Policy management of the murky waters of lake Berendonck

Team 3345: Diving deeper in nature, governance, stakeholders and water management of lake Berendonck

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Executive summary

The visibility in parts of lake Berendonck has become quite bad, especially the part where diving club ‘De Kaaiman’ performs its activities. This is both bad for their business and poses a safety risk. ‘De Kaaiman’ has approached the WUR science shop (WSS) regarding the visibility of the water. Currently research is being conducted and multiple potential solutions are on the table, however, it is unclear which stakeholder holds which responsibility regarding the management of the water quality.

The purpose of this project is to examine the governance of the water quality of lake Berendonck, understanding the roles of the different stakeholders and giving advice on which strategies could be applied to navigate the governance aspects.

After conducting scientific literature research, reading government publications, performing interviews and determining stakeholder analysis, we found that the most involved stakeholders in the water management of lake Berendonck are the province of Gelderland, the water board Rivierenland and the landowner Leisurelands. The relations between the different stakeholders are perceived as having no opposition to improving the visibility of lake Berendonck. Although, there are no stakeholders that have a high interest in the low visibility other than De Kaaiman. The governance structure surrounding the management of the water quality of lake Berendonck mainly falls under the water board Rivierenland. However, according to the water board, the visibility parameters in lake Berendonck are still within the required range for surface water. Therefore, it is not considered as a water quality issue. Furthermore, Rivierenland is the competent environmental authority in the context of lake Berendonck and thus is responsible for granting permits for interventions in the lake.

There are no stakeholders who bear the responsibility of improving the visibility in Lake Berendonck. If De Kaaiman wants to increase the visibility of the diving area, they need to initiate and manage a treatment plan themselves. However, we provide a roadmap in the recommendations section, as a clear overview of potential steps to be taken regarding the necessary permit.

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1. Introduction

Lake Berendonck, located in Wijchen in the province of Gelderland, is an artificial lake with a maximum depth of 18 meters. The lake is approximately 45 hectares in size and is surrounded by 115 hectares of recreational area including several sandy beaches, a golf club and sunbathing areas (overview of lake Berendonck and surrounding area, figure 1). The northern part of lake Berendonck is intended for water recreation (such as swimming), and the southern part is a nature reserve and connects to the Wijchense Ven nature reserve (Prak, 2024).

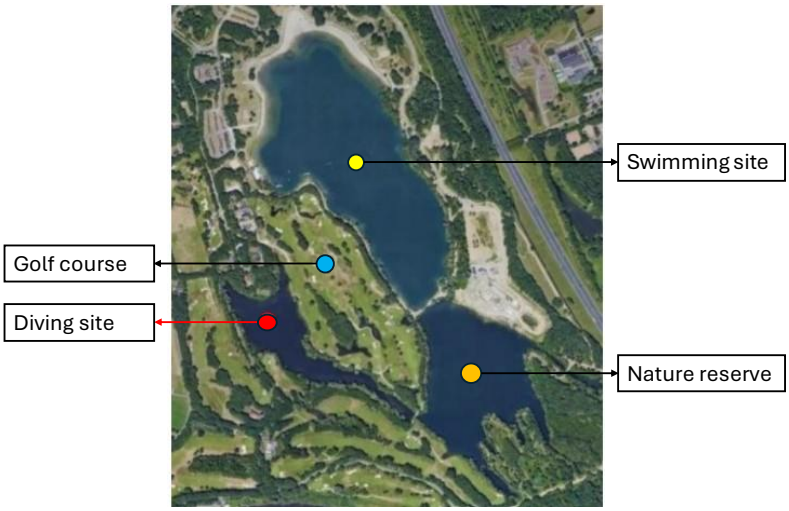

Figure 1. Remote sensing image of lake Berendonck (Plaatsman et al., 2023)

In the south-west branch of the lake only two reoccurring activities can be observed, these activities are diving and fishing (H. Hoofwijk, personal communication, 2024). The diving activities in lake Berendonck are organized by diving club 'De Kaaiman' (hereafter De Kaaiman). The club was founded in 1969 and is affiliated with the Nederlandse Onderwatersport Bond (NOB)(Prak, 2024; Smolders, 2006). In 1989 the De Kaaiman allocated their 'Aquavilla' (underwater housing) at a depth of 17 meters. The construction of this container set a precedent regarding the condition of the lakeevidencing very poor visibility through the aquavilla's windows (De Kaaiman, n.d.).

For the past 20 years the clarity of the water in the diving site has been consistently declining, affecting the activities. About the same amount of time, De Kaaiman contacted the WUR Science Shop to investigate the declining water clarity (Teixeira, 2023). Extensive research has been done to determine the causes and propose solutions to the low visibility (Plaatsman et al., 2023). However, despite the efforts, no significant changes have been implemented (Teixeira, 2023).

Several techniques have been identified as potential solutions to treat the water body (Plaatsman et al., 2023). Nevertheless, no control or permissions have been obtained to apply them, which is in part due to a knowledge gap regarding the water governance of the lake (Prak, 2024). Essentially, De Kaaiman wants the visibility of the water to be improved. However, in order to achieve this goal, it is important to identify the governance structure of the lake. It is essential to know what is allowed and who governs what before someone can implement any measures.

The central concept of water management in Europe is integrated into the Water Framework Directive (WFD) (Vinke-de Kruijf et al., 2010). However, this framework specifies on its guide, that water bodies smaller than 50 hectares are not necessarily considered under its regulation, and should follow the national policy of the country, instead. Therefore, lake Berendonck is out of this directive (EU Directive, 2000). This has fostered a series of uncertainties regarding water governance of lake Berendonck and other small lakes across the country. According to De Kaaiman, since the visibility of the diving part of the lake started to decline, it is been unclear whether the WFD regulations do or do not apply. As well as the distribution of powers and responsibilities within the governance structure (appendix 2a).

The governance structure in the Netherlands, regarding water management is multilevel. Thus, the responsibilities are distributed among different administrative institutions, encompassing the National government, provinces, municipalities, regional water authorities and the Directorate-General for Public Works and Water Management (Pot, 2024). These responsibilities mostly entitle regulation of ecological values, recreation, landscape quality, spatial development and water quality (Bergsma et al., 2012). Regarding the last category, the commissioner aims to clarify who is responsible for maintaining the water quality, initiating a request and providing permission for potential treatments.

Identifying the governance structure of the lake is important, as its potential outcomes could serve as a precedent and guide for the water management configuration of other small water bodies existing in the Netherlands. Lake Berendonck, like many others in the country, is not regulated under the general (WFD) legislation of the EU for water quality. Hence the governance of these water bodies remains unclear and uncertain. The outcomes of this research can serve as a point of reference in terms of water management. Moreover, from a local perspective, the consolidation of the water quality policy is essential in order to protect the ecosystem values and services the lake provides, such as the diving activity.

Problem definition & research questions

The project aims to solve the knowledge gap regarding the governance of lake Berendonck. As previously stated, the structure and distribution of responsibilities regarding the governance of the lake Berendonck remains unclear. Understanding the governance aspects is necessary for the implementation of possible solutions. Thus, it is essential to learn more about the governance of water quality in lake Berendonck.

The purpose of this project is to advise De Kaaiman and WUR Science Shop on what strategies can be taken to improve the water quality regarding the governance structure and stakeholder relations. This can be achieved by exploring Dutch policies and practices, concerning water management to determine which stakeholders are responsible for managing the water quality of lake Berendonck, as well as performing a stakeholder analysis to further understand the complex relations between these different stakeholders.

To fulfil this purpose the following research question was set up:

- *"Which strategies could be applied in order to best navigate the governance aspect of the clean-up project of lake Berendonck?"*

With the following sub-questions:

1. *"Who are the different stakeholders involved in the water management of lake Berendonck?"*
2. *"What are the relations and interests of the different stakeholders regarding lake Berendonck?"*
3. *"What is the governance surrounding the management of the water quality of the diver's part of lake Berendonck?"*
4. *"What possible courses of action can be taken if the commissioner wants to initiate the clean-up of lake Berendonck?"*

Ethical concerns

There are two ethical concerns we believe must be clearly stated. The first ethical concern is the question of whether there is a need for cleaning up the lake. How important is the visibility in the lake? What would be the consequences if the results were no laws encompassing obligations of the stakeholders regarding the water quality of the lake? This is also why it is important to not call out stakeholders on their perceived responsibilities, as these are, partly, influenced by opinions.

However, not all stakeholders may agree, which brings us to our second ethical concern. Conflicts of interest between the stakeholders could occur. Interests could not be aligned and this could cause friction. The possibility of conflicting interests stresses the importance of understanding both points of view and the underlying reasons. We understand that these conflicts could arise and we strive for good cooperation between all parties involved.

2. Theoretical framework

This study explores the governance structure regarding the water quality management of lake Berendonck by navigating the national policy, as well as EU regulations, and studying the interactions and dynamics among stakeholders. Therefore, defining a series of essential concepts is valuable for understanding the whole context regarding the problem. In this section, a theoretical framework is included, encompassing fundaments of governance and stakeholder theories, as well as an explanation of these concepts and their values for the study.

Scope and boundaries

This project is focused on the diving part of lake Berendonck. Referring to the smallest south-east segment of lake Berendonck which is situated next to the land De Kaaiman and the local golf course rent from Leisurelands.

Governance

Governance can be defined as the self-organizing system that establishes and enforces rules within a particular context, involving resource exchange to deliver services, as well as autonomy from the state (Fukuyama, 2013). Governance structure refers to the hierarchical and nonhierarchical organization to allocate authority and responsibilities for institutional decision-making (Enjolras, 2009). In the Netherlands, the governance system is integrative- oriented, and often involves active participation of relevant stakeholders. Within the Dutch context, stakeholders also have more influence on the decision-making than in traditional governance systems. This integration of stakeholders into governance has a long history. This trend commonly referred to as the Dutch Polder Model and has its origins in the Middle Ages. The Dutch Polder Model is a model that is based on consulting many stakeholders with the aim being the creation of a middle ground that favors all stakeholders. This is something that can be found still in the current governance in the Netherlands (De Vries, 2014).

In the context of the present study, the concept of governance and its structure is highly important to understand the dynamic regarding the management of the water in lake Berendonck. Additionally, understanding the Dutch governance system and the relevance of stakeholders in decision-making processes within this context, is also necessary to gain a better insight of the problem and for the exploration of possible solutions.

Stakeholder analysis

The stakeholder analysis theory is an approach to understanding the context and conditions within a specific problem by identifying key actors and assessing their respective interests in a particular project (Grimble & Chan, 1995). Within this theory, the influence-interest, as well as the actor-linkage are useful tools to explore the dynamics of specific stakeholder context.

The influence-interest matrix is a typical top-down approach, valuable to explain how the context functions regarding a specific environmental issue. This tool essentially categorizes stakeholders into “Key players”, “Context setters", "Subjects”, and “Crowd” based on the theoretical analysis of their interests and possible influences on a particular environmental problem. Within this scheme, the context setter actors are the ones with high influence but low interest in the problem. Key players indicate that they have both high influence and high interest in the issue, these are often the most engaged actors. Stakeholders located in the crowd means they have low influence and low interest. Finally, the actors located in subjects have low influence but have high interest in the problem. (Kivits et al., 2021).

The other tool is the actor-linkage matrix, which is used for situational analysis, contemporary historical analysis, monitoring and identifying relationships/interactions between stakeholders, in which we can obtain insights into stakeholders’ interactions and their effects on the decision-making process. As noted, this tool is useful to investigate and describe relationships between stakeholders. Each stakeholder is assessed again the others, and the character of these relationships concerning

the issue is indicated by different colors (Biggs et al., 1999; Yoo et al., 2018). The possible relations in this study are defined as cooperation, strong cooperation, no contact, unclear, reproach, no involvement and disagreement.

Essentially, the stakeholder theory provides good foundations to understand the perspectives of the different actors involved in the problem, what they perceive to be the benefits, stances and baselines regarding the problem. In the context of this study, understanding these dynamics could serve as a starting point for the decision-making process and the possible implementation of measures. (Kivits et al., 2021). Moreover, the outputs of this analysis provide valuable information about the extent of responsibilities regarding the visibility problem of the lake.

3. Methods

This section describes the methodology used in the study; in this case a qualitative research design was adopted, this strategy was chosen in order to address the uncertainties regarding the governance structure of lake Berendonck, answering questions such as "what" and "how". In this paper, the in-depth analysis is based on the information collected by two different instruments (1) textual analysis (2) guided interviews (Maguire & Delahunt, 2017).

Textual analysis

For the textual analysis, the sources of information included scientific literature and governmental documents. The collection of the information was gathered as described below.

Searching for scientific literature

The scientific literature review was done in order to expand our understanding of the situation. The exploration of the information surrounding lake Berendonck, served as a base of introduction to showcase the background of the problem. Additionally, this instrument was used to obtain general information about bringing stakeholders together, as well as the governance structure in the Netherlands. Afterwards, we scrutinized the literature on how to write and perform an interview (Maguire & Delahunt, 2017).

The stakeholder analysis theory to evaluate relationships between stakeholders was also derived from literature review, identifying the interest-influence matrix and actor linkage matrix as the most suitable tools for the case.

The quality of the papers used was critically assessed by means of credibility of the source. This process was done through the triangulation of data, comparing the obtained information, and through the inclusion of peer reviewed articles, this last one was corroborated by checking the journal's official site. Furthermore, to facilitate the searching process, a list of key words was preliminary made, including terms such as 'Berendonck', 'water management', 'Dutch lakes' and 'water quality'. The Wageningen library was also used to search for high quality papers.

Searching for government publications

The second activity was searching for government publication on the laws and regulations surrounding the water quality of lake Berendonck. Most of the documentation was found on official governmental sites from the water board Rivierenland, municipality of Wijchen, government of the Netherland and European Union. Although, some of the material was provided by the commissioner of the project.

Documents from the central government of the Netherlands and the European Union were used to gain knowledge about the nationwide laws regarding water quality and obtention of permits, under the Dutch regulation. The official documents from the central government of the Netherlands were found on a number of different sites, including, "ruimtelijkeplannen', 'informatiepunt leefomgeving', 'omgevingsloket' and 'wettenbank'. Additionally, we used documents from the water board Rivierenland to search for the laws regarding surface water specifically for lake Berendonck and

other areas under their jurisdiction. Documents from the municipality of Wijchen were also used to gain further insight into region specific application of the national laws.

In this stage, the primary search terms used were 'omgevingsvergunning', 'waterkwaliteit', 'omgevingswet', and 'watervergunning'. These key words were searched through different research engines such as google and ecosia. For official publications, most of the information contained in the documents is written in Dutch. Thus, literature search for governmental literature was mostly performed by the Dutch members of the team. To ensure good credibility of the research, a member check strategy was performed, as previously mentioned.

Performing interviews

Sampling plan

A non-random purposive sampling was adopted for the interview instrument. Which included key informants who were selected based on their interest and influence in the problem, with a perceived degree of knowledge regarding the state of the lake. A total of five stakeholders were interviewed in two modalities, in-person interviews or online interviews.

Selection of information sources

The interviews were conducted in accordance with the interview guide (appendix 1), the transcripts of these interviews can be found in appendix 2. The following organizations were approached for an interview and used as a source of information within the study (table 1). Initial contact was made through email or via a phone call. Whether the interview was held can be found in table 1.

Table 1. List of stakeholders interviewed

Organization	Interview status
Water board Rivierenland	Interview conducted online
Province of Gelderland	Interview conducted in person
Hengelsport Federatie Midden Nederland	Interview conducted in person
Diver's association De Kaaiman	Interview conducted in person
Nederlandse Onderwatersport Bond (NOB)	Interview conducted online
Leisurelands	Questions answered through email
Municipality of Wijchen	Questions answered through email
WUR Aquatic Ecology and Water quality management	Meeting with expert in person
WUR Soil physics, Ecohydrology and Ground water department	Meeting with expert in person
Natuur en Milieu Wijchen	No contact could be made

As previously noted, a purposive random sampling was adopted for the selection of key informants, that included in the first place, the water board Rivierenland, province of Gelderland, Hengelsport Federatie Midden Nederland, Diver's association De Kaaiman, Leisurelands and the municipality of Wijchen. This selection was based on their perceived degree of interest and influence regarding the problem in lake Berendonck. On the other hand, a group of experts was selected, based on their knowledge regarding the environmental state of the lake, and the policy surrounding the area. These

actors included Natuur en Milieu Wijchen and the Nederlandse Onderwatersport Bond (NOB). Furthermore, some important actors such as Leisurelands, municipality of Wijchen, Natuur en Milieu Wijchen were not formally interviewed due to logistical constraints. However, the exchange of information took place via email, except for Natuur en Mileu Wijchen who we could not reach at all. We have also had expert meetings with two WUR chair groups, Aquatic Ecology and Water quality management and Soil physics, Ecohydrology and Ground water department, with whom we discussed the project to gain more insight.

Each interview had a predetermined agenda, which was shared with the participants before the interview. These documents contained information regarding the date, time and locations, as well as the core interview topics, time allocated for each topic and its questions. The modalities of the interviews included in-person meetings and online meetings through Teams. For the rest of the stakeholders that were not interviewed, communication was carried out primarily via email, including a set of important questions.

Interview process

The interviews were conducted by two team members, with a distribution of tasks that involved chairing the meeting and taking notes. The structure of the interviews was followed as described in the interview guide, with adjustments made for each participant, depending on their role in the problem. With the consent of the participants, the interviews were recorded and further turned into a transcript. To enhance the transferability of the study, during the interviews, the questions remained open, encouraging in-depth responses from the participants and reducing interviewer bias.

Interview analysis and interpretation

The interviews were transcribed and analyzed. The analysis was done as described in Maguire & Delahunt (2017). In the interpretation phase, the stepwise replication strategy was applied, where two members of the team analyzed the same collected information, separately. Afterwards, the product was contrasted to ensure consistency in the findings (Anney, 2014). The process was performed in five major steps that will be described as follows:

Step 1: Scanning the collected data: The initial stage aimed at getting familiar with the data, for this purpose, two members of the team read the transcripts in parallel. This process was done a few times, to get general insights from the interviews.

Step 2: Identification of themes: Based on the general analysis of the data obtained from the scanning, the preliminary themes were identified, based on patterns related to the research questions. The structure of the interviews also served as a guide for the generation of themes, as there was a clear structure and separation of topics.

Step 3: Reviewing: During this stage, the data associated with the identified themes was examined according to relevance and logic. The themes were also assessed against the data to determine if the data is supportive enough and to find other potential themes or subthemes within the data.

Step 4: Defining themes: After exanimating the data, we finally identified the official themes and subthemes of the interviews. In this step, the themes were framed in order to find associations in between topics, this process responded to questions such as “What is the team answering to” “How are the themes related to each other's” and “how is the information related to the research question”.

Step 5: Writing the analysis: This was the final step of the process, and essentially encompassed writing the information, following a logical structure and keeping the focus on the research questions.

Study design

To increase the robustness of this study, a set of criteria were used to collect the information. These criteria were picked in order to guarantee good credibility, transferability, dependability, and confirmability of the research, following the trustworthiness criteria described by Anney, 2014.

Credibility

As part of the study design it is important to have good credibility. To increase the credibility of this report we have applied triangulation and a members check.

Triangulation: To enhance the quality of the obtained data and ensure corroborating evidence, two types of triangulation techniques were performed. Firstly, the triangulation of data, this strategy was applied by contrasting the information provided by different sources or respondents, during the interviews. Secondly, a methodological triangulation, using different research methods was also included in the study, encompassing scientific literature review and semi-structured interviews. Therefore, the findings obtained in both methods were contrasted to improve the trustworthiness of the research.

Members check: The data collected from the interviews were sent to the interview participants for revision of the content and enhance consistency. This strategy was implemented during the analyzing phase of the study, reducing researcher bias.

Transferability

To ensure that the outputs of the research could potentially be generalized, a purposive sampling was adopted in this study, with the selection of informants based on interest, influence and knowledge, regarding the problem.

Dependability

To ensure that the results of the study are stable over time, a set of strategies was developed through the research, which includes stepwise replication and triangulation. For the first one, two researchers analyze the same collected data, separately. Then, the information was contrasted to identify inconsistencies. On the other hand, triangulation of sources and methods was also performed, as previously mentioned.

Confirmability

To enhance the confirmability of the study, the strategy used was triangulation. Ensuring that the findings of the research could be corroborated.

4. Results

Textual analysis

In this section the literature regarding the governance of water quality in the Netherlands will be analyzed. First the national and international governance structure will be explained, then this will be applied to lake Berendonck and its region-specific governing parties. Afterwards, literature regarding the necessary permits will be analyzed. Again, first on a national level, followed by a section specifically about lake Berendonck.

Governance structure of water quality in the Netherlands

National governance of structure in the Netherlands

To describe the national governance of water quality in the Netherlands it is important to first explain the governance at an international level in the EU. As the Dutch policy is highly influenced by the regulations and standards established by the EU. The main policy instrument of European governance regarding water quality is the Water Framework Directive (WFD). This directive has been the main law regarding water quality since 2000. It ensures healthy water bodies for citizens, nature and companies alike. The WFD applies to both groundwater and surface water. The WFD requires member states to protect, and if necessary, restore, water bodies such that they have a good chemical and ecological status (European Commission, 2023). Not all waterbodies are considered as a WFD waterbody in the EU, this will be further explained in the section about the governance structure in lake Berendonck (EU Directive, 2000).

In the Netherlands, the legal framework regarding water management, established three main levels of administration, as shown in figure 2. In the first instance, the national water authority, named as the Ministry of Transport and Waterways, operating through the *Rijkswaterstaat (Directorate - General for Public Works and Water Management),* is responsible for the management of the main water systems, encompassing rivers, lakes and coastal waters. The *Rijkswaterstaat* is responsible for defining environmental goals and objectives, as well as setting agricultural policies (environment and planning act, 2021).

At a regional level, provinces are the competent environmental authority, with autonomy to establish regional objectives and standards. Furthermore, provinces are responsible for groundwater and swimming water management, as stipulated in the 'omgevingswet' (environment planning act) that came into force in January 2024. provinces also play an important role in supervising the management of municipalities and water boards. These last two are in charge of water management at a local level. However, municipalities have limited accountability in water management, primary being responsible for the provision of sewage service. Municipalities also have interests in other water related areas such as spatial planning, agriculture and recreation. Water boards on the other hand, are directly responsible for surface water management, encompassing flood protection, urban wasted water treatment, as well as water quality and quantity. Water boards manage all the matters related to pollution and water quality, with the exception of nutrient pollution, specifically nitrates (Warner et all., 2006).

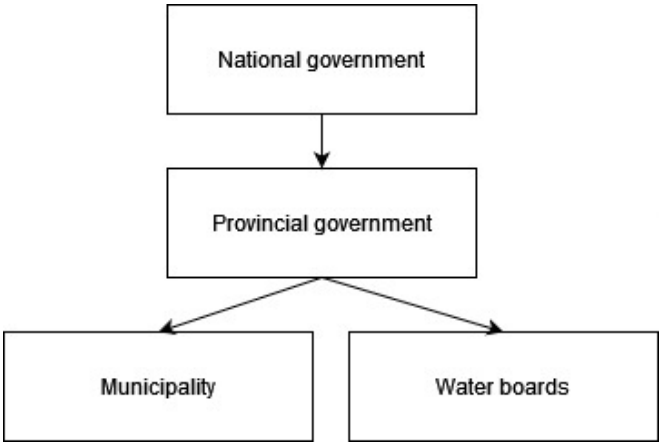

Figure 2. Institutional framework regarding water management in the Netherlands. Source: modified image from Warner er al., (2006).

It should be noted that while the responsibilities of these actors are broadly defined, the specifics leave a lot of room for ambiguity. Even governmental publications confirm this lack of demarcation. There are many actors with many different tasks which are not specified adequately, which ends up limiting the improvement of water quality (van Gaalen et al., n.d.).

Dutch water legislation, has established a different set of norms for water management, including the pollution of surface water act. This document contains the regulations regarding quality control of surface water, based on national policies. The water management act, on the other hand, stipulates and defines the government structure at a national and provincial level, regarding management of surface water, the mentioned documents were recently merged into the environment and planning act (Warmer & van Dokkum, 2001). This last one on its article 20.1 "Monitoring and information" establishes that the state or quality of a "physical environment" should be monitored and assessed, and the administrative body has the responsibility to carry out this activity (environment and planning act, 2024). Moreover, the competent authority of the waterbody, which is designated by provincial regulation or ministerial decree, is responsible for establishing a monitoring program of the state and quality of the physical environment. This document should include the methods and frequency of the monitoring (environment and planning act, 2021).

Governance structure lake Berendonck

As previously mentioned, the international policy instrument for water quality of the European Union (EU) is the WFD, which came into force on December 22nd of 2000. This directive is essentially a guideline for the conservation of the water status in the EU, with a special focus on water quality (Junier & Mostert, 2012). However, the WFD specified in its annex II, regarding the characterization of surface waterbody types, that lakes under 50 hectares are not included in this framework (EU Directive, 2000). Lake Berendonk is exempt from this directive due to its size being below 50 hectares. Thus, the regulations regarding water management of the water quality follow national policy and it was decided to not make lake Berendonck a WFD water body. The WFD is still very relevant to describe as this is a central part of the water quality governance in the Netherlands (Provincie Gelderland, 2021). The fact that lake Berendonck is not a WFD water body implies that it is of lower priority compared to other water bodies.

The governance structure in lake Berendonck follows what was described in the section about the national governance structure. The water board Rivierenland's literature confirms that they are in charge of good surface water quality (Waterschap rivierenland, n.d.-a). The water board specifies that their task is not for just WFD water bodies, but also many other smaller water bodies including lake Berendonck. Rivierenland follows the values set by the 'vierde nota waterhuishouding' as guidelines for the water quality (Waterschap rivierenland, 2017).

The regional water program of the province of Gelderland confirms that water board Rivierenland is the responsible governmental party regarding water quality in lake Berendonck. The province states that if an area is not a swimming area, WFD waterbody or classified as nature water, the water is classified as 'overige wateren' and fall under the jurisdiction of water boards. Lake Berendonck is classified as 'overige wateren'. The water boards can set up the goals and measures that are to be taken for the 'overige wateren' in their work area. These goals are mostly aimed at that they should not put the special classified waters (WFD waters, nature water) at risk of not reaching their quality standards (Provincie Gelderland, 2021). We were not able to find these goals of the water board in any literature from the water board Rivierenland online. However, after the interview with Rivierenland we received these goals in a private document. This document stated that their goals for deepwater lakes aim for a short-term goal of a Chlorophyll a content of 12 µg/L and a visibility of 1.1 m. Their long-term goal is a Chlorophyll a content of again 12 µg/L and a visibility of 1.7 m.

The visibility in lake Berendonck currently was measured at 3.4 m in April 2024 and 2.3 m in June 2024 (Prak, 2024). This means that for the water board the current water quality satisfies both their short term and long-term goals in regard to visibility. As their goals are met, the water board does not have any unmet responsibilities in regard to the water quality in the diving part of lake Berendonck.

Required permits

There are two types of initiative approaches, top-down and bottom-up. Top-down initiatives come from governmental parties who take the initiative to implement a solution. Bottom-up initiatives are initiatives taken by other parties who wish to take the initiative (Jans, 2021). There are different reasons as to why a party would wish to initiate change. It could be to uphold current legislations or to uphold future legislations (Dummett, 2006). It could also be due to personal or collective beliefs in wanting to change the status quo (Rees & Bamberg, 2014). If a party wishes to initiate an activity in order to change a situation, they are expected to have a permit. In the rest of this chapter we will explain how this works and apply it to the case of lake Berendonck.

National rules permits

In other parts of the Netherland's actions to improve the water quality such as application of PhosLock, lanthanum modified bentonite, which can reverse the ecological effects of eutrophication rapidly by controlling internal phosphor loading, have been used (van Kuijk & van der Klugt, 2021). Usually, these actions were initiated by either the water board or the municipality, however, it is possible for other stakeholders to be the initiator such as the landowner. In the past when the initiator was not the water board a water permit was needed (Informatiepunt Leefomgeving, n.d.-a). This permit was given by the water boards when actions involving water were assessed and approved by the water board. This process has been a necessity for previous projects that wished to improve the water quality (Hoogheemraadschap van Schieland en de Krimpenerwaard, 2022).

Currently the rules regarding permits for environmental actions have been changed. The recently implemented 'omgevingswet', 2024, changed these rules. In the past whenever an initiator wanted to perform an activity, such as the request to construct a pier, they would require permits for different aspects by different parties. In the example of constructing a pier the permit would be the water permit from the water board. With the new 'omgevingswet' all these different permits are now incorporated into one and only one request per activity needs to be made (or multiple in the case of multiple actions)(Waterschap Rivierenland, 2024b). This makes the process easier as only one permit is now required, the 'omgevingsvergunning' (Informatiepunt Leefomgeving, n.d.-c).

It is included in the 'omgevingswet' that it is expected of the initiative party to seek out contact with relevant stakeholders and take their wishes into account. Parties that are/could be affected by the planned actions need to be included in the project process (Gemeente Wijchen, n.d.-b). After the permit has been granted it will be publicized, giving the chance for objections to the suggested actions (Waterschap Rivierenland, n.d.-b). The permit is valid for one year, afterwards a new permit is required if the activity has not started yet (Waterschap Rivierenland, 2024b).

Required permits regarding lake Berendonck

The water quality standards of the water board for the diving part of the lake are not currently being breached. This is further confirmed by the stakeholder interviews with Rivierenland and Hengelsport Federatie Midden Nederland (appendix 2). This means that if De Kaaiman wishes to improve the visibility in the diving part of lake Berendonck, a bottom-up approach is the most viable option.

If actions are to be taken, the 'omgevingsvergunning' is a necessary permit to obtain before these actions are allowed. Depending on the activity more permits may be required, so this would need to be checked. In the case of lake Berendonck the 'omgevingsvergunning' is to be given by the water board Rivierenland, as it concerns water in the authority of that water board (Informatiepunt Leefomgeving, n.d.-b). We were not able to find any previously given permits for PhosLock or similar water cleaning actions. This is due to the new 'omgevingswet' being a very recent legislation.

According to the national policy, in some cases, the municipalities are the competent authority to provide environmental permits. Which is why it was advisable to contact them during the start of this process as well (Gemeente Wijchen, n.d.-a). However, as lake Berendonck is situated outside of the city limit, it can be assumed that it falls outside of the responsibilities of the municipality of Wijchen (Ruimtelijkeplannen, 2013).

The rules that Rivierenland will follow when deciding whether or not to grand a permit are written in article 1.6.1. in the 'waterschapsvordering' of Rivierenland. These rules can be summarized by categorizing them under these three aspects. The first aspect is that the activity may not clash with the prevention of water scarcity, flooding and waterlogging. The second aspect is that the activity should not put the ecological and chemical quality of the water system at risk. The third aspect is that the activity should not intervene with the social services that the water system provides. Additionally, ongoing programs and other projects concerning water governance should not be hindered by the proposed activities (Waterschap Rivierenland, 2024b).

When applying for the permit it should be noted that there are costs involved. These costs are based on a standard price with an additional fee. The additional fee is based on either a percentage of the costs someone make performing the action, a set amount of money per 100 m2 or 1 m3, or based on the amount of present construction vehicles. The specifics of these costs can only be calculated if there is a concrete plan (Waterschap Rivierenland, 2024a).

The landowner of the diving part of lake Berendonck is, as discussed before, Leisurelands and not De Kaaiman. It is required that the landowner knows about the proposed activities and has given, preferably written, permission for the activity and knows about the application for a permit by De Kaaiman (Waterschap Rivierenland, 2024b; Wettenbank, 2024).

Interview analysis

As part of our research, we conducted several interviews with the different stakeholders. The transcripts of these interviews can be found in appendix 2.

Diving club De Kaaiman

According to the diving club De Kaaiman, they have noticed the problem since 2002. With the condition deteriorating, the underwater visibility near the aquavilla is below 1.5 meters, sometimes just 0.5 meter. He has identified several potential causes for what has been causing the deterioration in visibility for the past approximately 20 years. Additionally, he mentioned the relationship with Hengelsport Federatie Midden Nederland, the fishermen, which was not completely harmonious because of the different interests in the lake. These different interests can be found in more detail in the transcripts in appendix 2.

De Kaaiman also communicated with the province of Gelderland and golf course. However, they did not think the low visibility to be a significant issue that required too much focus and effort. He also mentioned De Kaaiman has not had any contact with the municipality of Wijchen. The governance structure has several layers and has specific procedures when an issue occurs. For example, when

De Kaaiman face the issue of underwater visibility, it can report the issue to the province of Gelderland since they are responsible for the water quality according to the diving club. Then, the province of Gelderland will assign relevant departments like the water board to monitor the water quality, to check if there are really issues with the water. If there are issues occurring, which are suitable to WFD or other frameworks in the Netherland, the water board will apply solutions to tackle the issues. However, in conversation with the water board they expressed to De Kaaiman that the water quality was not an issue at the moment and their focus is more on swimming waters. The ideal visibility for the divers is approximately 5 meters, in which they can conduct diving courses without safety risks and for greater diving enjoyment.

Hengelsport Federatie Midden Nederland

We interviewed a member from Hengelsport Federatie Midden Nederland and he said that this organization is one of the seven fishing federations in the Netherlands. They are responsible for issuing fishing permits and also monitor the water quality of their fishing spots. They are aware of the low visibility problems and were invited two times to a meeting with the project committee. The low visibility does not affect their fishing activities. They want to remain uninvolved and are not opposed to treatments as long as the water quality is not affected. The local fishing clubs sometimes organize fishing games. It was explained to Hengelsport Federatie Midden Nederland that they were not involved in these activities, their main involvement is to make contracts for fishing with the owners and managers of the different water bodies. Most of the fisherman focus on fishing for carp, but there are also fishers that fish recreationally without targeting specific fish. Hengelsport Federatie Midden Nederland stated that they have a good level of communication with the local fisherman. The contract for fishing is owned by the Hengelsport Federatie Midden Nederland, which is why it was agreed on to include them as one of the stakeholders.

The ideal situation for them would be a good quality of the water, the visibility is not one of their criteria for good water quality. They have a few small areas for fishing along the shores. Communications with other stakeholders are good, and they want to stay informed about the future plans. They believe that De Kaaiman wants to have good biodiversity in the lake, same as they do. Hengelsport Federatie Midden Nederland sees that the province and water board have the role to monitor water quality of the lake. However, the province and water board only measure the swimming part of the lake and not the diving part. From Hengelsport Federatie Midden Nederland, we also know that the water board might have contact with Leisurelands as the landowner, but often excludes Hengelsport Federatie Midden Nederland from information. Hengelsport Federatie Midden Nederland would like to stay informed and invited to future meeting even though it is not their main priority.

Leisurelands

Leisurelands is one of the three stakeholders that we were not able to interview, however, Leisurelands did answer our questions via email. Leisurelands confirmed that they own both the land and the water of lake Berendonck and that while they do not have a formal obligation to uphold the water quality, they do have interest in that subject. The representative would be glad to see the situation resolved for De Kaaiman. He also explained that the water board is responsible for the water quality and that the situation in lake Berendonck is not a water quality issue. When asked about their relations and communication with the other stakeholders, he says that those are generally good with the different stakeholders. However, he does also mention that regarding the visibility project he feels like they are left in the dark when it comes to the progression of potential results. When asked about potential complications in the visibility treatment plan, he explains that they do have to keep the effects on the aquatic flora and fauna in mind as those are important for the local fishing association. Further complications could include the costs but also the license they will need from the water board. It remains unclear for Leisurelands what requirements the water board is going to attach to a license for the cleaning of the lake.

Municipality of Wijchen

The municipality of Wijchen is another stakeholder that we were not able to interview. Fortunately, they did manage to respond to our email and answered our questions. The municipality of Wijchen expressed that they do not own any of the land or water of lake Berendonck and that they are not responsible for the water quality or quantity of any surface water within lake Berendonck. They mention that this responsibility lies with the water board Rivierenland.

Nederlandse Onderwatersport Bond (NOB)

The member of the NOB that we interviewed said that the NOB is a federation for sport divers in the Netherlands who oversees the local sport divers' clubs. The NOB has been involved in meetings with the board of the lake Berendonck project. The NOB believes that the problem lasted longer than five years, however they were uncertain about the exact time. The members of the diving clubs are their main concern, which while affected by the low visibility of the lake has made the enthusiasm to dive decrease, even though they have no data about that. The interviewee stated that he was unsure of whether there are regulations regarding underwater visibility. According to the interviewee, the divers are trained to proceed diving if they still can see each other in the water, but they need to cancel it if they find it difficult to see underwater.

The NOB were not aware of any other activities besides diving but said that sport fishing might be done in the lake. They expect to have more divers in the lake if the water gets clearer. The NOB also mentioned a similar case in the Netherlands, lake Geesmerambacht, which used to be the site for diving activities but is now abandoned because the visibility got too poor. When we asked about the influence of seasonal change to the lake, he was not sure because there has not been done any research regarding the correlation between season and visibility. However, he believed in the winter the visibility might be better than summer. The NOB emphasized the importance of their diving clubs as a stakeholder. However, they also mentioned several stakeholders that might be important to consider, which are the water board and the sport fishing federation. They believe that the sport fishing federation benefits from fishing in the murky water. Furthermore, in the governance aspect, the NOB assumed that the Recreatieschap (Leisurelands, owner of the lake), the water board (who is responsible for water quality) and the province of Gelderland, have an important role regarding the water quality. Nonetheless, he was unsure of whether the visibility is one of the criteria of water quality. In the end, they also mentioned that money is an aspect which might complicate the process. They want to wait and see what the next steps would be according to research and are willing to participate in future discussions.

Province of Gelderland

The province of Gelderland stated that they have not been informed about the visibility situation in lake Berendonck. The representative explained that the water quality of lake Berendonck, at least in the swimming area of the lake, is at the required level. He stated that the province does checks of the water quality in the swimming area of the lake and not the diving area. When asked about their communication and relationships with the other stakeholders, he said that he communicates almost daily with the water board Rivierenland. If the swimming water quality is bad when they measure a lake then the local community is warned using signs at the lake and the appropriate municipality is warned as well as the local water board, since they have to find a way to improve the water quality if they can.

In general the communication with the other stakeholders is good and they experience no significant problems with them. The province stated that they do not really play a role in the lake Berendonck visibility situation other than that they would like to stay informed by the water board about possible water treatments or other measures that De Kaaiman may wish to carry out. When asked how they think De Kaaiman could proceed, they mentioned that any treatments or actions in the lake will have to be discussed with Rivierenland and that they also likely need a license to do any treatments. Lastly, he mentioned that there is a lot of confusion for water managing people due to the newly implemented 'omgevingswet' and that they wish to clear up this confusion in the future.

Rivierenland

We interviewed a representative of the water board Rivierenland. Who explained that the water board has been contacted in the past by divers from De Kaaiman and that they have given advice on what they think are the causes of the low visibility. He also explained that since the water quality of the diver's area is good and there is only low visibility, there is no reason for them to get involved since this situation is of such low priority compared to other lakes that are much more urgent. When asked about their relations with other stakeholders he said they have contact with other stakeholders, such as Leisurelands, but not about this problem. The only contact regarding this problem has been through students or divers who contacted them to ask questions and discuss the situation. Lastly, he clarified that to start implementing measures such as removing crayfish or using mussels could require more permits than we thought. For example, crayfish are exotic animals and fishing them requires special permits given by the government. Even transporting exotic animals requires an exemption as otherwise it is illegal to do so.

The representative stressed their role in water quality governance. They are in charge of the ecological water quality of lake Berendonck, but as it is classified as 'overige wateren' the rules are minimal. Only when drastic water quality deterioration is reported to them, will they undertake action and see what needs to be done. He explained this is because they have so many lakes under their jurisdiction that all need to be at a certain level. Furthermore, he explained that diving quality is not part of their job and the task of improving the water quality in this regard was not part of their responsibilities. Finally, he explained that Leisurelands do have a certain level of responsibility, as they facilitate that De Kaaiman rents the area to use as diving water. He argued that Leisurelands should bear both the benefits and the costs that are part of owning a lake.

5. Discussion

The interviews and results from the textual analysis indicate that the local water board is responsible for the water quality of the surface water within their region. However, the situation in lake Berendonck is not a problem in regards to the water quality, as the goals set for the visibility in lake Berendonck are met. These goals are made for all 'overige wateren' alike and require a short-term visibility of 1.1 meter and a long term visibility of 1.7 meters. This means that there is no one who is formally obligated to resolve the situation. In other words, the initiative of applying a treatment still lies with De Kaaiman.

To discuss our results, we have made an overview of the data we collected by creating two different stakeholder matrixes. Furthermore, we will discuss the topic of responsibility. Then the strengths and weaknesses of the report will be discussed.

Stakeholder matrixes

In complex situations such as the management surrounding the visibility of lake Berendonck, there are often many stakeholders with different viewpoints and levels of involvement. To analyze the relationships and interests shown by the interview analysis we made an overview in the form of the Interest-influence matrix and the Actor-linkage matrix.

Interest-influence matrix

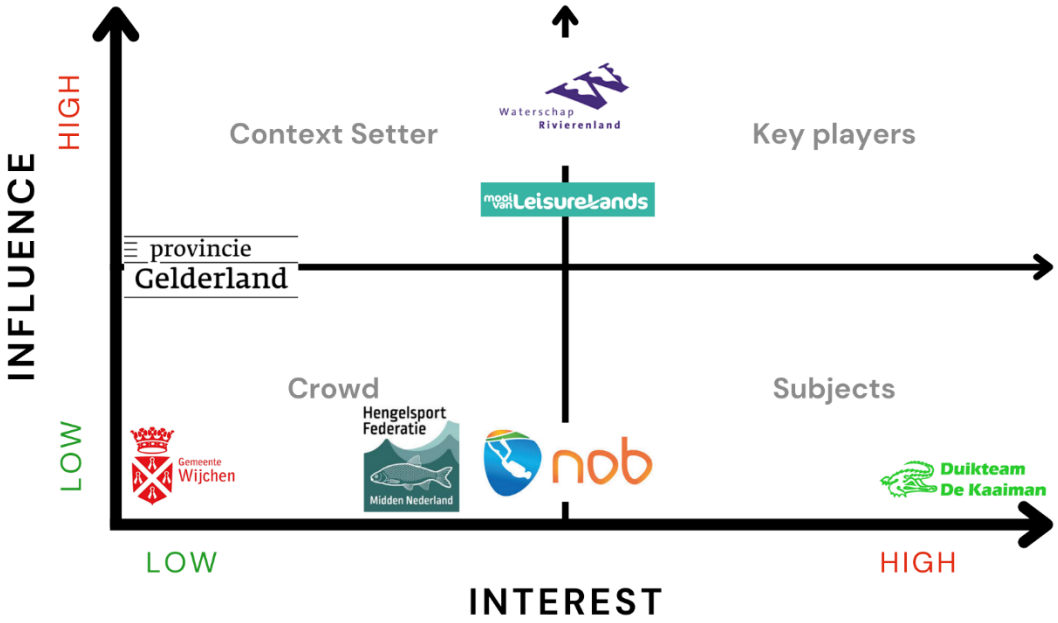

Figure 3. *Interest-influence matrix of stakeholders around lake Berendonck*

The stakeholder analysis comprehends three major steps, as follows: Identification, categorization and investigation of relationships. First the stakeholders were categorized based on their perceived degree of influence and interest, which was assessed according to both the semi-structure interviews and textual analysis. We made an interest-influence matrix with four quadrants with the context setter, key players, crowd and subjects as groups.

In the categorization phase, we identified Leisurelands and water board Rivierenland as being on the line between key players and context setters, as shown in figure 3. According to the analysis, these stakeholders pose both, a high influence and a medium interest in the visibility situation of lake Berendonck. On one hand, Leisurelands, as the owner of the land and water of the lake, has a strong power in decision-making and must give permission for any treatments to take place. Additionally,

they have medium level of interest in the developments in regard to their lake's water quality, as the low visibility is not perceived by them as part of the water quality and therefore it is not seen as an issue. Rivierenland, according to the governmental regulation, are the administrative body in charge of the water quality of the lake (Waterschap Rivierenland, n.d.-a). Rivierenland is therefore responsible for the monitoring of the water quality, as well as granting permits concerning activities near water. They also have a medium level of interest in the situation, as their role involves the management of water quality of the water bodies under their jurisdiction and since they are responsible for granting permits. The water board has confirmed what we found in the textual analysis. They govern the water quality of lake Berendonck. However, as the quality passes their standards, they indicate the low visibility is not currently seen as a problem.

The province of Gelderland plays a context setting role within the stakeholder dynamic, given its position in the governance structure. They have some influence over the management of the lake, being responsible for supervising the water board riverenland, which as previously mentioned, is the competent authority (Waterschap rivierenland, n.d.-a). However, we did not think they had a high influence on the visibility situation as they only concern themselves with and are responsible for the swimming areas. Therefore, the province remains in a neutral position regarding further actions to monitor and improve the quality of the issue, as it is not, in principle, part of their core functions.

De Kaaiman is placed in the subjects quadrant, because they are most impacted by the low visibility and its effects they have the highest interest. However, they need to get permission from Leisurelands and permits from Rivierenland to take action and improve the visibility. Hence, we think De Kaaiman should be placed in subjects because their high interest and low power. De Kaaiman is in a position in which they have the highest stakes, but a very low level of influence. There are no other parties De Kaaiman can point to or make a party step up to their responsibilities. This is a vulnerable position and it means that De Kaaiman is very dependent on the other, more influential, stakeholders' actions. As previously noted, the governance scenario, concerning the water quality of the lake Berendonck, indicates that there is not a formally responsible party, regarding the cleaning of the water. This finding has implications for De Kaaiman, as this stakeholder has the highest interest in the project. The absence of a responsible entity, means that De Kaaiman should take the further steps in order to improve the visibility of the water, encompassing asking for permits. On the other hand, it is important to highlight that the visibility condition of the lake, it is not perceived as a problem for the other involved stakeholders, which leaves De Kaaiman with the biggest responsibility, in terms of implementation of potential solutions.

The municipality of Wijchen, Hengelsport Federatie Midden Nederland and the NOB are categorized as crowds because they were invited to the discussions but do not have high influence nor interest in the issue. However, Hengelsport Federatie Midden Nederland and the NOB want to stay informed about the future plans for the lake. Therefore, they have a higher interest than the municipality of Wijchen and are placed more to the right in the matrix. The NOB is also concerned about the future of the divers and based on the interview, they have same goal as De Kaaiman to increase the biodiversity of the lake.

Actor-linkage matrix

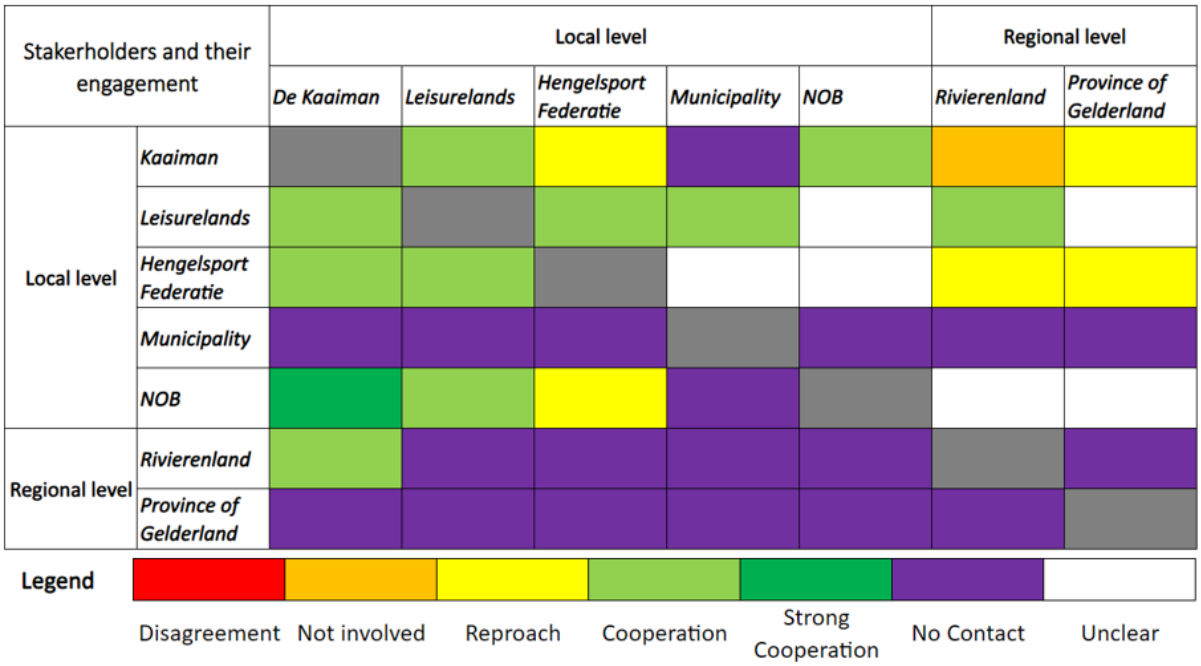

Figure 4. Actor-linkage matrix of stakeholders around lake Berendonck

On the basis of the interviews with stakeholders, we grouped their perceived degree of engagement in the actor linkage matrix, figure 4. The matrix should be read from left to right and describes what the row's stakeholder's perspective of their relationship with the other stakeholders from the upper columns. The color of the cells indicates the current relationship. The color red indicates disagreement, this refers to the situation in which one stakeholder experiences that the ideals between the two of them are so different that it results in disagreements. The orange indicates not involved, referring to a situation in which one stakeholder feels as if the stakeholder does not want to be involved and has barely communicated this. The yellow indicates reproach, in this instance the stakeholder has communicated with the other party, but this one has specified that this does not concern them and they wish to not be involved in the project. The light green indicates cooperation, meaning that the stakeholders feel that the cooperation between them is good. The dark green indicates strong cooperation, in this instance the stakeholder perceives a high-level cooperation and engagement. The purple indicates that no contact has occurred between the two stakeholders according to the stakeholder at hand. In addition, the white means we did not get enough information about relationships between specific stakeholders to appoint a status of relationship. For example, Leisurelands did not mention their relationship with the municipality of Wijchen, therefore, the grid was whitened to indicate a lack of information.

According to the communication with De Kaaiman, they consider having good relationships with Leisurelands and the NOB, because they feel like they want similar things regarding the visibility and their communication with one another is on a good level. We categorized their relationships with the Hengelsport Federatie Midden Nederland and province of Gelderland, at the level of reproach, due to their indifferent attitudes towards the visibility situation. De Kaaiman have not contacted the municipality of Wijchen before, therefore we filled the cell with purple. In the communication between De Kaaiman and Rivierenland, Rivierenland said they did not want to be involved in this issue. Hence, we filled the grid with the color orange. Based on the email reply from the Leisurelands, they stated to have positive communication and cooperation with De Kaaiman, Hengelsport Federatie Midden Nederland, the municipality of Wijchen and Rivierenland. Additionally, they do not mention anything about the NOB or the province of Gelderland, therefore we do not know the relationship between them and Leisurelands.

Hengelsport Federatie Midden Nederland has mentioned that they have good communication with both De Kaaiman and Leisurelands during the interview with them. Hence, we filled the grid with green to indicate their cooperation. However, regarding the communication with Rivierenland and the province of Gelderland, they perceived to be left out since Hengelsport Federatie Midden Nederland did not receive adequate information regarding lake Berendonck. Therefore, we determined their relationship to be reproach which is represented by yellow.

The NOB has a good relationship with De Kaaiman since they represent them and other diving associations in the country in laws and regulations regarding diving. Their relationship is therefore indicated by dark green. They also described a decent cooperation with Leisurelands hence indicated by light green. Furthermore, they believe that the fishermen might find fishing in the murky water to be more convenient since the murkiness can obscure the fish from predators thereby protecting the fish stock of the lake. Hence, we choose the level of reproach with yellow color to indicate their relationship since the NOB did not state that they thought the fishermen would be opposed to improving the water quality, they simply stated that they believe the current situation to be more convenient for them. The NOB have not contacted the municipality of Wijchen and do not know their standpoint; therefore, we filled the grid with purple. Additionally, the NOB did not mention Rivierenland or the province of Gelderland. Hence, we choose the color white to indicate the information gap.

The water board Rivierenland has little contact with the other stakeholders regarding this situation and has only given advice a few times in the past to De Kaaiman about potential causes of the low visibility. We therefore filled all the grids with purple except for De Kaaiman.

The province of Gelderland stated that they were not informed about the visibility issue in the lake. Despite their daily communication with the water board Rivierenland regarding the testing of the swimming part of the lake, they were not aware of the low visibility. Therefore, we placed the unaware level into all the cells between the province of Gelderland and all stakeholders. We did the same for the municipality of Wijchen as they were also unaware of the visibility situation and are not involved.

Responsibility

The governance structure surrounding the management of water quality is a complicated network. There are four different parties all responsible for different parts of the overall management of water quality in the Netherlands. These are Rijkswaterstaat, the provinces, regional water boards and municipalities. However, due to its status as an ‘overige wateren’ not many regulations are in place and the goals are met. This means that the most responsible party, the water board Rivierenland, is upholding its responsibilities.

However, we do not think this means that Rivierenland has no part in this play. Rivierenland is in charge of the water quality in lake Berendonck and the visibility is a part of this. The focus of Rivierenland is spread across the many different lakes it has under its jurisdiction and making sure their water quality is passable. This leads to them focusing on the mitigation of lakes with the worst water quality. Since lake Berendonck has a passable water quality the focus of Rivierenland is not on this lake. We think that Rivierenland should support initiatives of De Kaaiman to improve the water quality beyond passable. This would prevent the possibility of the water quality deteriorating to below the set standards. Rivierenland could support this project by getting more involved and attending meetings.

As the owners of the land and the lake, we believe that Leisurelands holds some level of moral responsibility. Leisurelands facilitates the land and water to De Kaaiman and other renters for their activities. Since Leisurelands get the benefits from renting the land, it makes sense that Leisurelands should play a part in upholding the water quality of the lake it rents out. We believe that Leisurelands should contribute, both financially and by attending meetings, to the initiative of De Kaaiman. We think so because Leisurelands should carry both the costs and benefits that are part of renting out a location suitable for diving.

Strengths and weaknesses

The decision to conduct semi-structured interviews was one of the strengths of this report. Being able to skip questions that turned out to be not as relevant as we perceived at the start kept the interviews more structured. Moreover, the flexibility of the semi-structured model allowed us to introduce follow-up questions, which was significantly helpful to get a broader picture of the problem, considering each stakeholder's perspective.

Another strength of this project was the communication with the stakeholders. We took the initiative at an early stage of the project, which facilitated the process of scheduling the interviews, since most of the participants were able to reserve a place on their agenda for our interviews. This action was key for effective planning, and therefore for the collection of the information. Given the fact that stakeholder contact is a recurrent limitation for research, without taking this approach, it is very possible it would have meant that we would not have been able to perform as many interviews as we did.

Unfortunately, we were unable to interview all the stakeholders due to time constraints and the busy agendas of three of the stakeholders. Fortunately, we at least received information through email from all but one of the stakeholders that we were unable to interview. Furthermore, since some information regarding the management of lake Berendonck was unclear to us before the textual analysis, we were not always able to ask the best questions at the first few interviews. These factors lower the validity of the interviews.

The stakeholders that we were not able to interview were sent the questions by email. However, these answers were very brief and gave us less insights than the interviews conducted. This means that the validity of the research decreases. Specifically, the validity of the stakeholder analysis and its matrixes as these rely largely on the stakeholder interviews.

A weakness of this project in general was the lack of time. The limited amount of time for the entire project, 2 months, meant that the pace was quite high. This caused on the long run that we wished we had done something different at the start. For example, if we had the time to pilot the interview guide, we could have collected data more efficiently. Another example would be that we could have performed the textual analysis before the interview and this would have given us the room to skip some of the general questions and ask more deepening questions.

6. Conclusion

Our main research question was *"Which strategies could be applied in order to best navigate the governance aspect of the clean-up project of lake Berendonck?".* To answer this question, we made a roadmap based on all of our results which can be found in the recommendations chapter. To conclude what we found in our results we will now individually answer all the sub-questions.

Who are the different stakeholders involved in the water management of lake Berendonck?

As a part of our research, we have held interviews with the province of Gelderland, the water board Rivierenland, diving association De Kaaiman, Hengelsport Federatie Midden Nederland and the NOB. We also got in contact with Leisurelands and the municipality of Wijchen through email where they answered our questions. These parties were chosen based on their interest and influence on the lake Berendonck situation. The WUR Aquatic Ecology and Water quality management was also contacted and interviewed for their knowledge and interest regarding the visibility situation. Based on our results the stakeholders that are most involved with the water management of lake Berendonck are the province of Gelderland, the water board Rivierenland and the landowner Leisurelands.

What are the relations and interests of the different stakeholders regarding lake Berendonck?

Generally, the relations between the different stakeholders are either cooperative or low interest. There is no real opposition to improving the visibility through water treatments as long as the right procedure is followed and the ecology of the lake is not negatively affected. As for the interest levels of the different stakeholders, the province of Gelderland and the municipality of Wijchen are not involved in the lake Berendonck visibility situation and have a low interest. Hengelsport Federatie Midden Nederland and Leisurelands have some interest and would like to stay informed about the project, but would rather not be too involved. The NOB and De Kaaiman have a medium and high interest in the project respectively and the NOB is willing to participate in future discussions. Lastly Rivierenland has said that they are willing to answer questions and give advice, but they will not help with any treatments or get too involved as the water quality is not in a state that requires their intervention.

What is the governance surrounding the management of the water quality of the diver's part of lake Berendonck?

As lake Berendonck is not part of any special regulation (WFD water body, protected nature area), the water management of lake Berendonck falls mainly under the water board Rivierenland. The water board is also responsible for issuing licenses and permits regarding construction and treatments around and in the water. The province has an overseeing role over this and is in charge of the water quality of the swimming area of lake Berendonck. Since lake Berendonck is not part of any special regulation, there are few water quality laws in place. The municipality of Wijchen has little to do with the water quality and/or water management of lake Berendonck. Leisurelands owns the land and water of lake Berendonck, but are still required to have a permit before they can undertake any altering measures.

What possible courses of action can be taken if the commissioner wants to initiate the clean-up of lake Berendonck?

We expect that currently there are no water quality standards breached in the diving part of lake Berendonck, this is further confirmed by multiple stakeholders throughout the interviews. This means that no one bears the responsibility of improving the visibility in lake Berendonck, if De Kaaiman wishes to increase the visibility, they should take that initiative themselves. Many of the possible solutions that could help increase the visibility require a permit from the water board Rivierenland. The roadmap in the recommendations will further explain which steps De Kaaiman can take.

7. Recommendations

Now that we have discussed the results and answered our research questions, some recommendations regarding the future can be made. To provide a clear overview of these recommendations we created a roadmap, see Figure 5. The roadmap contains the steps that we recommend in order to make this process as straightforward as possible. This roadmap takes the high possibility of a necessary permit into account.

Roadmap

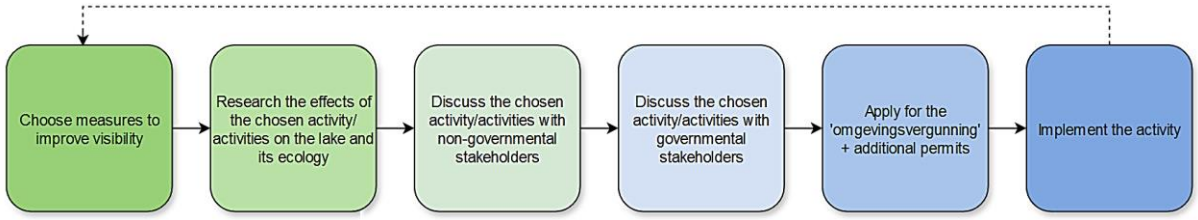

Figure 5. Roadmap improving visibility

Initiation

If the diving association wishes to decrease the murkiness of the diving part of lake Berendonck, it is advisable to do so themselves. The current legislation does not call for immediate action, which means that there is little chance any governmental body will take this initiative. Furthermore, they are the stakeholder which would benefit the most and have the most interest in an improvement in visibility.

Choosing an activity

Now it is time to decide on which activity (or activities) should be used in order to solve the issue at hand. In the case of lake Berendonck it is not yet clear which solutions are possible. However, at the moment there is research being conducted that could show which options would be the most suitable. After an activity is chosen a check can be done to see if a permit is needed through the website of the 'Omgevingsloket', however, it would be wise to consult with the water board Rivierenland as well. As these are very probable altering activities, it is to be expected that a permit is necessary.

Obtaining permit

In order to perform any altering activities to lake Berendonck an 'omgevingsvergunning' (and possibly more permits depending on the activity) is necessary from the water board Rivierenland. These activities can range from very minor such as planting vegetation to more drastic such as using chemicals. The only difference between these two activities is that it is easier to obtain said permit from the water board in the case of a less extreme activity. Every additional activity requires a different permit. In this section of the report, it will be explained what steps are necessary in order to obtain an 'omgevingsvergunning' from Rivierenland. These steps are based on the explanation of the section required permits from the textual analysis.

The first step would be to understand the chosen activity and what kind of effect this could result in. It is a requirement that the activity may not disrupt plans of the water board. The activity may not harm water availability, flood protection and it needs to follow the other rules described in the waterschapsvordering (Waterschap Rivierenland, 2024b). It is important to follow these guidelines, as it is a requirement to obtain a permit.

The second step in obtaining a permit is to discuss the activity with other stakeholders. A good start would be to approach the non-governmental stakeholders discussed in the stakeholder analysis. This

is a requirement that is stated as participation under the 'omgevingswet'. It is expected of the initiator to talk with all parties involved. For big activities as well as activities that could be controversial it is advised to first contact the water board Rivierenland and to consider hiring an unbiased process manager. After contacting all stakeholders, a short report should be made with all the different concerns, ideas, objections, comments and agreements. The report should be sent to all stakeholders and their written reactions should be included in the report (Gemeente Wijchen, 2024).

The third step is to contact the governmental body in charge of granting the permit before the official inquiry is made. This is a step advised by the municipality of Wijchen, it is meant to prevent unexpected issues (Gemeente Wijchen, n.d.-a). As discussed before, in the case of lake Berendonck the governmental body to contact would be Rivierenland. It could be useful to still contact the municipality of Wijchen and province.

The fourth step is applying for the permit. This can be done through the government website https://omgevingswet.overheid.nl/. On this website a project will be created, afterwards the location and activities need to be specified. Then questions about the activities need to be answered and the required documents, such as the participation report, need to be added. To conclude, the application is to fill in the personal information and then the application can be submitted. More details about this process can be found on the website mentioned above. When applying for this permit costs will be involved, the costs for applying for a permit under the legislation of Rivierenland are described above (Omgevingsloket, n.d.).

Implementation

After the 'omgevingsvergunning' (and other permits if necessary) has been obtained, the implementation of the activity or activities can take place. It is important to start these activities at least before 1 year has passed. If these activities are not started in this timeframe a new permit is required (Waterschap Rivierenland, 2024b). It is important to continue to inform the other stakeholders during the implementation as well (Gemeente Wijchen, 2024).

Assessment

After the activity/activities have been implemented the progress should be assessed. Did the action work? Is there a need for new activities? Does De Kaaiman wish to continue the process? What are the opinions of the other stakeholders? If it is decided to try more measures, the roadmap should be restarted, and new activities have to be chosen.

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