Differences in perceived spatial quality between new nature and traditionally managed nature

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ABSTRACT
This paper tries to identify differences in perceived spatial quality between new nature and traditionally managed nature. The ecological restoration strategy of rewilding results in new nature. The main function of new nature is improving ecological quality, yet as it is a nature landscape it carries multiple functions. In one of these functions, recreation, the spatial quality plays a role. This paper aims to find out to what extent the management programme of rewilding has implications for the spatial quality of the nature landscape. This relationship will be investigated through the perceptions of visitors of nature landscapes. In order to gain insight in the perceived quality of these areas the quantitative research method of surveying has been used. New nature was not found to be perceived significantly different from traditionally managed nature in many regards. Unexpectedly, traditionally managed nature was found to be perceived as more wild and pristine as opposed to new nature. This finding might be explained by the fact that visitors have a distorted image of what wild or pristine nature entails, as all nature in the Netherlands is partially man-made. The results did not indicate any difference in perceived spatial quality between new nature and traditionally managed nature.

Contents

1 Introduction

Over the past decades the term rewilding has gained popularity in both academic literature and government policy. In the Netherlands the emergence of the Oostvaardersplassen marked the first spontaneous nature development (Vera, 2009). This development marked the start of rewilding as returning practice in Dutch nature development discourses (Bulkens et al. 2016). Most notably the emergence of the rewilding movement inspired the creation of the EHS (now Natuurnetwerk Nederland), in the 1990 Dutch New Nature Policy Plan. This network connects existing nature areas through corridors, which is one of the key strategies in rewilding practice (Soulé and Noss 1998). The concept of corridors and other key components of rewilding will be further discussed in the theoretical framework.
Since its emergence as an important conservation strategy much research has been conducted on the effectiveness of rewilding and new nature in terms of its ecological value (Soulé and Ter Borgh 1999; Vera 1988, 2009). Only more recently however, social scientists have started exploring its value in terms of spatial quality and how it is perceived by users (De Groot and De Groot 2009; Bulkens et al. 2016; Buijs et al. 2004). This previous research on perceived value of new nature has mostly compared the old and new situations after the rewilding of the area. This paper will expand on this research into the perception of new nature, but focusing primarily on its value compared to “traditionally managed” nature.
Apart from the added ecological quality, one of the key effects of new nature is the added nature value for visitors (Buijs et al. 2004). Insight into this value for visitors will help determine the spatial quality of this new nature. By understanding the differences and similarities between new nature and traditionally managed nature we can explore where rewilding strategies can be improved. Now the main focus of rewilding and the creation of new nature is on improving ecological stability (Vera, 2009). The human experience of this new nature is often overlooked, while a large portion of the value of nature comes from human experience.

One of the guiding principles of rewilding is the transition to ecological autonomy (Soulé and Noss, 1998). Autonomy here means that nature is left alone as much as possible. In this way an ecosystem will develop that regulates itself. This type of management is great for the ecological quality and biodiversity of a nature area. Unfortunately promoting biodiversity is not the only function carried out by nature areas (Higgs, 1997). A second important function of nature is recreation, where spatial quality is an important factor. The danger of rewilded nature is in a lack of attention to this secondary function. Rewilding, with its focus on improving ecological quality, overlooks the spatial and aesthetical aspects of nature (Swart et al., 2001).

1.1 Background

A lot of research has been done into rewilding as a nature conservation and management strategy (Carver, 2012; Soulé and Noss, 1998; Vera, 1998). Most of this research focused on the improvement of ecological quality. However, ecological improvement is not the only important aspect of nature conservation. Higgs (1997) argues that in nature conservation and restoration there is often little attention for the aesthetics and perceptions of nature.

Swart et al. (2001) agrees, stating that besides ecological values, natural landscapes are valued for aesthetic reasons. In more recent years some research has emerged into the valuation of nature (Buijs et al., 2004; Bulkens et al., 2016). This paper will expand on this research by looking more specifically at the valuation of new nature by visitors, rather than local communities.

1.2 Research problem

Rewilding is a relatively new strategy in nature management. It differs from other nature management strategies in that it is focused a lot on ecological restoration and improving biodiversity. Some research has already been conducted into the perceived spatial quality of rewilded nature (De Groot and De Groot 2009; Bulkens et al. 2016; Buijs et al. 2004). However, these were mostly case studies or qualitative research. This paper will add to this existing literature by taking a qualitative comparative approach. The relationship between type of nature management and perceived spatial quality will be examined by comparing rewilded nature to traditionally managed nature. This comparison will show if new nature is perceived differently from traditionally managed nature. The insights gained from this research will improve our understanding of new nature, in terms of perceived spatial quality.

The main research question and sub questions this paper will look to answer are:
To what extent is New Nature valued differently from "traditionally managed" nature, by visitors of both types of nature areas, in the province of Groningen?

- What aspects of nature are valued by visitors?
- What different spatial characteristics do visitors of traditionally managed nature and new nature observe?
- To what extent is new nature perceived differently from traditionally managed nature?
- To what extent do spatial differences between new and old nature influence their perceived quality?

First the concepts of rewilding and new nature will be explained in more depth. Furthermore, their relation to the more common approach of nature management will be made clear. Then follows a brief introduction into the locations at which surveys were conducted about the valuation of nature landscapes. Next a set of hypotheses will be formulated based on the theoretical framework. This section is followed up by an explanation of the methodological approach including practical information on the way the study was conducted. The dataset resulting from the conducted surveys will be discussed here as well. The final sections discuss the outcomes of the statistical analyses, the finding and implications.

2 Theoretical framework

2.1 Rewilding

The term rewilding was first identified by Soulé and Noss as one of the important modern conservation movements (1998). Rewilding was defined as the restoration of wilderness through self-regulation of nature. More recently, Bulkens et al. (2016) defined “rewilding” as the restoration of lost ecological qualities with minimum human intervention. Prior and Ward (2016) agree, stating that “rewilding” distinguishes itself from other forms of ecological restoration through its focus on restoring ecological autonomy. This paper identifies three important aspects of rewilding. The first entails creating an “island biogeography”, connecting separate nature areas to allow genetic diversity and expand living spaces (Carver, 2012). This practice is actually being implemented in the Netherlands on a national scale and even in a greater European scale. This Dutch ecological network will be discussed in more detail. The reintroduction of fauna is another key part of rewilding that aims at creating this ecological autonomy (Jepson 2015; Vera 1988, 2009). In the Netherlands the most prevalent example of this is the Oostvaardersplassen, which will also be discussed. The third key aspect of rewilding is minimal human intervention, allowing nature to regulate itself (Soule and Noss, 1998). The idea behind this strategy is that nature will autonomously find a balance and regulate itself, without the need of any management. Rewilding strategies vary greatly depending on the ecological context (Bulkens et al. 2016, Jepson et al. 2018). The main distinction here is between European and North American practices of rewilding. Bulkens et al. (2016) explain that the introduction of large carnivores is central to the North American approach to rewilding. This is part of what is called the 3 C’s approach: core, corridors and carnivores (Soulé and Noss, 1998; Jepson, 2018). The importance of the reintroduction of carnivores however is subject to debate. (Soulé and Noss, 1998). The European approach has seen a shift to the reintroduction of large herbivores in the nature areas in order for more passive management of these areas through grazing (Vera, 1988, 2009). This paper will set its focus on the principles of the European approach to rewilding, including the reintroduction of large grazers rather than carnivores.

2.2 New nature

The term new nature goes hand in hand with the concept of rewilding and refers to agricultural land that has been given back to nature (Van der Heijden, 2005). As rewilding has gained a more prominent role as a nature conservation strategy its principles are adopted in more new nature projects (Jepson et al. 2018). With this rise in popularity also comes an increase in critiques towards the ideas of new nature. Critics point out that the creation of new nature requires intense human work, while its goal is to have as little human intervention as possible (Van den Belt 2004). Van Koppen (2002), however argues that “real nature” doesn’t exist in the Netherlands anymore. All landscapes are influenced by humans to some extent and in the creation of new nature this influence is minimized.

2.3 New nature in the Netherlands

New nature in the Netherlands originates from when in 1968 “spontaneous nature” emerged from a marshy part of the Flevoland polder. This area, now known as the Oostvaardersplassen, was meant to become an industrial area. These plans were delayed due to an economic crisis, which allowed many plant and animal species to start inhibiting the area (Vera, 2009; Jepson, 2018). Because of the wet soil, the Oostvaardersplassen proved to be an ideal area for many bird species (Vera, 2009). As a result of these developments a group of biologists and environmentalists started lobbying for the Oostvaardersplassen to become a protected nature area, which it did in 1974. Since then the Oostvaardersplassen have become regarded as an ecologically valuable piece of “new nature” (Bulkens, 2016). The Oostvaardersplassen case inspired the implementation of “new nature” in Dutch planning policy, with the Millingerwaard as a pilot case (Bulkens, 2016). Since then, the concept of “new nature” has started playing an important role in many ecological restoration projects in the Netherlands and Europe (Jepson et al. 2018). Especially the idea of creating an ecological network through connecting existing nature areas with corridors has gained a lot of attention in the Netherlands, leading to the creation of a national ecological network (Jepson et al. 2018; Van den Belt 2004). This network, called the Natuurnetwerk Nederland, connects protected nature areas and will in the future become part of a larger European network. The purpose of this network is to connect habitats in order to help maintain biodiversity (European Commission, 2019). Furthermore, the introduction of large herbivores has been implemented in several new nature projects in the Netherlands, most notably: the Oostvaardersplassen, Kempen-Broek and the Millingerwaard (Root-Bernstein et al. 2018; Bulkens 2016; Jepson 2018).

2.4 Traditionally managed nature

In today's world nature is in most places no longer an original and pure landscape. Rather nature has become a malleable concept, an object of restoration and re-creation (Doevendans et al. 2007). Most nature in the world, and definitely all nature in the Netherlands, has been influenced to some degree by humans (Van Koppen 2002). Therefore the distinction this paper makes is not between ‘man-made’ and ‘original’ nature, but between types of nature management. Traditionally ecological conservation refers to the practice of restoring damaged ecosystems through removing unwanted species, reintroducing missing species, changing or rebuilding soils, removing hazardous substances and restoring natural processes (Higgs, 2003). In this type of ecological restoration humans play a very active role, influencing the development intensely. One of the guiding principles of new nature, on the other hand, is creating a self-regulating ecosystem that does not require any human interventions (Hajer 2003). Thus the most important difference between new nature and traditionally managed nature is the intensity of human intervention. This paper will define traditionally managed nature as nature where developments are guided by human interventions.

2.5 The valuation of nature

Some of the qualities natural landscapes bring have been discussed previously, in the introduction. Higgs (1997) was among the first to argue that ecological restoration did not merely bring ecological qualities to a landscape. An equally important aspect of nature is the aesthetic value. This is the reason for the popularity of outdoor recreation and landscape painting (Swart et al. 2001). Turner (1992) claims that beauty should be the final goal of ecological restoration. The importance of aesthetics is undeniable, as illustrated by current day landscape design practices, but it certainly is not the only quality in nature. Especially in ecological restoration it is still overshadowed by the importance of biodiversity and other ecological values (Prior & Ward, 2016). Furthermore, nature landscapes have a great recreational value, which is a result of this aesthetic quality (Higgs, 1997). In the rest of this paper the terms spatial quality and aesthetic value will be used interchangeably, they will both refer to the intrinsic qualities of beauty that are associated with nature landscapes.

2.6 Conceptual model

The proposed conceptual model, as represented in figure 1, is based on the claims made by Higgs (1997) and Swart et al., (2001). Ecological restoration projects, and particularly rewilding, often overlook the importance of the secondary nature value of aesthetical or spatial quality. Buijs et al. (2004) also identify this lack of attention to what they describe as nature values. No one however questions the importance of the recreational function of natural landscapes. The connection between aesthetic quality and increased recreational value was proposed by Higgs (2001) and confirmed by De Groot and De Groot (2009). The dotted line represents the lack of attention in rewilding practices to the aesthetic value of projects. Rewilding projects will often be perceived as having a lower spatial quality as a result of this phenomenon.

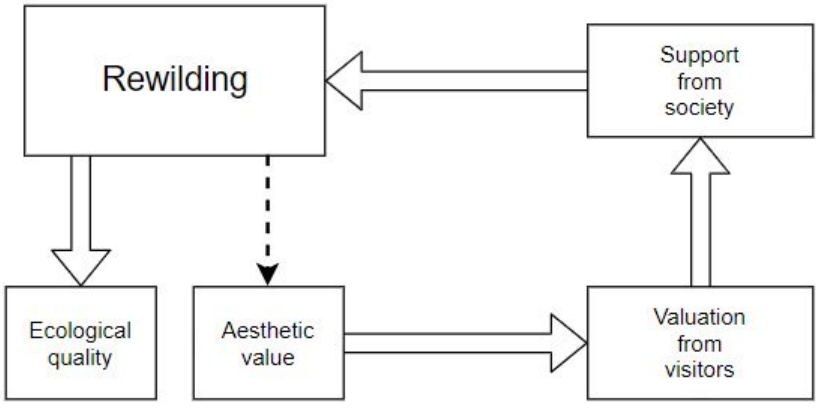

Figure 1: conceptual model representing the importance of aesthetic values in rewilding – author (2020).

2.7 Hypotheses

Where the main goal for traditional nature management includes improving spatial quality and recreational potential, rewilding shifts the focus more to the ecological quality side. This does not mean that improving ecological quality is not one of the goals of traditional nature management. Rewilding gives nature the freedom to develop autonomously, where traditionally nature development would be heavily guided (Prior and Ward, 2016; Higgs, 2003). This difference between intensity of human involvement must lead to differences in the spatial characteristics of new nature, as opposed to traditionally managed nature. Based on the literature discussed in the previous sections, rewilded nature is expected to be a more wild and diverse landscape, as opposed to traditionally managed nature. New nature is managed less intensely, so it would be more disorganised and pristine. Traditionally managed nature however would be expected to be more cleaned up and well-maintained. As a result of these differences in spatial characteristics, traditionally managed nature is expected to have a higher overall spatial quality.

3 Methodology

This paper tries to find a difference in visitor valuation between new nature and “traditionally managed” nature. In order to make claims about this variance in experienced nature value a quantitative dataset is most useful, as statistical tests can then be used to find significant differences. Therefore a quantitative research method will be put in practice. The most common quantitative research methods include different kinds of surveys and systematic observations. As the research is focused on the human experience of a large group of people, the quantitative method of surveying will be most useful, as perception is hard to measure in other ways. The surveys can be found in appendix 1 and 2.

3.1 Reliability and validity

In terms of reliability, the study has been conducted in such a way that is easily repeatable. Originally, surveys were to be conducted on weekend days only, between the morning and afternoon. This is because the target group is recreational users of the nature area, whom would be mostly present at such a timeframe. As a result of changed circumstances, which will be discussed in section 5.2, the method of data collection was slightly changed. Using an online survey made it harder to ensure that the right target group was filling in the questionnaire. This has been accounted for, using a question into frequency of visits into the particular nature area. Furthermore, since there was no face to face contact between researcher and respondent, the anonymity of respondents is better assured. This will have a positive effect on the trustworthiness of their responses. Regarding validity, the dataset resulting from the surveys contains information on the perceptions of nature by the respondents. This research focused on specific measures, such as the wildness of a nature landscape, and inquired about their perceived level of applicability. The disadvantage of this method is that some relevant measures are not included and might be overlooked. Therefore some open questions were included in the survey regarding the perceived qualities of the nature landscape. These have not been used for statistical analysis as they did not indicate there were any important overlooked variables.

3.2 Locations

Surveys will be conducted in two locations. Both nature areas are located in the North of the Netherlands. The Onlanden are a traditionally managed nature area. The Drents-Friese Wold however, is managed as part of a rewilding project. Both areas can be found on the map in figure 2. Both areas are managed by Natuurmonumenten (Natuurmonumenten, 2019). The rewilding programme in the Drents-Friese Wold is managed by natuurmonumenten in cooperation with rewilding Europe, an international nature conservation organization (Rewilding Europe, 2020). The Drents-Friese Wold covers 6000 ha of forest, heath and meadows. The Drents-Friese Wold is accessible through the villages of Diever and Appelscha. The Onlanden cover 2500 ha of land on the border between Drenthe and Groningen. It is a very wet area, consisting mainly of meadows, wetlands and marshy forest. The Onlanden can be accessed easily from the city of Groningen.

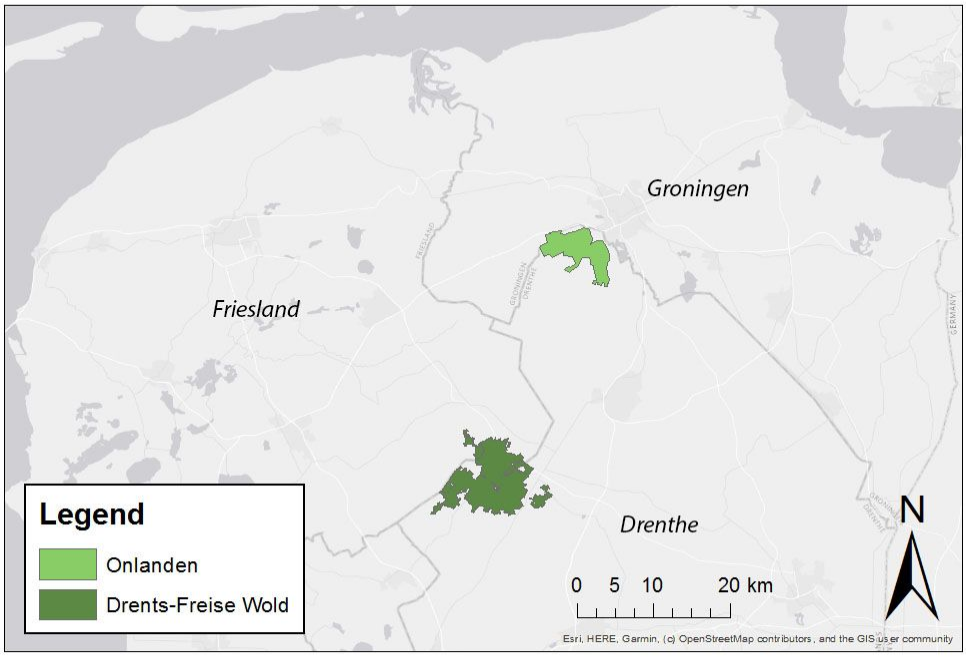

Figure 2: locations of the nature areas – author (2020).

3.3 The Drents-Friese Wold

The Drents-Friese Wold is an interesting location for this study as it joined the Rewilding Europe programme in 2000 (Rewilding Europe, 2020). Rewilding Europe is an organization that sets up rewilding projects throughout Europe. The aim of this project is to stimulate more natural forest growth and biodiversity. The means employed to achieve these goals include typical rewilding practices such as the reintroduction of large grazers, including: the Red deer, Fallow deer and Sayaguesa cattle (Rewilding Europe, 2020; Spring Partner, 2017). Furthermore, the Drents-Friese Wold is also part of the Natura 2000 network, which is a European program based on one of the other keystones of rewilding; stronger biodiversity through connecting nature areas (Dienst Landelijk Gebied and Staatsbosbeheer, 2016). These two programmes make the Drents-Friese Wold a perfect example of the implementation of rewilding projects.

Figure 3: the Drents-Friese Wold – Nationaal Park Drents-Friese Wold (2019).

3.4 The Onlanden

The Onlanden area has similar goals to the Drents-Friese Wold, most importantly the improvement of biodiversity (Van Boekel et al., 2017). Yet the approach taken in the Onlanden is a more active style of nature management. This is partly because the area also has an important water storage function (Noorderzijlvest, 2020). Were this not the case the Onlanden would be a great location for the implementation of rewilding practices, as it is a very young nature area. Since the Onlanden has similar ambitions to the Drents-Friese Wold, but is not able to use the same methods, it is a great location to compare against. The Onlanden are currently managed by several governmental agencies which include; Het Groninger Landschap, Natuurmonumenten, Het Drentse landschap and Staatsbosbeheer (Natuurmonumenten et al. 2019). The management of the area includes mowing grass and removing the clippings, fertilization, cleaning up the ditches and grazing (Natuurmonumenten et al. 2019). Apart from being a protected nature area the Onlanden also serves as a buffer where water is stored after heavy rainfall.

Figure 4: the Onlanden – Natuurmonumenten (2020).

3.5 Data Collection

Due to the circumstances resulting from the Covid-19 outbreak during this bachelors project the data collection has been changed from the initial plans. Initially, surveys were to be conducted on location, with each nature area providing a good place to recruit respondents in the form of a visitor centre. These sites were selected as a lot of visitors would come by them and they offer seating, which makes filling out surveys more comfortable. Secondly, visitors who are already sat down are more easily persuaded to fill in the survey. Since face to face data collection has become impossible as a result of the Covid-19 outbreak, data had to be collected using an alternative method. An online survey was set up in Google Forms and directed at people likely to be familiar with the nature areas. This was achieved through spreading flyers in nearby residents' mailboxes. These flyers included a short introduction to the nature area, the research, the researcher and a link and qr-code to the online survey. These flyers can be found in appendix 3. The locations where these flyers were spread were selected based on their proximity to the nature areas, using ArcGis. All flyers were spread within a 2 km radius of the respective nature areas, as this is a reasonable walking distance. Two hundred flyers were distributed in the village of Appelscha, near the Drents-Friese Wold and in the neighborhood of Eelderwolde, near the Onlanden. This first round resulted in 50 respondents in the Onlanden and only 20 in the Drents-Friese Wold. Therefore an additional three hundred flyers were spread in Appelscha to balance the size of the samples and ensure each sample included at least thirty cases.

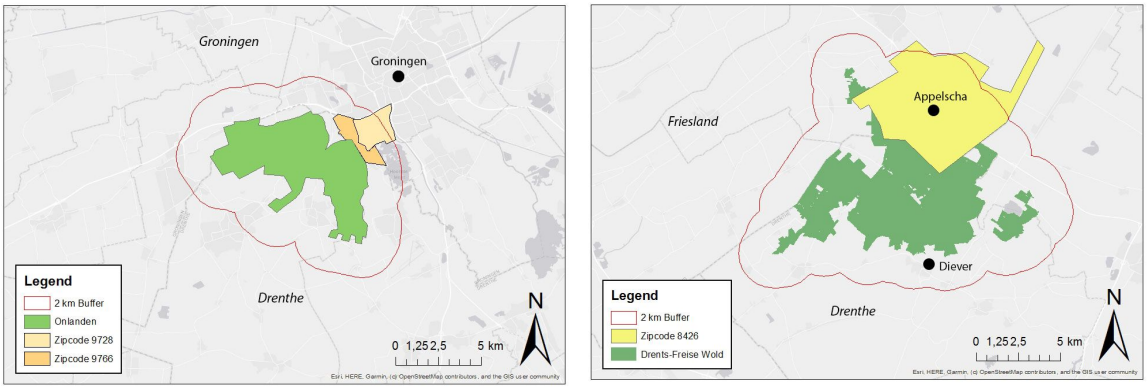

Figure 5: a two kilometer radius projected around the areas of investigation, using ArcGis – author (2020).

3.6 The dataset

The fact that the data was collected using an online survey has several effects on the resulting sample. Primarily, those people who are not adept at handling online technology, such as the elderly, are not represented in the sample. Furthermore, there will be a higher percentage of the sample that is not familiar with the nature landscape in question. The online survey has thus included an inquiry on the frequency of visits to the nature area. Cases from people who visit the nature area less than once every six months are thrown out. Cases with zip codes from outside the 2km buffer were also thrown out. The claims they make about the nature area are unreliable, as they do not make regular visits and thus are not familiar. After throwing out these unusable cases the dataset included 56 cases for the Drents-Friese Wold and 60 cases for the Onlanden. The data was then coded and cleaned

up for statistical testing. The Chi-square test will be used primarily, as this test allows the comparison of two samples.

Location * Regularity of visits Crosstabulation

Count

		Regularity of visits			
		once a month	once every three months	once every six months	Total
Location	Onlanden	57	1	2	60
	Drents-Friese Wold	51	5	0	56
Total		108	6	2	116

Figure 6: regularity of visits from respondents – author (2020).

Most of the survey questions were based on multiple choice, resulting in nominal data. Chi-square tests for homogeneity were used to investigate the significance of difference of perceived quality and values between the Onlanden and the Drents-Friese Wold. Initially the answers were split into five categories; totally agree, somewhat agree, neutral, somewhat disagree and disagree. This however resulted in the conditions of the chi-square test not being met. The categories were thus recoded into agree, neutral and disagree. A significance level of 0.05 is used for all statistical tests.

4 Results

In this section the gathered data will be analyzed. First the characteristics that are valued by visitors of nature landscapes will be identified. Secondly different spatial characteristics found at each type of nature area will be distinguished. In the third section we will take a look at the overall valuation of each type of nature area. All statistical tests can be found in appendix 5.

Valued characteristics of nature landscapes

The first set of Chi-square tests pertained to the degree to which respondents appreciated nature values, including wildness, intensity of maintenance and purity. Knowing what aspects of nature landscapes are valued by visitors will help understand why some are perceived as having a higher spatial quality than others. When comparing the two population to each other, no significant differences in most valued characteristics were found between visitors of the Onlanden and the Drents-Friese Wold. This means both samples valued the characteristics under examination equally.

Questions into the perceived importance of the amount of human influence yielded results in line with expectations. Visitors were asked if they value nature that is influenced as little as possible. Here each sample was looked at separately. For the visitors of the Onlanden the single sample chi-square test yielded a significance level of 0.00. This same test for the Drents-Friese Wold sample gave a significance level of 0.01. Figures 7 and 8 show the test statistics for these tests and the descriptive statistics in a diagram. From these significant results we can conclude that nature that is influenced as little as possible is valued by both

visitors of the Onlanden and visitors of the Drents-Friese Wold. Since we know that the Drents-Friese Wold is managed less intensely as opposed to the Onlanden we would expect it to be valued more on the basis of this finding.

Test Statistics

	I value nature that is influenced as little as possible
Chi-Square	21,700[a]
df	2
Asymp. Sig.	,000

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 20,0.

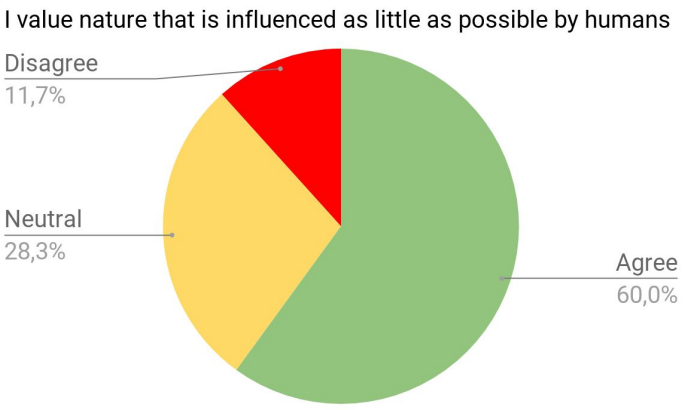

Figure 7: Chi-square test and descriptives for valuation of little influenced nature for the Onlanden – author (2020).

Test Statistics

	I value nature that is influenced as little as possible
Chi-Square	14,179[a]
df	2
Asymp. Sig.	,001

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 18,7.

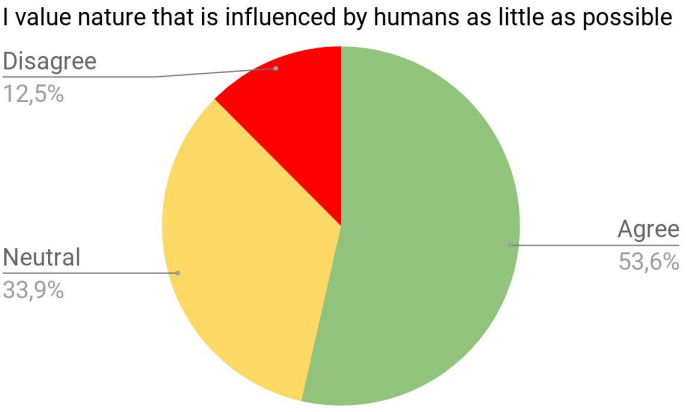

Figure 8: Chi-square test and descriptives for valuation of little influenced nature for the Drents-Friese Wold – author (2020).

Next we looked into the perceived importance of wild and pristine nature. Two separate one sample chi-square tests were carried out again. For both the Onlanden and the Drents-Friese Wold these tests resulted in a significance level of 0.00, as can be seen in figures 9 (Onlanden) and 10 (Drents-Friese Wold). We can conclude that wild and pristine nature is valued significantly in both populations. These are characteristics we expect to find at the Drents-Friese Wold because the nature here is rewilded.

We have found that visitors of both the Onlanden and the Drents-Friese Wold value nature landscapes that are wild and pristine and that are influenced by humans as little as possible. This might indicate a high valuation of the Drents-Friese Wold, as these characteristics can be associated with new nature landscapes. In the next section we will look into what spatial characteristics either nature area is perceived to have.

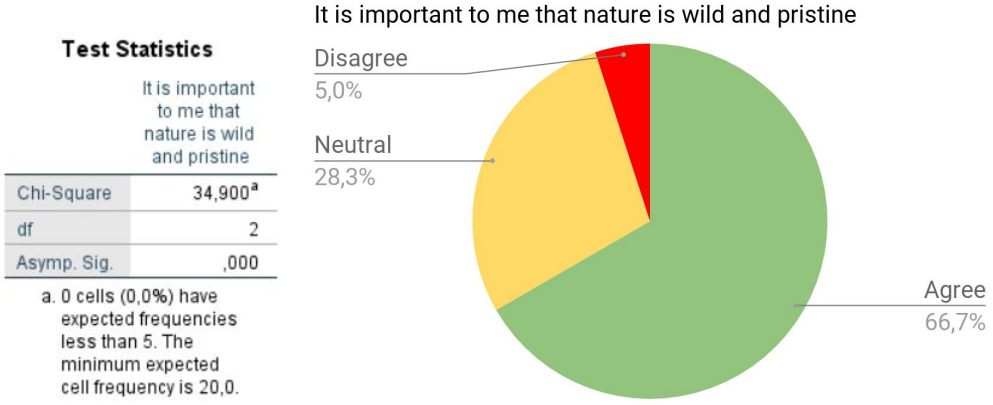

Figure 9: Chi-square test and descriptives for valuation of wild and pristine nature for the Onlanden – author (2020).

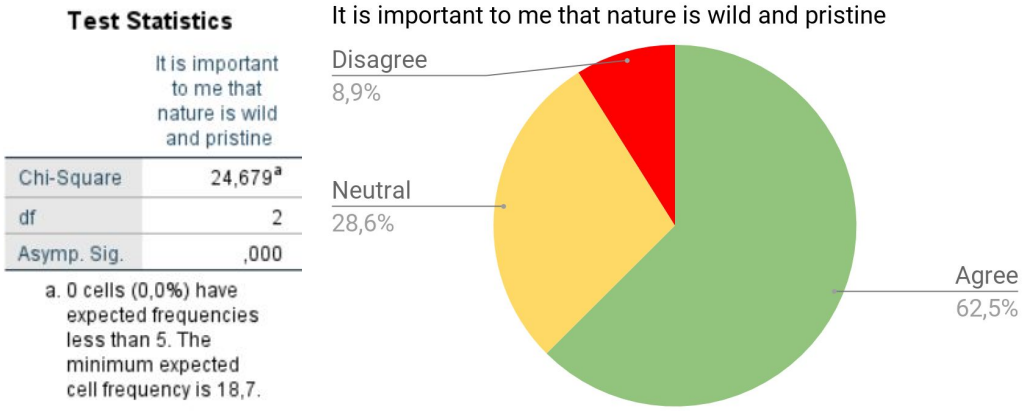

Figure 10: Chi-square test and descriptives for valuation of wild and pristine nature for the Drents-Friese Wold – author (2020).

Visitors of both new nature and traditionally managed nature were found to value nature landscapes that are wild and pristine. In the Netherlands it is hard to find nature that is untouched by humans (Van Koppen 2002). As argued by Doevendans et al. (2007) nature in the Netherlands has become an object of creation. In this regard it is new nature that has the most similarities with untouched nature. One of the guiding principles of rewilding is the idea that: “there should be as little human interference as possible” (Soulé and Noss, 1998). Furthermore, the focus on restoring ecological autonomy is the distinguishing feature of rewilding as a nature conservation strategy (Prior and Ward, 2016). The spatial characteristics of being wild and pristine are seen as qualities in a nature landscape. The practices that are put to use in rewilding seem as if they would lead to the creation of a nature area that has these qualities.

Spatial characteristics of each type of nature landscape

Now we will go into the perceived differences in spatial characteristics between the Onlanden and the Drents-Friese Wold. The first chi-square test for homogeneity pertained to how pristine each nature area is perceived to be. This test showed a significant difference in the distribution of perceived pristineness between the Onlanden and the Drents-Friese Wold at a significance level of 0.011.

Applicability of the term 'Pristine'			
	Agree	**Neutral**	**Disagree**
Onlanden	76.7%	11.7%	11.7%
Drents-Friese Wold	50.0%	28.6%	21.4%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9,089[a]	2	,011
Likelihood Ratio	9,234	2	,010
Linear-by-Linear Association	6,605	1	,010
N of Valid Cases	116		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 9,17.

Figure 11: Test statistic for perceived pristineness and descriptives – author(2020).

From the findings represented in figure 9 we derive that the Onlanden are more often perceived as pristine. This finding is not in line with the expectations that are based in the academic literature as the Onlanden are more intensely managed, as opposed to the Drents-Friese Wold where the principles of rewilding are being applied (Dienst Landelijk Gebied and Staatsbosbeheer, 2016).

Secondly, regarding spatial characteristics, a chi-square test for homogeneity pertaining to the perceived wildness was conducted. This test showed a significant difference in perceived wildness between the Onlanden and the Drents-Friese Wold at a significance level of 0.001.

Applicability of the term 'Wild'			
	Agree	**Neutral**	**Disagree**
Onlanden	65.0%	23.3%	11.7%
Drents-Friese Wold	32.1%	53.6%	14.3%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13,500[a]	2	,001
Likelihood Ratio	13,805	2	,001
Linear-by-Linear Association	7,382	1	,007
N of Valid Cases	116		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 7,24.

Figure 12: Test statistic for perceived wildness and descriptives – author (2020).

These findings, represented in figure 10, show that the Onlanden are more often perceived as being wild as opposed to the Drents-Friese Wold. The Drents-Friese Wold was expected to be perceived as more wild as a result of the rewilding programme, which advocates as little human influence over nature as possible (Prior and Ward, 2016; Higgs, 2003).These two findings show that, contrary to expectations, the traditionally managed nature is perceived as more wild and pristine as opposed to the new nature. Visitors seem to feel like the traditionally managed nature landscape contains more of the qualities associated with pure nature.

A third test regarding the spatial characteristics was about the perceived intensity of maintenance of the both nature areas. This was again done using a chi-square test for homogeneity. This test showed a significant difference in perceived level of maintenance between the Onlanden and the Drents-Friese Wold at a significance level of 0.004. At 70% the Onlanden are more often perceived as well-maintained. This finding indicates that the Drents-Friese Wold is perceived as less intensely maintained.

Applicability of the term 'Well maintained'			
	Agree	**Neutral**	**Disagree**
Onlanden	70.0%	21.7%	8.3%
Drents-Friese Wold	41.1%	32.1%	26.8%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11,236[a]	2	,004
Likelihood Ratio	11,540	2	,003
Linear-by-Linear Association	11,071	1	,001
N of Valid Cases	116		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 9,66.

Figure 13: Test statistic for perceived level of maintenance and descriptives – author (2020).

Finally, the distributions of the perceived diversity of the nature areas were tested. Again the chi-square test for homogeneity was used. This test found a significant difference in perceived diversity between the Onlanden and the Drents-Friese Wold at a significance level of 0.014. From the descriptives in figure 11 we can derive that the Drents-Friese Wold is more often perceived as diverse as opposed to the Onlanden.

Applicability of the term 'Diverse'			
	Agree	**Neutral**	**Disagree**
Onlanden	55.0%	31.7%	13.3%
Drents-Friese Wold	78.6%	10.7%	10.7%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8,489[a]	2	,014
Likelihood Ratio	8,829	2	,012
Linear-by-Linear Association	4,024	1	,045
N of Valid Cases	116		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 6,76.

Figure 14: Test statistic for perceived diversity and descriptives – author (2020).

So we have found that the Onlanden are mostly perceived as wild and pristine and also as well-maintained. These findings are striking because they seem to contradict each other. Surprisingly, new nature was not perceived as more wild or pristine by visitors. In fact, the nature that was managed traditionally was perceived as both more pristine and more wild than new nature. We know that the intensity of management in the traditionally managed nature landscape of the Onlanden is more intense, yet it is perceived as more wild (Natuurmonumenten, 2019). These findings are also not in line with the expectation that new nature would be pristine since the aim is for nature to find its own way (Prior and Ward, 2016). The new nature landscape was perceived as more diverse than the traditionally managed nature landscape. This is one finding in line with expectations. With its intense

focus on improving ecological quality, including biodiversity, rewilding was expected to be perceived as more diverse (Soulé and Noss, 1998). The perceived diversity of the landscape, however, did not lead to an increased perceived wildness of the landscape. Also striking is the finding that traditionally managed nature is perceived as more intensely maintained as opposed to new nature. This finding was in line with expectations in the sense that traditionally managed nature is usually managed more actively than new nature (Jepson et al., 2018). However, it contradicts the previous finding of traditionally managed nature being perceived as wild and pristine. The traditionally managed nature was thus perceived as both well maintained and wild and pristine. These two spatial qualities were expected to be mutually exclusive as a well maintained nature landscape could by definition not be wild and pristine.

Spatial quality of each type of nature landscape

In this section we will try to determine which nature area was perceived as having the highest overall spatial quality. Another chi-square test was used to compare the perceived attractiveness between the two locations. This test yielded no significant result at a significance level of 0.107. There is thus no difference in perceived attractiveness between the Onlanden and Drents-Friese Wold. These findings indicate again no difference in spatial quality between the rewilded and traditionally managed nature. The Onlanden were perceived as more intensely managed, more wild and more pristine, although this did not result in an increased appreciation of its spatial quality. Thus there has not yet been an indication of a higher spatial quality in the Onlanden as opposed to the Drents-Friese Wold. As a result of the significant differences in perceived spatial characteristics, such as wildness, some difference in overall perceived quality would have been expected.

5 Conclusions

The aim of this paper was to gain insight on the effect of rewilding on the spatial quality of the resulting natural landscape. To this end a comparative study has been conducted into the perceived quality of a new nature landscape and a traditionally managed nature landscape. Rewilding practice pays a lot of attention to improving ecological conditions, and less so to creating a landscape of high spatial quality (Prior and Ward, 2016). We have seen that some researchers in the field of ecological restoration have started arguing that there is too little attention for the non-ecological values of nature landscapes (Higgs, 1997; Turner 1992; Swart et al., 2001). Therefore this paper sought to identify some of these weaknesses and gain insight in their causes in order to help improve rewilding as a nature conservation and management strategy.

Overall the valuation of new nature did not differ greatly from the valuation of traditionally managed nature. Some different spatial characteristics were found, most notably was the fact that nature that was managed traditionally, with more human involvement, was perceived as more wild and pristine. One explanation for this is the fact that most nature is managed by governmental agencies such as Natuurmonumenten or Staatsbosbeheer. These organisations have been managing most nature in the Netherlands for a long time.

We come back to the statement by Doevendans et al. (2007) that nature in the Netherlands is a malleable concept. The nature that one is used to seeing in the Netherlands is by no means true, pure or wild. Our image of wild and pristine nature is skewed, for all nature is managed to some extent (Van Koppen, 2002). So a good explanation for the reason traditionally managed nature is seen as wild and pristine is the fact that this is the type of nature that we are used to seeing.

The different spatial characteristics did not translate to significant differences in valuation of new nature as opposed to traditionally managed nature. We thus have to conclude, based on this research, that rewilding practices do not lead to the creation of nature landscapes of a lower quality than those resulting from traditional nature preservation strategies, based on the extent of this research. While drawing these conclusions it has become apparent that this paper has not been able to investigate the full scope of variables that play a role in the valuation of nature landscapes. This research tested for intensity of maintenance, degree of human interference, wildness, pristineness, diversity, attractiveness of vegetation and diversity of flora and fauna. All variables were based on the expected differences between rewilded and traditionally managed nature. In order to gain a more complete understanding of the differences in perceived spatial quality between new nature and traditionally managed nature a more extensive study would have to be conducted. The limited time and resources available for this study lead to an incomplete picture of the spatial characteristics that influence the perceived quality of a nature landscape. Interesting to investigate would be how the aesthetic value of a landscape is perceived. Alternatively one could look into the exact ways that rewilding measures, such as the introduction of large grazers, affect a landscape. Such a study would be qualitative in nature, which is a good thing. By combining different research methods this would help paint a more complete picture of the mechanisms behind the valuation of a landscape.

5.1 Reflection

The main struggle during this bachelors project were the measures resulting from the Covid-19 outbreak. Data could not be collected in the intended way as surveying in person was not allowed by the university. The implications from the Covid outbreak mainly affected the data collection stage. As discussed in the methodology section, data was eventually collected using online surveys. As a result of this change, data collection took more time than originally intended. This however did not affect the rest of the process, as extra time was made available. Furthermore it has become apparent that the entire process of conducting research has to be planned carefully and entirely, prior to starting data collection. Some aspects of this research were not entirely thought through, since some professors hammered on the circularity of the research process. In a future research I would apply a more exact planning in before starting data collection, as no changes to the method can be made after starting.

6 References

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7 Appendices

The appendices are supplied in a separate document