

HEGEWARREN



Report

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HEGEWARREN

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Abstract

The Hegewarren is a unique area with core values of quietness, calmness & darkness. It is an agricultural landscape close to the Alde Feanen and Aldeboarn-De Deelen. Currently the Hegewarren is not used for recreation other than the the ferry route '8 van Grou'. This project answers the following research question: "What will the Hegewarren area, based on the vision 'Open en Natuurlijk', look like in 2050 while focussing on the combination of recreation & nature and preserving quietness, calmness and darkness?". A connection is made with the surrounding area by stimulating the natural values and creating more recreation possibilities. The socio-ecological alliances are considered in combination with the concept of environmental capacity.

This research is approached by doing an area analysis and some theoretical research. With these parts and a survey, three different models are created. The models have a different principle. Model 1 is based on nature, model 2 on an integration of nature and recreation, and model 3 on vibrant recreation. On these models feedback is asked by interviewing several stakeholders in Friesland and sending out a survey to people who are interested to contribute to this research. Based on these outcomes a masterplan is formed.

This masterplan combines nature and recreation in the Hegewarren with respect to quietness, calmness and darkness. By increasing the ground water level and applying wet cultivation the CO₂ and nitrogen emissions can decrease. There are several possibilities for daily recreation in 2050 in the Hegewarren. The experience points in the Hegewarren give an impulse to the region, by stimulating the surrounding area to go here as well. By having small scale options to stay overnight, quietness, calmness and darkness can be preserved. The masterplan is adjusted to the surrounding area to distinguish the Hegewarren from the rest.

The integrated plan gives extra recreation options in the area. It is a plan where the core values amplified and socio-ecological alliances are enhanced. Because the plan is connected to the surrounding area and the wishes of different stakeholders have been taken into account, there is environmental capacity for the plan.

Keywords: Hegewarren, socio-ecological alliances, environmental capacity, wet cultivation, recreation, nature

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Introduction

Problem statement

Peat meadow landscapes in the Netherlands are under threat due to the current land use and climate change. The Hegewarren is one of these peat meadow landscapes where the main concern is about the water level. The current water level is lower than surrounding areas, like nature reserve Alde Feanen, which leads to desiccation of these areas. Nature areas drying out and the current water level in the Hegewarren both result in oxidation of peat, which releases CO₂ and causes land subsidence (Provincie Fryslân, 2022). A higher groundwater level forms the basis of the future transition of the Hegewarren.

However, a transforming the Hegewarren could lead to the loss of its valuable characteristics: quietness, calmness and darkness. On the one hand there is this desire to increase the recreational value of the Hegewarren, in a way that people can experience the beauty of the landscape and its surroundings. On the other hand, it is important to preserve and enhance the landscape's characteristics and natural values.

Core values Hegewarren
Quietness, Calmness & Darkness

The multiple desires that are at play here could potentially lead to concerns and conflicts of interest. Focussing too much on the recreational aspect could result in too much pressure on the area, leading to negative effects for both natural aspects as well as the quietness, calmness and darkness. At the same time, another holiday park in the area is unwanted by many local citizens. Citizens are important to consider, because a successful plan needs sufficient environmental capacity. However, when focussing too much on natural values, there is a danger for the plan to become very costly and economically infeasible.

A final issue is the presence of gas extraction in the Hegewarren, which is licenced until 2040. Parts of the area currently in use for gas extraction result in parts of the plan cannot be executed until 2040 (Co-creatieteam Hegewarren, 2021). It is important to keep this in mind for phasing the plan.

Objective

The objective of this research is to investigate possible forms of recreation in the Hegewarren by looking at the environmental capacity, in which different land uses, accessibility and economic feasibility are also considered.

The environmental capacity is analysed by looking at recreational and natural developments possible in the area. This is done through investigating what facilities are already present that allow for recreation and (eco)tourism, while also looking at what is missing. It is also important to see what role the Hegewarren plays in the surrounding area, to look at how both recreation and nature would fit into the larger regional network and how this new landscape is managed. It is important to locate current and facilitate new socio-ecological alliances. To investigate the environmental capacity, stakeholders are involved. The feedback and information

that is obtained from stakeholders, is used to find the most appropriate implementations.

Scope

The scope of this project is to create a plan for the Hegewarren area, combining nature and recreation. For this, several models are created where the most desirable aspects are worked out in a masterplan. These concepts are based on the alternative 'Open en Natuurlijk' as created in the co-creation process but are expanded further upon its ideas. In these scenarios the desired quietness, calmness and darkness are taken into account. To ensure a good understanding of the area and its processes, the surrounding area is also analysed. The analysis of the surrounding area is used to integrate the project into its surroundings. However, the final plan has its focus mainly on the Hegewarren itself.

Research question

Based on the objective of the project focused on combining nature and recreation, a research question is formulated.

What will the Hegewarren area, based on the vision 'Open en Natuurlijk', look like in 2050 while focussing on the combination of recreation & nature and preserving quietness, calmness and darkness?

Based on the problem statement the main research question has been split into four sub-questions, that allow for a clearer division between the complex topics. Although these questions do not reappear in the report, these questions have served as a guideline throughout the project. The conclusion discusses the outcomes to these questions, as well as their relation to one another and the core values.

Sub-questions

- Which recreational options are suitable for the Hegewarren?
- How can the natural values in the Hegewarren be strengthened and connected with the surrounding region?
- What is the social-economic feasibility of the plan?
- What is the environmental capacity for recreation in the Hegewarren?

Also the theoretical background of wet cultivation is investigated by articles, internet sources and interviews.

Methodology

To create a masterplan for the Hegewarren, which includes quietness, calmness and darkness, an inclusive approach has been created. Figure 1 shows the steps towards creating this masterplan. An area based analysis has been conducted, in combination with some theories. The theory is based on the important aspects of this project: nature and recreation. It is defined what socio-ecological alliances are and how environmental capacity can be determined. Also the theoretical background of wet cultivation is investigated through articles, internet sources and interviews. These theories are important to answer the main research question. An analysis is done based on several sources and a survey. Later, the analysis is supplemented with information from the interviews and a second survey. The first survey can be found in appendix 3. The survey is sent in the newspaper of the Hegewarren project. The survey asks people what the most important quality of the Hegewarren is, what kind of recreation is wanted and if the accessibility needs to be changed. The answers that came out of this survey, in combination with conversations with the municipality, province and Arcadia and the analysis, led to three models. The three models are based on the vision 'Open en Natuurlijk' as this has already passed province, municipality and waterboard. The models are extreme variants to obtain reactions from the people. These reactions are acquired through a second survey and several interviews during a field trip. The interviewees are selected by looking at different parties and their interests. An overview of the interviewed organisations can be found in Table 1.

Organisation
Wetterskip Fryslân
Farmer with bulrush cultivation
Owner of Hotel le-Sicht
Owner of Sailing School de Veenhoop
Coordinator 'de 8 van Grou'
Province of Fryslân
Municipality of Smallerland

Table 1: Overview of the interviewed organisations

In the interviews the job of the interviewee and their view on the Hegewarren is discussed. In the end there is a discussion about the three models based on their interests. These outcomes are used in combination with the results of the second survey to form the masterplan. The second survey (appendix 4) is sent to the people that were interested to contribute to further research during this project. In the second survey required a reaction on the three models, to show what people found attractive or unattractive about them. The survey only allowed for a limited selection of answers. The answers of the survey are combined with the conversation of the interviews but also with the analysis. A combination of several implementations of the different models could have another effect which has to be taken into account during formation of the masterplan. Also the theory and the vision 'Open en Natuurlijk' are taken into account in the masterplan. The choices that have been made are explained in the chapter 'From models to masterplan'. The masterplan is formed by keeping the core values quietness, calmness and darkness in mind. After the outlines of the masterplan are clarified the details are discussed. By making a concise design, a phasing plan and a social cost-benefit analysis the plan is clearly motivated and based on all necessary aspects for the Hegewarren.

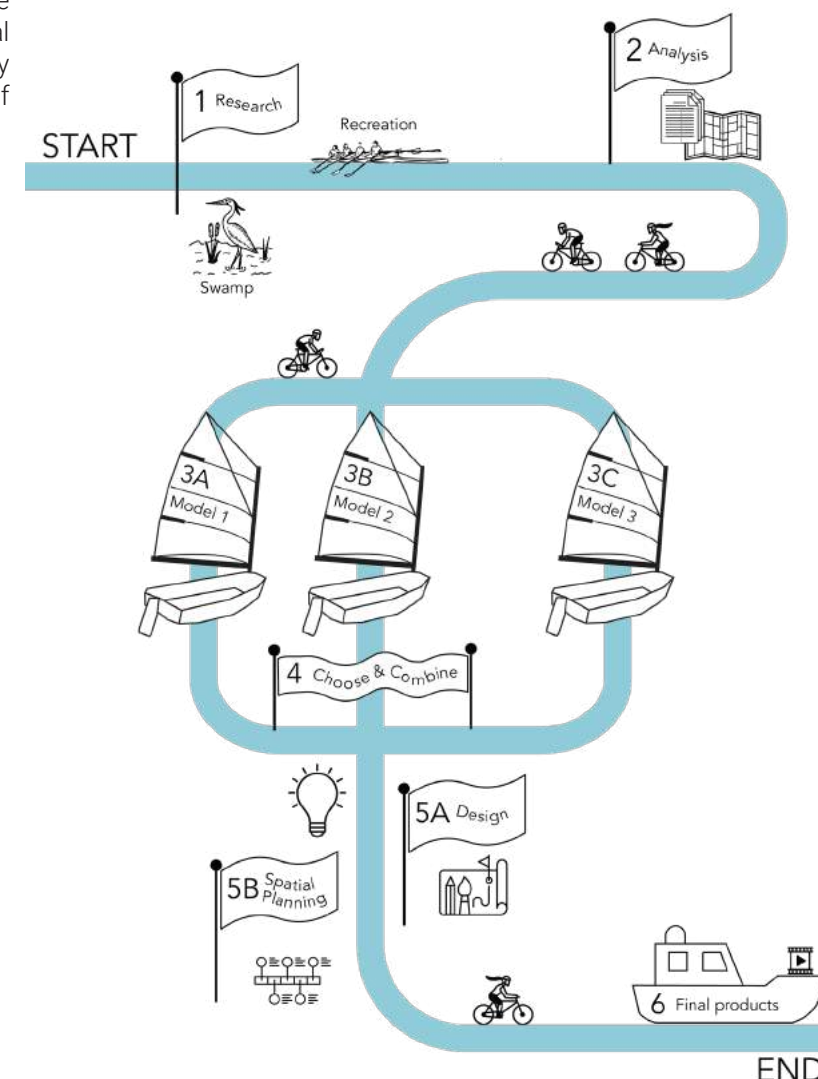


Figure 1: Theoretical framework: 'de Pontjesroute'

Analysis

Area introduction

The Hegewarren, part of the municipality of Smallingerland, is a peat meadow polder (about 400 hectare) located in the province of Friesland between the villages Grou and Drachten, southeast of Leeuwarden. The area is surrounded by water, nature and recreational areas, with the National Park De Alde Feanen north of it as most important. At the south is a large nature area called the Aldeboarn-De Deelen. The current function of the Hegewarren is mainly agriculture.

The valuable characteristics of the area are its quietness, calmness and nightly darkness, which are qualities that cannot be found in many areas anymore (Co-creatieteam Hegewarren, 2021). Figure 2: spatial situation Hegewarren shows the current spatial situation of the Hegewarren. More detailed analyses on social-geographical and physical-geographical aspects are presented next.

Social-geographical analysis

Demography

Due to its agricultural function there are mostly farmers living in the Hegewarren. In total there are 24 inhabitants in the area divided over nine permanent residences. This does not include recreational residents, that live here not permanently. There is one family who has recently acquired a large part of the land at the west of the Hegewarren. They are willing to work with the government concerning the planned developments, and eventually want to live in the area (M. Swenne, personal communication, May 17, 2023). The surrounding villages of the Hegewarren have stayed roughly the same size since 2013 (see Figure 3).

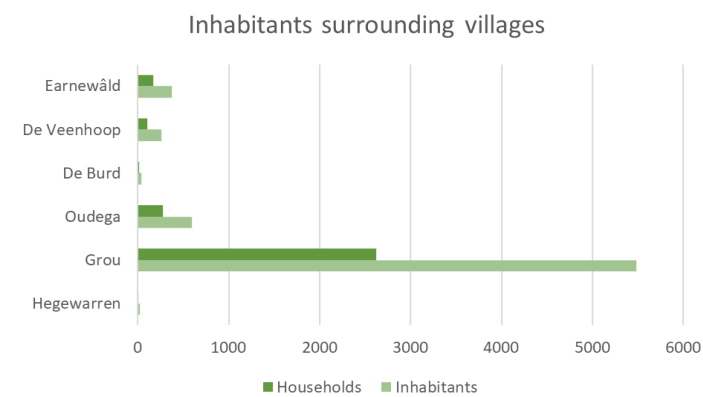


Figure 3: Inhabitants surrounding area (allecijfers.nl, 2023)

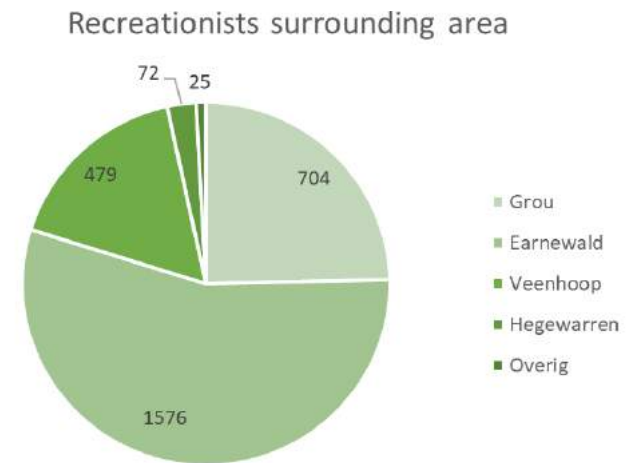


Figure 4: Recreationists surrounding area (Data Friesland, 2019)



Figure 5: The Hegewarren by day

Apart from the people living here permanently, there are a lot of recreationist in the surrounding area. In total there is place for 2856 recreationist to stay overnight in the surrounding area. Most of the people can stay in Grou or Earnewâld, but the division can be found in Figure 4.

Local identity

From the interviews and survey it is clear that the Hegewarren is commonly known for its quietness, calmness and darkness (Figure 5). It is the wish of the (surrounding) inhabitants that this identity is maintained in the future. Right now this character is preserved because the area is poorly accessible and there are no streetlights at the Hegewarren.

Mobility

You can reach the Hegewarren by ferry, boat or car. The Hegewarren has one major road that cuts through the area from east to west. This road is only accessible for cars from

the bridge at the east side. At the same time this road is part of the regional walking and cycling network. Cyclists and pedestrians use the same road but can enter this by one of the ferries in the east and west or the bridge in the east. Other roads for cars, cyclists or pedestrians are absent (Google Earth, 2023). There is a small parking place at Hotel le-Sicht but only for their guests. It is not possible to reach the area by public transport. The closest train station is located in Grou. Currently, there are multiple waterways (Figure 6). The limited mobility options make the area poorly accessible. However, the limited accessibility contributes to the valuable characteristics quietness, calmness and darkness.

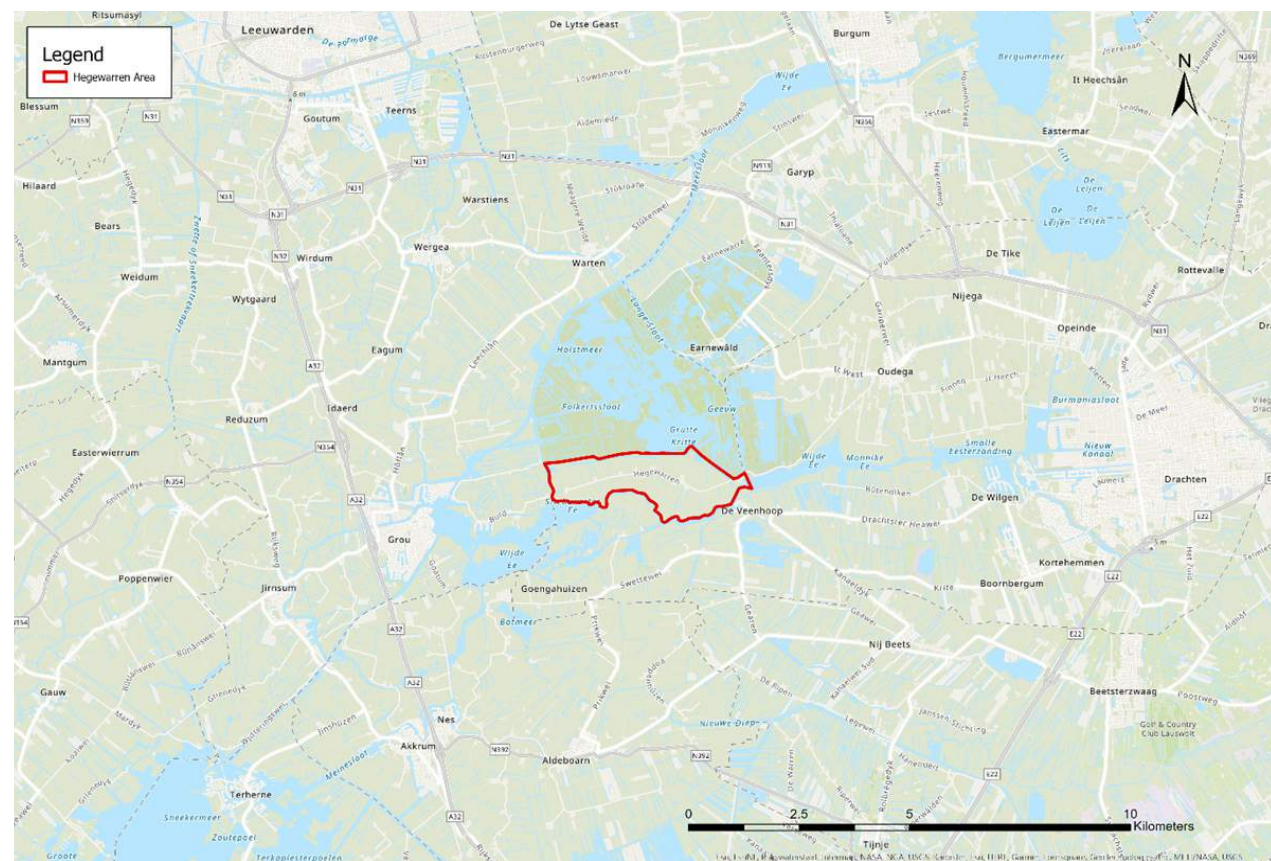


Figure 2: Spatial situation of the Hegewarren

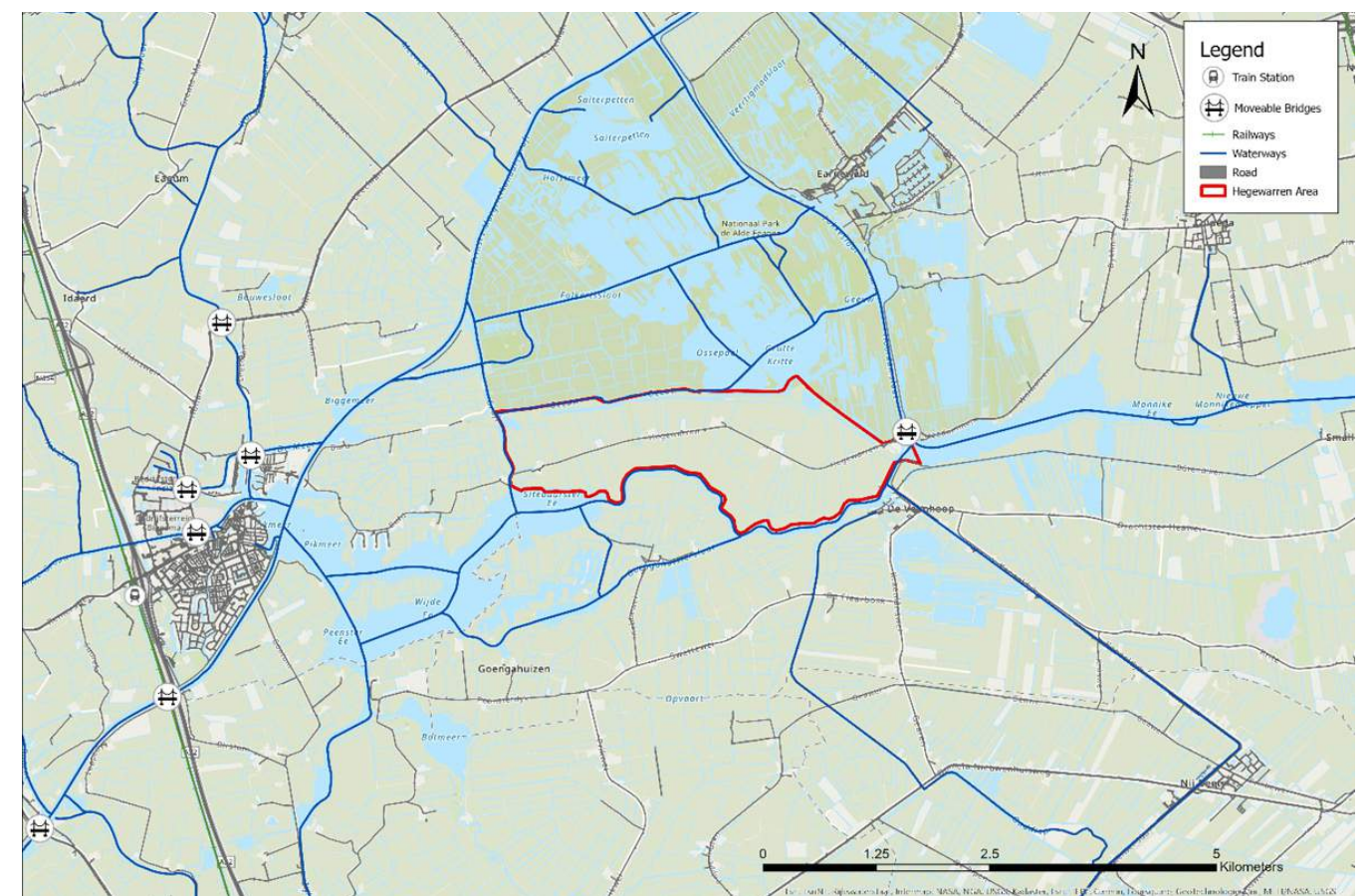


Figure 6: Current waterways in the area (Provincie Fryslân, 2022)

Analysis

Recreation

In and around the Hegewarren there are several forms of recreation available. The Hegewarren is part of the cycling route, 'de 8 van Grou'. This is a popular cycling network where you take several ferries. (de8vanGrou, n.d.-a). 'De 8 van Grou' brings many tourists to the Hegewarren. This route is used by 30.000 cyclist a year. The ferries are open from the 1st of April until the 30th of September, which shows the seasonality of tourism in the area (de8vanGrou, n.d.-b). The ferries are called 'De Grietman' at the east and 'De Snoekbears' at the west. The surrounding waterways are used for sailing. The national park and its surroundings is visited by tourists and local community to walk, cycle and sail.

The Hegewarren itself has a few camper parking spots at the west on a farmers land and Hotel le-Sicht at the east (Google Maps, 2023). Close to Hegewarren, at the Alde Feanen there are a lot of places to stay (Figure 7). These range from campsites, hotels and vacation homes (chalets, bungalows or tiny houses) and are mostly situated around Earnewâld. Also Grou and the Veenhoop offer places to stay, such as camping sites and recreational homes. Besides the accommodations on the map, private home rentals, such as B&Bs, are also popular in the area. These accommodations have a large

effect on the area, especially because it has few inhabitants. Figure 7 shows how the Hegewarren is positioned within the recreational network.

History

Figure 8 shows a timeline of the historic development of the Hegewarren and the region around the Hegewarren.

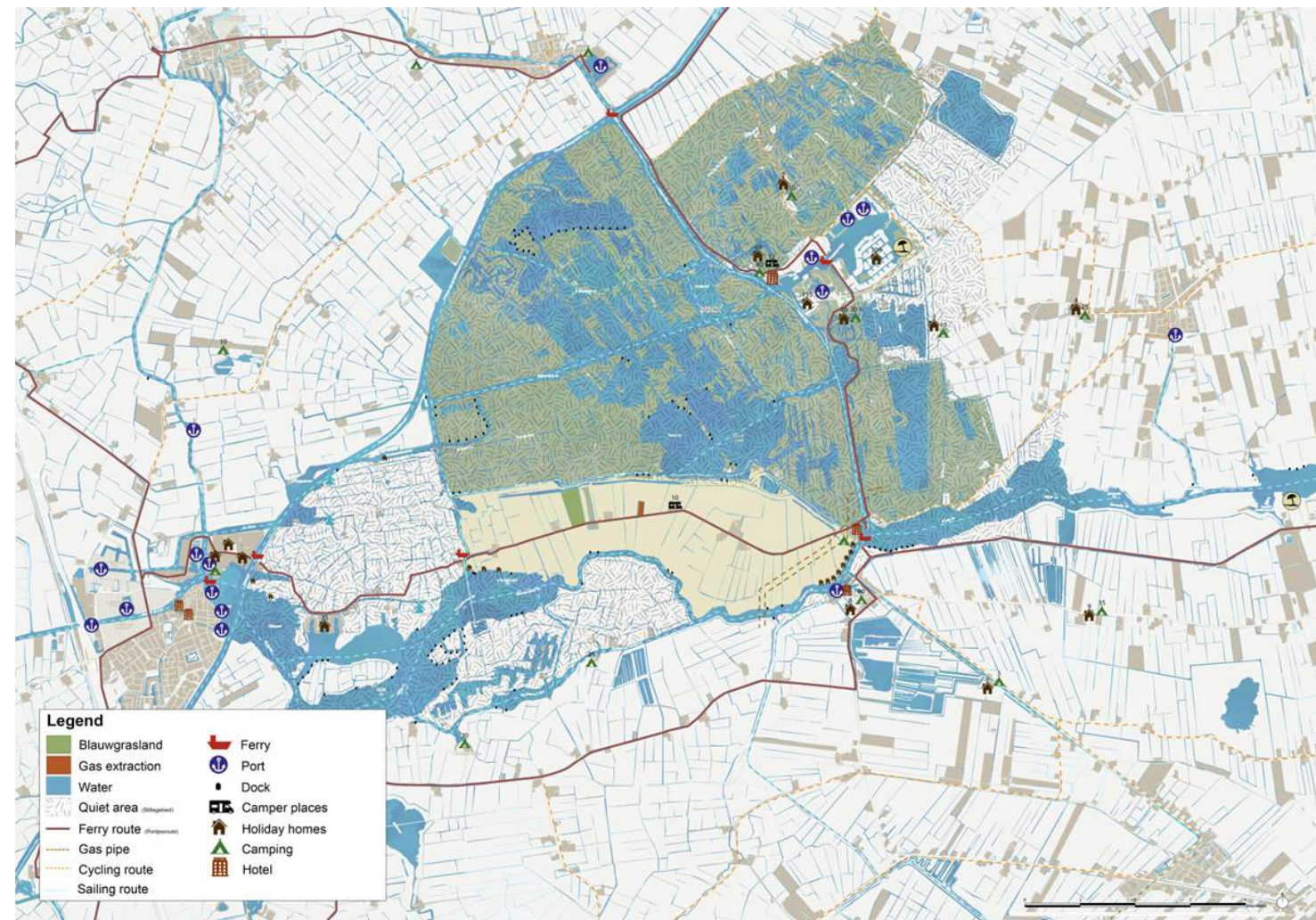


Figure 7: Recreation in the surrounding area

Region

Middle Ages

First attempts of living on the peatlands were made, in the form of terps (Wiersma, 2020)



Illustration of a 'Terp' (Out, 2009)

18th century

Windmills are placed in the area to control the water and transform the 'Dotterbloemhooilanden' to 'Kamgrasweilanden' (Wiersma, 2020)

1915

First people start to recreate in the area of the Alde Feanen (Roolvink, n.d.)

2006

The Alde Feanen is appointed as a National Park (Wikipedia, 2023)



Promotional image of the Alde Feanen (NPAF, n.d.)

Hegewarren

1250

The high peatlands in the Hegewarren are used for agriculture (Wiersma, 2020)



Illustration of farmer ploughing the land (Kros, n.d.)

1975

The allotment of land in the Hegewarren is finalised and the current farms and parcels are realised (Wiersma, 2020)

1984

The Hegewarren become part of the municipality Smallingerland (Wiersma, 2020)

2020

Start Co-Creation process for the future of the Hegewarren

2022

The variant 'Open en Natuurlijk' is chosen



Map of the plan 'Open en Natuurlijk'

Figure 8: Historic timeline of the Hegewarren

Analysis

Physical & Geographical analysis

Nature & Ecology

Currently existing nature includes a rare species-rich grassland named 'Blauwgrasland'. This small area of blue grassland is a leftover of a much bigger area of blue grassland that used to be there in the past.

The ecological value of the Hegewarren is currently limited due to its agricultural function. The biodiversity in the natural reserves of the Alde Feanen and the Aldeboarn-De Deelen is much higher than the Hegewarren. This shows its potential for future developments. A number of key animal species have been identified and compared in Table 2 which shows the ecologic potential for the Hegewarren (van der Heijden, 2016). Furthermore, six different types of habitats can be found in the Alde Feanen, such as peat forests, fens, and lakes. In peat forests you find small birch trees and many sphagnum species, which are small mosses. The lower fens consist of only low fen species, and the lakes can be found in the wettest areas.

Land use & soil

The current land use is mainly agriculture, with exception of a plot in the middle (gas extraction) and the northern borders with nature as destination (see Figure 9). Due to

Type	Species in the Alde Feanen	Hegewarren
Fish	Bittervoorn	Yes
	Grote modderkruiper	Yes
	Kleine modderkruiper	Yes
Birds	Aalscholver	No
	Roerdomp	No
	Purperreiger	No
	Bruine kiekendief	Possibly
	Porseleinhoen	No
	Kemphaan	No
	Zwarte stern	No
	Snor	No
	Rietzanger	No
	Kolgans	Yes
	Grauwe gans	Yes
	Brandgans	Yes
	Smient	Yes
	Krakeend	No
	Wintertolling	No
	Slobeend	No
Tafeleend	No	
Kuifeend	No	
Nonnetje	No	
Grutto	No	
Other	Rivieronderpad	No
	Meervleermuis	No
	Noordse woelmuis	Yes
	Otter	No

Table 2: Ecology in the Hegewarren and Alde Feanen

the gas extraction pipeline infrastructure can be found throughout the area. Buildings can be found mostly along the main road through the area and at the entrance with Hotel le Sicht. The Hegewarren is part of the lower peat area of Fryslân. The lower peat area has a similar land use, which is a combination of natural development and agricultural grassland.

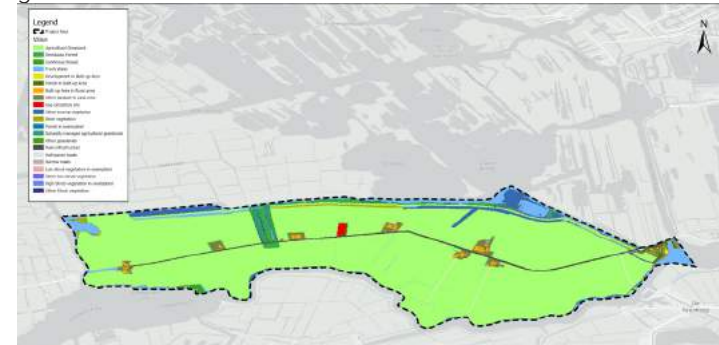


Figure 9: Current land use in the Hegewarren (Gemeente Smallingerland, n.d.)

The lithology can be found in Figure 10 (DINOloket, n.d.). It shows that the soil is mainly peat. In the west there is a small layer of clay on top. The soil in the area mainly has a clay layer on top, as shown in the soil profiles in Figure 10. There is a substantial peat layer in between, which causes oxidation problems at -1.10 NAP and low water levels. Overall, the soil quality is alright. The only exceptions are underground locations of tanks at farms and the gas extraction, slight concentrations of PAH, mineral oils and chromium, and dumped debris (Atlas Leefomgeving, 2022).

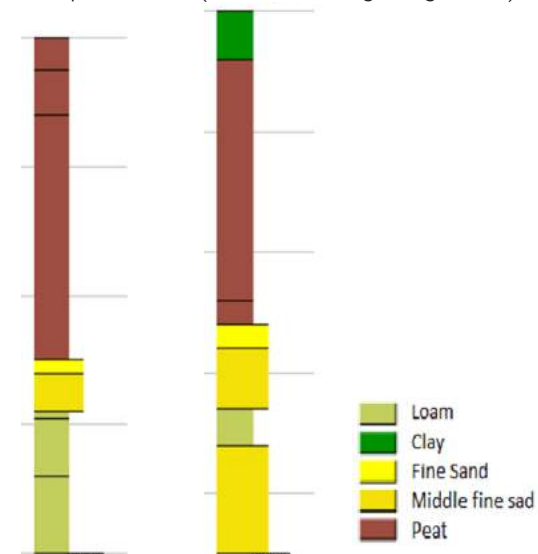


Figure 10: Lithologies of the East of the Hegewarren (left) and the Sytebuorren (right) (DINOloket, n.d.)

Climate

The Hegewarren is a vulnerable area with climate change in mind, though currently effects on the area are limited. These effects mostly consist of more severe droughts and heat stress (IPCC, 2007). Due to subsidence and the corresponding peat oxidation, costs of water management and greenhouse gas emissions are increasing (Deltares, 2018; Witteveen+Bos, 2021) (Figures 11 & 12). Due to high groundwater levels the water storage capacity is also low, which could cause problems for drainage.

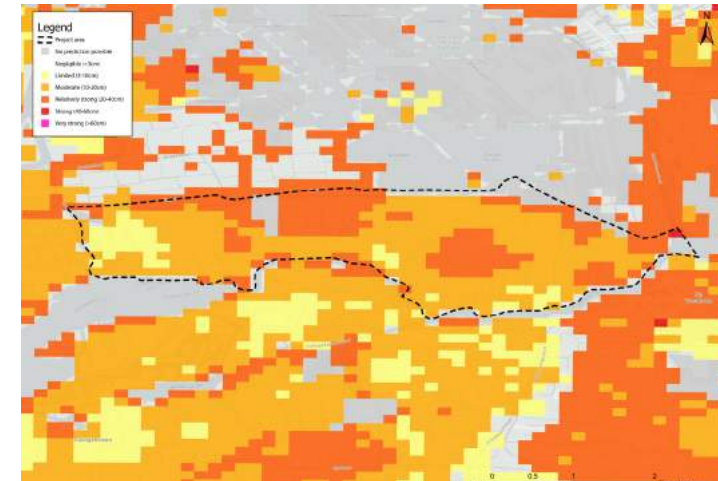


Figure 11: Subsidence in 2050 in case of limited climate change (Deltares et al., 2021)

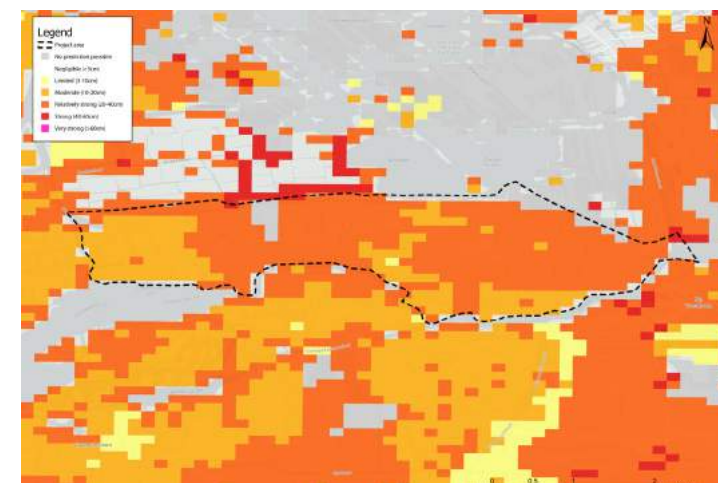


Figure 12: Subsidence in 2050 in case of strong climate change (Deltares et al., 2021)

Elevation

The Hegewarren is a low area between the -0.7 and -1.0 meter. The elevation map (Figure 13) shows that the west and north-east of the area are lower with an average of -1.2 meter. The places that are higher (light brown) are farms, but the highest locations are dikes at the edges of the area.



Figure 13: Elevation Hegewarren (Actueel Hoogtebestand Nederland, n.d.)

Water

There is mostly light to moderate in the Hegewarren (Royal Haskoning DHV, 2019). Without any intervention, the expectation for 2085 is that the seepage in the area increases, becoming moderate to strong. Looking at absolute seepage, the area changes from seepage area to infiltration area. The different variants of boulder clay resistance mostly have the same effect on the groundwater level. When there is a lower boulder clay resistance, there is more rewetting. Currently there is a net inflow of water from the surrounding area, and is also expected in the future (scenario GH-85).

The average highest groundwater level in general is 19 centimeters below ground level (Figure 14). In the south- and northeast the average highest groundwater level is a bit higher, around 8 centimeters below ground level. The average lowest groundwater level in general in the area is 80 centimeters below ground level (Figure 15). The blue grassland area has an average lowest groundwater level of 67 centimeter below ground level and the south- and northeast of the area 64 centimeters below ground level.

There is not much known about water quality in the Hegewarren, except that the toxicity of the water in the east is minor.

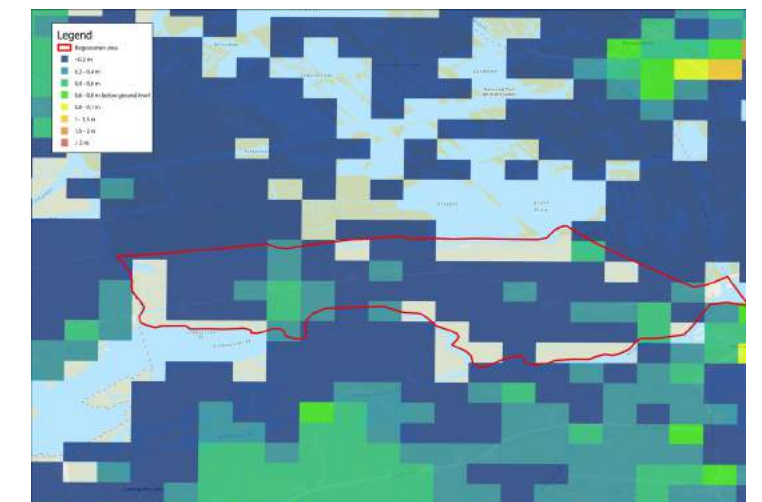


Figure 14: Groundwater level highest

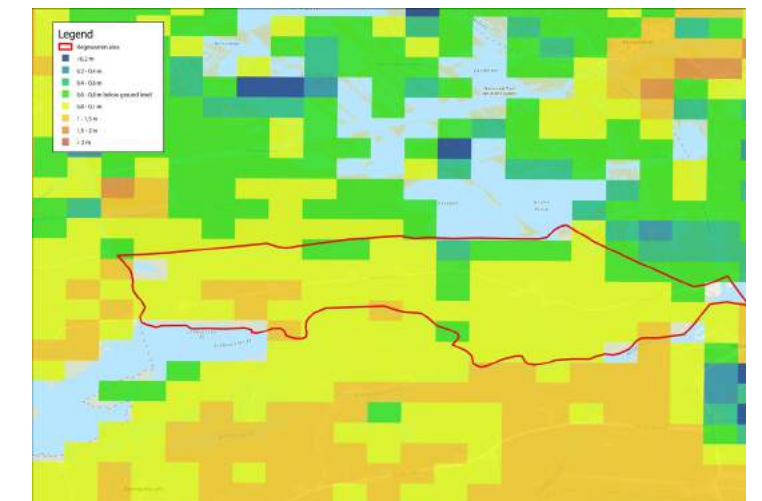


Figure 15: Groundwater level lowest

Analysis

Stakeholder analysis

To show that there are several parties with all different interests, there is made a power-interest matrix (Figure 16). It is clear that many different parties have interest but low power. It is important to take this into account while environmental capacity is needed for this plan to be successful.

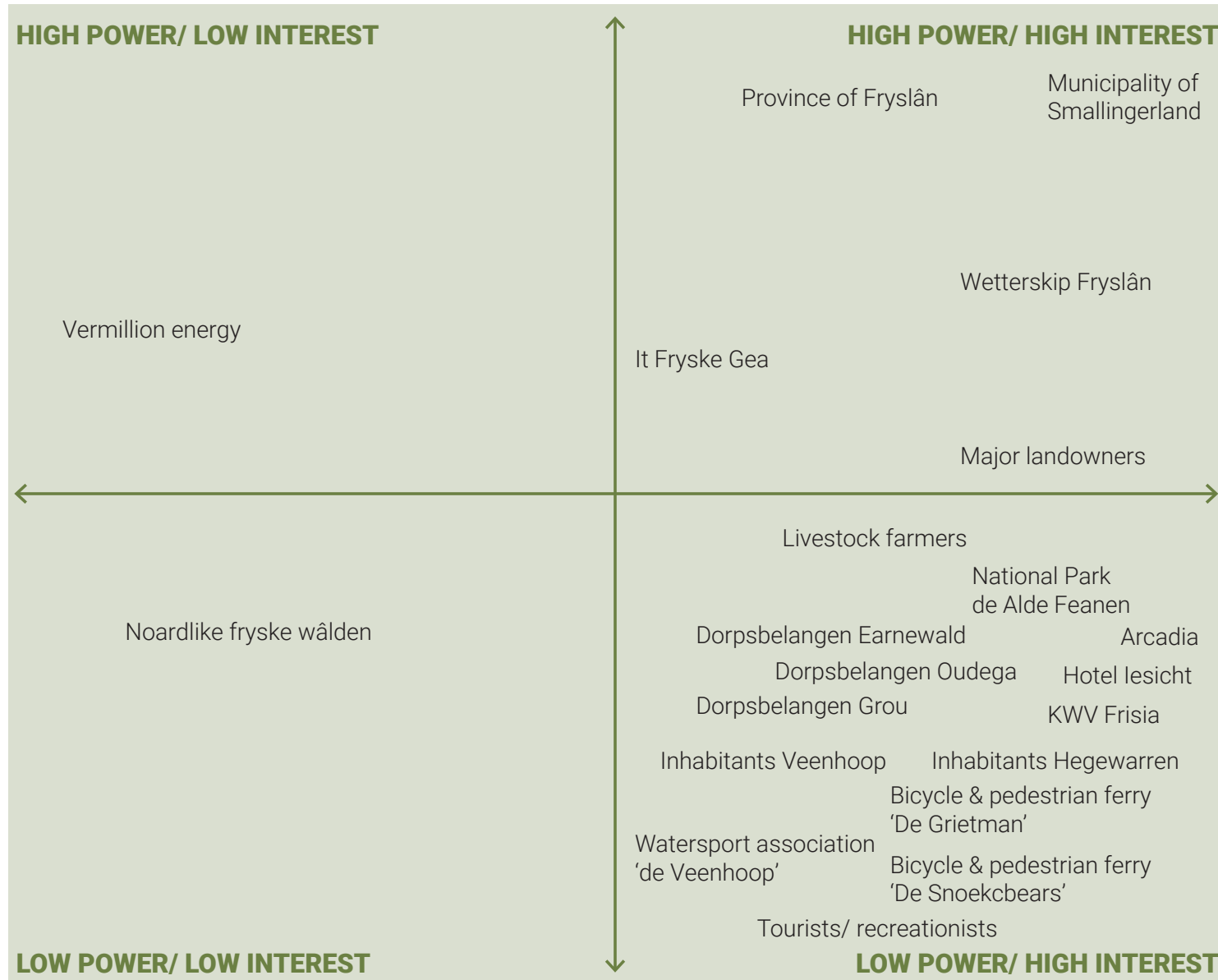


Figure 16: Power interest matrix

SWOT

Based on the other analyses, the Strengths, Weaknesses, Opportunities and Threats of the Hegewarren are determined, see Figure 17.



Figure 17: S.W.O.T. analysis

Models

Introduction of 'Open en Natuurlijk'

To decide on the future transition of the Hegewarren, a co-creation process was started in November 2020. This process led to multiple concepts for the future of Hegewarren, of which the concept 'Open en Natuurlijk' (open and natural) was chosen to develop further. The proposed concept 'Open en Natuurlijk' (see Figure 18) has a main focus on water, which is expressed in a plan where some parts of the current land will be transformed into open water and swampy areas (Co-creatieteam Hegewarren, 2021). This creates an opportunity to restore the water level to a sufficient height which also give more recreation possibilities.

At the same time, this plan leads to concerns about increased human activity in the area, which could disturb the current quietness and calmness. Important is the recreational and natural connection with the Alde Feanen. Within the concept new forms of agriculture will be explored, for example wet farming. To create an economically feasible plan, the development of recreational dwellings is an important element in this alternative. Lastly, one part in the middle of the area is currently in use for gas extraction. The company responsible for this gas extraction has a contract until 2040. There are also several farmers in the area with a contract to use the land for farming until 2040. This means that parts of the plan cannot be executed until these contracts have expired (Provincie Fryslân, 2021). It is important to keep this in mind in the phasing of

the plan, to know where several interventions can take place before 2040 and others cannot. The spatial layout of this concept is used as basis for three different models, which are discussed below.

Model 1 – Quietness, Calmness and Darkness

In this first model (Figure 19) the main focus is on development of high-quality nature, and recreation is more on the background. The open view and polder landscape is clearly visible in this model. Although nature is leading, recreation still plays an important role. People get the opportunity to experience the qualities of the Hegewarren. By offering limited recreational options the core values of the Hegewarren are preserved. On the east side people can enjoy a significant area of open water, with quiet forms of recreation such as supping or canoeing. To enter the area people can use the already existing bridge and the two still existing ferries 'de Snoekbears' and 'de Grietman'. The Hegewarren is car free to stimulate a peaceful character and the core values of the Hegewarren. This also means that the farm at the west is only accessible by boat. A car free area can improve the attractiveness of the ferry route 'de 8 van Grou'. The different islands are connected by pull ferries. People also have the possibility to stay overnight in a tent at a nature camping, surrounded by grazing sheep. Another possibility is to stay at Hotel le-Sicht in the east or in one of the four cabins on stilts located on the middle island. There is a possibility to rent a bike trailer at the entrance of

the area to bring necessities to your accommodation. The darkness is persevered while only sensor animal-friendly lightening is placed at the nature camping. The rest of the area does not have any lightening.

Important is the rise of the water level, which lead to development of a big swampy area on the western island. Throughout the whole Hegewarren birds scavenge and breed. During breeding season, large parts of the area are closed for people to provide optimal conditions for birds to breed. Also, the 'Snoekbears' and 'Grietman' are not open all year, but only from April until October as in the current situation. As mentioned before the ferry route crosses through the Hegewarren, and forms a beautiful cycling route connected with the surrounding environment of the Hegewarren. Some beautiful walking paths are located in the swampy area, with rest spots and a bird watching hut to enjoy beautiful bird species which the Hegewarren offers. The bike path is an unpaved sandy path, and the walking paths are mainly wooden decks. People can also drop by at a picking garden to try pick some locally produced food. Biodiversity increases through a good quality of open water and natural transitions between different landscape types. By giving free rein to nature and water, the Hegewarren is a peaceful, natural and enjoyable peat area at the heart of Friesland.

Model 2 – Nature & Recreation

In this model there is a focus on nature as well as on recreation (see map in Figure 20, on page 10). Nature and recreation go hand in hand, people have plenty opportunities to explore the beautiful nature the Hegewarren offers. However, nature is still respected. This also contributes to quietness, calmness and darkness at the Hegewarren. To respect the natural values, recreational activities is seasonal. During breeding season, large parts of the area are closed, also the ferries are closed from November until March. When the ferries are open, they are open from 9:00-23:00 to enjoy a full day at the Hegewarren. The two ferries are part of the enjoyable ferry route, which is a

paved cycling route that runs through the Hegewarren. Along this route people can buy some local products coming from wet crops and the picking garden. Beside ferries, the Hegewarren is also accessible for destination traffic through the bridge in the east. The different islands are connected through bridges as well. Beside cycling possibilities, there are also plenty of walking routes to explore the different islands. These walking paths are mainly wooden decks and lead to multiple rest spots and bird watching huts. Finally, an important characteristic is not only to explore the Hegewarren over land, but also over the water. The large area of open water offers opportunities for sailing, supping and electric motorboats, and there are berths to have a rest and enjoy the view.

People are able to enjoy the Hegewarren for a day, but also have the opportunity to stay overnight. A campsite, houseboats and tiny houses provide some accommodations for people to stay. A small beach with swimming opportunity, is close to the campsite. Darkness is mostly persevered in the area where more nature is. At the west there is no lightening, in the middle only sensor animal-friendly lightening is placed, and at the camping there is normal lightening. The rest of the area does not have any lightening. Through all these recreational activities people are able to experience the nature the Hegewarren offers. By offering recreational opportunities with respect to the natural values, people and nature are connected in the Hegewarren.

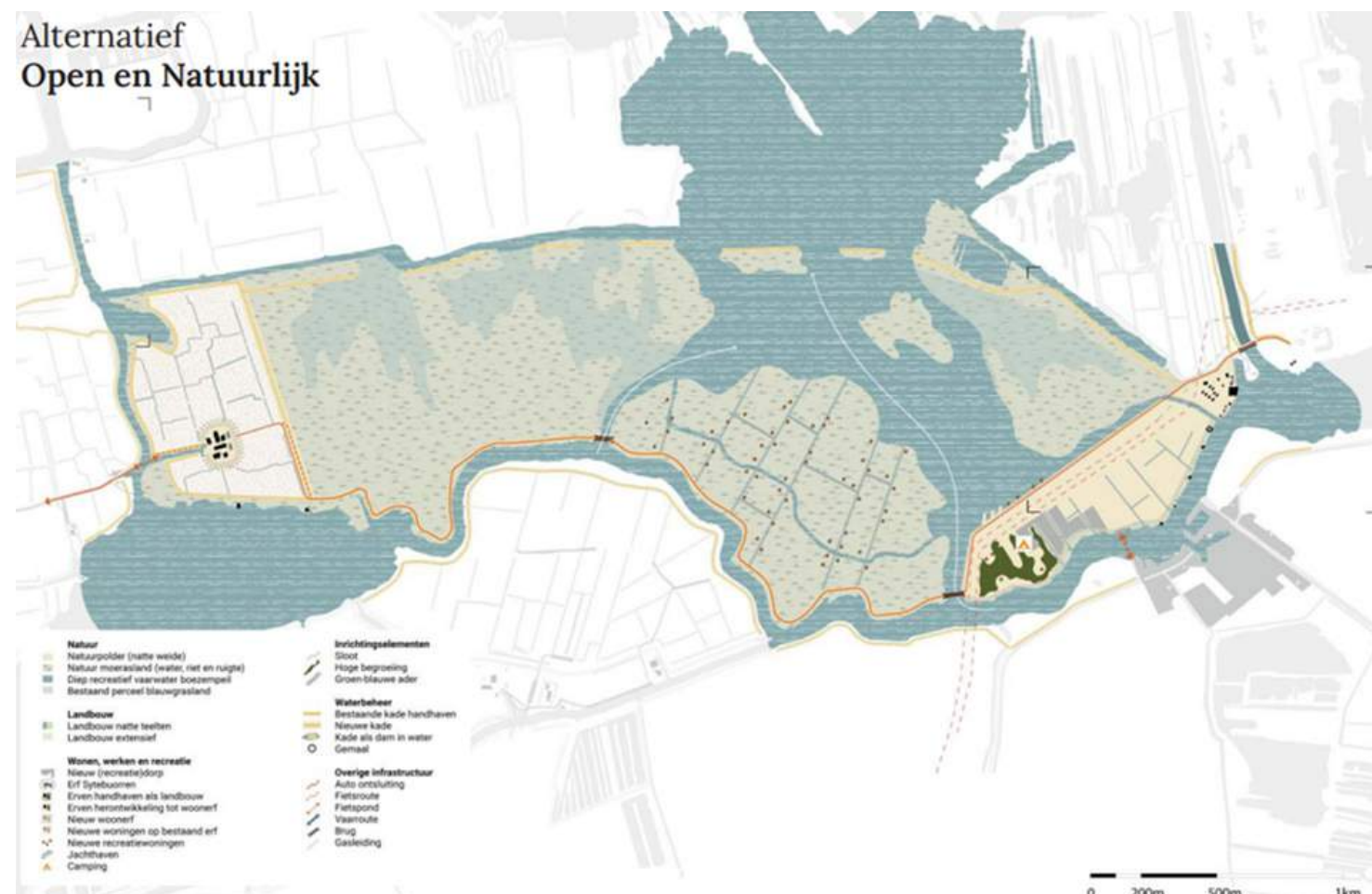


Figure 18: Map of plan 'Open en Natuurlijk'



Figure 19: Map of model 1

Models

Model 3 – Lively Recreation

In this final model (Figure 21) the main focus is on recreation. Despite the water and nature qualities of the Hegewarren still being very important, most important is the opportunity for people to have a great recreational experience in the area. There are plenty of options to stay overnight such as holiday homes, houseboats and old farms that are converted into group accommodations. Furthermore, there is the possibility to bring your tent or caravan to a camping at a farm or a normal camping. Darkness is less persevered in this model. Along the road there is street lightening and also around the recreational homes, nature camping and berths there is normal street lightening. During your stay at the Hegewarren there are many activities possible, for example cycling, walking, sailing and swimming. There is a paved cycling path that is part of the regional ferry route, and the islands are connected by bridges. This provides a perfect cycling environment and

a good cyclability through the area without many obstacles. The water can be explored in multiple ways. People can bring their own boat and stay overnight at one of the berths. But it is also possible to rent a boat or sup board in the harbour. The Hegewarren provides two swimming locations, one at the beach, and a natural swimming pool near the campsite. Another way to explore the beauty of the Hegewarren, is by making use of the many walking paths on the different islands. The walking paths are mainly wooden decks and lead you to resting spots, bird watching huts and a watching tower. From these locations you can enjoy the natural beauty and even a rare piece of blue grassland, which is actively managed. People can also enjoy some local products from a picking garden and wet crops. The area is accessible by car and public transport. Cars can make use of the road on the dike in the south and can access the accommodations on the western island by a part of the old road. Bus stops are located just outside the area on

both the western and eastern side. The ferry 'de Grietman' is open all year, and on the west side the ferry 'de Snoekbears' is replaced by a bridge. If people want to educate themselves more about the Hegewarren, they can visit a visitors centre. Through all described elements, people can fully experience the Hegewarren.

Comparison of three models

Table 3 shows the comparison of the three models on six themes.

1. Accommodation refers to the type of recreational stay in the Hegewarren.
2. Activities refers to the type of recreational activities that can be done in the Hegewarren.
3. Mobility refers to how the mobility is organised in the Hegewarren.
4. The landscape characteristics refer to the main elements and qualities that are key to the plan.
5. Ecology refers to the ecological values that are created in the model.
6. Other land use refers to other typologies than recreation.



Figure 20: Map of model 2



Figure 21: Map of model 3

Theme	Model 1	Model 2	Model 3
Accommodation	<ul style="list-style-type: none"> Nature camping Few cabins on stilts 	<ul style="list-style-type: none"> Tiny houses Small houseboats Camping 	<ul style="list-style-type: none"> Holiday homes Houseboats Group accommodations Farm camping Camping
Activities	<ul style="list-style-type: none"> Bird watching hut Quiet forms of recreation: canoeing, supping, walking, cycling 	<ul style="list-style-type: none"> Birds watching huts Sailing, supping and electric motorboats Small beach Berths Walking and cycling paths 	<ul style="list-style-type: none"> Beach Watching tower Bird watching huts Natural swimming pool Visitors centre Harbour (boat rent) Berths (also to stay overnight) Many walking paths Cycling
Mobility	<ul style="list-style-type: none"> Unpaved cycling path Unpaved or wooden walking paths Car free Pull ferries connecting islands Only sensoring animal-friendly lightening at the camping 	<ul style="list-style-type: none"> Ferries open 9:00-23:00 Paved cycling path Unpaved or wooden walking paths Destination traffic Bridges connecting islands At the west no lightening, in the middle only sensor animal-friendly lightening and at the camping normal lightening. 	<ul style="list-style-type: none"> Paved cycling path Bridges connecting islands Ferry (east) open all year Unpaved or wooden walking paths Bridge at the west replaces ferry 'de Snoekbears' Bus stops at the edges Street lightening along the road and at recreational spots
Landscape characteristics	<ul style="list-style-type: none"> Calm Quiet Darkness Protected nature No lighting Partly closed in breeding season 	<ul style="list-style-type: none"> Fragmented calm and quiet areas Seasonal recreation Peaceful 	<ul style="list-style-type: none"> Lively Sparkling Accessibility
Ecology	<ul style="list-style-type: none"> Breeding birds Otter Peat bog Open water Natural transitions 	<ul style="list-style-type: none"> Breeding birds Peat bog Open water 	<ul style="list-style-type: none"> Blue grassland actively managed Peat bog Open water
Other land use	<ul style="list-style-type: none"> Picking garden Grazing sheep 	<ul style="list-style-type: none"> Wet cultivation Picking garden 	<ul style="list-style-type: none"> Wet cultivation Picking garden

Table 3: Comparison of three models

Theory

Socio-ecological alliances

Planning and design practices nowadays are more and more focussed on respecting and/or restoring ecological values. For example, through nature-based solutions new socio-ecological alliances are formed. Frank et al. (2017) defines socio-natural relationships as "the attempt to pacify the relationship between a society and its natural environment". Socio-ecological networks are the combination of ecological and sociocultural networks. Ecological networks consist of ecologically valuable patches and connections between them (Kangas & Store, 2002). Sociocultural networks consist of land areas reserved for sociocultural purposes, for example recreation. Based on this literature a definition is formulated (textbox 1). The Hegewarren case provides an ideal setting to explore the dynamics between people and nature. For a successful transformation of the area, socio-ecological alliances are needed to let both nature, as well as human activity thrive. On the one hand there are ecological challenges occurring, like the deterioration of biodiversity and increased desiccation. On the other hand, sociocultural challenges are present, like difficulties in the recreational and agricultural sector. Facing these challenges requires the involvement of all relevant stakeholders. Every stakeholder in the area has different interests that might conflict, which means that alliances are needed to keep and/or strengthen the current qualities and characteristics of the area. Differences in priorities at different scales show the need for a strong cross-scale integration of planning and design goals (Langemeyer & Baro, 2021). The co-creation process in the Hegewarren project resulting in 'Open en Natuurlijk' can be seen as an instrument through which these socio-ecological alliances can be formed.

Our definition of socio-ecological alliances:

Socio-ecological alliances are about the relationship between society and its natural environment, where society can be seen as human activity and the areas reserved for these activities and natural environment can be seen as the ecologically valuable patches and connections between them.

Textbox 1: Definition of Socio-ecological alliances

Environmental capacity

In order to make proper decisions for the transformation of the Hegewarren, it is important that these decisions are supported by relevant societal actors. This relates to the Dutch term 'draagvlak', which is defined by Ruelle & Bartels (1998) as "an interest-driven evaluation of the political situation by target groups of a policy, to which a target group actively or passively supports or opposes". It relates to both public support as well as the absence of resistance (Boedeltje & de Graaf, 2004). By actively involving relevant stakeholders through interactive and participatory processes, governments expect that these stakeholders are more likely to back their plans or decisions. Throughout this project 'draagvlak' is referred to as environmental capacity, and a definition is shown in textbox 2.

The environmental capacity is of great importance for the future transition of the Hegewarren. The evaluation of stakeholders is not only influenced by images and discussions in the media, but also by their own experiences with the area. In terms of recreation, there is still a large group of people enjoying and valuing recreation in nature (Buijs & van Koppen, 2013). To gain acceptance among relevant stakeholders, it is valuable if decision-makers show their emotional involvement with the subject.

Our definition of environmental capacity:

With environmental capacity we refer to the level of agreement or acceptance among societal actors regarding a decision, policy or action. Environmental capacity relates to both public support as well as the absence of resistance.

Textbox 2: Definition of Environmental capacity

Wet cultivation

Wet cultivation can play an important role in the preservation of peat landscapes and reduction of oxidation in the future, causing a decrease in emissions. The most suitable wet cultivation crop for this area would be bulrush. This crop can play a role in water retention, while also aiding in improving water quality through its function as a helophyte filter (Kennisprogramma Bodemdaling, 2018). Meanwhile, ecologically it provides a habitat to a number of different swampland-based species in both early stages of growth as well as later stages. Birds, reptiles and mammals have all been seen in previously conducted experimental bulrush fields (Altenburg & Wymenga ecologisch onderzoek, 2021). Bulrush is also known for efficiently storing both nitrogen and phosphorus, up to 500kg and 80kg respectively (Bestman et al., 2019). A definition of wet cultivation based on multiple articles (Kennisprogramma Bodemdaling 2018; Ziegler, 2020) is provided in textbox 3.

The main criticism of wet cultivation in peat landscapes is that it emits methane gas that is stuck in the peat layers. However, when compared to the oxidation that occurs when the peat is exposed to air, it is still a net improvement in terms of emissions to implement wet cultivation in these areas. (Altenburg & Wymenga ecologisch onderzoek, 2020). Additionally, in its current form, there are no optimised methods for harvesting and planting, like there are for "dry" crops, such as large harvesters.

As a business model bulrush can also be interesting for the future as the fibres can be used to create building materials, isolating material and furniture for example. Furthermore, the business model can be expanded through compensation for nitrogen and carbon storage.

Our definition of wet cultivation:

Wet cultivation refers to the productive (agricultural) use of wet and rewetted lands, where the groundwater level is above or around surface level.

Textbox 3: Definition of Wet cultivation

From Models to Masterplan

From the first survey about the important qualities of the area it became clear that the calmness and wide view are the core values of the Hegewarren. Also, quietness and darkness are mentioned in the answers on the survey. In the interviews these core values are mentioned several times by different stakeholders (M. Swenne, personal communication, May 17, 2023; C. Zandstra, personal communication, June 21, 2023; A. Zijlstra, personal communication, June 21, 2023). Our masterplan focuses on a socio-ecological plan where activities and a natural environment are connected with each other. The analysis and interviews show that the Hegewarren is in the middle of a large nature and silent area. Connection with the surrounding area is important according to several stakeholders. Therefore, it is considered that the Hegewarren can become the missing link between the Alde Feanen and the Aldeboarne-De Deelen. This creates a new regional connection of the lower peat area in Fryslân. By applying the vision 'Open en Natuurlijk', both the large peat area and its connection with the Alde Feanen thrives.

The water level in the variant 'Open en Natuurlijk' is based on the elevation map of the Hegewarren. This groundwater level is set to -0.7m, which gives a water level of 30 centimetres above surface level. This is the same as the boezem level (S. Dupon, personal communication, June 20, 2023). From the analysis and interviews it also became clear that the ecology expands when the Hegewarren is connected with the Alde Feanen (S. Dupon, personal communication, June 20, 2023; Municipality Smallingerland, personal communication, June 22, 2023). This should be stimulated by creating silent places and specific nature areas because respondents of the survey also emphasized that bird watching is loved. Therefore, several bird watching places are incorporated in the masterplan. The interviews and theory showed that wet cultivation could have a valuable impact in the Hegewarren (S. Dupon, personal communication, June 20, 2023). First of all to clean up the soil until 2040, before the start of dredging when the gas extraction contract is expired. On the other hand, it could be a future form of agriculture for the farm on the west side. By experimenting with bulrush, the Hegewarren could set an example for other peat landscapes that go through a transition. The analysis and interview with the waterboard showed the vulnerability of the Blue grassland (S. Dupon, personal communication, June 20, 2023). It is unlikely that this could be preserved without a lot of management. Due to the fact that this plan is focused on giving water and soil more space, actively managing blue grassland is not part of the masterplan. Therefore it is expected that the blue grassland does not exist in 2050.

Attractive	Less attractive
<ul style="list-style-type: none"> • Ferry route • Bird breeding season • Nature given free rein • Walking paths • Bird & observation tower • Paved road surface for cycling 	<ul style="list-style-type: none"> • Too many vacation homes • Large-scale camping • Houseboats • Transforming old homes into group accommodation

Table 4: Outcomes survey models

The second survey looked at the attractive and less attractive implementations in all different models (Table 4). The analysis, second survey and interviews show that the Hegewarren should not experience too much pressure of tourists because there are already many touristic points in the surrounding area (M. Swenne, personal communication, May 17, 2023; C. Zandstra, personal communication, June 21, 2023; A. Zijlstra, personal communication, June 21, 2023). The Hegewarren is a quiet, calm and dark area which could not have many large recreational forms conform environmental capacity. The masterplan should therefore be focused on small scale recreation with a limited number of people to preserve the environmental capacity for tourism in the area. Therefore, it is clear that this plan is mainly for the direct surroundings, for example Veenhoop, Grou and Earnewâld. No public transport should be constructed, and travel by car should not be stimulated. Parking places are exclusively for people who stay at the nature camping, tiny houses or Hotel le-Sicht. The road through the area should not be used by a lot of cars to keep the area quiet, calm and dark. Also, streetlights should only be implemented in the area on necessary places such as the nature camping. When presenting our models in interviews, it became clear that small scale recreational homes have more environmental capacity than large scale recreational homes. In the surrounding area there are already many recreational homes in the form of holiday parks and group accommodations.

Because of the core values of the Hegewarren and the fact there is no environmental capacity for large scale accommodations a decision was made to implement a few two-person based tiny houses. The focus in the Hegewarren in 2050 is more on daily recreation. As mentioned before 'De 8 van Grou' is important for the Hegewarren. This route is responsible for the majority of recreationists coming to the area. Therefore, there is a large focus on this route in the masterplan. Several (small) places to have a rest or walk are wanted and therefore implemented in the masterplan. To emphasize socio-ecological alliances in the Hegewarren several experience points are implemented such as bird watching places and an observation tower. The analysis and interviews emphasize that for the future transition of the Hegewarren it is important there are walking and cycling possibilities, which could give an opportunity to improve recreational values (Municipality Smallingerland, personal communication, June 22, 2023; A. Zijlstra, personal

communication, June 21, 2023). As the ferries are such an important asset to the area in terms of accessibility and experience, it is crucial to facilitate and consider this modality in the final advice. As the location of the area is quite remote, it is important to consider parking possibilities when looking at its accessibility. Currently there is only one designated parking zone at Hotel le-Sicht in the eastern part of the Hegewarren. Depending on the number of expected visitors to the area, this number should be increased.

Masterplan

The experience of quietness, calmness and darkness

The Hegewarren is a vast mostly clear polder that offers impressive sightlines along the surrounding area. This masterplan (Figure 22) is created with the intention to preserve the values, quietness, calmness and darkness, that make the Hegewarren unique. The plan reimagines ways to experience this in the landscape through the lens of recreation and natural development. Therefore it is important to note that our proposed implementations within the masterplan can all be traced back to these core values. Values that are also of great importance to relevant stakeholders. By putting these values at the core of the masterplan, an attempt is made to create sufficient environmental capacity. Although the core values can be found throughout the entire area, four distinctive islands have been created to allow the different

land-uses to have ample room to flourish. Within these islands special attention is paid to socio-ecological alliances to create a better relationship between natural values and the experience of people. The connecting element that brings it all together is the cycling route (see impression in Figure 23) that lets you travel between all these islands and experience their respective characteristics.



Figure 23: Impression of the cycling route through the Hegewarren



Figure 24: Impression of the bulrush farm



Figure 22: Masterplan

Masterplan

In the morning you take the ferry 'De Snoekbaers' from the Burd to the Hegewarren. This ferry goes from 10:00 – 18:00 between the 1st of April and 1st of November. The reason for this is that this ferry is used by cyclists or pedestrians which mostly not arrive before 10 o'clock (S. Dupon, personal communication, June 20, 2023). When entering the Hegewarren, at your left hand you can see a bulrush field. At the farm are several experience points where you can read about the effect of bulrush and different applications of bulrush. (Figure 24 & 25) Bulrush is also used during the transformation of the Hegewarren to 'Open en Natuurlijk', explained in the phasing. At this farm people can experience how the Hegewarren is transformed as a landscape. This bulrush field can also be an example for surrounding areas to (partly) transform to wet cultivation.

After this bulrush field you cycle over a paved cycling path with a width of 2.5 meter. The reason for a paved cycling path of 2.5 meter wide is based on the survey and interview with the coordinator of the ferries (S. Dupon, personal communication, June 20, 2023). This width causes that people can cycle next to each other but also cars can reach this side from the island since destination traffic is allowed. This cycling path connects the different ferries with each other to maintain the ferry



Figure 26: Location of the zoom in on the Bulrush farm and fields



Figure 27: Location of the section of the observation tower

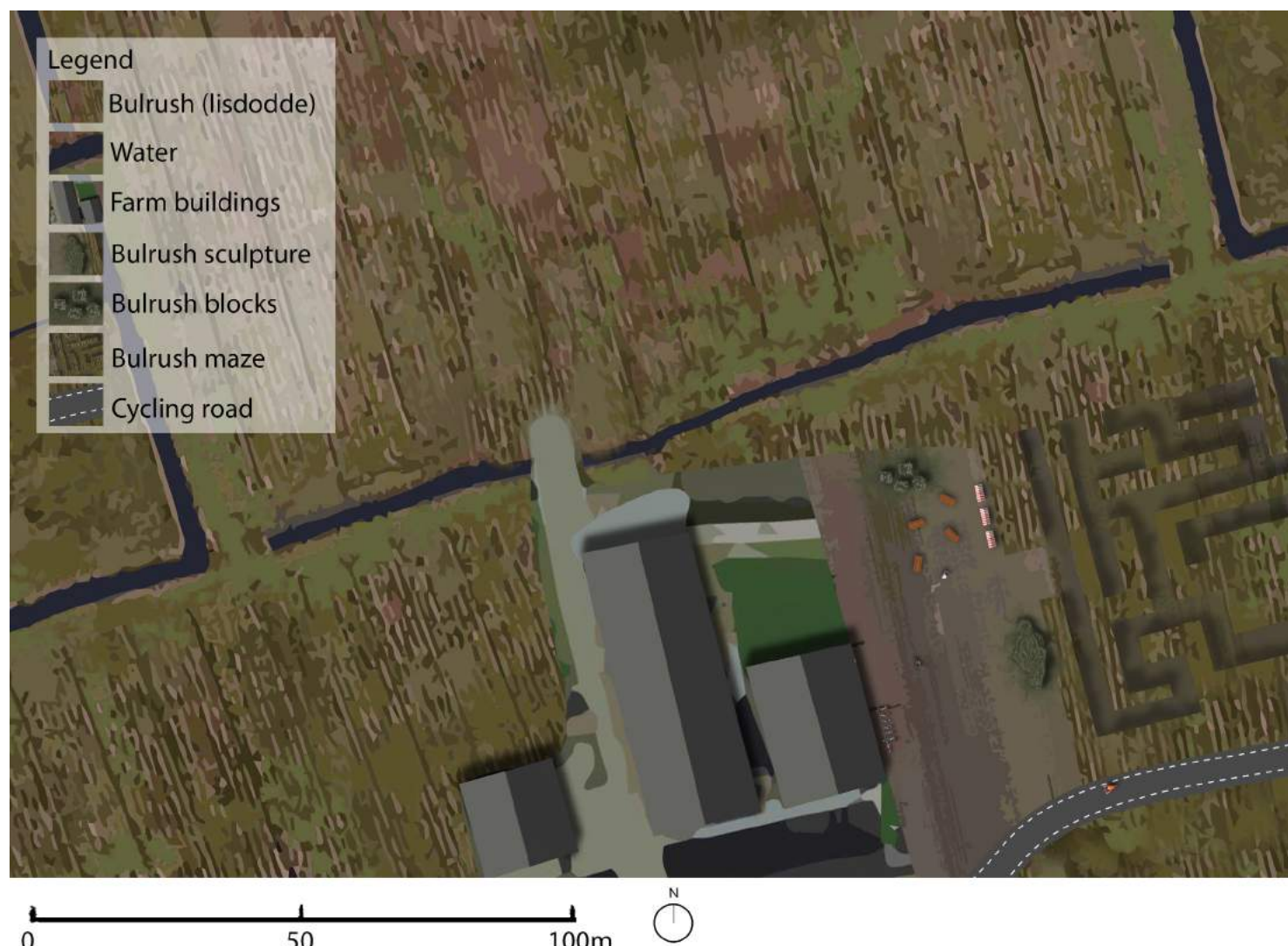


Figure 25: Zoom in on the Bulrush farm and fields



Figure 28: Impression of the observation tower (by day)



Figure 29: Impression of the observation tower (by night)

route 'De 8 van Grou'. When following the cycling path you experience the calmness of the Hegewarren. There are several benches and picnic tables where you can have a rest. The daily recreation possibilities here give the surrounding area the change to diffuse over the Alde Feanen, Aldeboarne-De Deelen and the Hegewarren. The survey and interviews showed that extra places to rest are wanted in the area (S. Dupon, personal communication, June 20, 2023). These places are not close to each other to make sure people could still experience the calmness of the Hegewarren. At the north of the cycling path the quietness of the Hegewarren can also be experienced. You can park your bicycle and have a walk on several walking paths. At the wet area the walking paths are constructed with decks. These decks are always above the water to give water and soil space in this landscape. This area has multiple different rounds you can walk; some are small and some larger. There is a

possibility to walk to the water in the north and look at the Alde Feanen but also walk to one of the two birdwatching cabins or large observation tower (see impressions in Figures 28 and 29 and section in Figure 30). These cabins and tower came out of our survey and interviews as a preference (Municipality Smallerland, personal communication, June 22, 2023). It gives the Hegewarren multiple points where nature, quietness and calmness can be experienced. To stimulate the ecology in the area some small parts of this area are impassible during breeding season. This could help to increase biodiversity. The Hegewarren could also have an advantage of the Alde Feanen because its biodiversity is larger. A better connection of these areas could probably strengthen flora and fauna.

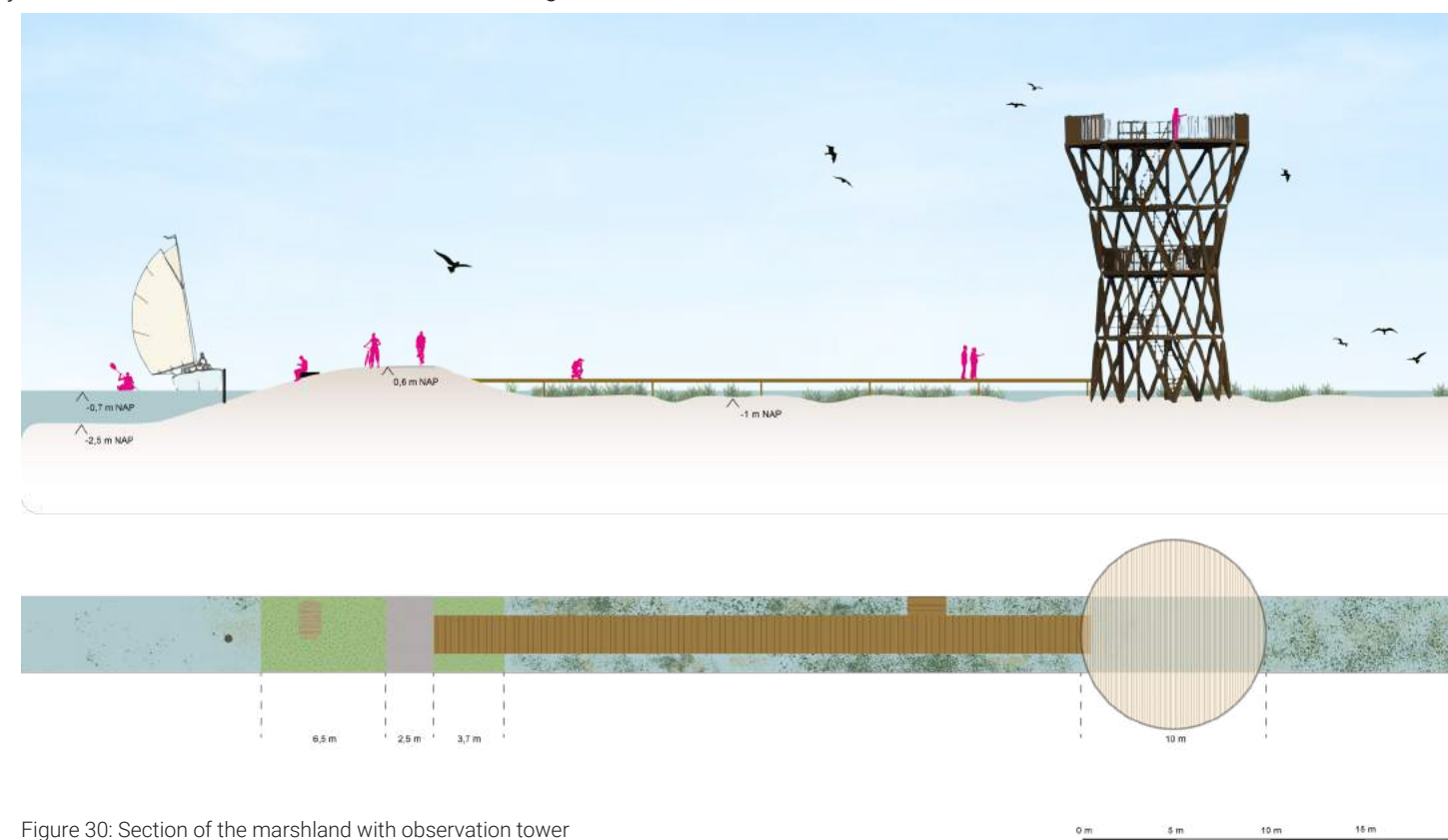


Figure 30: Section of the marshland with observation tower

Masterplan

After walking around, you jump on your bicycle again and pass a fixed bridge. The next bridge can be opened. This choice is made to make sure there is as little congestion as possible for cyclists but also to give the sailing school and other small recreational boats the possibility to sail in this area (A. Zijlstra, personal communication, June 20, 2023; C. Zandstra, personal communication, June 21, 2023). Bridges, and not ferries, are implemented because destination traffic still has the possibility to reach the west side of the Hegewarren. Electric boats are allowed in this area because quietness and calmness are preserved. At the north there are ten tiny houses in the area (see impression in Figure 34). The houses are on the water or on stilts which helps to give water enough space. All houses are built for two persons with enough space between them to avoid groups and families. In this way you can experience the quietness, calmness and darkness of the area. Also the houses are spread over the whole area which helps to experience darkness of the area (see Figure 31 and 33). The surrounding area already has several parks with recreational

homes of which the concept is very different from this one. At this island there are several day-time berths. With these berths more daily recreation is possible because the Hegewarren is easy accessible by boat. Also people from the surroundings can sail rounds on the water and have an extra possibility to stop. These berths are wanted by people from the surrounding area which are using the Hegewarren for daily recreation.



Figure 32: Location of zoom-in and section of the reedland



Figure 34: Impression of the reedland with cabins

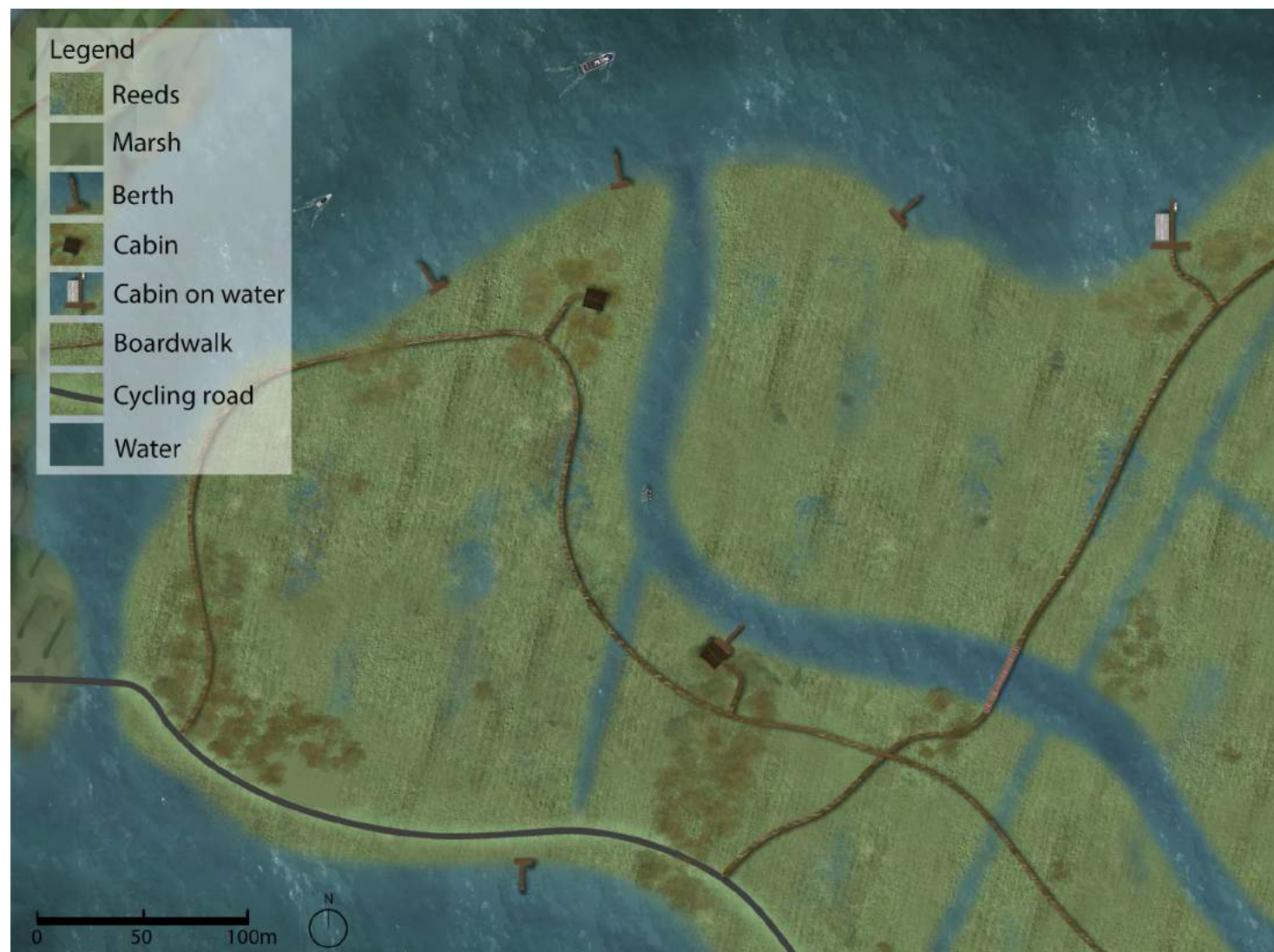


Figure 31: Zoom in of the island with reed and cabins

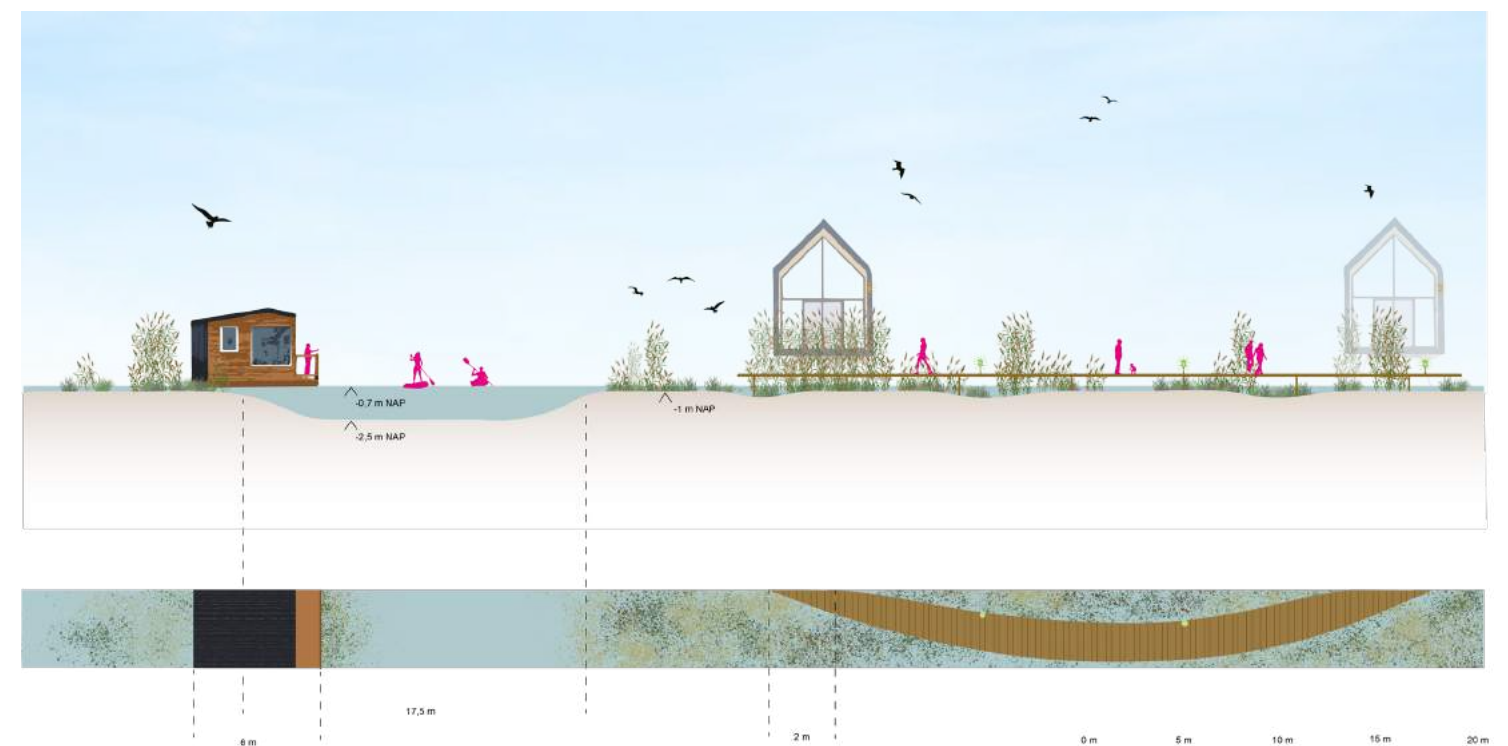


Figure 33: Section of the reedland with cabins

Masterplan

When you cycle over the next bridge you arrive at the next island which is more focused on recreation (see Figure 35). The camping is a nature camping with no fixed places, where sheep are grazing around. Only 50 people are allowed on the camping with small tents, a maximum of 5 persons, to limit the camping places. There is chosen for five person tents to give families also the possibilities to have a stay at the Hegewarren and experience quietness, calmness and darkness. The camping has a basic bathroom facility and there is no electricity. The camping is open from June till mid-September to limit the people on the island during breeding season. From this island you can also take the ferry 'Grietman' which brings you to Veenhoop (see impression in Figure 39). This ferry goes from 9:00 till sunset from the 1st of April till the 1st of November and on Saturdays and Sundays from 11:00 – 16:00 in March and November. The decision is made to extend the opening times so people from the surrounding area can experience the Hegewarren during more seasons.



Figure 36: Location of zoom-in and section of beach and camping



Figure 38: Impression of the beach



Figure 39: Impression of the (ferry) connection to Veenhoop



Figure 35: Zoom in of the island with the beach and camping

Near the camping there is a small beach where people from the surrounding villages as Veenhoop, Earnewâld and Grou can also recreate (see section in Figure 37 and impression in Figure 38). Next to this beach is a small day-time restaurant, which is open from 11:00 – 18:00 during summer. Here you can rent an umbrella or have a drink with some finger food. From the beach you can experience the wide view and the calmness of the area. The walking paths are made of shells.



Figure 37: Section of the beach

Masterplan

From the beach you can use a pull ferry which brings you to the other island where an information centre is located (see impression in Figure 42). A pull ferry is something various people liked in our survey and interviews because it creates a real experience point (C. Zandstra, personal communication, June 21, 2023). A deck walking path leads you to the information centre. The location of the information centre is based on the position of the Hegewarren, between the Alde Feanen and the Aldeboarn-De Deelen. The information centre in the Alde Feanen will disappear. An information centre shows the connection of the Hegewarren with the surrounding area, the transformation of the Hegewarren and the biodiversity in the area. From this information centre several activities are organised such as a silent walk, a boat tour on an electric boat, a bird watching tour and backpack hikes for kids. This island has four tiny houses where you can experience the quietness and darkness of the Hegewarren (see Figure 40).



Figure 41: Location of zoom-in of the nature island



Figure 42: Impression of the camping with the ferry to the nature island

From the information centre you can cycle to Hotel le-Sicht where you can have lunch or dinner. Hotel le-Sicht has a small extension (P. Bakker, personal communication, June 21, 2023). Their all-inclusive concept, more focused on elderly guests, still exists. Close to Hotel le-Sicht you find some houses which already exist. In 'Open en Natuurlijk' these houses are still present, therefore also in this masterplan. At Hotel le-Sicht there are also some parking spots. More parking spots have been created because it is already focused on overnight stays. Another advantage is that the parking spots are not very visible because of the trees surrounding them. The parking spots are exclusively for camping and hotel guests and people sleeping in tiny houses, to prevent large scale tourism. The harbour at Veenhoop is extended with 30 places. The daily recreation is expected to increase, but the harbour is not full at this moment (C. Zandstra, personal communication, June 21, 2023). Therefore a large extension does not make sense and is also not in line with preserving the core values.



Figure 40: Zoom in of the nature island

Masterplan

Connection to regional routes

In this plan the Hegewarren is a recreational area for the direct surroundings. Several rounds are formed to experience the area. In Figure 43 the different rounds are showed. There are sailing routes, cycling routes and different walking routes. With this the connection with the surrounding area is also made. With this approach the calmness, quietness and darkness in the Hegewarren could be preserved.

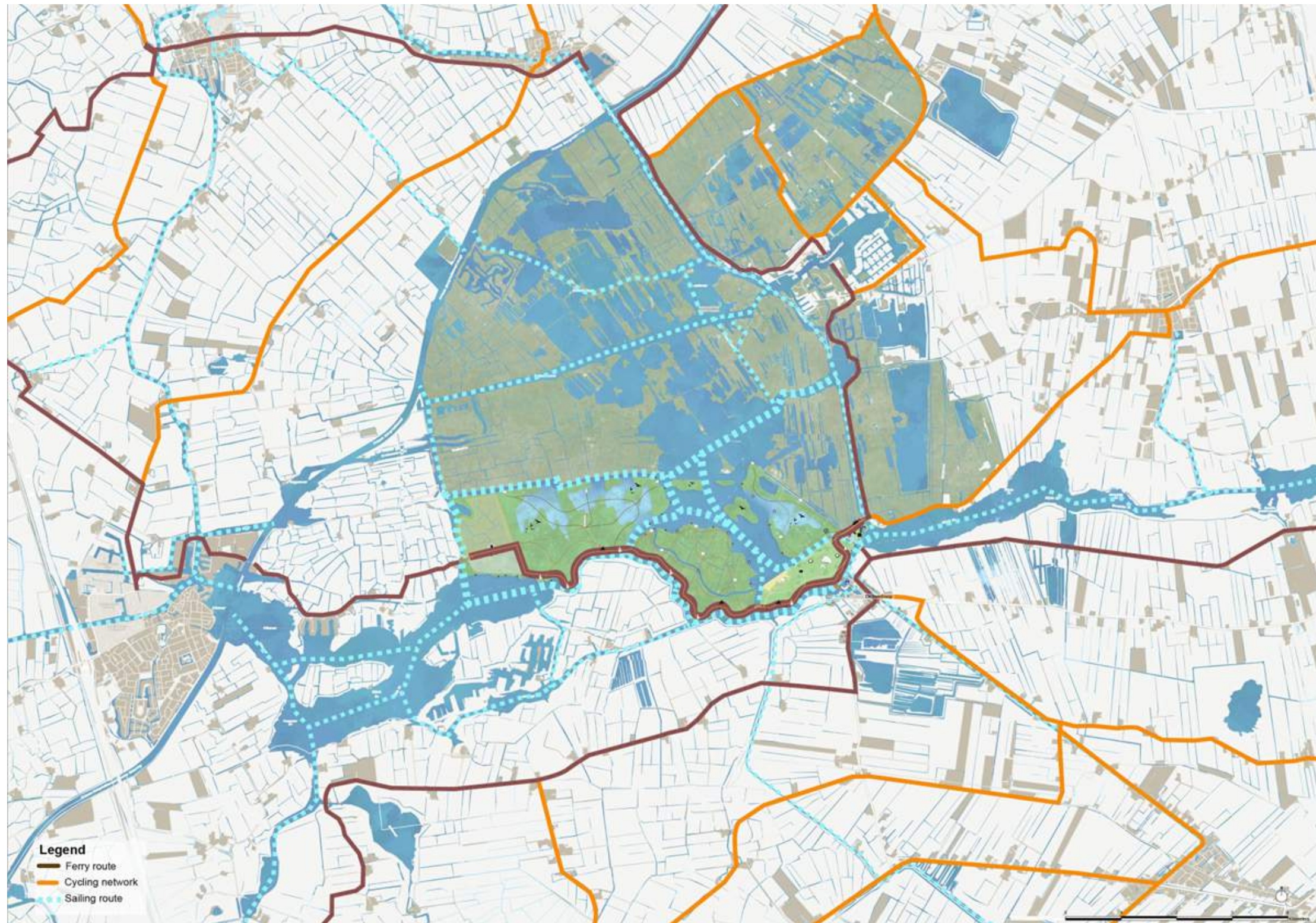


Figure 43: Regional map of the routes

Phasing

To aid in the realisation of the plan an underlying phasing plan has been set up (see Figure 44 for the timeline). Three phases have been identified, with different goals and implementations. The first phase "Preparation" focuses on the possible expansions and implementations that can be realised before the raising of the surface water level. As this can only be realised after the gas exploitation in the centre of the area has withdrawn from the Hegewarren. This phase consists of preparatory work such as acquiring plots of land, infrastructural changes and clearing redundant buildings. The second phase "Realisation of Recreation" is the most impactful phase, in which the project area is changed drastically by the water level increase. Parts of the area are flooded, while others are raised. As the focus is on recreation; accommodation, walking paths and the accompanying facilities are constructed. From

this point onwards large parts of the area are transformed into a marshland, and nature develops naturally. This creates a connection to both natural areas the Alde Feanen and the Aldeboarn-De Deelen. The third phase "Exploitation" focuses on the operationalisation of the implementations, in which the functions of the area start to flourish. Together with this operationalisation a management strategy has been set up for the Hegewarren, which is discussed in the next part.

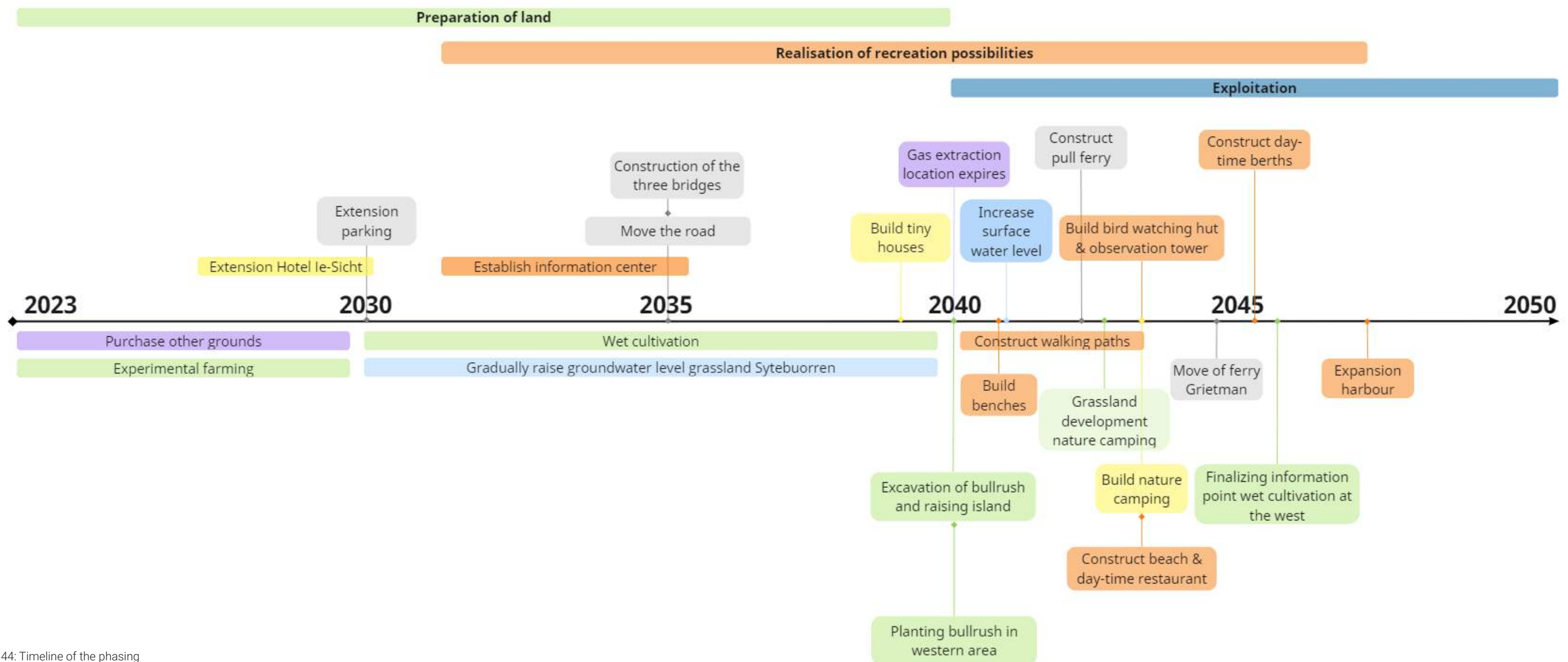


Figure 44: Timeline of the phasing

Phasing



Figure 45: Phasing map of 2023

2023 - 2040

In Figure 45 the situation in 2023 is illustrated. A large part of the land in the Hegewarren has been bought by the government, from 2023 onwards the remaining grounds are bought. Experimental farming with cows remains in the area until 2030 and the gas company has a contract to extract gas until 2040. Regardless, preparation of the land can commence. The first bits of bulrush is planted, this raises the

land and extracts nitrogen and other nutrients from the ground, which essentially cleanses the land. From 2030 onwards the groundwater is raised gradually until 2040.



Figure 46: Phasing map of 2040

2040 - 2045

In Figure 46 the situation in 2040 is illustrated. The first parts of construction have started. The road has moved to the dyke on the southside of the Hegewarren. From there several walking routes are already in place and the information centre is built. Along the created routes several tiny houses are built. Further, bulrush is added to the areas that will be flooded. Before excavation of the land can take place, this area needs

to be cleansed of excessive nitrogen and other nutrients. After several years this land can be excavated to lower the ground level in this area. The excavated ground is used to raise the island at the south-east of the area.



Figure 47: Phasing map of 2045

2045 - 2050

In Figure 47 the situation in 2045 is illustrated. With the expiration of the gas extraction contract in 2040, the area can start to look as intended in the masterplan. On the west side of the island bulrush cultivation now takes place. The surface water level is raised and areas of the Hegewarren have flooded. The grassland for the camping is developed and the camping is now open to visitors. The beach and restaurant

are also built. More of the walking routes and tiny houses are constructed. With the raised groundwater level, the marsh areas are taking shape. The ferry 'De Grietman' has moved to its new location.



Figure 48: Phasing map of 2050

2050

In Figure 48 the situation in 2050 is illustrated. As construction of the area is now finished, the exploitation stage commences. The final walking routes are constructed and people can enjoy recreation in the area for several years now, and they continue to do so for many years to come.

Elaboration

Management strategy

Due to the diverse functions and implementations that are involved in the masterplan, a number of stakeholders have been selected as managing organisations. Table 5 shows the division. The smaller scale implementations are mostly managed by the Municipality Smallingerland. Instead, larger implementations are managed by the Province of Fryslân. This decision is made as the larger scale implementations have a more regional purpose, which is in line with provincial policies. Natural areas and nature-related implementations like bird watching huts are managed by It Fryske Gea, who are responsible for the management of most natural areas in Fryslân. The management of wet cultivation consists of a public-private collaboration of the Province of Fryslân, the Wetterskip and farmer, in which compensation, desired water levels and exhibition purposes are clearly defined. The moveable bridge is managed by the Province of Fryslân, while the fixed bridges are managed by the Municipality Smallingerland. With this management strategy the tasks are divided which creates a joint responsibility in the area.

What	Management by
Wet cultivation	Province of Fryslân & Wetterskip
Raise groundwater level	Wetterskip Fryslân
Roads and paths	Municipality Smallingerland
Management nature areas	It Frykse Gea
Nature camping & small restaurant	Private owner
Management Beach	Municipality Smallingerland
Information centre	Province of Fryslân
Bird watching huts	It Fryske Gea
Observation tower	Province of Fryslân
Tiny houses	Private owner
Bridges	Province of Fryslân & Municipality Smallingerland
Experience points (benches, picnic tables, berths)	Municipality Smallingerland

Table 5: Overview of what is managed by whom

Policy embedding

For the feasibility of the masterplan it is important to look at current policies, and how the masterplan fits into policy goals on local, provincial and national level. Relevant policy goals for the Hegewarren are categorized in four different categories: soil and water, recreation, nature/agriculture, and challenges. (Figure 49) In terms of soil and water, the masterplan contributes to a healthy soil, water quality and air (Gemeente Smallingerland, 2020). By increasing the water level to 30 cm above ground level, a reduction of subsidence and decrease in greenhouse gas emissions is realized (Veenweideprogramma, 2021). This is not directly in line with the goal of a water level of 20-40 below surface level, but it is still a good level to contribute to the policy goals. The goal to combat subsidence is achieved because the swamp is growing instead of shrinking and emission is reduced (Ministerie van Infrastructuur en Waterstaat, 2022). In this way, the Hegewarren contributes to the national programme for rural areas, in which Friesland (45%) takes an important role to reduce national emissions account (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2022-a).

Since the masterplan is heavily focussed on recreational interventions, it contributes to all local and provincial policy goals related to recreation. The recreational value is strengthened by new sailing and walking networks, water recreation and accommodations (Beleidsnota Gastvrij Fryslân, 2020). This does not only lead to a more diverse variety in day recreation, but also creates opportunities for futureproof jobs. The accessibility of the Hegewarren remains limited to preserve the core values.

The transition of the Hegewarren contributes to an increase in biodiversity through newly developed nature areas and a better connection with surrounding nature areas (Gemeente Smallingerland, 2020). Due to the uncertainty of management of blue grassland this is not actively preserved, which limits management costs. Through experiments with wet cultivation, a sustainable alternative for agriculture is maintained in the Hegewarren (Beleidsnota Gastvrij Fryslân, 2020).

Finally, the plan contributes to the challenge of limiting the costs for water management because the water level is increased to surface water level (Gemeente Smallingerland, 2020). The masterplan is in line with remaining relevant policy goals from the local and national level. No extra (large) roads are added, and a broad perspective is taken into account (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2022-b). The management plan shows the collaboration of multiple actors. Circularity is shown through the use of dredged soil to elevate other areas. The challenge of a new waterway from Drachten is out of the scope of this project.

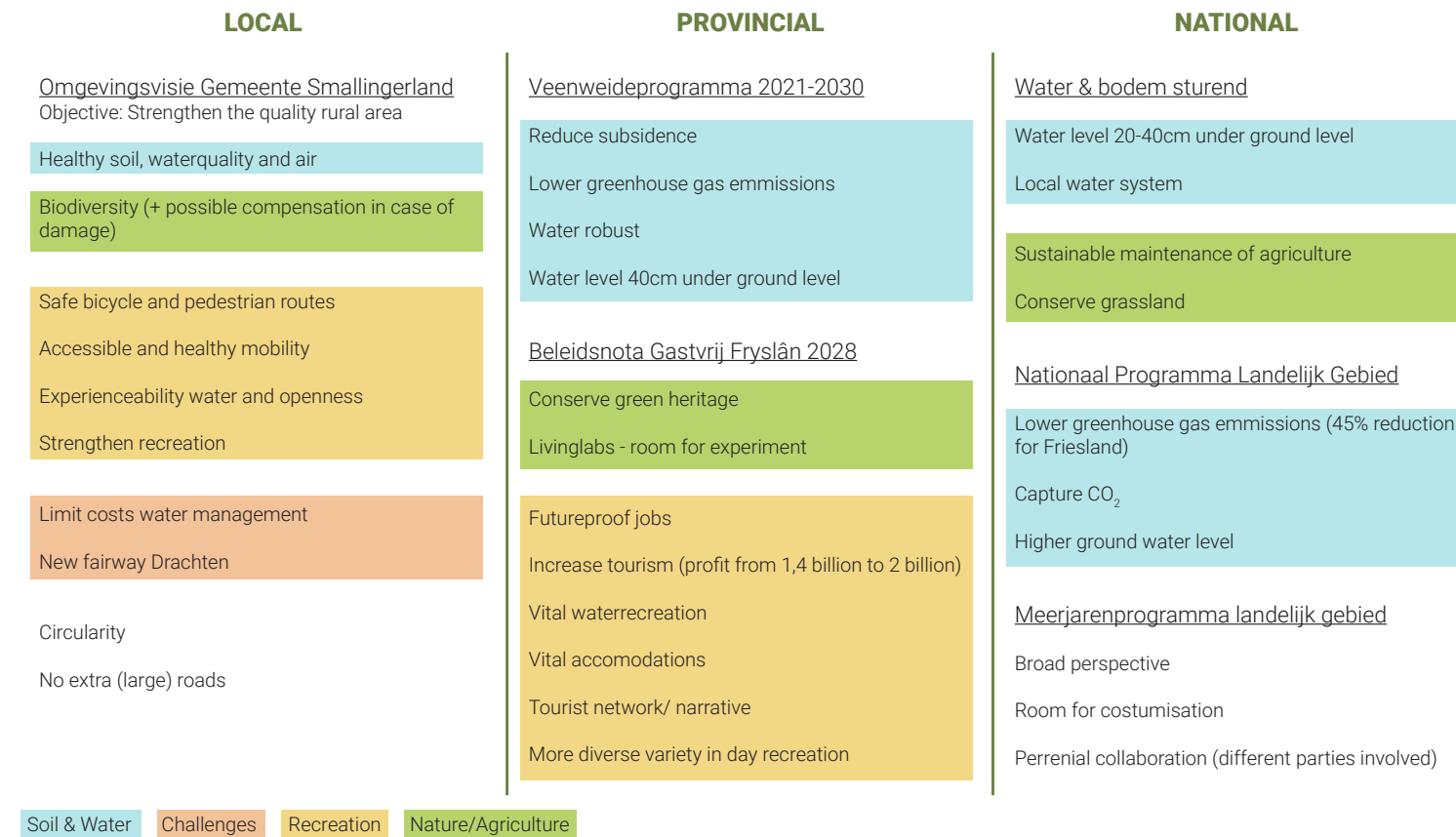


Figure 49: Overview of different policies

Social Cost-Benefit Analysis

Social Cost-Benefit Analysis for Nature

Table 6 and 7 show an overview of the effects of the various implementations on the natural and physical environment. The total analysis can be found in Table 8 (appendix 2). Through the connection to the larger nature network in the Netherlands, it shows an increase in biodiversity and reduction of the overall risk of desiccation in the surrounding area. Furthermore, the Hegewarren itself has drastically lower costs for water management, as the water level is not artificially lowered throughout the year. This increase in water level causes a direct decrease in the emission of greenhouse gases from the peat soils due to oxidation, as well as creating an opportunity for swampland vegetation. This swampland vegetation is further explored through the creation of commercial bulrush fields that focus on the production of this sustainable crop. Bulrush has further positive effects on the area through effectively capturing CO₂ and phosphorus in its biomass, which can be used for construction purposes. Although a lot of the current area has to change in the future, the positive effects caused by the proposed implementations outweigh the negatives. From the surveys and interviews, it is expected that the Pro-Memoria benefits for nature have a high environmental capacity. Nature is highly appreciated.

Direct positive effects	Indirect positive effects
<ul style="list-style-type: none"> Yearly bulrush harvest Increased biodiversity Negate oxidation through reduction of subsidence Regional connection to NNN Decrease in costs for water management Reduction of desiccation for neighbouring natural areas Temporary bulrush fields No more gas exploitation 	<ul style="list-style-type: none"> Wet cultivation exhibit CO₂ storage Nitrogen & phosphorus storage Water purification and retention Employment for bulrush management Enhance socio-ecological alliances Increase (mental) health

Table 6: Overview positive effects for nature

Direct negative effects	Indirect negative effects
<ul style="list-style-type: none"> Transformation to wet cultivation costs Methane emission from bulrush Less agricultural land Management costs of natural areas Decrease in habitat size Disappearing of Blue grassland Plan-related preparation costs of land Purchase of remaining plots Plant bulrush fields 	<ul style="list-style-type: none"> Loss of cultural heritage through changed landscape

Table 7: Overview negative effects for nature

Social Cost-Benefit Analysis for Recreation

In Table 9 (in)direct positive effects and in Table 10 (in)direct negative effects are shown. The total analysis can be found in Table 11 (appendix 2). To improve recreational possibilities

Social Cost-Benefit Analysis for Nature

Costs	
Methane emission from bulrush	P.M.
Less agricultural land	P.M.
Management costs of natural areas	€114.095,50 per year
Decrease in habitat size	P.M.
Disappearing of Blue grassland	P.M.
Plan-related preparation costs of land	P.M.
Purchase of remaining plots	€8.635.000
Plant bulrush fields	€182.000
Loss of cultural heritage through changed landscape	P.M.
Harvesting costs of bulrush (yearly)	€15.600
Planting bulrush across larger temporary area	€10.850.000 over 10 years' time
Harvesting costs Bulrush across larger temporary area (yearly)	€930.000 over 10 years' time
Benefits	
Yearly bulrush harvest	€ 327.600 per year
Yearly bulrush harvest temporary larger plot	€ 19.530.000.0 over 10 years' time
Decrease in water management costs	€307.812 per year
Negate oxidation through reduction of subsidence	P.M.
Stop in gas exploitation	P.M.
Increased biodiversity	P.M.
Regional connection to NNN	P.M.
Reduction of desiccation for neighbouring natural areas	P.M.
Nitrogen & phosphorus storage	P.M.
Water retention, storage and purification	€20.800
Compensation for CO ₂ storage in bulrush	€45.500 yearly
Increase (mental) health	P.M.
Employment for bulrush management	P.M.
Enhance socio-ecological alliances	P.M.
Wet cultivation exhibit	P.M.

Table 8: Overview of costs and benefits for nature

many investments are made. For daily recreation berths, a beach, a small restaurant and information centre are built. These implementations have a lot of positive effects on the Hegewarren; both direct as well as indirect. More tourists visit the Hegewarren, there is financial profit of the information

centre, harbour and restaurant, and also the employment increases. Interventions to experience the quietness, calmness and darkness are implemented. Investments are made in the implementation of several benches and picnic tables, bird watching huts, an observation tower and different walking paths. This causes an increase in the amount of tourists in the Hegewarren, which helps decreasing the pressure on the Alde Feanen. The mobility in the Hegewarren is also invested in through the construction of several bridges, a pull ferry and a wide cycling path. This gives the Hegewarren more walking paths and the possibility for the surrounding area to experience the Hegewarren. The investments in small scale forms of accommodation simultaneously benefit the area. One of the main positive effects of this plan is that quietness, calmness and darkness can be experienced in a strengthened way. This mainly has to do with the fact that the environmental capacity for this plan is large due to the core values of the area being preserved. From the surveys and interviews, it is expected that the Pro-Memoria benefits for recreation have a high environmental capacity. Daily recreation is highly appreciated.

Direct positive effects	Indirect positive effects
<ul style="list-style-type: none"> More profit of tourists on the Hegewarren Profit entree fee information centre Profit tiny houses Profit nature camping Profit day-time small restaurant Profit hotel le-Sicht Profit fee ferries Profit expansion harbour 	<ul style="list-style-type: none"> Enhanced experience on cycling path More walking rounds More sailing rounds Employment Experience quietness, calmness and darkness Increase tourism Hegewarren Experience of Hegewarren by surrounding area More water to sail for electric boats, rowing, sups and sailing boats Decrease tourism pressure of the Alde Feanen Expected a large environmental capacity

Table 9: Overview positive effects for recreation

Direct negative effects	Indirect negative effects
<ul style="list-style-type: none"> Construction cycling & walking paths Construction berths Build information centre Build tiny houses Build nature camping Build day-time small restaurant Construction bird watching hut & observation tower Bridges & Pull ferry Expansion hotel le-Sicht & parking place Benches & picnic tables Construction beach Expansion harbour Sensor animal-friendly lightening at the camping and tiny houses 	<ul style="list-style-type: none"> (Possible) pollution of nature by tourists

Table 10: Overview negative effects for recreation

Social Cost-Benefit Analysis for Nature

Costs	
Construction cycling path	€3.226.500
Construction berths	€252.960
Build information centre	€485.000
Build tiny houses	€942.500
Build nature camping	€307.500
Build day-time small restaurant	€179.100
Construction bird watching hut	€45.000 - €60.000
Construction observation tower	Unknown
Bridges	€480.000
Pull ferry	€12.000
Construction walking paths	€1.086.000
Benches and picnic tables	€1.480
Construction beach	€31.359
Expansion harbour	€22.115
Expansion parking place	€6.250
Sensor animal-friendly lightening at the camping and tiny houses	€1.499,80
(Possible) pollution of nature by tourists	P.M.
Benefits	
More tourists on the Hegewarren	P.M.
Profit entree fee information centre	€28.350 - €37.350
Profit tiny houses	€360.620
Profit nature camping	€64.124
Profit day-time small restaurant	€121.800
Profit fee ferries	€94.500
Profit expansion harbour	€30.000-€75.000
Enhanced experience on cycling path	P.M.
More walking rounds	P.M.
More sailing rounds	P.M.
Employment	P.M.
Experience quietness, calmness and darkness	P.M.
Increase tourism Hegewarren	P.M.
Experience of Hegewarren by surrounding area	P.M.
More water to sail for electric boats, rowing, sups and sailing boats	P.M.
Decrease tourism pressure of the Alde Feanen	P.M.

Table 11: Overview of costs and benefits for recreation

Discussion

The Hegewarren is a complex case where transdisciplinarity is taken into account as much as possible. In this project the socio-ecological alliances are highlighted and environmental capacity is addressed. However, due to its complexity not all data was available or could be considered. In this discussion the limitations are addressed, followed by some recommendations for the continuation of this project.

Recreation

The future of recreation is uncertain. As this masterplan is for 2050 it would have been nice if recreational trends that are expected are researched and taken into account in this plan. However, due to time but also unknown factors in 2050, especially for Friesland, future recreational trends are not taken into account. For example, the expected forms of recreational accommodations and daily activities would have been nice to incorporate. Another point which is under lighted is testing the plan to the different age categories in the area. An analysis has been done on the regional demography and the plan is made for couples but it is not tested for others.

Nature

The uncertainty of nature in 2050 and several other aspects, such as development of peat and diffusion of flora and fauna, are a limitation for this project. The natural policy is currently changing and its development towards 2050 is uncertain. The development of bulrush is uncertain because it is still in an experimental stage. This has impact on the plan because the outcomes of wet cultivation can differ (Innovatie Programma Veen, 2022; Bestman et al., 2019). The reason why blue grassland is present in the Hegewarren is unclear. Therefore its development is also considered unpredictable. It is expected that the blue grassland cannot be preserved, due to its sensitive nature. These limitations are stimulated by that fact that the project team was unable to meet with 'It Fryske Gea' and 'National Park the Alde Feanen'. Employees from these organisation are approached by mail and phone but the question to have a conversation is not answered. The story about the connection with the Alde Feanen and the Aldeboarn-De Deelen could have been improved by information of these nature organisations.

Socio-economics

An essential contribution in this project would have been key figures ('kentallen'). The social-cost benefit analysis is not based on up to date key figures, but on several different sources. These sources could be discussed. For example the costs of benches can differ. However, the sources are named so it can be validated. There are also many things uncertain for 2050. It could be that there comes a compensation for CO₂ or nitrogen, which would be very good for the Hegewarren while much bulrush is implemented to decrease the CO₂ and nitrogen in the soil.

Phasing

The phasing is currently based on a number of key moments that align with the starting points for the different phases. The most important is the halt in gas exploitation in the centre of the area, which is set to 2040. If the attitude towards gas extraction changes towards this date, this cease in production can occur sooner. This would result in an opportunity to shift the phases towards an earlier date, as it depends on the gas extraction site. The surface water level would be raised earlier, which expedites the process. This opportunity would still depend on the acquisition of the remaining plots, but would result in more natural development towards 2050.

Environmental capacity

In this research insight is gained in environmental capacity by conducting two surveys and several interviews. The first survey was answered by 37 people which is a significant number for the region. Therefore it could be said the environmental capacity for daily recreation is large. The second survey shows that environmental capacity for more visible recreation was also present. However, environmental capacity for overnight stays is uncertain. The significance of the second survey is less because it was answered by 17 people. By keeping the accommodations small scale the environmental capacity is expected to be much larger. With this masterplan there is tried to incorporate all the wishes and keep the area quiet, calm and dark. This could increase the environmental capacity.

Transdisciplinary

A limitation for the whole masterplan is that it is uncertain how policy develops. Is there a specific compensation for CO₂? Are there limitations for recreational possibilities? Is the nature in Friesland protected in the future and is even constructing a decking path not allowed? Looking into the future is always hard. There is tried to incorporate this in the plan but there is still uncertainty in some aspects.

Recommendations

- **Connection with surrounding nature areas:** As became clear from the interview with the sailing school there are several developments in the surrounding area. It is of high value to connect the future Hegewarren to the Alde Feanen and Aldeboarne-De Deelen on a natural and recreational level. Because the Hegewarren is situated in the middle of this larger region, the connection is crucial for the regional cohesion. It would be interesting if the Hegewarren is incorporated in the plans of the Alde Feanen and Aldeboarne-De Deelen.
- **Environmental capacities for pro memoria:** By using a survey, an attempt is made to understand the environmental capacity for several implementations. With the outcomes of the survey, it is clear that there is much environmental capacity for daily recreation and less capacity for accommodation. This masterplan tries to incorporate the wishes but also create more vital recreation on the water as well as on land. With this a connection to the larger region-based tourist network is formed. To clarify the environmental capacity specific for this plan a new survey is advised, together with a brainstorm evening. During this project it became clear that the stakeholders want to give input. A lot of benefits (and also some costs) are placed under pro memoria. When it is clear how many people are in favour of a specific implementation, it helps to measure the environmental capacity. With this in mind, the importance of the pro memoria will also be easier to explain.
- **Social cost-benefit analysis:** The social cost-benefit analysis is made as complete as possible. However, it would be good to let a specialist work on this. A good social cost-benefit analysis helps in explaining your plan but also create more environmental capacity.
- **Transdisciplinarity:** This plan is made transdisciplinary by enhancing socio-ecological alliances where multiple disciplines are taken into account. Due to the complexity in the area, it is advised to reflect on the interactions of different disciplines. It is important to make clear what the additional value is of these implementations for the surrounding area. This increases the environmental capacity and also the value of the plan.

Conclusion

The masterplan is created by looking at all relevant disciplines: suitable recreation options, natural values, social-economic feasibility and environmental capacity.

The recreational options that are suitable for the Hegewarren are focused on small scale and mainly daily recreation. There is not only more environmental capacity for this, it is also the way to keep the area quiet, calm and dark. In the surrounding area, the variety of daily recreation options is limited. By creating more walking paths, a beach and several sailing routes, more daily recreation is possible and also easy accessible for the surrounded area.

Within this plan the nature of the Hegewarren is connected with the surrounding area which leads to increased biodiversity. The challenge is to integrate nature with recreation which enhances socio-ecological alliances. By giving nature enough space and making some places inaccessible during breeding season, there is more focus on natural development. By also creating several experience points such as bird watching huts, an observation tower, information centre and some benches and picnic tables, the socio-ecological alliances are stimulated.

In the social cost-benefit analysis it became clear that the plan brings many non-monetary benefits on a natural and recreational level. The area gets a large impulse through the implementation of this plan. This is an advantage for the surrounding areas because the pressure on these areas can decrease.

The core values of the Hegewarren are mentioned by many relevant stakeholders, and are therefore important to preserve to ensure sufficient environmental capacity. It is clear that there is much environmental capacity for daily recreation. However, overnight stays are less popular in the area. By making the accommodations small scale and contained within the core values 'quiet, calm and dark', sufficient environmental capacity is expected.

When creating this masterplan the core values 'quietness, calmness and darkness' were always at the centre. The goal was to combine these values with a proper recreational plan, while at the same time respecting the natural values. When looking at the main question 'What will the Hegewarren area, based on the vision 'Open en Natuurlijk', look like in 2050 while focussing on the combination of recreation and nature?', it could be said that the Hegewarren is an area with an open view where people can experience quietness, calmness and darkness. At the Hegewarren nature and recreation are intertwined and socio-ecological alliances are enhanced.



Figure 49: Photograph of the Hegewarren

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Appendix 1

Physical implementations and their effect

Measure	Details	Effect Hegewarren	Effect surroundings	Reasoning
Nature camping	50 people allowed on free places, small bathroom area, reception at the small restaurant at the beach. On the camping grounds sheep can walk around. Only tents are allowed. The camping is open from May until mid-September.	The camping gives the Hegewarren an extra place to stay and enjoy the quietness, calmness and darkness of the island.	This camping give people a good option who really want to have a calm and quiet place. It is a place where you go back to basics and experience nature. In the surroundings are mainly holiday parks and campings with regulated spots.	The quietness, calmness and darkness have to be preserved. To experience this island a nature camping brings most in this situation. Recreational homes are enough in the surrounding area but there is only one nature camping.
Beach at the west of nature camping	The beach is placed at the north of the east-island. It does not lay in the wind and it has quiet but clean water (because the water is big enough).	The Hegewarren gets an extra recreational option, namely swimming and sunbathing.	The Veenhoop, Grou and Earnewâld get a place to swim and relax while enjoying nature. There are not many places for swimming and sunbathing in the surrounding areas.	This place is on the recreational island, close to the camping and also relatively close to Veenhoop. The wind is mainly not directed towards this location, which creates nice condition for the beach.
Day-time small restaurant (11:00 – 18:00)	Place for 40 persons inside and outside on the beach is also a place for takeaway. You can rent a sun umbrella, have a drink and some finger food.	The Hegewarren gets an extra place to have a drink. By having it on small scale and only during day-time the area remains quiet and dark.	The surrounding area has an extra place to go for a day trip. It also creates an extra spot along the ferry cycling route.	The place has to be different from Hotel le-Sicht. By having this concept, difference is guaranteed and for larger meals such as lunch and dinner people can go to le-sicht.
Sensor animal-friendly lightening at the camping and tiny houses.	There are placed 20 lights at the nature camping.	The Hegewarren keeps its darkness.	It has not much effect on the surrounding area.	It is important to preserve the darkness and therefore there are no lights at the Hegewarren only at the camping.
Bulrush field at the west	The farmer at the west transforms to wet cultivation, in this case bulrush. There are some information points where you can read about the effect of bulrush, what it is, and what you can do with it. Examples are also placed in the landscape.	During the transformation the area which becomes water is full of bulrush. This helps to naturally clean the soil and ensure good water quality. The bulrush field with some information shows how the Hegewarren is transformed.	This land can stimulate farmers of the surrounded area to (partly) transform to wet cultivation. The Hegewarren can be seen as a living lab.	Bulrush can take up to 500 kilograms nitrogen and 80 kilograms phosphorus per hectare. Besides, it can improve water quality.

Paved cycling path	Width of 2,5 meter. This is broad enough to cycle next to each other, to pass and for a car to ride on.	The houses and farm at the west of the area is still accessible by car. By having a more winding road the path gives more experience for the people.	The ferry route is very important in the area and therefore the route has to be easy to cycle.	Showed in the survey a paved cycling path has the preference in the area.
Deck & shells walking paths	The decks are placed in the wet area and can move with the water level. The shell paths are in the area where it is drier. These paths are still very save to walk on when it is raining.	It brings walking routes in the area to enjoy nature more.	The Hegewarren becomes a place to go for a daytrip. By having several routes it brings several possibilities to have a walk and takes recreational pressure away from surrounding areas.	Having rounds to walk is important for enjoyment of nature.
Birdwatching cabin	Three cabins in total: one at the east and two at different places on the bigger island at the west	There are several points where you can see birds and become aware of the ecological values. These places are popular rest spots for people.	People can see that the Hegewarren has an ecological value in the area. It can get a wanted place to visit.	People want places where they can get feeling with the area and nature.
Observation tower	One large observation tower of 13.5 meter.	It creates a special experience point in the Hegewarren.	The observation tower shows the large nature network of the area and the importance of the nature in the Hegewarren.	Several people and the survey show that an experience point is a good addition to the Hegewarren.
Tiny houses on the water & on stilts	13 tiny houses for two persons to limit the pressure on the area. The tiny houses are sustainable and self-sufficient.	The tiny houses give the Hegewarren a place for people to sleep some nights in a quiet area. The houses are only accessible by foot to keep the calmness in the area.	In the surrounding areas, several recreational housing parks are placed. Instead of a lot of houses, this gives people a place to get one with nature and be in a quiet and dark area.	By making the houses for two persons, groups are avoided as well as families.
Information centre	The centre is placed at the island at the right. It is placed there to get a connection with that island as well. The centre only has a ground floor.	An information centre helps recreationist to understand and experience the area.	This centre shows the ecology and recreation, but also nature in the surrounding areas. The information centre is placed in the Hegewarren to connect de Alde Feanen and the Aldeboarn-De Deelen	The current visitor centre in the Alde Feanen has been sold. As this can be major addition, it will be placed in the Hegewarren.
Day-time berths	There are 31 berths constructed. These won't be placed in the quiet areas in the north to keep this for birds and other fauna.	More daily recreation on the Hegewarren is possible because it is easy accessible by boat.	People of the surroundings that make a round on the water have an extra possibility to stop.	From the survey it became very clear that more daily recreation is wanted.

Appendix 1

Benches and picnic places next to cycling route and in the area	4 picnic tables and 6 benches	The Hegewarren is not only a place to cycle through but also to experience. By having some places next to cycling and walking routes people can have a rest here.	People can diffuse more in the areas which eases the existing places, mainly the Alde Feanen.	The survey but also several interviews showed that extra places to rest are wanted in the area.
Replacement ferry Grietman in the east	The 'Grietman' is replaced to the middle of the first island and goes to Veenhoop.	The Hegewarren can go to Veenhoop to have dinner or do go to the sailing school and rent a boat.	The Veenhoop get more people in their village because also the cycling route changes. The Veenhoop can also easily go to the Hegewarren to have a walk or go to the beach.	To increase the function of this ferry for the Veenhoop.
Preservation of Hotel le-Sicht	Hotel le-Sicht keeps their concept of all-in holidays with several activities included. Their guests are still around the age of 70.	The Hegewarren won't feel much effect of this because this is the current situation.	The surrounding won't feel much effect of this because this is the current situation.	Hotel le-Sicht told us that expansion is planned but very limited. This means that it does not have a major effect.
Bridges between the islands	There are placed three bridges between the islands. The first bridge can open automatically for the sailing school. The second bridge is a low bridge. This is chosen because only small scale boats are allowed in the area behind the bridges.	The bridges are needed for the destination traffic as well as for not creating congestion on the cycling path.	The sailing school gets an extra option for sailing. The area remains quiet because only sups, small sailing boats and quiet (small) motor boats can pass the bridges.	The bridges are needed for the destination traffic so cars can pass them as well. The cycling route is easy to cycle and won't have much congestions.
Pull ferry	The pull ferry goes from the nature camping to the information centre.	This increases the experience of the area.	It does not have effect on the surroundings.	The bridges cannot become pull ferry because congestion can get a problem, therefore the pull ferry is placed in this area.
Expansion of the harbour	The harbour is expanded with 30 places. It has 80 in total.	The Hegewarren is a place to stall your boat and have a day trip.	People in the surrounding areas can go to the Hegewarren for a daytrip.	The harbour is not full at this moment so a large expansion does not have function. However, the development of the area needs extra boat spaces for people going to the camping, beach or walking routes. However, not too many to keep the area quiet.

Parking spots at Hotel le-Sicht	There are constructed 25 extra parking spots at Hotel le-Sicht. The north side of the parking place can be extended. Trees are placed next to the road to guarantee the natural experience.	The parking spots are needed for the camping guests. By limiting the spots the area remains more quiet and calm because it is mainly for people who come by bicycle or boat.	By limiting the parking spots, mainly people from the close surrounding villages come to the Hegewarren. The people of the surrounding area are stimulated to come by bicycle or boat.	The wish is to limit the people coming to the area. By limiting the parking spots, the distance from where people come to the Hegewarren decreases because by bicycle and boat less distance is passed.
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Policy implementations and their effect

Measure	Details	Effect Hegewarren	Effect surroundings	Reasoning
Destination traffic	The destination traffic is needed to reach the houses and farm at the end of the island. However, the speed is limited to 30 km/h.	Destination traffic causes the amount of cars on the Hegewarren to be limited.	There is no change in the situation.	The area should remain quiet. When there is no possibility to travel by car over the island the quietness is easier to maintain.
Ferry in the east from 9 am till sunset	This is only for the Grietman because this ferry is connected with de Veenhoop and catering industry of the Hegewarren. Opening the Snoekcbears till this late won't have much effect on the island	Hotel le-Sicht and the beach can be used late. For example, People can have dinner at the restaurant of le-Sicht and go to the beach after work in the summer.	The Hegewarren is better accessible for the surroundings till late in the summer.	To stimulate daily recreation and limit overnight stays, it is useful to extend the ferry times. Also the survey showed that extension of the ferry times is wanted.
Ferries go from 1st of April till 1st of November	This is meant for both ferries 'Snoekcbears' and 'Grietman'.	The Hegewarren is accessible in spring and autumn as well.	The ferry route is longer available and can also be cycled in spring and autumn.	The coordinator of the ferry route explained that an extension of the dates of the ferries is wanted.
Small areas impassible in breeding season	These areas are at the west island of the Hegewarren. It is only possible to walk to certain points.	The biodiversity can increase due to more quiet areas during an important season for some fauna.	The biodiversity could diffuse over the whole area.	The Alde Faenen has a larger biodiversity as in the Hegewarren. To enlarge the biodiversity the connectivity probably won't be enough and the breeding season has to be stimulated by small areas where this is possible.
Creating large nature area by connecting the Alde Feanen and the Aldeboarn-De Deelen	The Hegewarren is the missing piece of nature in this large nature area.	The flora and fauna of the Hegewarren increases by connecting these areas.	The natural area becomes less fragmented which stimulates the biodiversity but also the experience of the area.	The Aldeboarn-De Deelen is now a separated project. When creating one nature area the value of this area increases.

Appendix 1

Increase the groundwater level	The groundwater level is the same as the boezem level. It becomes 30 centimeter above surface level.	The Hegewarren becomes a swamp area. The costs for water management decrease.	The surrounding is a large area with the same water and water level.	The water level is one with the boezem which is preferable.
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Legend:

-  Accommodations
-  Recreation
-  Nature
-  Mobility

Appendix 2

Cost-benefit analysis

Nature

Direct positive effects:

- Yearly bulrush harvest: 17 – 20 ton dry stuff per ha. €0,60-0,80 per kilo dry material (Innovatie Programma Veen, 2022).
- Increased biodiversity: Through changing the landscape to a swampy habitat the biodiversity increases for the area (Innovatie Programma Veen, 2022). This is a pro memoria benefit.
- Negate oxidation through reduction of subsidence: Through allowing the groundwater level to rise, the peat oxidation process is halted (Kennisprogramma Bodemdaling, 2018). This causes the amount of emissions that normally occur to decrease drastically. This is a pro memoria benefit.
- Regional connection to NNN: The Hegewarren is the missing puzzle piece in connecting the Nature Network of the peat areas to one another (Interprovinciaal Overleg, 2022). This is a pro memoria benefit.
- Decrease in costs for water management: 770 per ha peat meadow per year. 770*360 (PBL, 2016)
- Reduction of desiccation for neighbouring natural areas: By allowing the groundwater level to rise in the area, the risk of desiccation for the surrounding areas also become limited. This is a pro memoria benefit. (Rijkswaterstaat, n.d.)
- Temporary bulrush fields: Bulrush is planned as part of the transformation to 'Open and Natuurlijk'. There is some harvest of the bulrush itself but it mainly helps to clean the ground and water and cause that the land is levelled up. The land can then be raised. This is a pro memoria benefit.

Indirect negative effects:

- Loss of cultural heritage through changed landscape: As the area changes drastically due to the water level rising, the cultural heritage such as polder landscapes and farm buildings disappear (Co-creatieteam Hegewarren, 2021). This is a pro memoria cost.

Direct negative effects:

- Transformation to wet cultivation costs: To alter landscape to allow for wet cultivation, areas must be dug out and prepared. The costs depend on how intensive the production is planned to be (Innovatie Programma Veen, 2022).
- Methane emission from bulrush: bulrush leads to the emission of methane (Innovatie Programma Veen, 2022).
- No more gas exploitation: By stopping the gas exploitation, the area loses one of its biggest production locations. Although this exploitation ceases production either way, it affects the revenue generated by the area. This is a pro memoria benefit. (Co-creatie Hegewarren, 2021)
- Less agricultural land: Due to the transformation to peat bog, it no longer supports the agricultural production it has now (Mettrop & Oosterveld, 2019). This is a pro memoria cost.

- Management costs of natural areas: €736,10 per ha for peat bog * 155 ha = €114.095,50 per year (BIJ12, 2022).
- Decrease in habitat size: due to the transformation to peat bog, current species (like meadow birds) experience a decrease in habitat (Co-creatieteam Hegewarren, 2021). This is a pro memoria cost.
- Disappearing of Blue grassland: This rare habitat is bound to go away with the rising ground water level. Although it is valuable for the current biodiversity, the transformation to swampland makes up for this loss (Co-creatieteam Hegewarren, 2021). This is a pro memoria cost.
- Plan-related preparation costs of land: Dredging: € 3,- à € 10,-/m3 (Grondverzet, 2023)
- Purchase of remaining plots: average price per ha agricultural grassland Fryslân (2021) is €55.000 (Michels et al., 2022). Amount of ha remaining plots is 157. €55.000 * 157 ha = €8.635.000
- Plant Bulrush fields: €6000-€8000 per ha * 26 ha = €156.000 - €208.000 (Kennisprogramma Bodemdaling, 2018).
- Harvesting Bulrush fields: 250- 1500 per ha per year (Kennisprogramma Bodemdaling, 2018).

Indirect positive effects:

- Wet cultivation exhibit: An exhibition to show the value of wet cultivated products, and how they can be used for creative production purposes (Bestman et al., 2019). This is a pro memoria benefit.
- CO₂ storage: Government Compensation for storage of CO₂ is 30 to 110 per ton CO₂ (Bestman et al., 2019).
 - 20 to 25 ton CO₂ per ha (Gremmen et al., 2022)
 - 26 ha total area
- Nitrogen & phosphorus storage: Bulrush is efficient in storing both excess nitrogen and phosphorus in its biomass, which can have a positive effect on the environment. This is a pro memoria benefit. (Bestman et al., 2019))
- Water purification and retention: The creation of bulrush fields assists in the purification and retention. This is a pro memoria benefit. (Westerhof, n.d.)
- Enhance socio-ecological alliances: Through the transformation of the landscape new ecological values arise in the Hegewarren. In combination with the recreational interventions people are able to experience these ecological values. This is a pro memoria benefit.
- Increase (mental) health: By creating a more natural environment, the effect that it has on the (mental) health of the local population and recreationists is positive. This is a pro memoria benefit. (Pearson & Craig, 2014)

Recreation

Direct positive effects:

- More tourists on the Hegewarren: Due to all new recreational possibilities in the Hegewarren, more tourists visit the area. This leads to increased financial benefits for the economic activity in and around the area.
- Profit entree fee information centre: €1 kids / €2 adults (Alde Feanen) (Nationaal Park De Alde Feanen, n.d.).

- Guess that 35% of the ferry users visit the information centre. Of them 20% are children. 45.000 * 0,2 * 0,35 * €1 = €3.150 and 45.000 * 0,8 * 0,35 * €2 = €25.200. (Also daily recreationists probably visit the information centre. Guess these are 5000. 5000 * 0,2 * €1 = €1.000 and 5000 * 0,8 * €2 = €8.000.) This means that the profit of the information is between €28.350 and €37.350
- Profit tiny houses: €152 per night (2 persons) (Natuurhuisje.nl, 2023). There is expected an occupancy grade of 50% in the year. 365 * 0,5 * €152 * 13 houses = €360.620
- Profit nature camping: €10 pp/pn + €4 per tent + €1,50 tourist tax pp/pn (Natuurkampeerterreinen, n.d.). In May, June and mid-september there is expected an occupancy rate of 50% and in July and August of 100%. There is expected an average of 2 persons in middle season which means 25 persons and 12 tents. This means €11,5 * 25 * 76 = €21.850 and €4 * 76 * 12 = €3.648. In July and August the average is 4 persons per tent which means 12 tents. There are 50 persons. means €11,5 * 50 * 62 = €35.650 and €4 * 62 * 12 = €2.976. In total the profit is: €64.124
- Profit day-time small restaurant: Average expenditure lunch per guest: €15. Average expenditure drinks and other costs per guest: €10. Daily guest are expected in the summer 100 per day. Where 80 % is good weather. 100 * 0,8 * 62 days * €10 = €49.600. In the summer daily costs of lunch are expected by 50 people. 50 * 0,8 * 62 days * €15 = €37.200. Before and after summer most guests are expected in the weekend. Because of not always good weather but also other days good weather there is calculated with 20 days and 100 people as average and 50 people for lunch. 100 * 20 days * €10 = €20.000 and 50 * 20 days * €15 = €15.000. In total there is a profit of €121.800. (Horecatweepuntnul, 2023)
- Profit fee ferries: €1 (€0,50 for children) p.p. De Snoekcbears / €1,50 p.p. De Grietman (de8vanGrou, n.d.-b) Users De Snoekcbears: 30.000 / De Grietman: 45.000 (assumed 20% children). 45.000 * €1,50 + 6.000 * €0,50 + 24.000 * €1 = €94.500
- Profit expansion harbour: 30 places are added in the harbour. A place in a harbour costs on average €1000-€2500 per year (Leidraad voor de Yachtman, 2021). 30 * 1000-2500 = €30.000-€75.000 per year.

Indirect negative effects:

- (Possible) pollution of nature by tourists: We try to limit this as much as possible. In the area there are placed several bins. However more recreationist could cause more pollution. This is a pro memoria cost.

Direct negative effects:

- Construction cycling path: around €512 because it's a path with a width of 2,5 meter. The path is around 6,3 kilometres. €512 * 6300 = €3.226.500 (Rijkswaterstaat, n.d.)
- Construction berths: €408/m2. A berth is 20 m2 average. There are 31 berths. 31 * 20 * 408 = €252.960
- Build information centre: €2450/m2. The information

is around 250 m2. 250 * €2450 = €485.000 (ITX bouwconsult BV, n.d.)

- Construction walking paths: €34/m2 for decking paths and €25/m2 for shell paths. There are 14.5 kilometres of decking paths with a width of 2 metres gives €34 * 2 * 14500 = €986.000 and the shells paths are 2.0 kilometres in total gives €25 * 2 * 2000 = €100.000. In total €1.086.000 (Zoofy, 2023-a)
- Build tiny houses: €55.000 on the water and €87.500 on land. 6 on the water and 7 on the land. €55.000 * 6 + €87.500 * 7 = €942.500
- Build nature camping: €1 per m2 om graszoden aan te leggen. De camping betreft een gebied van 30 hectare. The camping costs €300.000. Toilets are €450. There are 10 toilets in total €450 * 10 = €4500. A simple shower is €600. There are 5 showers. €600 * 5 = €3.000. (Zoofy, 2023-b)
- Build day-time small restaurant: €1500/m2. An average of 1.4 m2 per guest. 40*1.4*1500 = €84.000. A kitchen is about €28.500. The inside is simple so around €30.000. Total of €179.100. (Indusigns, 2023; Bijkerkgastro, 2019; HorecaRama, 2022)
- Construction bird watching hut: (Guess) between €15.000 - €20.000 per hut. There are placed 3 huts. So it costs between €45.000 - €60.000. (Jansema, 2021)
- Costs construction observation tower: unknown
- Bridges: Bridge west: 25 m length * 2,5 m width * €1200 = €75.000. Bridge east: 10 m length * 2,5 m width * €1200 = €30.000. Bridge middle (automatic) 50 m length * 2,5 m width * €3000 = €375.000. Total of €480.000 (Haasnoot Bruggen, 2023)
- Pull ferry: €12.000 (Omroep Zeeland, 2016)
- Benches: 4 picnic tables and 6 benches. A picnic table costs €220 and a bench €100. €220 * 4 + €100 * 6 = €1480 (Gamma NL, n.d.; LeenBakker, n.d.)
- Construction beach: €31.359 for the construction of a beach. (Wäldnet, n.d.)
- Expansion harbour: Harbour is expanded with 30 places. Jetty costs for a harbour of 78 places are €57.499. 30 * 57.499 / 78 = €22.115.
- Expansion parking place: €20/m2 green parking place. 25 places in total which are 12,5 m2. This is €6.250 in total. (Recreatief totaal, 2020)
- Sensor animal-friendly lightening at the camping and tiny houses: €74,99 * 20 = €1.499,80 (Lampgigant, 2023)

Indirect positive effects:

- Enhanced experience on cycling path: The cycling path is a path where you can experience the Hegewarren and its quietness, calmness and darkness. This is a pro memoria benefit.
- More walking rounds: The Hegewarren is more attractive for recreationist to have a day at the Hegewarren. By having several possibilities there is a reason to come back, walk another round and have a very different experience. This is a pro memoria benefit.
- More sailing rounds: Because of more water at the Hegewarren there is more possibilities for different boats. The boats can experience different rounds and sail

Appendix 2

another route to their destination. Also the sailing school can use this water more. This is a pro memoria benefit.

- Employment: The small implementations of a small day-time restaurant at the beach, the nature camping and the information centre gives an impulse of employment to the Hegewarren. At this moment only farming is a possibility but with this plan more employment is possible. This is a pro memoria benefit.
- Experience quietness, calmness and darkness: This masterplan gives the opportunity to experience the quietness, calmness and darkness of the Hegewarren. As said by the local community this is something really valuable. This is a pro memoria benefit.
- Increase tourism Hegewarren: More tourists at the Hegewarren means that the area is more commonly known. This is a pro memoria benefit.
- Experience of Hegewarren by surrounding area: By increasing the recreational possibilities experiencing the Hegewarren is also possible for the surrounding area and villages such as Veenhoop, Grou and Earnewâld. This is a pro memoria benefit.
- More quiet water to sail for electric boats, rowing, sups and sailing boats: The extra water gives the possibility to have more possibilities to sail on quiet water. This is a pro memoria benefit.
- Decrease tourism pressure of the Alde Feanen: The Alde Feanen has become very popular and the connection with this area and its biodiversity and the extra recreation possibilities cause a decrease of tourism pressure of the Alde Feanen. This is a pro memoria benefit.

Appendix 3

Survey important qualities of the Hegewarren

1. Wat is uw relatie met de Hegewarren? (meerdere antwoorden mogelijk)

- Inwoner Hegewarren
- Inwoner de Veenhoop
- Inwoner Grou
- Inwoner de Burd
- Inwoner Oudega
- Inwoner Earnewâld
- Agrariër Hegewarren
- Agrariër buiten Hegewarren
- Recreant
- Ondernemer recreatie
- Ondernemer overig
- Anders...

2. Wat is voor u een belangrijke waarde van de Hegewarren om ook te behouden voor de toekomst (variant Open en Natuurlijk)? (meerdere antwoorden mogelijk)

- Donkerte
- Rust
- Stilte
- Blauwgrasland
- De vaarrecreatie
- Agrarische bedrijvigheid
- Wijds uitzicht
- Open polderlandschap
- Pontjesroute
- Anders...

3. Wat moet zeker behouden blijven in de Hegewarren? [Tekst vak]

4. Welke uitdagingen ziet u op dit moment voor de recreatie in dit gebied? [Tekst vak]

4. Moet er ruimte zijn voor verblijfsrecreatie in de toekomst?

- Ja
- Nee

5. Zo ja, wat voor?

- Vrijstaande huizen
- Camping
- Bungalowpark
- Tiny houses
- Recreatie woonboten
- Aanlegplaatsen
- Anders...

6. Moet er meer ruimte zijn voor dagrecreatie?

- Ja
- Nee

7. Zo ja, wat voor?

- Wandelpaden
- Fietspaden

- Aanlegplaatsen
- Touristische punten
- Uitkijktoren
- Picknickbanken
- Anders...

Hierna volgen 2 stellingen:

Geef aan of u het hier eens of oneens mee bent.

8. De Hegewarren moet in de toekomst beter bereikbaar worden met de auto ten behoeve van de recreatie.

- 1 Helemaal eens
- 2 Eens
- 3 Neutraal
- 4 Oneens
- 5 Helemaal oneens

9. De Hegewarren moet in de toekomst beter bereikbaar worden met het OV ten behoeve van de recreatie.

- 1 Helemaal eens
- 2 Eens
- 3 Neutraal
- 4 Oneens
- 5 Helemaal oneens

10. Wat vindt u een aantrekkelijk onderdeel van het nieuwe landschap voor recreatie? (meerdere antwoorden mogelijk)

- Natte teelt (lidodde, cranberry, olifantsgras, etc.)
- Vogels
- Waterrecreatie
- Moeras
- Anders...

11. Welk type recreatie vindt u het beste passen bij de toekomst van de Hegewarren (Open en Natuurlijk)? (meerdere antwoorden mogelijk)

- Fietsroute
- Wandelroute
- Zwem mogelijkheid
- Watersport
- Fierljeppen
- Vogelspotten
- Horeca gelegenheid
- Winkel met lokale producten
- Stilte route/plekken
- Camping
- Recreatiewoningen
- Woonboten
- Groepsaccomodatie
- Tiny houses
- Natuurhuisjes
- Pluktuin
- Anders...

12. [Optioneel] Hoe ziet u de toekomst van de Hegewarren?

[Tekst vak]

13. Heeft u interesse om verder bij te dragen aan dit studentenproject? Laat hier dan uw naam en emailadres achter. Dan kunnen we u benaderen voor een eventueel kort vervolggesprek in Juni 2023 (project duur: mei - juli 2023). [Tekst vak]

Appendix 4

Survey Hegewarren models

Ten eerste hartelijk dank dat u verder wilde meewerken aan ons project. Wij hebben de enquête verwerkt en mede hieruit zijn drie toekomstige scenario's uitgekomen voor 2100. In onderstaande enquête horen wij graag wat u van de scenario's vindt: goede punten, maar ook aspecten of onderdelen die u liever niet terug zou willen zien. Eerst wordt elk scenario apart behandeld. Hierbij kan u maximaal 3 dingen selecteren welke u wel en niet terug wil zien. Vervolgens kunt u de sterkste en minst sterke punten selecteren van alle scenario's bij elkaar.

Met vriendelijke groeten,
Julia, Lianne, Marlin, Max, Mees & Rick

Wij zijn een groep masterstudenten Landschapsarchitectuur en Planning van de Wageningen Universiteit die aan de toekomst van de Hegewarren werken voor de drie samenwerkende overheden: Provincie Fryslân, Wetterskip Fryslân en gemeente Smallingerland.

1. Wat is uw relatie met de Hegewarren? (meerdere antwoorden mogelijk)

- Inwoner Hegewarren
- Inwoner de Veenhoop
- Inwoner Grou
- Inwoner de Burd
- Inwoner Oudega
- Inwoner Earnewâld
- Agrariër Hegewarren
- Agrariër buiten Hegewarren
- Recreant
- Ondernemer recreatie
- Ondernemer overig
- Anders...

Scenario 1

Het eerste scenario richt zich op de bestaande waarden van de Hegewarren. In dit scenario krijgt de natuur vrij spel, waarbij de donkere en rustige esthetiek behouden blijft. De accommodaties in het gebied bestaan uit een natuurcamping en hutjes op palen die in hun omgeving zijn geïntegreerd. Op de natuurcamping kun je een mooie plek vinden om te kamperen in een natuurlijke omgeving, omringd door vee. Recreatie staat op een laag pitje. De pontjesroute blijft behouden en er is mogelijkheid voor stille vormen van recreatie zoals suppen of kanoën om te genieten van een leuke tijd op het water. Wandelen en fietsen kan op zandpaden en houten vlonders, hierbij zijn auto's niet toegestaan. De oversteek naar verschillende eilanden gaat doormiddel van trekpontjes.

Rondleidingen door boswachters of ecologen kunnen mensen helpen het belang van de natuur te begrijpen. De rondleidingen laten de rust en stilte van de natuur van dit gebied zien, waar de vogels graag scharrelen en broeden. Met een gebied dat zo sterk gericht is op de natuur mogen

we het broedseizoen niet vergeten. In deze periode worden grote delen van het gebied afgesloten voor mensen, om de natuur optimale omstandigheden te geven. Ook opereren de pontjes alleen in het zomer seizoen, net zoals nu. In dit scenario ligt de focus op de onderlaag welke sturend is, open water biedt plaats aan meer soorten en worden er natuurlijke overgangen tussen deze landschapstypen gerealiseerd. Als de natuurlijke waterfluctuaties terugkeren, zal de Hegewarren een prachtig en gezond veenweidegebied zijn.



2. Wat vindt u aantrekkelijk aan scenario 1? (maximaal 3)

- Vlonder wandelpaden
- Vogelbroedgebieden
- Seizoensgebonden toegang
- Natuur vrij spel
- Behoud pontjesroute
- Geen toegang voor auto's
- Natuurcamping
- Kleine blokhuizen
- Zeil en Roeibootjes zijn toegestaan (buiten het broedgebied)
- Grazende schapen
- Onverharde Fietsroutes
- Pluktuin

3. Wat vindt u niet aantrekkelijk aan scenario 1? (maximaal 3)

- Vlonder wandelpaden
- Vogelbroedgebieden
- Seizoensgebonden toegang
- Natuur vrij spel
- Behoud pontjesroute

- Geen toegang voor auto's
- Natuurcamping
- Kleine blokhuizen
- Zeil en Roeibootjes zijn toegestaan (buiten het broedgebied)
- Grazende schapen
- Onverharde Fietsroutes
- Pluktuin

Scenario 2

Scenario 2 richt zich op de combinatie van mens en natuur. Er zullen accommodaties zijn zoals woonboten en tiny houses op het water en een camping om te genieten van de natuur. Het water is ook de perfecte plek om te zeilen en varen en genoeg aanlegmogelijkheden voor de boot. Grote delen van het gebied gaan open voor suppen en zeilen. Vanaf de camping kun je gemakkelijk een strandje bereiken waar je kunt genieten van de zon en een duik kunt nemen in het open water. Met de verharde fietsroute door het gebied kun je genieten van dit gebied dat onderdeel is van de pontjesroute. De pontjes zullen van april tot oktober open zijn, van 9:00-23:00uur om een volle dag te kunnen genieten van de Hegewarren. Dompel jezelf onder in de omgeving door een bezoek te brengen aan de vogelkijkhut en koop lokale producten. Deze producten komen bijvoorbeeld van de natte teelten en de pluktuin in het gebied. Recreatieve activiteiten in dit gebied zijn seizoens afhankelijk. In de broedtijd zijn grote delen van het gebied afgesloten, maar de vogelkijkhut blijft binnen handbereik. Recreatie en natuur gaan dan hand in hand.



4. Wat vindt u aantrekkelijk aan scenario 2? (maximaal 3)

- Strandje
- Vogelkijkhut
- Meerdere wandelroutes
- Camping
- Tiny houses op water
- Pontjes open van 9:00-23:00
- Natte teelten
- Suppen en zeilen
- Meer aanlegplekken (deels overnachting mogelijk)
- Bestemmingsverkeer (uitgezonderd fiets)
- Afgesloten broedgebieden
- Geasfalteerd fietspad
- Lokale producten
- Pluktuin

5. Wat vindt u niet aantrekkelijk aan scenario 2? (maximaal 3)

- Strandje
- Vogelkijkhut
- Meerdere wandelroutes
- Camping
- Tiny houses op water
- Pontjes open van 9:00-23:00
- Natte teelten
- Suppen en zeilen
- Meer aanlegplekken (deels overnachting mogelijk)
- Bestemmingsverkeer (uitgezonderd fiets)
- Afgesloten broedgebieden
- Geasfalteerd fietspad
- Lokale producten
- Pluktuin

Scenario 3

Scenario 3 legt de nadruk op recreatie. In dit scenario zijn er veel mogelijkheden om in het gebied te verblijven. Zo worden oude boerderijen omgebouwd tot groepsaccommodatie en kan je hier 'camperen bij de boer'. Ook zijn er genoeg vakantiehuisjes, woonboten en campingplekken om te overnachten.

In de Hegewarren is veel te beleven. Je kan zwemmen bij het strandje, wandelen over de houten vlonders die leiden tot vogelkijkhutten of een uitkijktoren. Het stukjes blauwgrasland blijft behouden door goed beheer van de natuurbeheerder. Ook is er aandacht voor recreatie op het water: er komt een haven waar men een bootje kan huren, verschillende vaarroutes en veel aanlegmogelijkheden waar men met de boot kan overnachten. Men kan hier fietsen over een verhard fietspad wat ruimte biedt voor snel fietsverkeer en is verbonden met de pontjesroute. In het gebied zijn bruggen tussen eilanden om de oversteek over water makkelijk te maken.

Ook is het gebied goed te bereiken met de bus en auto. De bus stopt voor de ingang van het gebied, en met de auto kan men tot aan het vakantiehuisje parkeren. Het pontje legt een goede verbinding met De Veenhoop en zal het hele jaar door varen.

Appendix 4



6. Wat vindt u aantrekkelijk aan scenario 3? (maximaal 3)

- Oude boerderijen als groepsaccommodaties
- Woonboten
- Vakantiehuisjes
- Camping
- Bezoekerscentrum
- Natuurzwembad
- Vaarwegen door het hele gebied
- Uitkijktoren
- Wandelroutes
- Informatiepanelen
- Verharde fietsroutes
- Bruggen
- Bushaltes aan de rand
- Scheiding van mens en natuur
- Zeil, roei, sup en motorboten
- Strand met basisvoorzieningen
- Actief beheer blauwgrasland

7. Wat vindt u niet aantrekkelijk aan scenario 3? (maximaal 3)

- Oude boerderijen als groepsaccommodaties
- Woonboten
- Vakantiehuisjes
- Camping
- Bezoekerscentrum
- Natuurzwembad
- Vaarwegen door het hele gebied
- Uitkijktoren
- Wandelroutes
- Informatiepanelen
- Verharde fietsroutes

- Bruggen
- Bushaltes aan de rand
- Scheiding van mens en natuur
- Zeil, roei, sup en motorboten
- Strand met basisvoorzieningen
- Actief beheer blauwgrasland

Het totaal plaatje

U heeft alle drie de scenario's gezien. De scenario's hebben allemaal een andere focus maar ook worden er andere elementen voorgesteld. De verschillende elementen uit de scenario's worden samengenomen in ons uiteindelijke advies aan de provincie, het waterschap en de gemeente. Wij horen daarom graag welke elementen u het liefst ziet terug komen en welke niet. Het is belangrijk dat u niet meer dan 5 elementen selecteert.

8. Wat vindt u de beste aspecten van alle scenario's? (Maximaal 5 selecteren)

- Oude boerderijen als groepsaccommodaties
- Woonboten
- Vakantiehuisjes
- Camping
- Bezoekerscentrum
- Natuurzwembad
- Vaarwegen door het hele gebied
- Uitkijktoren
- Wandelroutes
- Informatiepanelen
- Verharde fietsroutes
- Bruggen
- Bushaltes aan de rand
- Scheiding van mens en natuur
- Zeil, roei, sup en motorboten
- Strandje
- Vogelkijkhut
- Tiny houses op water
- Pontjes open van 9:00-23:00
- Natte teelten
- Suppen en zeilen
- Afgesloten broedgebieden
- Meerdere wandelroutes
- Bestemmingsverkeer (uitgezonderd fiets)
- Geasfalteerd fietspad
- Lokale producten
- Pluktuin
- Vlonder wandelpaden
- Vogelbroedgebieden
- Seizoensgebonden toegang
- Natuur vrij spel
- Behoud pontjeroute
- Geen toegang voor auto's
- Natuurcamping
- Kleine blokhutjes
- Zeil en roeibootjes toegestaan (buiten broedgebied)
- Grazende schapen
- Onverharde fietsroutes
- Strand met basisvoorzieningen
- Actief beheer blauwgrasland

9. Wat vindt u de slechtste aspecten van alle scenario's? (Maximaal 5 selecteren)

- Oude boerderijen als groepsaccommodaties
- Woonboten
- Vakantiehuisjes
- Camping
- Bezoekerscentrum
- Natuurzwembad
- Vaarwegen door het hele gebied
- Uitkijktoren
- Wandelroutes
- Informatiepanelen
- Verharde fietsroutes
- Bruggen
- Bushaltes aan de rand
- Scheiding van mens en natuur
- Zeil, roei, sup en motorboten
- Strandje
- Vogelkijkhut
- Tiny houses op water
- Pontjes open van 9:00-23:00
- Natte teelten
- Suppen en zeilen
- Afgesloten broedgebieden
- Meerdere wandelroutes
- Bestemmingsverkeer (uitgezonderd fiets)
- Geasfalteerd fietspad
- Lokale producten
- Pluktuin
- Vlonder wandelpaden
- Vogelbroedgebieden
- Seizoensgebonden toegang
- Natuur vrij spel
- Behoud pontjeroute
- Geen toegang voor auto's
- Natuurcamping
- Kleine blokhutjes
- Zeil en roeibootjes toegestaan (buiten broedgebied)
- Grazende schapen
- Onverharde fietsroutes
- Strand met basisvoorzieningen
- Actief beheer blauwgrasland

Overig

10. Heeft u verder nog opmerkingen laat deze hier achter [Tekst vak]

11. Mocht u onze resultaten willen ontvangen, laat dan hier uw email achter. [Tekst vak]