,50	3,00	1,50	1,50	0,00
Lower limit	-0,50	1,50	-2,00	0,25	2,50	1,50	-1,00	1,50	2,50	4,00
Upper limit	3,50	5,50	6,00	6,25	6,50	5,50	7,00	5,50	6,50	4,00
<b>Aesthetic</b>										
<b>N = 42</b>	pmaster	mwmaster	puser	mwuser	psteward	mwsteward	ppartner	mwpartner	pparticipant	mwparticipant
Minimum	1,00	2,00	1,00	1,00	3,00	1,00	1,00	1,00	2,00	2,00
Q1	1,00	3,00	1,50	3,25	4,00	3,00	2,00	3,00	4,00	4,00
Median	2,00	4,00	2,00	4,00	5,00	4,00	3,00	3,00	4,00	4,00
Q3	2,75	4,00	2,50	4,00	5,00	4,00	4,00	4,00	5,00	5,00
Maximum	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00
Mean	1,95	3,54	2,14	3,60	4,52	3,49	3,20	3,22	4,12	3,98
Range	4,00	3,00	4,00	4,00	2,00	4,00	4,00	4,00	3,00	3,00
IQR	1,75	1,00	1,00	0,75	1,00	1,00	2,00	1,00	1,00	1,00
IQR x 1,5	2,63	1,50	1,50	1,13	1,50	1,50	3,00	1,50	1,50	1,50
Lower limit	-1,63	1,50	0,00	2,13	2,50	1,50	-1,00	1,50	2,50	2,50
Upper limit	5,38	5,50	4,00	5,13	6,50	5,50	7,00	5,50	6,50	6,50
<b>Function</b>										
<b>N = 60</b>	pmaster	mwmaster	puser	mwuser	psteward	mwsteward	ppartner	mwpartner	pparticipant	mwparticipant
Minimum	1,00	1,00	1,00	2,00	1,00	1,00	1,00	2,00	1,00	2,00
Q1	2,00	3,00	2,00	3,00	4,00	3,00	2,00	3,00	4,00	4,00
Median	2,00	4,00	2,00	4,00	5,00	4,00	4,00	4,00	4,00	4,00
Q3	3,00	4,00	3,00	4,00	5,00	4,00	4,00	4,00	5,00	4,00
Maximum	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00
Mean	2,16	3,55	2,53	3,46	4,43	3,59	3,25	3,40	4,05	3,84
Range	4,00	4,00	4,00	3,00	4,00	4,00	4,00	3,00	4,00	3,00
IQR	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,00	1,00	0,00

IQR x 1,5	1,50	1,50	1,50	1,50	1,50	1,50	3,00	1,50	1,50	0,00
Lower limit	0,50	1,50	0,50	1,50	2,50	1,50	-1,00	1,50	2,50	4,00
Upper limit	4,50	5,50	4,50	5,50	6,50	5,50	7,00	5,50	6,50	4,00
<b>Panoram</b>										
<b>ic N = 29</b>										
	pmaster	mwmaster	puser	mwuser	psteward	mwsteward	ppartner	mwpartner	pparticipant	mwparticipant
Minimum	1,00	2,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Q1	1,00	3,25	1,50	3,00	4,00	2,75	3,00	3,00	3,00	4,00
Median	2,00	4,00	2,00	4,00	4,00	3,00	3,50	3,00	4,00	4,00
Q3	2,00	4,00	3,00	4,00	5,00	4,00	4,00	4,00	5,00	4,00
Maximum	5,00	5,00	5,00	4,00	5,00	5,00	5,00	5,00	5,00	5,00
Mean	1,81	3,73	2,37	3,43	4,14	3,25	3,32	3,29	3,93	4,00
Range	4,00	3,00	4,00	3,00	4,00	4,00	4,00	4,00	4,00	4,00
IQR	1,00	0,75	1,50	1,00	1,00	1,25	1,00	1,00	2,00	0,00
IQR x 1,5	1,50	1,13	2,25	1,50	1,50	1,88	1,50	1,50	3,00	0,00
Lower limit	-0,50	2,13	-0,75	1,50	2,50	0,88	1,50	1,50	0,00	4,00
Upper limit	3,50	5,13	5,25	5,50	6,50	5,88	5,50	5,50	8,00	4,00

7.3.4 Kruskal Wallis analysis of the ten statements across the four groups: *Inclusive* ( $N = 85$ ), *Aesthetic* ( $N = 42$ ), *Functional* ( $N = 60$ ) and *Panoramic* ( $N = 29$ )

**Table 12,** Overview of the data for the Kruskal Wallis analysis of the ten statements across the four groups: *Inclusive* ( $N = 85$ ), *Aesthetic* ( $N = 42$ ), *Functional* ( $N = 60$ ) and *Panoramic* ( $N = 29$ )

	Kruskal Wallis H	N	Median (Md)	Degrees of freedom	Asymp. sig.
Human beings have the right to alter nature radically	5.118	207	2, 2, 2, 2	3	<b>0.163</b>
We should protect reed artificially against Geese in order to create a habitat for waterbirds	6.733	199	3, 4, 4, 4	3	<b>0.081*</b>
Nature exists primarily for our own wellbeing	4.024	210	2, 2, 2, 2	3	<b>0.259</b>
We should construct hiking tracks for people to be able to recreate	5.028	212	4, 4, 4, 4	3	<b>0.170</b>
Human beings have a responsibility to conserve the natural environment	2.292	209	5, 5, 5, 4	3	<b>0.541</b>
Because we made biodiversity decline, we should build islands to compensate nature	4.666	205	4, 4, 4, 3	3	<b>0.198</b>
People and nature are of equal value	2.595	206	3; 3; 4; 3,5	3	<b>0.458</b>

	Kruskal Wallis H	N	Median (Md)	Degrees of freedom	Asymp. sig.
Human beings have the right to alter nature radically	5.118	207	2, 2, 2, 2	3	<b>0.163</b>
After a period of drought, equal shares of Markermeer-water should be given to drinking water facilities and the reviving of nature	0.960	190	3, 3, 4, 3	3	<b>0.811</b>
Human beings are part of nature	0.949	213	4, 4, 4, 4	3	<b>0.814</b>
We should make parts of Marker Wadden accessible for humans because here we can feel our connection to nature	2.163	209	4, 4, 4, 4	3	<b>0.539</b>

\* This is significant with a level of  $p < 0,1$

7.3.5 Mann Whitney U analysis of the ten statements across the three groups: *Inclusive* ( $N = 85$ ), *Functional* ( $N = 60$ ) and *Panoramic* ( $N = 29$ )

**Table 13**, Overview of the Mann Whitney U analysis of the ten statements across the three groups: *Inclusive* ( $N = 85$ ), *Functional* ( $N = 60$ ) and *Panoramic* ( $N = 29$ )

	Mann Whitney U	N	Z	r	Median	Asymp. Sig.
Inclusive ~ Functional	1723	132	-1.966	0.17	3, 4	0.049
Inclusive ~ Panoramic	719.5	103	-2.301	0.23	3, 4	0.021

#### 8.4 Appendix IV: Expert interviews

In this part of the Appendix, the expert interviews are set out. Only the parts of the interview that are explicitly referred to in this study are added. The interview was held in Dutch and therefore also transcribed in Dutch.

W: “Interessant, nog even terug naar een basale vraag, waarom natuur beschermen?”

“Voor iedereen verschillend, maar voor mij, ik voel me zeer verbonden met natuur, vind ook dat mensen bij natuur horen. Natuurbescherming heeft natuurlijk mijn grote voorkeur want natuur beschermen doe je met natuur die nog min of meer intact is en dat is oneindig veel goedkoper en effectiever om die goed te beschermen en daar zouden we veel meer werk van moeten maken. Maar wat we natuurlijk wereldwijd zien is dat we heel goed zijn om natuur naar de filistijnen te helpen dus maar je hebt natuurlijk wel verschillende natuurbelden van mensen maar op de vraag zijn we in staat de natuur stuk te maken krijg ik nooit een aarzelend antwoord dus ongeveer iedereen is ervan overtuigd dat we daar best wel goed in zijn, zeg maar, nou juist in Nederland talloze voorbeelden van ontginningen en noem maar op dus dat is niet zo omstreden maar dan de omgekeerde vraag zouden we als mens ook in staat zijn om de natuur weer een beetje heel te maken? nou dan zie je al weer mensen wat meer ‘puzzeld’ kijken, sommigen zeggen volmondig ja, dus Marker Wadden is bij uitstek een voorbeeld van een poging om door de condities die we als mens doorgaans negatief beïnvloeden weer wat positiever te maken een betere uitgangssituatie voor natuurherstel te creëren, dus het is niet zozeer \*valt weg\*, voor mij is dat heel logisch dat mensen onderdeel van de natuur zijn, dus natuur herstellen is echt waarom zou je natuur willen herstellen dat is een andere vraag zeg maar dat is omdat de natuur functies voor ons vervuld, ik heel blij wordt van natuur dat is omdat ik vind dat we niet het recht hebben om natuur te verzieken dus dat is een soort op een stapeling van motieven en uiteindelijk zit er ook zelfs een economisch motief achter, het functioneren van het ecosysteem levert gewoon heel weinig op. En voor mijzelf, ik ben zelf heel erg geïntrigeerd door hoe we als mens met natuur omgaan door te verhouden dus ik zit zelf heel erg op dat snijvlak van mens en natuur, dus niet zo van 1 hokje maar voor mij is het wel heel essentieel tussen herstel en bescherming, ja.”