A Path to Climate Mitigation

FACTORS HINDERING AND FACILITATING THE REWETTING OF TRUNDHOLM MOSE

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Abstract

The rewetting of carbon-rich lowland soils is identified as a cost-effective tool to curb GHG emissions. For Denmark to reach the climate targets set out by the 2030 Paris Agreement, prompt action is needed. Given that more than 50% of Denmark's CO_2 emissions from the agriculture sector originate from cultivating carbon-rich lowlands, such areas have been prioritized on the political agenda. Our case study of Trundholm Mose (TM) sheds light on the factors that could potentially hinder or facilitate the implementation of similar rewetting projects. Through an interdisciplinary approach, hindering and facilitating factors were identified in the socio-economic, environmental, emotional, and institutional dimensions of rewetting project implementation. Calculations of TM's carbon emission mitigation potential suggest the executive order on wetland projects' requirements will be met, therefore not hindering project implementation. Given the identified hotspots for phosphorus leakage, scaling down the project's size may mitigate phosphorus' hindering role. The consideration of additional socio-economic and emotional factors reveals that landowners mainly fear personal loss. While interest in land swapping and monetary compensation have generated project support, scepticism, concerns, and confusion may hinder project implementation. Enhanced communication and inclusivity have the potential to mitigate these hindering factors. Institutional inadequacies underlie these environmental, socio-economic, and emotional factors. Therefore, we advise profound structural changes to incorporate flexibility and the consideration of trade-offs. Without such reforms, the identified hindering factors in Trundholm Mose may continue to manifest throughout Denmark, thereby challenging nationwide implementation of rewetting projects and reducing the likelihood of meeting the 2030 targets.

Keywords: Interdisciplinary research, climate mitigation, rewetting, implementation factors, Denmark

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Disclaimer

This report is based on two weeks of supervised field work (data collection). The report expresses the analysis and views of the students, which may not necessarily correspond with the views of the persons and institutions who the students have engaged with, or the University of Copenhagen.

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List of Abbreviations

Abbreviation	Item
AFOLU	Agriculture, Forestry and Other land-use
BoP	Bangsgaard og Paludan Aps
CAP	Common Agricultural Policy
DCCC	Danish Council on Climate Change
IPCC	Intergovernmental Panel on Climate Change
PoV	Principle of Volunteering
SSI	Semi-Structured Interview
TM	Trundholm Mose

1. Introduction

In December 2015, the Paris Agreement united 197 countries to limit global warming well below 2°C. Denmark's dedication to a green transition has allowed the country to stand out as a frontrunner in climate action. Despite this ambitious commitment, only nine years remain to reach the 2030 Danish pledge of cutting emissions by 70%. The Danish Council on Climate Change (DCCC) concluded in its 2020 yearly Status Update Report that Denmark is unlikely to meet its targets and urged for the implementation of immediate and concrete climate action plans (DCCC, 2021).

The DCCC specifically advises for greater pace in rewetting Danish carbon-rich lowland soils to mitigate emissions in the agricultural sector. Rewetting receives particular praise and attention as a climate mitigation mechanism that brings immediate benefits at meagre societal costs (DCCC, 2021). This rhetoric is motivated by statistics revealing that while only 7% of agricultural production takes place on carbon-rich lowlands, these soils contribute to more than 50% of Denmark's CO_2 emissions related to agricultural production (DCCC, 2020). Additionally, current estimates state rewetting all carbon-rich lowland soils would reduce emissions by up to 4.1 million tonnes of CO_2 per year, representing approximately 25% of Denmark's 2030 emission reduction target (DCCC, 2020).

Subsequently, rewetting projects are high on the Danish political agenda as a strategic path to fulfilling climate targets. In practice, many rewetting projects have been delayed or stopped due to unanticipated barriers. This report aims to shed light on the factors that facilitate and hinder the implementation of rewetting projects in Denmark. These factors have been organized into environmental, socio-economic, emotional, and institutional categories for analytical purposes. Primary data was collected on-site in Trundholm Mose (TM), Odsherred Municipality, a proposed area to be rewetted.

1.1 Literature Review

This section provides an overview of the literature on key factors that facilitate and hinder the implementation of climate mitigation rewetting projects. From this point on, rewetting will specifically refer to projects intended to reduce emissions unless noted otherwise. A large body of literature on this topic exists throughout the world (Duarte et al., 2013; Warren et al., 2017; Ojanen & Minkkinen, 2020). This text will mainly focus on temperate climate literature to contextualize the case of TM with climate-specific information.

Many case studies support rewetting's fundamental hypothesis that CO_2 emissions increase when organic soils are drained (Chistotin et al., 2006; Maljanen et al., 2007; Salm et al., 2012; Renou-Wilson et al. 2014). This increase is driven by the soil's newly dry aerobic state,

which allows for greater decomposition rates and, therefore, more significant CO_2 emissions. Therefore, many studies support rewetting as a mechanism to significantly reduce emissions (Tuittila et al., 1999; Soini et al., 2010; Waddington & Warner, 2001; Schrier-Uijl et al., 2014; Renou-Wilson et al., 2014).

Despite this great potential, a fair share of uncertainty remains when calculating emissions. One discrepancy occurs when determining emissions from soils with 6-12% carbon contents versus soils with >12% carbon content. Currently, Danish calculations assume 6-12% soils emit half of the emissions from >12% soils (DCCC, 2020). A more extensive German study reveals 6-12% soils do not necessarily emit less than soils with >12% carbon content (Tiemeyer et al., 2020). Tiemeyer et al. (2020) suggests this discrepancy is due to the "high bulk density and, accordingly, high aerated N stocks" in low carbon organic soils. As a result, Danish carbon mitigation potential calculations are considered an underestimation from a German perspective (Tiemeyer et al., 2020). On the other hand, overestimations in Danish models likely occur due to assumptions that drained soils are dryer than they are (DCCC, 2020).

The influence of cultivation intensity is also not adequately addressed in current Danish models. At the moment, Danish models divide cultivation into 'areas in rotation' with crop grown and 'areas outside of rotation' with permanent grassland (DCCC, 2020). More extensive research suggests this binary is too simplistic. For example, no significant difference in emissions was found between 'areas in rotation' and those 'outside of rotation' (Tiemeyer et al., 2020). Large emission variability in grasslands calls for including mean annual water depth and nitrogen content as variables to account for methane and nitrous oxide emissions (Tiemeyer et al., 2016).

Another factor to consider is nutrient leaching which causes eutrophication of downstream water bodies and algal blooms. Phosphorus leaching, caused by the mobilization of iron-bound phosphorus molecules, is of particular concern in large scale rewetting projects in intensive agricultural areas (Meissner et al., 2008). To estimate and help avoid these adverse side effects, analysis of the quantity, distribution, and chemical form of phosphorus is required (Hyvärinen et al., 2012). While phosphorus leaching acts as a risk, the likelihood of nitrogen leaching becomes reduced with rewetting. This is due to nitrogen shifting from an inorganic to its organic state common to wetlands. This organic state is more prone to retention (Lundin et al., 2017).

Enhancing biodiversity is often advertised as a co-benefit of rewetting, but research shows attaining this goal is complicated in practice. Species associated with carbon-rich lowlands are known to be sensitive to even small changes in water levels (Bragg & Tallis, 2001). Therefore immediate consequences of rewetting can negatively impact biodiversity with large amounts of plant species death (Kløve et al., 2017). A long term perspective sheds further caution in terms of biodiversity. European projects tend not to budget for mechanisms, like seed dispersal and mulching, to support biodiversity. As a result, European projects may require a considerable amount of time to reach pristine conditions of biodiversity (Holden et al., 2004; Soini et al., 2010).

Beyond biodiversity, Kløve et al. (2017) investigate the land-use history and local biophysical conditions and further emphasizes the importance of local realities for effective rewetting projects, such as the taking into account of peat quality, local hydrology conditions and farmers' socio-economic dependency on land. Similarly, Vasander et al. (2003) stress that rewetting initiatives should combine scientific research, project monitoring, and careful attention to stakeholder relationships to encourage co-benefits.

To further explore the societal dimensions of rewetting, the literature scope was widened to the general topic of nature-based climate mitigation projects. Key local barriers include lack of awareness, fear of the unknown, and inequitable distribution of costs and benefits (Kabisch et al., 2016). The latter point of agrarian society marginalization in the name of sustainable development is largely discussed in a Global North-South dimension (Mathur et al., 2014; Borras & Franco, 2018). Bringing it back to Denmark, Woods et al. (2017) note Danish farmers are motivated into climate action by potential gains rather than out of fear. This results from the "perception of climate change risks [as] temporally and/or spatially bound" so that "impacts are perceived or expected to occur elsewhere, far in the future, or both" (Woods et al., 2017, p. 111). Further literature from the Danish context comes from Svendsen & Sørensen (2007). Here the influence of 'intangible capital', such as trust, identity, and community organization skills, is discussed as the missing link in sustainable development (Svendsen & Sørensen 2007).

Finally, institutional factors have also received attention in the existing literature. Most authors explore the municipality's role and related challenges encountered with climate mitigation project implementation (Lund et al., 2012; Amundsen, 2010; Storbjörk, 2007). By studying Danish, Norwegian, and Swedish municipalities' experiences and strategies, these authors have identified key factors potentially hindering project implementation. Common factors are lack of existing data, local expertise, knowledge sharing, and collaboration which hinder potential co-benefits or synergies in climate change projects (Lund et al., 2012)

1.2 Objectives and Research Question

While the literature review reveals substantial existing knowledge on the biophysical characteristics of rewetting, less attention has been given to socio-economic, emotional, and institutional facets. This report investigates these manifold factors at play in the TM rewetting proposal to answer the research question:

What factors facilitate and hinder the implementation of the Trundholm Mose rewetting project?

2. Analytical Framework

This study is guided by the following analytical framework, which assesses hindering and facilitating factors for the implementation of rewetting projects (Figure 2.1). Specifically, this framework is used to systematically assess the hindering and facilitating factors at play in the proposed rewetting of TM. The analytical structure mainly draws upon Geist and Lambin's (2002) underlying and proximate causes for deforestation. Based on the literature review and collected data, four analytical dimensions could be identified: socio-economic, environmental, emotional, and institutional factors. All dimensions are assumed to act synergistically and thus interact. In the following section, the four analytical dimensions are further outlined.

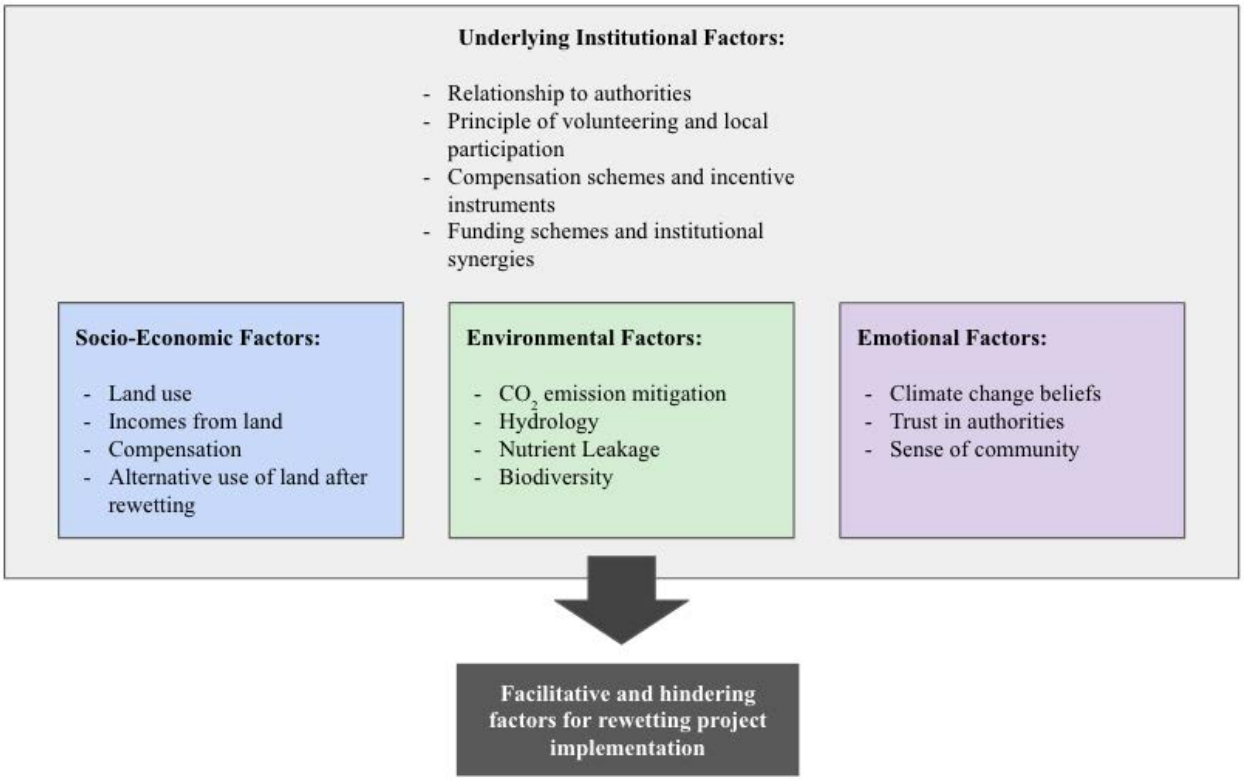

Figure 2.1 Analytical framework for assessing the opportunities and barriers for the implementation of rewetting projects

The institutional factors act as underlying facilitating or hindering factors as they determine the political context and thus influence the socio-economic, environmental, and emotional factors. These institutional conditions appear in the relationship within and between authorities and local people, characterised by communication, knowledge and information sharing, trust, transparency,

the level of involvement, and local participation in decision-making and finding solutions. Additionally, international funding schemes for rewetting projects and national landowner compensation and economic incentive schemes impact the conditions and outcomes for rewetting projects. This is partly materialized through landowners' attitudes, which correlates with the socio-economic factors. Here, it is emphasized that the classification of hindering or facilitating may differ in the perceptions of authorities and local people. The socio-economic dimension focuses on the relationship between land-use and landowner income and how this may facilitate or hinder project implementation. Land-use is considered the fundamental base to which income from land, financial support, compensation, and alternative land-use are connected. The degree of reliance on these livelihood components can influence landowners' willingness to voluntarily participate and may hinder or facilitate project implementation (SSI UCPH professor). Environmental factors include the carbon emission mitigation potential, hydrology aspects, risk of nutrient leaching and biodiversity. Informed by the executive order on wetland projects and lowland areas (MFVM, 2021), each of the aforementioned factors needs to adhere to rigid requirements that determine project implementation or not. Since rewetting projects cannot be implemented without people's approval, emotional factors do play a role in the process. Investigating individual stakeholders' opinions, values, and concerns allow us to assess the complexity of individual experiences and their impact on project support. To gain a sense of landowners' openness for change and willingness to participate, topics like climate change, relationships to authorities, sense of community, and attachment to land will be investigated.

3. Background

3.1 Roles and Coordination Between Involved Actors

The main roles of stakeholders at the European, Danish, and local level are presented in Figure 3.1.1. In the case of TM, these same actors will affect, either directly or indirectly, the conditions behind project implementation.

3.2 The Process of Rewetting Trundholm Mose

To initiate the rewetting project in TM, an application for an 'execution of responsibility feasibility study project' was submitted to the Ministry of Environment by Odsherred Municipality. Once validated, the municipality reached out to the BoP consultancy to implement a preliminary project assessment. This preliminary assessment is ongoing to ensure "the project area fits under carbon-rich lowland soils" (SSI Municipality representative) and is expected to be finished by the end of summer 2021. Among other things, BoP's preliminary study will estimate the risk of phosphorus leakage, changes in biodiversity, and hydrology. If the preliminary study reveals TM is feasible to rewet, the consultancy will begin individual landowner talks to discuss potential impacts and compensation options.

As of now, 80 landowners are included in the project area (SSI Municipality representative). Therefore landowner talks can require a considerable amount of time (SSI DNA employees). Nevertheless, landowners' participation is pivotal for project implementation. The so-called principle of volunteering (PoV) applies to all nature management projects in Denmark and implies rewetting must occur voluntarily. While this principle aims for unanimity, the municipality can expropriate landowners and force them to sell their land to the state (SSI UCPH professor; Municipality representative). In practice, this power is rarely used (SSI DNA employees). If the municipality succeeds in getting all landowners on board, an application for rewetting funding will be submitted and eventually granted by the Ministry of Environment.

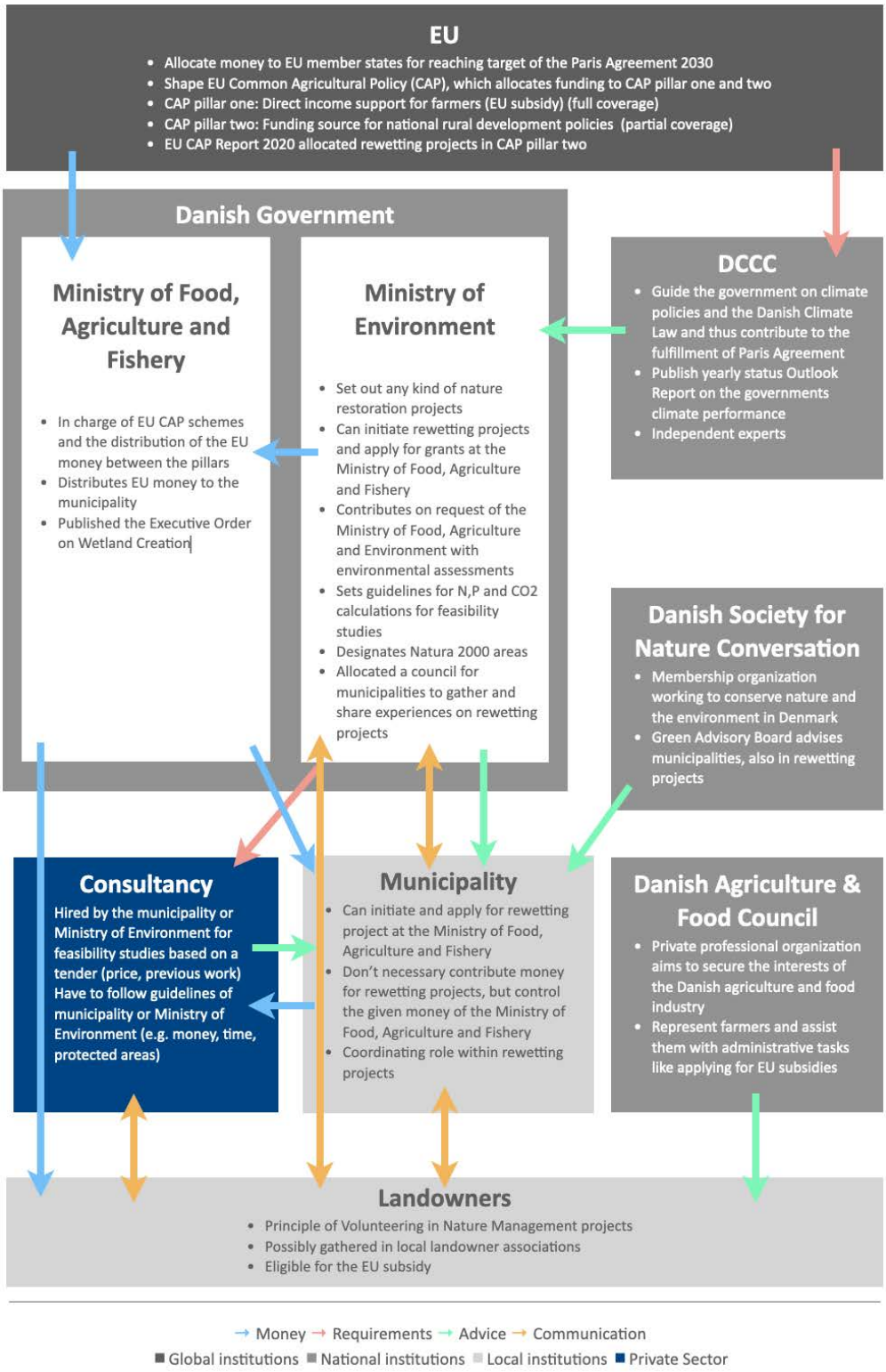

Figure 3.1 Stakeholder map in the context of rewetting proposals (SSI Tage Duer; Jette Jacobsen; Municipality representative; DNA employees; UCPH professor)

3.3 Description of Study Site

TM is the result of both geologic history and the following human-made efforts to cultivate the land. During the Nordic Stone Age, the sea was at its highest level at TM's current location (Geopark Odsherred, 2021a). In the following 5000 years, climate change, associated storms, and sea surges led to the Sejerø bay's erosion (Figure 3.2). Large deposits of sand and gravel into coves formed seawalls and isolated the inner part of the bay from the open sea. Lacking saltwater input, a freshwater lake developed over time which subsequently turned into a bog through plant debris deposition. The resulting anoxic environment caused a carbon-rich, organogenic soil to form (Odsherred Geopark, 2021b).

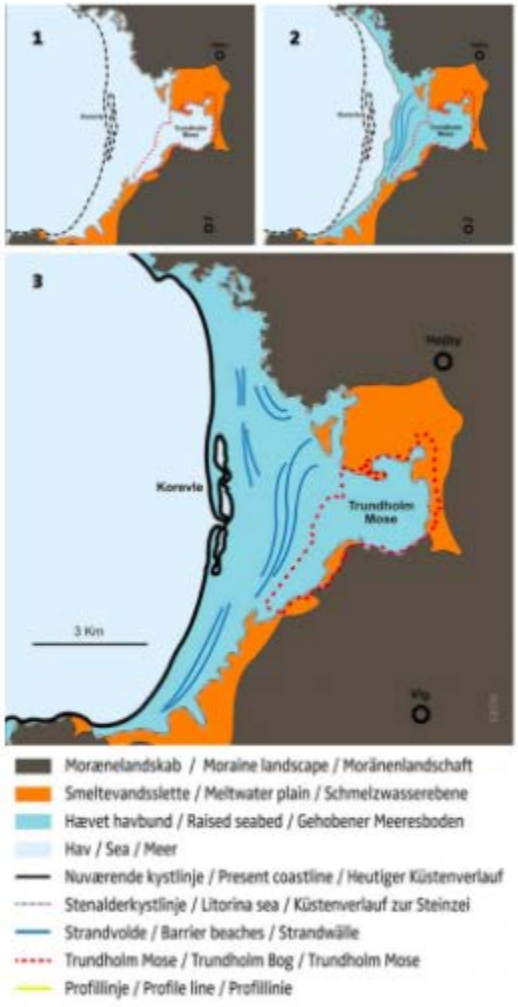

Figure 3.2 Geologic history of Trundholm Mose
Adopted from UNESCO Geopark Odsherred

At the end of the 18th century, inhabitants of the area capitalized on this fertile land by draining it for agricultural purposes. This practice became more common after the Second Schleswig War in 1864 between Germany and Denmark (SSI Jette Jacobsen; Odsherred Geopark representative). This uptick was to meet the following request: "what we lose on the outside, we have to compensate for on the inside" (Grænseforeningen, 2020), referring to the land lost in southern Jutland during the War. Back then, the land was mainly used for livestock grazing and cereal production (SSI 5, 6). To provide equal access to the grazing lands, TM was originally divided into multiple small plots (Figure 3.3). Over the 20th and 21st century, intensively managed land has decreased, creating the current mosaic of agricultural land, grasslands, and natural bogs (Figure 3.3). During this period, many smaller plots merged into bigger ones, hinting towards a decreasing trend of landowners in the area (SSI 11, 12). Nowadays, approximately 150 people own plots in TM, of which 80 will be potentially affected by the rewetting project.

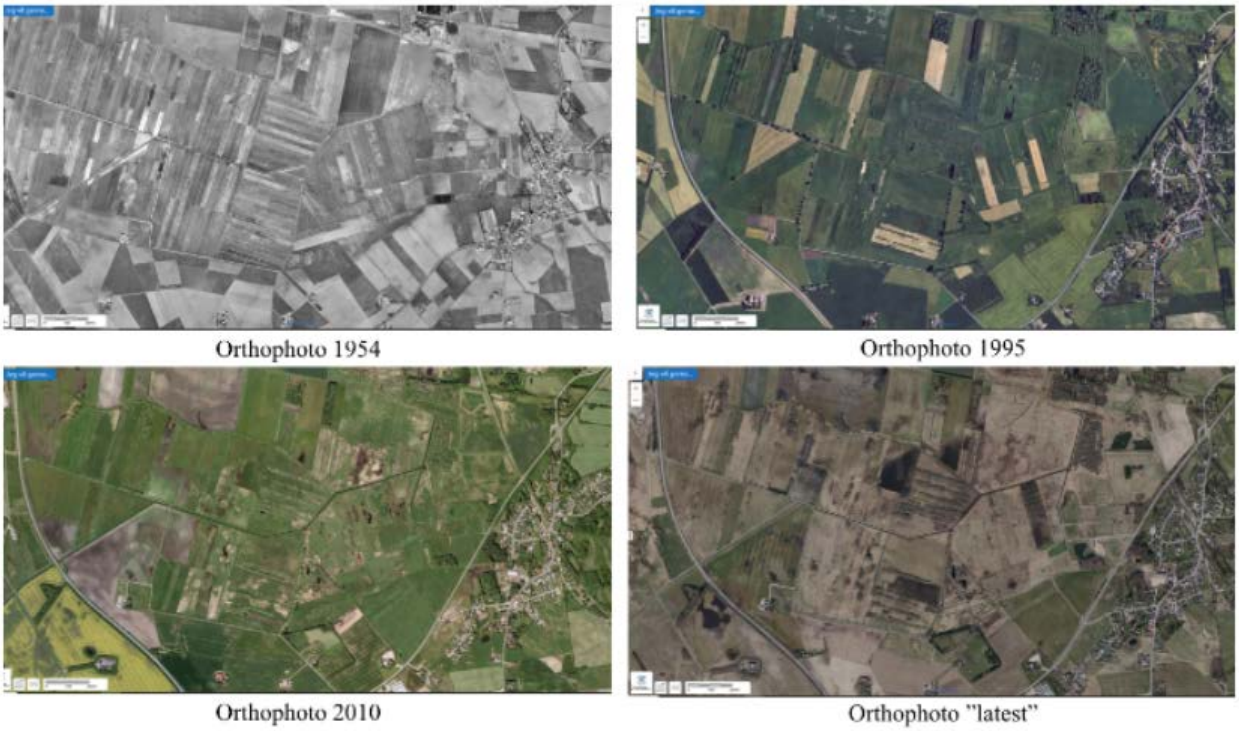

Figure 3.3 Time series of orthophotos of Trundholm Mose from the years 1954, 1995, 2010, and "latest" (Miljøportalen 2021)

4. Methodologies

A combination of methods from both the natural and social sciences was used for data collection. Fieldwork was carried out in the first two weeks of March 2021, with follow-up online meetings and email correspondence with relevant stakeholders after the *in situ* presence in Odsherred Municipality.

4.1 Soil Sampling

The transformation of a drained carbon-rich lowland into a freshwater wetland entails various changes to the natural environment, both biotic and abiotic. To identify potential factors hindering and facilitating rewetting implementation, we primarily focused on TM's pedologic characteristics. Given TM's agricultural history, it is crucial to quantify phosphorus's harmful potential and nitrate leakage into inland and coastal water bodies. Additionally, carbon content was measured to calculate related CO_2 emissions. The following sections are inspired by Hoffman et al. (2018).

4.1.1 Sampling Strategy

Bulk density, total carbon and nitrogen, nitrate (NO3-N), and iron-bound phosphorus were measured via a 5m x 30m sampling grid, laid out in the same direction of the nearest watercourse following the assumption that subterranean water flows follow the same direction (Figure 4.1.1). Each grid is assumed to represent homogeneous soil conditions. At the centre of the grid, a bulk density measurement was taken for volume weight determination together with a spade test for soil description. Here, root depth, insertion depth of the soil core and, if relevant, the groundwater level were asserted. In parallel, the central point coordinates were registered via a Garmin eTrex® 10 GPS device together with pictures of the soil profile and the surrounding environment. In total, 56 soil samples were taken, of which 28 were used to assess the bulk density and the total carbon and nitrogen. The remaining 28 samples were used to assess the amount of nitrate and iron-bound phosphorus. The separation of samples was necessary since it was for the lab analysis procedures.

Access to land within the study site for soil sampling was gained through prior informed consent. Here, we aimed to sample a wide variety of land-use types (i.e., wetland, (planted) forest, wet forest, agricultural land, intensively and extensively managed permanent grasslands), and elevation levels. The drainage level at the moment of sampling was also noted down. A distinction was made between a low, medium, and high drainage level, ranging from the majority of the land surface inundated, an intermediate level of land surface inundated, to no visible groundwater above the surface. Whenever a plot was deemed too heterogeneous and/or too large,

two sampling grids with varying distances to the nearest drainage canal were laid out to capture this landscape diversity. The preceding sampling considerations required us to take at least 56 soil samples in order to attain adequate coverage of the study site.

4.1.2 Carbon, Nitrate and Phosphorus Sampling

At the centre of each quadrant in the sampling grid (see Figure 4.1.1), a soil sampling spear with a depth of 25 cm was used to obtain data on total carbon and nitrogen, nitrate, and iron-bound phosphorus (NPC samples). The four subsamples were then pooled *in situ,* thereby averaging the values of the NPC samples.

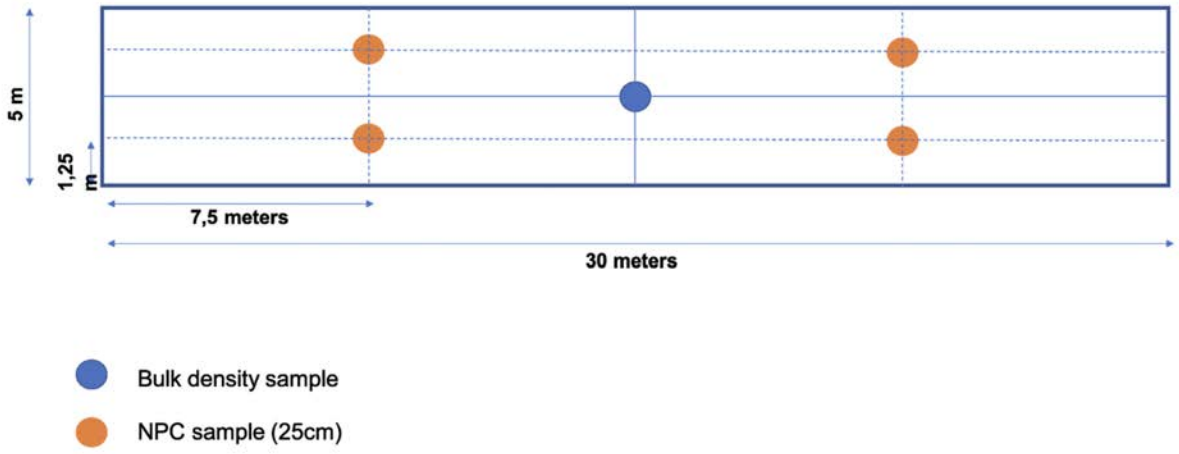

Figure 4.1.1 Schematic representation of the sampling grid used for soil sampling

4.1.4 Analysis of Soil Samples

Analysis of the iron-bound phosphorus was performed through the standardized dithionite-extraction procedure (Hoffman et al., 2018). The soil texture assessment was done through the commonly adopted feel analysis, developed by USDA and modified from Thien (1979). The evaluation of the soil's nitrate content was performed via a standardized nitrate extraction method (ISO/TS 14256-1) with slight modifications. Soil: KCL ratio was 10g to 40 ml KCL (1M solution). Afterwards, samples were shaken for 1 hour in the over-end shaker. Final results are presented in mg NO3-N per kg soil.

4.1.5 Data Analysis

To calculate the carbon emissions, a combination of primary data and Texture2014 data on carbon content was used. To assert emission data for the whole study site, three models with

different CO_2 emission conversion factors (tonnes per ha per year) were used (see Table 5.2.2). This table also outlines which land-use categories were incorporated into the analysis. For the calculation of the total study site area (ha), plots that were covered for at least 50% by the study site delineation line (Figure 5.1.1) were counted fully. Therefore, calculated CO_2 emissions (Table 5.2.2) and the associated project costs (Table 5.2.3) are an overestimation of the actual values according to the models.

ArcGIS™ software was used to compose the spatial distribution maps of both the carbon content and phosphorus leakage risk hotspots.

4.2 Diachronic Land-Use Assessment

4.2.1 Current Land-Use in TM

To assert the current land-use of plots located within TM, a combination of *in situ* ground-truthing and the consultation of Denmark's Miljøportalen satellite images was carried out. The categorisation of land-use types was also inspired by previous land-use assessments of the area (Støltz et al., 2008). *In situ*, additional information on land-use characteristics was noted, such as drainage level, management intensity of the plot, potential use of fertilizer, among others. A final typology of land-use resulted in the identification of agricultural land (AC), intensively (IG) and extensively (EG) managed permanent grasslands, wetland areas (WT) and planted forest (PF). Notice that wet forests are not categorised as a distinctive land-use type whereas carbon calculations required this distinction (see section 4.1). Based on the initial *in situ* classification of the plots, unidentified plots were assigned a category via satellite images based on noted characteristics. Data on the plot area (ha) was extracted via the publicly available database Miljøportal (2021).

4.2.2 Historical Land-Use in TM

To further understand TM's temporal landscape dynamics, a time series of orthophotos from Denmark's Miljøportal (2021) was composed. Available orthophotos range from 1945 to 1954 and from 1995 to 2020. A comparative study of the orthophotos at different points in time allows for a time-series analysis in which plot size, land-use, and water level are considered varying parameters. The resulting overview of historical land-use trends combined with the land's current status is considered an essential factor in understanding current attitudes towards TM and the current biophysical status of the soil.

4.3 Web-Based Survey

4.3.1 Survey Strategy

A structured, web-based survey was designed via the SurveyXact software to gather standardized data that reveals patterns in perceptions about the rewetting proposal, the municipality and the socio-demographic background of landowners in TM. As the survey could be sent out to all 80 landowners in TM thanks to the Municipality of Odsherred, the survey followed the census sampling strategy and no other possible sampling strategies, like snowball sampling were required. After testing the survey with two Danish translators familiar with the process of rewetting to eliminate misleading or unclear formulations, the survey was translated in Danish to increase the number of participants by including landowners, who do not feel comfortable in English. Also, the translation into the national language should generate trust. Subsequently, the Danish online survey was distributed via Denmark's centralised email service, e-Boks, with the help of the Municipality of Odsherred. A total of 21 landowners completed the survey, online or in some cases on paper by personal consultation in the context of SSI's.

Explicit attention was devoted to the sequence in which the different themes of the survey were addressed (Appendix 9.4.1). Commencing with less sensitive, generic questions on the respondents' i) demographic background and ii) socio-economic situation, the survey led into questions on iii) land-use and ownership. Potentially sensitive questions were addressed in iv) landowners' experiences related to TM, their v) trust in the municipality, and their vi) attitudes towards the rewetting project, and more specifically, perceived risks and opportunities related to rewetting. Before terminating the survey, landowners were asked about their interest in a follow-up interview and whether they would grant permission to access and soil sample their land.

Primarily closed-ended questions were used to elicit information on personal attitudes allowing for quantitative comparison. A combination of binary (e.g. yes/no), nominal (e.g. multiple choice), and ordinal variables (e.g. Likert scale) were used for this purpose. Complemented by open-ended questions on more in-depth topics (e.g. concerns and opportunities), the survey data allows for both quantitative and qualitative analysis.

4.3.2 Online Survey Analysis

The data analysis comprised three steps. First, the surveys filled out on paper were combined with the online responses. Afterwards, the data was cleaned by removing incomplete survey responses and unreliable single values (outliers) from the data set. Subsequently, the automatic coding by SurveyXact was improved to a more understandable extent. After this necessary data preparation, a first preliminary analysis of the different themes was done during and after the fieldwork, thereby feeding into a finer-grained analysis of the in-depth interviews. Secondly,

quantitative analysis of the closed-ended questions was performed via Excel® to elicit relations between the variables. A combination of chi-squared and t-tests were performed to test the significance between continuous and/or categorical variables. In the case of Likert scale data, the strongly agree/agree and strongly disagree/disagree categories were grouped including the 'neutral' category, depending on the response spectrum. For relevant variables, contingency tables were constructed to present the frequency distribution of the respective variables (as shown in section 5). Finally, quantitative data was complemented by qualitative analysis of the open-ended questions similar to the semi-structured interviews (SSI) data (see section 4.4).

4.4 Semi-Structured Interviews

A combination of online and face-to-face SSIs was used to elicit nuance and rationale behind the factors which facilitate and hinder the rewetting project's implementation. Through preliminary interviews with key informants (e.g. Municipality representative), it was possible to identify potentially affected landowners and other relevant stakeholders through a snowball sampling strategy (Reed et al., 2009). The final set of interviews (n = 28) covered a broad spectrum in terms of social and professional backgrounds (Appendix 9.2). Of the 13 landowner interviews, 3 of these informants also completed the online survey. Walk-and-talk SSIs with recreational users were also conducted to gain an outsiders' perspective on TM.

The interviews were flexibly structured according to the four themes, as outlined in the analytical framework. Depending on the participant's relation to TM, different aspects of the themes were highlighted within interviews. Landowner SSIs were aimed to gain personal insights on socio-economic, environmental, emotional, and institutional factors (Appendix 9.3.2), whereas SSIs with other stakeholders (e.g. authorities, experts) focused on factors most relevant to their role at TM. During the interviews, particular attention was devoted to major discrepancies, overlapping information, and conflicting statements between participants.

The majority of interviews took place indoors with two interviewers, accompanied by a translator if requested by the interviewee. Translators were briefed on the research scope before the interview. Outdoor interviews were primarily conducted to collect first-hand knowledge of the environment and used when most convenient for the interviewee. If possible, background sit-ins were present for note-taking and ensuring all key topics and discrepancies were addressed. The interview was audio-recorded with the consent of participants.

Data analysis involved the transcription of the audio-recorded interviews with a focus on relevant quotes. Interesting conversations were paraphrased. Each informant was anonymized by labeling them as an SSI 1 through 34. Except for two informants, who preferred to use their name in order to stress that they were speaking on their own behalf rather than for their employer. Next, the qualitative data was colour-coded according to the four themes: socio-economic, environmental, emotional, and institutional factors. Within each factor, analysis

led the relevant data to be organized into the themes seen in our results section.

4.5 Ethical Considerations

Special considerations were taken given our position as foreigners from the University of Copenhagen coming to rural Denmark with less experience of the local context. To acknowledge this position, we were aware of how this position could affect the research. Having a Danish translator present at interviews to some extent helped overcome such barriers, especially when addressing research topics that could be perceived as sensitive. During fieldwork, the TM's rewetting proposal was in its initial phase of carrying out a preliminary study, and landowners were yet to be informed how the project could affect them. This contextual information, our academic intentions and distinction from the municipality were emphasized during interactions with landowners to avoid misunderstandings and moderate expectations regarding the project. Concerning privacy protection, participation in the study was voluntary, and all informants were anonymized when possible. Lastly, the ongoing COVID-19 pandemic was considered during the fieldwork by offering the alternative for interviews on Zoom, and precautions were made for face-to-face interviews.

5. Results

This chapter triangulates interdisciplinary data collected through the methods outlined previously. The analysis follows the framework structure by beginning with socio-economic factors that facilitate or hinder rewetting project implementation. This is subsequently followed by environmental, emotional and institutional factors.

5.1 Socio-Economic Factors

In this section, an analysis of facilitative and hindering socio-economic factors at TM are presented. Based on an initial assessment of land-use in the area, key factors explored are how landowner attitudes towards the rewetting proposal are shaped by incomes from land, compensation preferences, and perceptions around alternative land-uses.

5.1.1 Land-Use

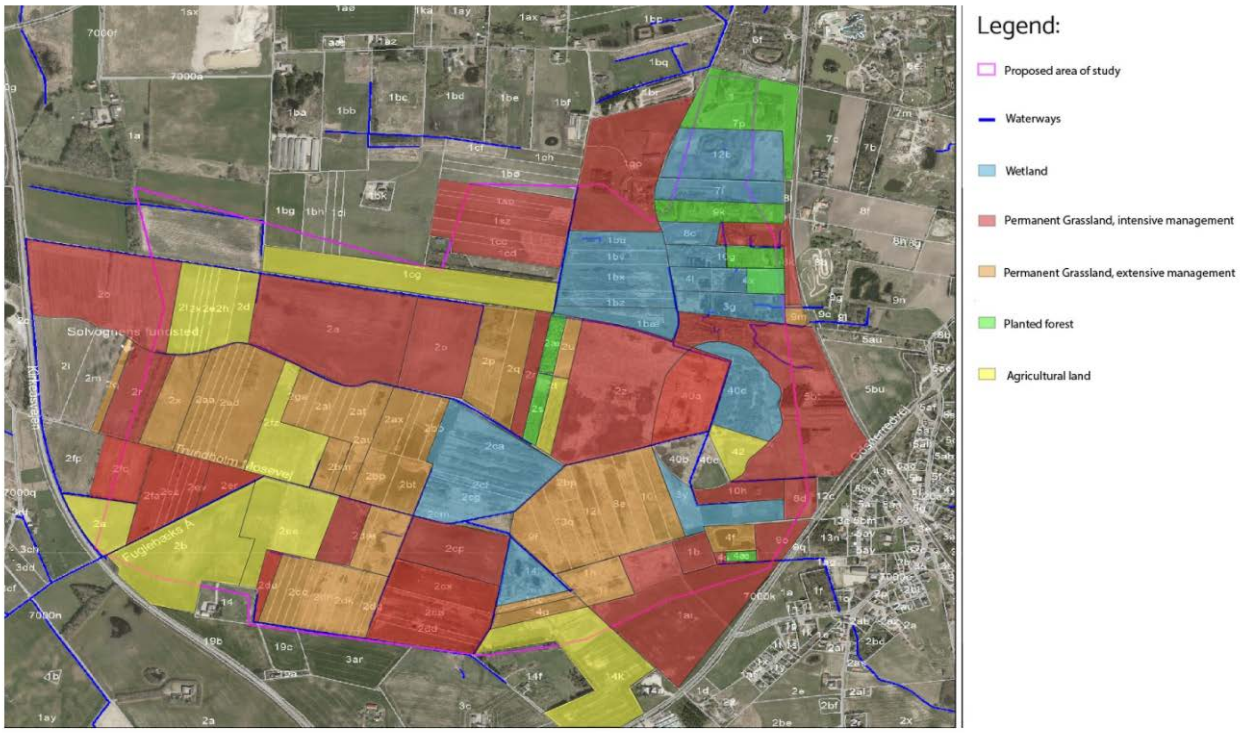

Figure 5.1.1 Current land-use types in Trundholm Mose (Appendix 9.6)

Table 5.1.1 Current land-use in Trundholm Mose, area in hectare (ha) (Appendix 9.6)

Land use	Management	Area (ha)
Wetland		48,54
Permanent grassland		150,88
	Intensive (93,90 ha)	
	Extensive (56,98 ha)	
Forest		8,21
Agricultural land		63,20
Total		270,83

Low amounts of production are thought to lessen opportunity costs of rewetting and therefore decrease landowner resistance to project implementation. With this in mind, several experts viewed TM as an easy area to rewet compared to sites known for intensive agriculture, partly thanks to TM's low agricultural productivity and economic profit (SSI Municipality representative, DNA employees, Naturplan project representative). Despite an assumption of low land productivity, our land-use assessment reveals large areas of TM are used as permanent grasslands and agricultural land (Figure 5.1.1). The majority of the area (150 ha) is currently permanent grassland of which approximately 90 ha are intensively managed, while another 63 ha are used for agricultural production (Table 5.1.1). Correspondingly, most landowner SSIs state their land is currently used for hay production (SSI 3, 5, 6, 10-13). The municipality representative acknowledged this production and expressed concerns about getting this large group of landowners on board as they may be unwilling to give up their hay production. In this way, current land-uses may hinder project implementation.

Furthermore, landowner attitudes may be influenced by how their land-use has changed over the years. The time series of TM (Figure 3.2) suggests that intensive land-use has decreased over time. Although it is difficult to distinguish agricultural land from grassland, from 1995 onwards, it seems intensive management has decreased while nature areas have increased. Qualitative data confirm that this extensification of agriculture is a response to decreased land productivity (SSI 1, 2, 7, 8, 11). One landowner, with intensively managed grassland, called himself “one of the few stubborn farmers that remain cultivating here” (SSI 11) while referring to the land’s low economic potential. The loss of economic potential is attributed to increased wetness by informants 5 and 6. This couple, who bought their land 20 years ago, perceived “in early years [TM] was used very much for grazing” but now as the land is wetter grazing is uncommon (SSI 5, 6). The increase in dark areas on the latest orthophoto also indicates the area is wetter (Figure 3.2). However, as pointed out by several landowners it must be acknowledged that the land is much wetter during the winter months (SSI 1, 2). Despite this one uncertainty, the larger consensus that land has lost productivity may facilitate project implementation by decreasing potential economic losses for landowners.

Figure 3.2 shows that many smaller plots have been merged into bigger plots. This was confirmed by two informants who explained that this has led to a decrease of landowners over time (SSI 11, 12). This could facilitate project implementation as expert informants identified getting many landowners to participate as a crucial barrier (SSI DNA employees, Municipality representative, Naturplan project representative). However, the landowners in TM are still more than in similar projects (SSI Municipality representative, DNA employees), which potentially hinders the project. The merging of plots also means that some landowners have invested economically by increasing their land. Accordingly, a chi-square test shows that landowners who have increased their land over the past 20 years are more likely to not support the project However, uncertainty remains due to the small sample size (Table 5.1.2).

Table 5.1.2 Relationship between landowners' increase/no increase of land they own in Trundholm Mose the past 20 years and rewetting project support. Based on the following variables: s_82 & s_111 (Appendix 9.4.2)

Change in amount of land owned	Support	Do not support
Increase	1	5
No increase	10	2
p value 0,0062		

5.1.2 Incomes from Land

Table 5.1.3 Contingency of landowners' incomes from land in Trundholm Mose and their support of the rewetting proposal. n = 20. Based on the following variables: s_87 & s_111 (Appendix 9.4.2)

	Income from agriculture		**Income from rental property**		**Income from renting land to hunters**		**Other**		**No income-generating activities**		**Total**	
Support of rewetting	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Strongly disagree	4	29	0	0	1	20	1	33	1	17	7	24
Disagree	0	0	1	100	1	20	1	33	0	0	3	10
Neither agree nor disagree	2	14	0	0	1	20	0	0	0	0	3	10
Agree	6	43	0	0	2	40	1	33	3	50	12	41
Strongly Agree	2	14	0	0	0	0	0	0	2	33	4	14
Total	14	100	1	100	5	100	3	100	6	100	29	100

Table 5.1.3 gathers information on respondent income from TM along with their respective project support level. This reveals 14 of 20 respondents generate income from their land through agricultural activities. This income does not correspond with the disapproval of project implementation as 71% of these landowners either support or do not have a strong opinion about the project. This support and neutrality may be motivated by the low importance of TM income to total landowner income (Figure 5.1.4). Chi-square calculations could not explain this relationship, however, it is interesting to note that a low income from land may act as a facilitating factor as the majority of landowners who estimated 0% income from TM supports the project although the sample size remains small (Table 5.1.4).

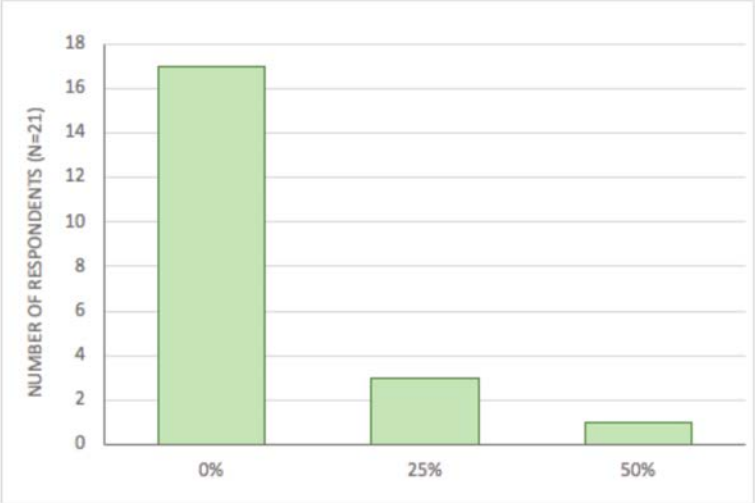

Figure 5.1.4 Landowners' estimated income from their land in Trundholm Mose. Based on the following variables: Based on the following variable: s_84 (Appendix 9.4.2)

Table 5.14 Relationship between estimated share of income from land in Trundholm Mose and rewetting project support. n=21. Based on the following variables: s_84 & s_111 (Appendix 9.4.2)

Share of income	Support	Do not support
0% income	10	6
25-50% income	1	2
p value 0,2796		

While a low income directly from agricultural production may facilitate project implementation, qualitative data suggest that the associated agricultural subsidies and tax benefits may act as a strong hindering factor. For example, several landowners indicated frustration of losing EU support after their land became too wet for cultivation (SSI 4, 7, 8). Another landowner explained how "everything is tied to the money from the EU" (SSI 13), although stressing that no farmer relies fully on the subsidies. The same farmer expressed strong economic concerns over the rewetting taking away his part-time farmer status, which would end his tax benefits when buying farm products.

Furthermore, Table 5.1.3 shows five respondents receive an income by renting out TM land to hunters. Qualitative data from two landowners suggests that this is a common practice in TM and that it can generate significant amounts of untaxed income (SSI 10, 13). In this way, renting out land for hunting could hinder project implementation if it entails a decrease in

economic gains. However, the data cannot confirm the actual width of hunting as a source of income.

5.1.3 Landowner Compensation

Landowners attitudes towards rewetting are related to the views on compensation. Survey data show most respondents are positive towards both monetary compensation and land swapping (Figure 5.1.5). Similarly, several landowners who do not live in TM but use the land for hay production express eagerness to swap to a more productive plot closer to their home or receive monetary compensation (SSI 4-8, 11, 12). Attitudes conflicted more among the landowners who spend more time in the area and use it for other activities than production. Some were keen on swapping to another plot within the bog while some expressed unwillingness to give up their land (SSI 3, 13).

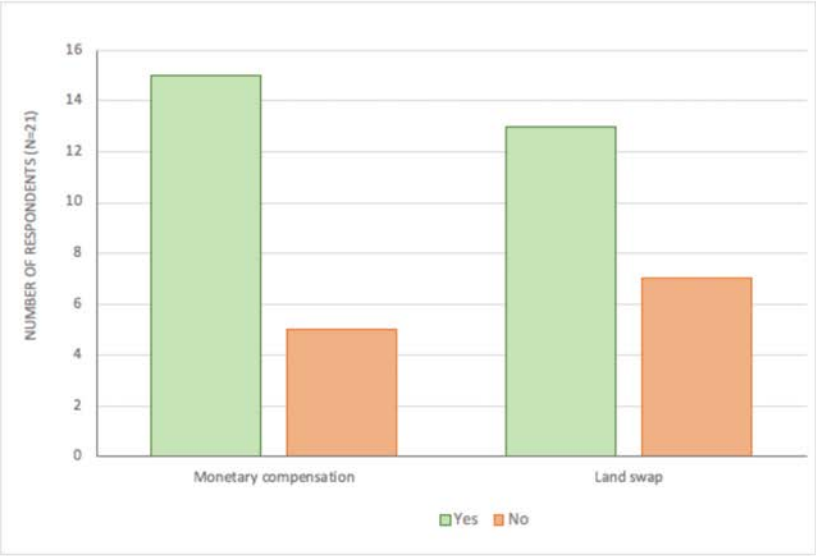

Figure 5.1.5 Landowners' willingness to give up their land for compensation in case of rewetting Trundholm Mose. Based on the following variables: s_96 & s_98 (Appendix 9.4.2)

Overall, qualitative data show most landowners would be willing to give up their land for "fair" compensation. Fairness is discussed in terms of the monetary compensation amount and/or the size, quality, and location of new land (SSI 3-12). In this regard, compensation can generally be considered a facilitating factor if the process is flexible and individualized. However, it remains uncertain if offered compensation would meet landowners requirements as this is largely dependent on the estimated value of the current land owned. Overall, the municipality representative does not perceive compensation as a challenge for the project and trusts

landowners' requests to be met individually. Compensation on the institutional level is further analysed in 5.4.3.

5.1.4 Alternative Land-Uses

Landowner attitudes towards rewetting may be influenced by perceptions of what the land is good for after rewetting. Survey data show landowners' interest in the opportunities of paludiculture and installing solar cells on rewetted land (Figure 5.2.6). However, many experts indicate their interest and knowledge about alternative uses are limited and therefore, this is not often communicated to landowners (SSI Municipality representative, DNA employees). It is also important to note that although alternative land uses offer good promises on paper, local context assessments in the case of TM haven't been implemented (yet) preventing farmers from picturing any tangible future possibilities. Besides, the lack of supporting financial schemes for such adoption might hinder any adoption from farmers with limited financial means. Overall, this knowledge gap between what could be possible and what is actually doable potentially hinders project implementation as landowners are more likely to support the project if they could see opportunities for economic gain after rewetting.

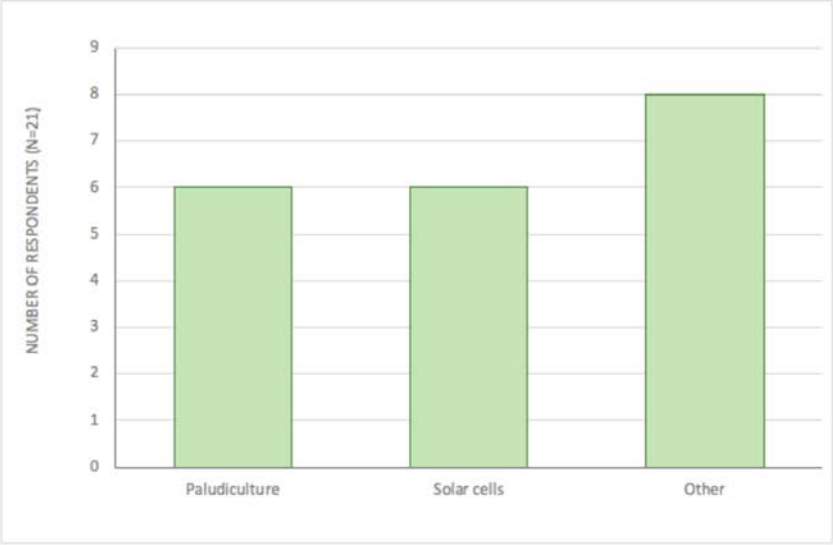

Figure 5.1.6 Landowners' interest in alternative uses after rewetting their land in Trundholm Mose. Based on the following variable: s_99 (Appendix 9.4.2)

5.2 Environmental Factors

Guided by the requirements in the BEK 191 Executive Order (MFVM, 2021), this section carbon emission mitigation potential, hydrology, nutrient leaching and biodiversity as key hindering and facilitative factors.

5.2.1 Current Carbon Emissions and Mitigation Potential

Given that the primary focus of the rewetting proposal in TM is to mitigate carbon emissions, the first environmental factor assessed is the current carbon content in topsoil and the associated CO_2 emissions. Figure 5.2.1 illustrates the location of soil sample plots and the measured carbon content. Our data corresponds with data found in the Texture2014 database on Danish carbon soils (Miljøportal 2021). This data also reveals a heterogeneous distribution of carbon-rich soils that was noted by informant 11 and 12. Landowners (SSI 1, 2, 11) also confirmed the presence of carbon-rich organic layers in the eastern part of TM where "one year there was a fire that burned for the whole summer" (SSI 11). An overview of TM land-use types and corresponding carbon content is presented in Table 5.2.1.

For a Danish rewetting project to be implemented, several requirements need to be met. These are outlined by the Executive Order on wetland projects and low-lying areas (MFVM, 2021). The carbon dimension has three major requirements;

i) A minimum of 75% of the project area must be on soil with at least 6% carbon content.

ii) The project must contribute to a reduction of a minimum of 13 tonnes CO_2 per ha per year.

iii) The project must be cost-effective in terms of Danish krone (DKK) paid per CO_2 equivalent.

For implementation, the total budget cannot triple average reference values of DKK 150 per tonnes CO_2 eq. for the preliminary assessment and DKK 5,000 per tonnes CO_2 eq. for implementation. Primary data and extrapolated data from the Texture2014 database (Table 5.2.3) (texture2014; miljoeGIS 2020), suggests the TM rewetting project meets carbon-related cost requirements. This finding corresponds to BoP's estimate of 13,2 tonnes CO_2 (per ha per year) with a project cost of 6310 DKK/CO_2 eq. (Bangsgaard og Paludan ApS, 2020).

Table 5.2.2 presents an overview of the current TM CO_2 emissions (tonnes per ha per year) based on three models. The respective conversion factors used in the models for CO_2 emissions related to the land-use categories are shown in Table 5.2.5. For model 1 (Dubgaard & Ståhl, 2018; Nielsen et al., 2020) and model 2 (Nielsen et al., 2020), topsoils with a carbon content between 6-12% are estimated to emit half of what topsoils with carbon contents above 12% do. Whereas model 3 (Tiemeyer et al., 2020) abandons this distinction and empirically

asserts equal emissions for both soil types. As a result, CO_2 emissions in model 3 are higher than models 1 and 2. Different land-use categories within the models further increase inconsistencies. Interestingly, all three models suggest considerably higher emission savings compared to BoP's estimate. This discrepancy may be partially explained by an overestimation of the total area (ha) and current methane emissions due to lower drainage levels than *a priori* assumed.

Despite considerable differences, all estimates meet the executive order requirements suggesting a lack of carbon mitigation potential will not hinder TM project implementation (see Table 5.2.3).

Table 5.2.1 Overview of total area (ha) per land-use type and topsoil carbon content within the projected area in Trundholm Mose

	Land-use						
Carbon content	**AC**	**EG**	**IG**	**PF**	**WF**	**WT**	***Grand Total***
<6%	19	3	0	0	0	0	22
6-12%	30	16	56	7	0	0	109
>12%	14	40	38	1	5	44	142
Grand Total	63	59	94	8	5	44	**273**

Total area calculation is based on primary data and Texture2014 data
AC, agricultural land; EG, extensively managed permanent grassland; IG, intensively managed permanent grassland; PF, planted forest; WF, wetland forest; WT, wetland nature area

Table 5.2.2 Current CO_2 emissions (tonnes per year) based on three models for the projected rewetting area in Trundholm Mose

	Based on Dubgaard & Ståhl (2018) and Nielsen et al. (2020)		
Topsoil carbon content (%)	agricultural land in rotation	permanent grassland	***grand total***
6-12	630	1126	1756
>12	605	2432	3037
grand total	1235	3558	**4793**

	Based on Nielsen et al. (2020)			
Topsoil carbon content (%)	agricultural land & grass in rotation	permanent grassland	nature areas	***grand total***
6-12	628	1109	45	1782
>12	603	2396	638	3637
grand total	1231	3506	682	***5420***

	Based on Tiemeyer et al. (2020)			
Topsoil carbon content (%)	cropland	grassland	forest	***grand total***
>6	1488	4560	231	***6280***

Table 5.2.3 Meeting the requirements from the BEK191 executive order on wetland project and low-lying areas (lavbundsproject)

	*Amount of land meeting the requirement	*Total land	Actual value	
1.Minimum 75% of total area must be on soil with >6% carbon	248 ha	273	91%	
	Model 1: Dubgaard & Ståh (2018), Nielsen et al. (2020)	**Model 2: Nielsen et al. (2020)**	**Model 3: Tiemeyer et al. (2020)**	**Bangsgaard og Paludan ApS (2020)**
2. Project contributes to a reduction of min. 13 tonnes CO2 per ha per year	18	20	23	13
3. Project must be cost effective**		***indicative reference value***		
prelimenary study	718.883,23 DKK	812.964,59 DKK	941.932,60 DKK	508.050,00 DKK
project implementation	23.962.774,20 DKK	27.098.819,61 DKK	31.397.753,23 DKK	16.935.000,00 DKK
Total project cost***	30.241.021,04 DKK	34.198.710,35 DKK	39.623.964,57 DKK	21.371.970,00 DKK
	Sampled plots in high risk category	**Sampled plots in medium risk category**	**Sampled plots in low risk category**	
4. Project must not lead to an increased phosphorus discharge	14%	39%	47%	
	Amount of §3 Protected Areas			
5. Project contributes to promoting the quality of nature and to creating cohesive and robust nature areas.	Approx. 50% of site (currently)*****			

*Based on primary data and Texture2014 data

**Estimated costs cannot exceed three times the indicative reference value provided by the executive order

***Based on Bangsgaard og Paludan's estimate of 6310 DKK/tonnes CO2 (incl. feasibility study). The final calculation is based on tonnes CO2 per year from table 5.2.2

****High risk (FeBD:PBD <10); medium risk (FeBD:PBD 10-20); low risk (FeBD:PBD >20); see table 5.3.1 for distribution of risk per land-use type and figure 5.3.1 for a visual representation

***** Based on personal correspondence with SSI Municipality Representative.

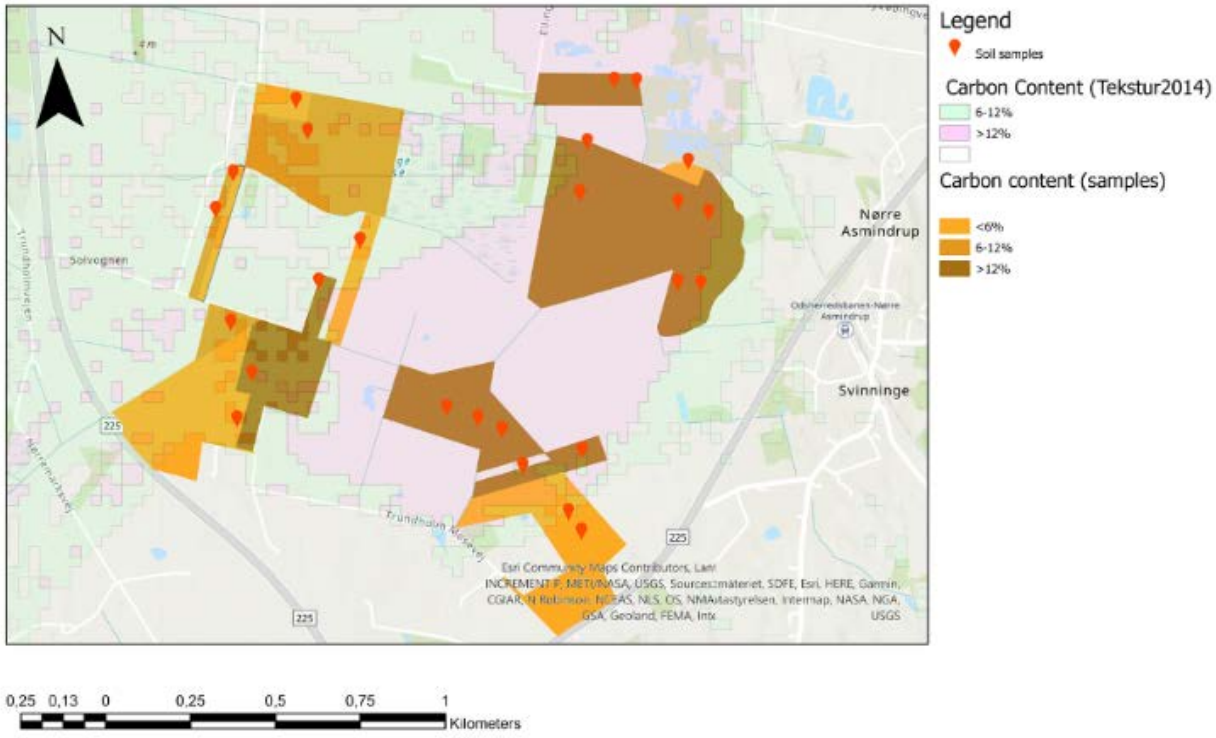

Figure 5.2.1 Spatial distribution of soil carbon content of sampled plots in Trundholm Mose in comparison to Texture 2014 data

Table 5.2.5 Overview of CO_2 emission conversion factors used in the three models

model's land-use category	*associated land-use category*	*CO2 emission conversion factor*
Model 1: Dubgaard & Ståh (2018), Nielsen et al. (2020)		
agricultural land in rotation >12%	AC >12%	42,2
agricultural land in rotation 6-12%	AC 6-12%	21,1
permanent grass >12%	IG, EG >12%	31,2
permanent grass 6-12%	IG, EG 6-12%	15,6
Model 2: Nielsen et al. (2020)		
agricultural land and grass in rotation >12%	AC >12%	42,1
agricultural land and grass in rotation 6-12%	AC 6-12%	21,0
permanent grass >12%	IG, EG >12%	30,7
permanent grass 6-12%	IG, EG 6-12%	15,4
nature area >12%	WF, WT, PF >12%	12,8
nature area 6-12%	WF, WT, PF 6-12%	6,4
Model 3: Tiemeyer et al. (2020)		
cropland >6%	AC >6%	33,7
grassland >6%	IG, EG >6%	30,4
forest land >6%	PF, WF >6%	28,2

5.2.2 Hydrology

Many TM landowners have an intimate connection with water (SSI 1-3, 5-8, 11-13). For example, Informant 11 “has been fighting water [their] whole life”. This shared understanding hinders project support due to fears of unintended flooding. For some, this fear and questioning of project feasibility is informed by hydrology knowledge. SSI 3, 11, and 12 reveal that TM collects water from higher ground and drains it to the sea via Fuglebæks Å pictured in Figure 5.1.1. Some informants place a high degree of importance to this geography and drainage to the sea. Leading the informants to suggest flooding of the adjacent Kirkeåsvejen, agricultural fields and nearby summerhouses is more than likely if the project stops drainage to the sea completely by encapsulating TM as a discrete wetland (SSI 1, 2, 11).

Concern for flooding was also reflected by DNA employees who worked on the nearby Sidinge Fjord project. Here, an ineffective dike, installed in 2018, more than doubled project costs despite their consultancy’s confidence in models that said the dike was functional. Since 2018, they have experienced a constant battle of putting in pumps, fixing pumps, deepening the dike, etc. With this in mind, the DNA employees stress “water does not always stay where it’s supposed to” (SSI), and rewetting projects are not risk-free.

Conversely, the municipality and BoP representatives feel confident in flood prevention. The consultancy notes “it will not happen if we make the design” and mentions technological solutions such as pumps, dikes, and increasing surrounding areas' elevation through landfills (SSI BoP representative). This confidence suggests flooding at TM will not be interpreted as a hindering factor in terms of project feasibility. The hindrance rather lies within the landowners’ uncertainty regarding effective flood mitigation.

5.2.3 Nutrient Leaching

According to Executive Order BEK 191, rewetting projects must not increase phosphorus discharge in neighbouring environments. Multiple landowners suggest this will not be an issue (SSI 7, 8, 11). And SSI 11 notes that they “don’t believe there is a lot of phosphorus stored in the soil because it has never really been intensively fertilized”. SSI 7 nuanced this statement by saying “if there is phosphorus here, it is coming from areas surrounding the bog”.

Soil sampling data does not support these landowner claims, as our findings suggest a risk of phosphorus leakage in certain areas of TM. Table 5.2.4 presents an overview of the different risk classes, based on Kjærgaard & Forsmann’s (2014) thresholds, and the relation to the land-use type the sample was measured on. As expected, agricultural land is associated with 42,86% of samples with a high risk for phosphorus leakage, thereby contradicting local perceptions that fertilizer use is absent (SSI 7, 8, 11). The medium-risk group is dominated by permanent grasslands. Figure 5.2.3 shows the relationship between total phosphorus release and the Fe_{BD}:P_{BD} molar ratio, indicating the cut-off points of the risk groups. Given the expected correlation between land-use and risk for phosphorus leakage, the risk hotspots are spatially scattered across TM, as depicted in Figure 5.2.2.

Overall, our findings suggest a risk for phosphorus leakage in TM, which can hinder project implementation (Table 5.2.3). However, given the scattered spatial distribution of the soil samples (Figure 5.2.2), no sweeping conclusion can be formulated for the whole study area.

Tage Duer, an employee of the DCCC speaking on his own behalf, suggests phosphorus' role as a strong hindering factor may lessen with policy changes. Currently, the phosphorus risk acts as a "trump card" which Duer deems outdated. Suggesting "phosphorus is something we should take seriously but we should take it down from the pedestal" as it prevents the assessment of a project's overall achievement. The softening of the phosphorus release requirement can be argued for since this would only cause a temporary negative effect on the environment (DCCC, 2020).

In the case of TM, current knowledge on carbon emissions and phosphorus release hotspots (Figure 5.2.1 and 5.2.2.) reveal that high-risk areas for phosphorus release do not overlap with high carbon content (>12%) areas. This observation hints towards the possibility to reduce the size of the project area and thereby assist in the accommodation of the BEK191 phosphorus requirement..

No reliable assessment of current nitrate leaching was possible given the timing of the soil sampling. Winter leaching caused the majority of the nitrate already to discharge, while fertilizers are commonly applied in spring, according to SSI 11.

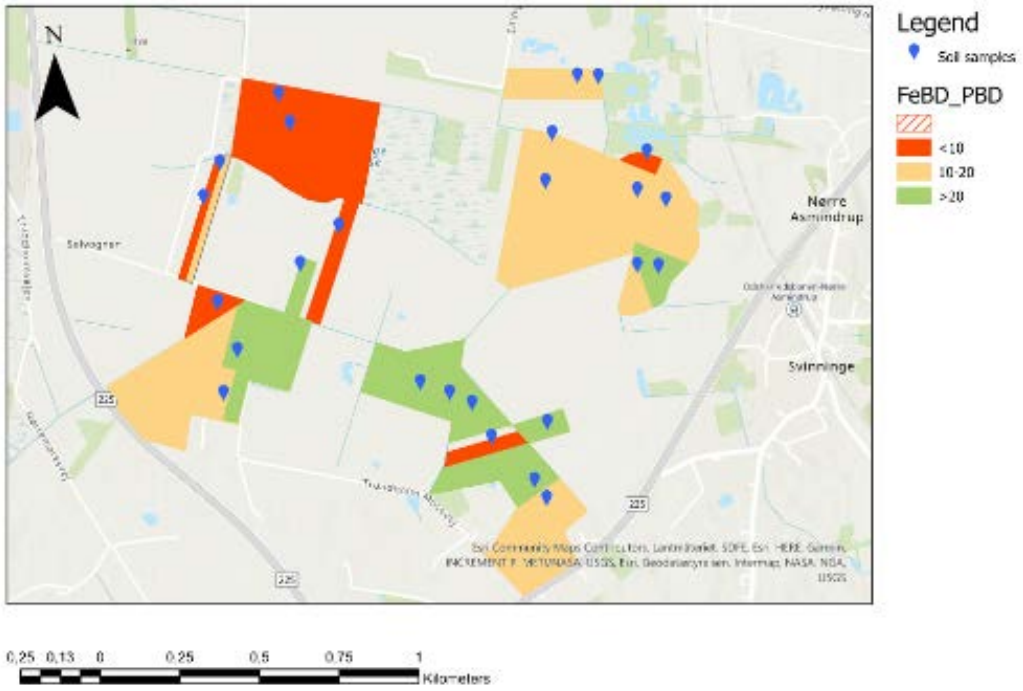

Figure 5.2.2 Spatial distribution of potential phosphorus leakage hotspots in Trundholm Mose

Table 5.2.4 Overview of phosphorus leakage risk related to the sampled land-use types

	High risk (FeBD:PBD <10)		Medium risk (FeBD:PBD 10-20)		Low risk (FeBD:PBD >20)		*Total*	
Land-use type	n	%	n	%	n	%	n	%
AC	3	43%	1	10%	3	38%	7	27%
EG	2	29%	5	50%	2	25%	9	35%
IG	1	14%	3	30%	2	25%	6	25%
WF	1	14%	0	0%	0	0%	1	2%
WT	0	0%	1	10%	1	13%	2	10%
Total	7	100%	10	100%	8	100%	25	100%

High risk (FeBD:PBD <10); medium risk (FeBD:PBD 10-20); low risk (FeBD:PBD >20)
AC, agricultural land; EG, extensive permanent grassland; IG, intensive permanent

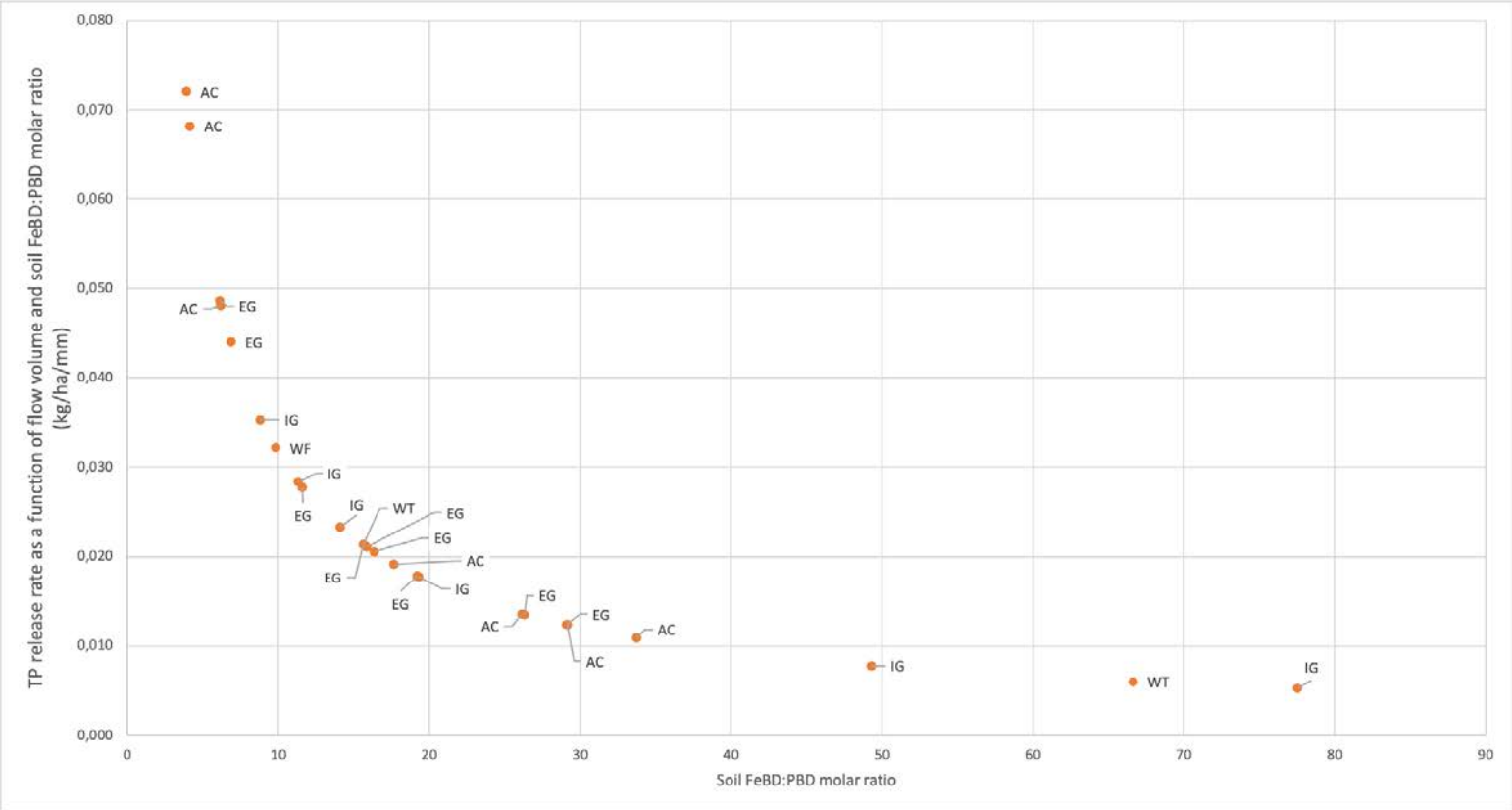

Figure 5.2.3 Phosphorus leakage risk in relation to current land-use in Trundholm Mose.

5.2.4 Biodiversity

According to the Executive Order BEK 191, rewetting projects must contribute to the promotion of nature's quality and the creation of cohesive and robust natural areas within §3 protected areas (MVFM, 2021). Currently, approximately half of the study area is protected under §3 of the Nature Protection Act (Figure 5.2.4), either as bog or meadow habitat. Therefore, if preliminary studies project a decrease in biodiversity, the project will not be implemented.

Despite the TM project objective to increase local biodiversity, or at least not damage biodiversity, the actual impact is far from certain. Specifically, it is logical to suspect the process of rewetting will likely transform the area that currently consists of meadows/grasslands, agricultural habitats, planted forests and wetlands (Figure 5.1.1 and Figure 5.2.4) into one large wetland area. A local entrepreneur with a forestry background argues that this homogenization of land associated with rewetting will negatively impact biodiversity and instead suggests creating multiple habitats to increase biodiversity (SSI Naturplan representative). Landowners lament these concerns and suggest rewetting will shift species composition away from 'valuable' biodiversity. Specifically, landowners believe unique species like the pipe hawk and red stag will be replaced by a homogenous environment of insects, grasses, and ducks (SSI 3, 7, 8, 10, 13).

Comparing the land use map (Figure 5.1.1) and the municipality's protected areas map (Figure 5.2.4) suggests the latter map may overestimate the current amount of wetland areas in TM. This overestimation may lessen official concerns regarding biodiversity decreases, as it suggests a smaller amount of area will be transformed into a wetland during rewetting. Therefore, smaller landscape diversity (and the associated biodiversity) losses would be estimated.

Further scepticism is generated when noting mechanisms to enhance biodiversity after rewetting, such as seed dispersal and birding islands, are not within the project's scope (SSI BoP representatives). Although findings suggest rewetting may decrease biodiversity and therefore prevent project implementation, no definitive stance can be taken since our data reveals biodiversity as a subjective topic and the study site's preliminary study is still underway.

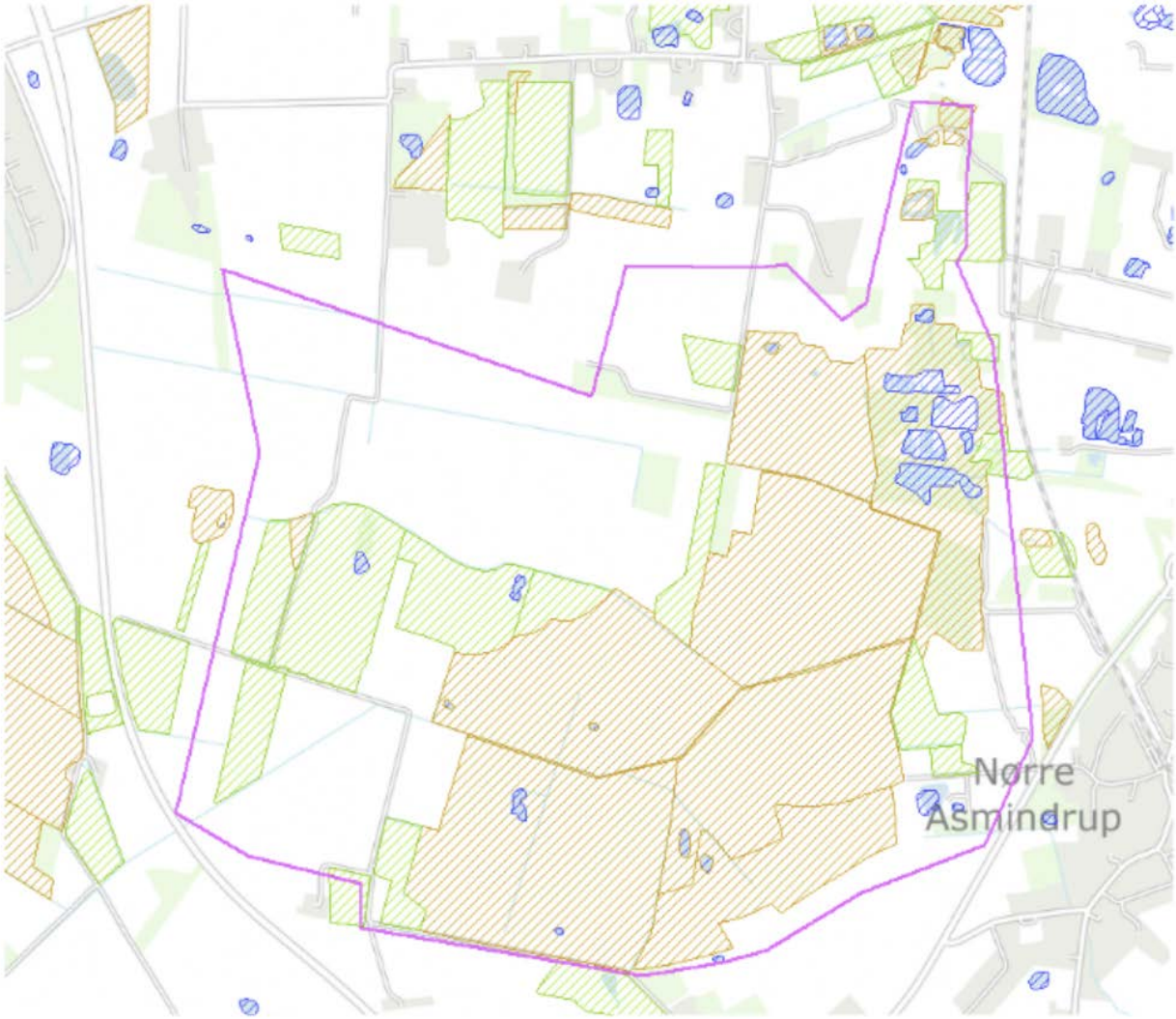

Figure 5.2.4 Paragraph 3 Protected Areas at Trundholm Mose (SSI Municipality representative. Green areas indicate meadows. Yellow indicates bog areas and the pink line delineates the initial proposed area for rewetting.

5.3 Emotional Factors

Emotional factors combine to create unique perspectives with which landowners view TM. Table 5.3.1 reflects this individuality with no ranking orders repeating and large ranges. Diverse perspectives can hinder project implementation as it becomes difficult to meet all landowner priorities with one project. Despite this, Figure 5.3.1 allows us to see which values have more and less consensus in terms of importance.

Three emotional factors were identified as influencing project support and, therefore, implementation. These factors are climate change beliefs, trust in authorities, and a sense of community.

Table 5.3.1 Ranking Values Landowners Place on Trundholm Mose. The maximum amount of six points was assigned to a landowner's most valuable aspect associated with Trundholm Mose. The second most valuable aspect was assigned five points and so on. The minimum amount of zero points was assigned to a landowner's least valuable aspect.

	Beauty	**Biodiversity**	**Carbon Sequestration**	**Sense of Belonging**	**Healthy Living**	**Natural Resources**	**Tourism**
Respondent 1	3	4	1	6	5	2	0
Respondent 2	6	2	3	4	5	1	0
Respondent 4	4	6	3	0	1	5	2
Respondent 5 & 6	3	5	6	0	2	4	1
Respondent 7	2	5	4	0	3	1	6
Respondent 8	6	5	4	0	3	2	1
Respondent 13	3	6	2	1	4	5	0
Total	27	33	23	11	23	20	10
Median	3	5	3	0	3	2	1
Average	4	4.5	3.5	1.7	3.2	2.5	1.7
Maximum	6	6	6	6	5	5	6
Minimum	2	2	1	0	1	1	0
Range	4	4	5	6	4	4	6

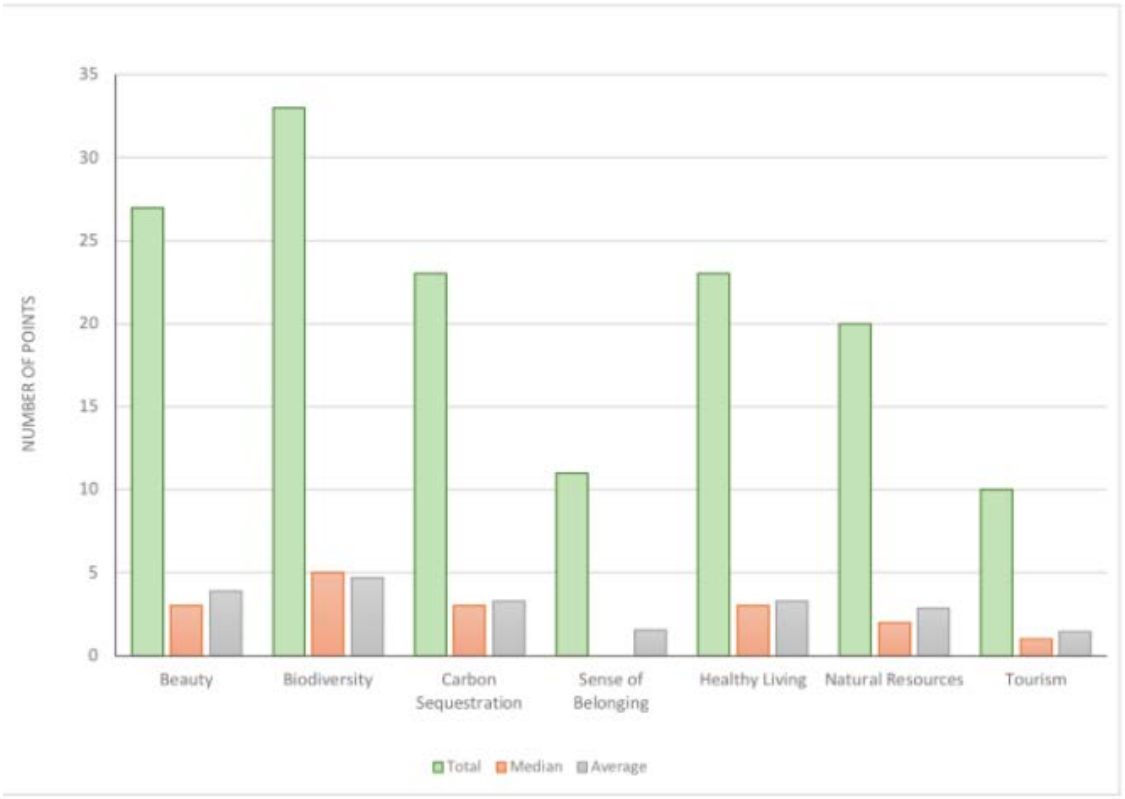

Figure 5.3.1 Average, medium, and sum of values landowners place on Trundholm Mose. n = 7 (Table 5.3.1)

5.3.1 Climate Change Beliefs

A near significant p-value of 0,0668 from survey data suggests climate change concern may influence landowner support and, therefore, project implementation (Table 5.3.2). Qualitative data complement these borderline findings with nuanced discourses. Here, climate change attitudes range from 'concerned' to 'largely indifferent,' but not opposing climate mitigation. This consensus facilitates implementation by suggesting few landowners are inherently against the project. Instead, variability presents itself when discussing *how* climate mitigation should occur.

An extreme example comes from SSI 10. This informant's commitment to sustainability, by not flying, etc., does not generate project support. Instead, they note "using climate change as an excuse to do projects like this is a little far fetched". Despite loosely understanding the rewetting emission reduction mechanism and project proposal, Informant 10 does not perceive a clear connection between TM and climate mitigation. Greater optimism coinciding with climate concern comes from Informants 5 and 6. An organic farming couple who support the project and note "it's a nice way to see that this could be our way of contributing to solving the crisis". This enthusiasm does not come without scepticism. In terms of the emission reduction potential, they view it as "a needle in a haystack" which "is not making a big difference in the whole world". This is informed by their experience of TM as an area that is already largely wet throughout the

year. Leading Informants 5 and 6 to question the effectiveness, in terms of emission reduction potential, of rewetting an already wet area. On the other hand, Informants 1 and 2 follow nicely the proposed idea that climate concern can facilitate project approval. Despite not completely grasping all the complexities of climate change or the rewetting mechanism, their concern for climate change leads them to support the project as a good way to reduce emissions. This concern and project support are largely tied to fears for their grandchildren's future and knowledge received from their daughter's climate activism work.

Table 5.3.2 Relationship of Concern for climate change and rewetting project support. n = 12. Based on the following variables s_106 &s_111 (Appendix 9.4.2).

Climate Change Beliefs	Support	Do not support
Unconcerned	0	2
Concerned	7	3
p value 0,0688		

5.3.2 Trust in Authorities

Lack of trust towards the municipality was a theme throughout data collection. Figure 5.3.2 reflects this with eight of twenty respondents answering 'Strongly Disagree' or 'Disagree' to the statement 'I trust the municipality will consider my interests regarding the rewetting of TM.'

Qualitative data suggests distrust hinders project support but is not a determining factor. For some informants distrust is grounded in previous negative experiences with the municipality. For example, the municipality's failure to adequately respond to drainage issues has resulted in Informant 2 feeling that "the municipality doesn't give a damn." Similar negative experiences related to drainage also influenced Informant 8's feeling of distrust. Ultimately leading Informant 8 to feel the municipality would not listen to them if they opposed rewetting. These feelings are on the stronger end of our data spectrum, yet, these informants either support or are largely indifferent to the project.

Beyond poor experiences with the municipality, distrust can also be generated by feelings of otherness. Informant 9 feels a clear distinction between politicians and farmers like themself. They feel there are "so many politicians who have never had a real job before" and have only worked in offices to think about agriculture, nature, and livelihoods "in theory". Leading Informant 9 to agree with climate mitigation but not trusting authorities to implement this objective logically. This informant is "in the middle" of opinions and project scepticism is clearly driven by distrust.

Distrust is not felt by all. The majority of neutral data in Figure 5.3.2 suggests this opinion is more commonplace compared to qualitative data in which eight of thirteen informants note distrust. Informant 4 acts as an outlier in qualitative data by trusting the municipality and

other authorities to represent their interests. Since Informant 4 is largely neutral in other factors, increased levels of trust may play a large role in their agreeableness towards the project.

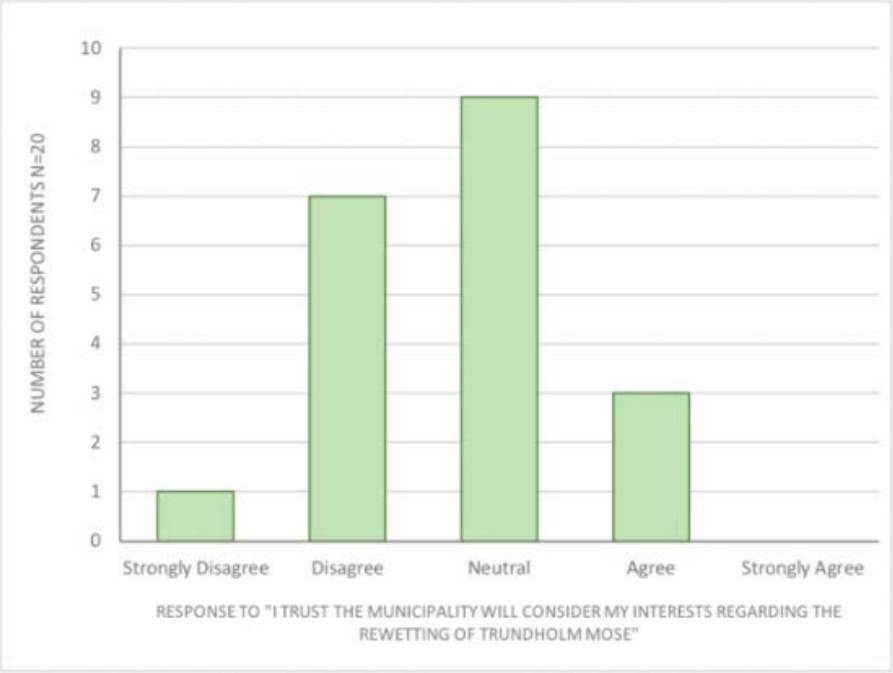

Figure 5.3.2 Landowner trust towards the Municipality. n = 20. Based on the following variables: s_103 (Appendix 9.4.2)

The nearing significant 0,0910 p-value of municipality trust and project support aligns with qualitative data that trust is influential but not all-determining (Table 5.3.3). Further alignment occurs when noting all survey respondents with trust support the project, while those lacking trust both support and do not support. Reflecting the qualitative pattern that trust is a facilitative factor that enhances support likelihood while distrust does not always hinder support.

Table 5.3.3 Relationship of trust toward the Municipality and rewetting project support. n = 10. Based on the following variables:s_103 & s_111 (Appendix 9.4.2)

Trust to municipality	Support	No not support
Trust	3	0
Do not trust	3	4
p value 0,0910		

5.3.3 Sense of Community

Data reveals landowners largely do not value TM for the community. This is reflected in Table 5.3.1 where 'sense of belonging' ties 'tourism' for the lowest average value points. Similarly, only two of thirteen SSIs mention a strong sense of community. The dominant rhetoric is well summarized by Informant 7 who notes "I only have a connection to the hay in the area". SSI 4, 5, 6, 8, 9, 11, 12 repeat this practical view.

Despite this lack of community, which seems to facilitate project support by reducing social costs, there is a large consensus around the land's beauty and recreational value (Figure 5.3.1; SSI 1-4, 7, 8, 11, 13). Activities associated with these values are solitary. For example, Informant 3 notes enjoying a morning coffee in their hunting post while watching nature. Informant 11 says if they lost their land they would "miss the nightingale in the early morning. You can hear them singing". This reverence for TM as a "gem of nature" led the community to create an association to voice opinions on a previously proposed 2006 Naturplan project (SSI 1-3). In response to the current project proposal, this association kept the funding they previously planned to donate, as a safety net if the current project does not fit community values (SSI 1, 2). Suggesting there is a strong sense of attachment to the land despite an apparent lack of community. This dynamic can hinder project implementation because landowners appreciate the current state of the environment and are uninterested in change. This process is linked to the landowner appreciation of current biodiversity and skepticism towards the idea that rewetting could improve biodiversity (Section 5.2.4).

5.4 Institutional Factors

In this section, we examine a set of underlying institutional factors which provide the foundation for rewetting projects. In this context, institutions are understood as "the rules of the game" in a society, according to Douglass North (North, 1991, p. 98). Those rules can either constraint or incentivize actors involved in the rewetting project proposal in getting on board or not.

These factors are landowners' relationship to authorities, incentive structures, and EU subsidies. Facilitative and hindering factors are identified along with room for improvement where streamlining can facilitate rewetting implementation.

5.4.1 Landowners' Relationship to Authorities

According to Tage Duer "it is difficult to have a system where you have somebody at the top saying we need this and this". This top-down approach negatively affects landowners' opinion about politicians which could hinder project implementation. Also, the government underestimates the local's extent of land-use and their knowledge about nature (SSI 9, 13). Accordingly, Tage Duer calls for more flexibility and local solutions to mitigate these challenges.

At the local level, qualitative data revealed the confusion around the rewetting proposal as only half of the respondents stated that they understand its purpose (Figure 5.4.1).

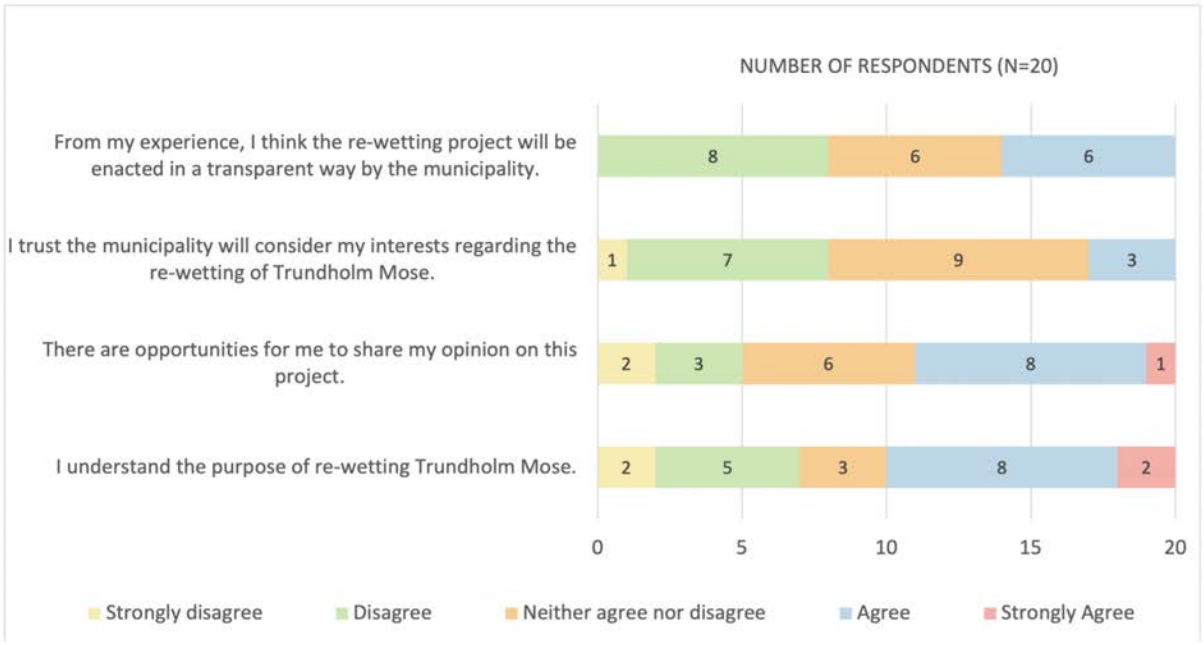

Figure 5.4.1 Statements about the relationship to the Municipality of Odsherred. Based on the following variables: (Appendix 9.4.2)

Likewise, many landowners expressed misunderstanding about the goal of rewetting. This confusion was rooted in previous extensive efforts put into achieving sufficient drainage systems in the project area by the municipality.

Others could not picture the resulting change in the landscape (SSI 5, 6, 10-12). These uncertainties could hinder landowners from making informed decisions (SSI 10). A t-test and a chi-square-test show that neither the education level (Table 5.4.1) or age (Table 5.4.2) significantly impacted landowners' understanding of the project.

Table 5.4.1 Understanding of the rewetting proposal in relation to education. Based on the following variables: s_101 & s_73 (Appendix 9.4.2)

Rewetting proposal	Lower Education	Higher Education
Not understanding	6	1
Understanding	6	4
P value 0,252		

Table 5.4.1 Understanding of the rewetting proposal in relation to education. Based on the following variables: s_101 & s_73 (Appendix 9.4.2)

Rewetting proposal	Lower Education	Higher Education
Not understanding	6	1
Understanding	6	4
P value 0,252		

Table 5.4.2 Understanding of the rewetting proposal in relation to age. Based on the following variables: s_101 & s_72 (Appendix 9.4.2).

Understanding the rewetting proposal	N	Mean (age)	Variance (age)
(Strongly) agree	7	57,3	16,6
(Strongly) disagree	11	61,5	164,7
p value 0,3350			

Consequently, the misunderstanding could be a communication problem. So far, the municipality sent out three letters to landowners. However, four landowners did not receive any letter (Figure 5.4.2; SSI 9), which could hinder the process. One t-test suggests that landowners, who have not received any information or are less aware of the rewetting proposal, are significantly older

(Table 5.4.3). Perhaps resulting from infrequently checking their e-Boks or postbox. However, Informant 9, aged 40, did not receive any letter. Therefore, additional organisation issues can be expected in the process of informing all affected landowners in TM.

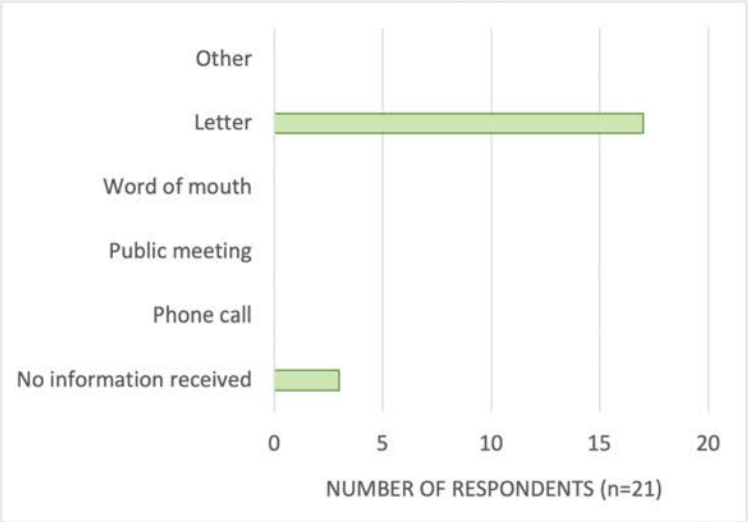

Figure 5.4.2 Received information about the rewetting proposal in Trundholm Mose in channels. Based on the following variables: (Appendix 9.4.2)

Table 5.4.3 Probability to receive information about the rewetting proposal in relation to age. Based on the following variables: s_96_1 & s_72 (Appendix 9.4.2).

Received information about the rewetting proposal	N	Mean (age)	Variance (age)
I have received information	18	58,2	76
I have not received information	3	77,6	13
p value 0,0005			

The letters informed landowners about the project's climate mitigation purpose, feasibility study, and voluntary nature (SSI Municipality representative; Appendix 9.5). However, ten informants agreed that the information was insufficient, resulting in rising concerns about the motivation behind the project, which could be counterproductive in implementation efforts (SSI DNA employees). Similarly, 50% of survey respondents are not feeling well informed about climate change (Figure 5.4.3). No correlation between climate change knowledge, age, and level of

education was found (Figure 5.4.3 & 5.4.4). Suggesting the municipality has the opportunity to mitigate knowledge gaps and generate interest through informative communication. Talks with the municipality representative, who believes only a small group of landowners in TM are well-informed about climate change, suggest awareness of this potentially hindering factor. Despite this, past communication seems to hinder implementation by inadequately explaining TM's climate mitigation purposes in approachable terms for less informed landowners.

Despite this discrepancy, the municipality representative believes dialogue is easy and that both parties are prone to collaborate although the municipal work is mostly dealing with the topics of summerhouse owners. This lower level of interaction between the municipality and landowners in TM could explain landowners' scared calls where they raised their concerns about missed opportunities in the process participation (SSI Municipality representative). Also, it might explain the perceived lack of transparency, which might be rooted in previous interactions and negative experiences with the municipality (Figure 5.4.1). Only six survey respondents think the rewetting project will be enacted transparently while three informants qualified the municipality as two-faced (SSI 1-3). This perceived lack of transparency, next to insufficient communication, may impair trust in the municipality (Chapter 5.3). To overcome this hindering factor, some informants suggested to "go beyond individual talks" (SSI DNA representatives) and engage in collective discussions (SSI 10, Naturplan 2006 project representative, DNA employees).

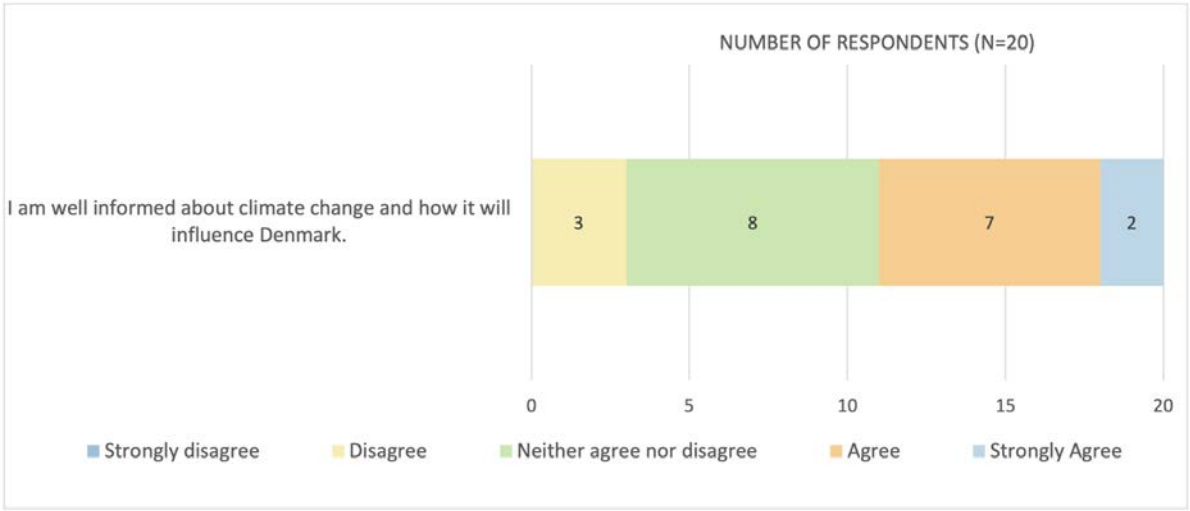

Figure 5.4.3 Status of information about climate change of landowners in Trundholm Mose (Appendix 9.4.2)

Table 5.4.4 Information about climate change in relation to education. Based on the following variables: s_105 & s_73 (Appendix 9.4.2).

Climate change	Lower education	Higher education
Less informed	8	3
More informed	4	5
p value 0,1990		

Table 5.4.5 Information about climate change in relation to age. Based on the following variables: s_105 & s_72 (Appendix 9.4.2).

Information about climate change	N	Mean (age)	Variance (age)
(Strongly) agree	9	60,6	53,0
(Strongly) disagree / neither agree nor disagree	11	60,3	111,4
p value 0,5671			

5.4.2 Principle of Volunteering

As outlined in the background, landowners "have the final say in Denmark" (SSI 1, 2) and the power to "make or break a project" (SSI DNA employee). Although the voluntary nature of project participation was emphasised in municipality letters, the municipality representative expressed room for expropriation if no consensus is reached on compensation and land swapping arrangements. Concern for expropriation is reflected by survey respondents who don't see an opportunity for sharing their opinion (Figure 5.4.1) and expressed by landowners in SSI 2 and 10.

When "time is money" (SSI Jette Jacobsen), the PoV hinders project implementation with time-consuming negotiations. To make the process more efficient, Tage Duer calls for "a setup to bring people together" for sharing landowner project outcome visions (SSI Tage Duer). Here, the PoV facilitates the process of rewetting in the long run by enhancing communication, transparency, and participation during the process.

To generate this inclusive participation "a platform for collective decision making in regards to risk mitigation" is needed (SSI Jette Jacobsen). Within collective decision-making, agreement schemes facilitate the creation of individual solutions by negotiating monetary, temporal, and practical steps of project implementation (SSI Tage Duer, Jette Jacobsen). Proposed national screening cards which incorporate "local analyses of the actual areas" can further enhance project implementation (SSI Tage Duer). Jette Jacobsen, an employee of the DCCC while speaking on her behalf, noted this instrument "could be done tomorrow".

5.4.3 Compensation and Incentives Structures

If the municipality aims to comply with the PoV, favourable compensation options must be offered to landowners. Figure 5.1.5 shows landowner openness to monetary compensation and land swapping. The latter is perceived as "a very powerful tool" (SSI Tage) to find solutions for "landowners who do not want to participate in the centre of the project area" (SSI BoP representative). Conversely, issues with estimating fair monetary compensation have downgraded the tool's perception as a useful facilitative factor by authorities. Tage Duer notes overpaying landowners in rewetting projects due to "compensation tables [that] are a bit off" whereas Jette Jacobsen believes more money is needed to cover landowners' opportunity costs in the form of lost income from alternative land use like renting out for hunting.

As touched upon in section 5.3, landowner's attachment to land can hinder project implementation. To overcome factors like this which are unique to landowners and difficult to monetize, both DCCC employees advise for an auction-based subsidy in the short term. Such subsidy would allow farmers to bid for the compensation they deem fair. This tool is seen as a "good and fair incentive structure" which is "reflecting the reality and true preference of landowners" (SSI Tage Duer). This subsidy would be most useful if implemented with a carbon tax looming in the future. Tage Duer explains this using the carrot (e.g. subsidy) and stick (e.g. carbon tax) metaphor. Currently, the lack of 'stick' in Danish climate policy hinders projects as people are less motivated to join rewetting projects. Before a facilitating carbon tax can be rolled out, more precise data on emissions are required.

The current EU subsidy scheme also acts as a hindering factor for project implementation and is identified as a "major structural barrier in rewetting" (ibid.). As explained in section 5.1, many respondents receive the EU subsidy by practising 'active' land maintenance "for nothing but to keep the subsidy" (ibid.). In this way, the EU subsidy keeps motivating the farmers to maintain and drain the land even though there is a lack of land productivity. Thus, the EU forces farmers to put effort into low productive land just to receive the EU subsidy. In this regard, the current EU subsidy scheme is not beneficial to the environment.

To mitigate such institutional hindrances, adaptations are needed to balance climate mitigation with other priorities. Specifically, Tage Duer urges rearranging structures so that "climate, biodiversity as well as production targets can be supported". Today, rigid funding schemes of EU CAP pillars prevent adequate funding to support biodiversity during rewetting projects. Streamlining these two objectives, along with other counterproductive policy, can facilitate the incorporation of multiple objectives to increase local support.

6. Discussion

6.1 Reflections on Results

Our research reveals multiple factors that potentially hinder the implementation of the TM rewetting proposal. Hindering factors can often be linked to counterproductive institutional structures. In the case of environmental factors, rigid legal thresholds found in the Executive Order BEK 191 simplify complex questions on carbon emission reduction potential, nutrient leakage, and biodiversity into a binary that can single-handedly determine project implementation. As a result, holistic assessment of a projects' cost and benefits becomes difficult when one factor can halt implementation. Hydrology concerns are an outlier to this pattern since authorities perceive technical solutions will prevent flooding. While environmental factors are the criteria by which authorities determine project feasibility, socio-economic and emotional factors influence implementation via landowner attitudes. In TM, potentially facilitative socio-economic factors include low land productivity and an associated small income from land. Hindering factors are the importance of agricultural subsidies and tax benefits to landowners. This hindrance can be mitigated by streamlining institutional incentive structures to encourage climate mitigation practices. A potentially facilitative emotional factor is a concern for climate change, despite not always indicating accurate climate change knowledge. While lack of trust in authorities and high nature attachment hinder implementation.

To bring all landowners on board, the municipality needs to maintain good relations. With the PoV, the ground for this bottom-up approach is already in place but its execution depends on the municipality. For this reason, "municipalities are seen as both part of the problem and the solution to climate change" (Storbjörk 2007, p. 458). With the preliminary study underway, current participation levels could be identified as 'participation by consultation' characterized by a lack of local participation in decision-making and without obligation to include local opinions (Pretty 1995). Pretty (ibid.) argues that involvement generates local support and recommends 'interactive participation' with "joint analysis, development of action plans and formation or strengthening of local institutions" (ibid., p. 1252). The assessment on whether the municipality will reach this ideal of 'interactive participation' is difficult as project implementation has yet to occur. Despite this, survey data and several SSIs demonstrated that there are doubts from landowners regarding the room for participation in the rewetting of TM and Storbjörk's (2007) conclusions further suggest this institutional challenge should not be taken lightly. Specifically, Storbjörk (2007) notes this difficult task in Sweden "where policy directives, requirements and expectations, stemming from the national level entail important demand on municipalities" (2007, p. 459). Accordingly, the

municipality has the tough task to coordinate national-level governance requirements with adequate local involvement to ensure implementation.

Structural rigidity is also a hindering factor in the environmental assessment. Kløve et al. (2017) notes "the benefit to one environmental target such as GHG emission might be uncertain and difficult to assess. Therefore, restoration projects should consider all these ecosystem services" (2017, p. 91). Our calculated emission reduction potentials varied largely based on the selected model, emphasizing Kløve (ibid.)'s point that certainty is difficult and narrowing in on the importance of only one ecosystem service is unwise. Similarly, uncertainty was found regarding the biodiversity aspect due to local scepticism and authority knowledge gaps. The literature supports this scepticism, that rewetting can't simply be assumed to increase biodiversity, by highlighting fallacies in the assumption that rewetting increases biodiversity (Bragg & Tallis 2001; Kløve et al. 2017; Holden et al., 2004; Soini et al., 2010). Currently, it is difficult to incorporate multiple ecosystem services in rewetting projects due to the reliance on cost-effective modelling which focuses solely on carbon sequestration and financial costs. Fortunately, the last EU Post-2020 CAP Report aims to enhance structural flexibility to allow for ecosystem service synergies.

Kløve et al. (2017) stress the importance of socio-economic factors by noting "peatlands offer income to farmers and communities in many regions with few other sources of income" (p. 86). Our findings support this claim of incorporating socio-economic factors into the cost-effectiveness analysis to facilitate implementation. However, nuance can be added by noting agricultural production income is not a large factor in TM due to the low agricultural intensity. Rather the importance of EU subsidies and tax benefits drive socio-economic concerns. Either way, the outcome remains unchanged whereby landowners do not see potential personal gains from rewetting, hindering project support. This dynamic is similar to Wood et al.'s (2017) findings on Danish farmers who are largely motivated to adopt sustainable practices when personal gains are perceived while fear of climate change does not motivate action. Therefore the obvious way to encourage landowner support is to generate adequate and individual incentives with land swapping and monetary compensation. Additionally, gathering and disseminating more knowledge on alternative land-uses for economic gains could encourage landowners to support rewetting.

Hindering distrust and aversion to change can also be mitigated by enhanced communication. Svendsen & Sørensen (2007) stress the importance of such 'intangible' factors in the Danish rural context by noting although "invisible to the eye and not easily measured in quantitative terms. They nevertheless involve visible socioeconomic outcomes and should therefore rightly be seen as productive, like tangibles" (p. 453). Our findings confirm equal importance should be granted to these 'intangible' factors. Particular notions of distrust from SSI 9 may be an interesting 'intangible' factor to place more attention on. This participant's distrust, which was uniquely motivated by feelings of agrarian marginalization, align with literature on the environmental justice dilemmas of "how the

burdens and benefits of mitigation are shared across various levels" (Mathur et al. 2014, p. 42). Although this point of inequity in the literature is largely based on a Global North-South divide, the experience of SSI 9 and questioning of 'why is TM, in particular, targeted for climate mitigation' from other participants suggests a comparable dynamic may occur within Denmark. Although the degree and mechanism of agrarian marginalization can be presumed to vary significantly in a Danish context compared to literature on the Global North-South divide.

6.2 Reflections on Methods

The study site and the local context were unknown to all researchers before the project which entailed some methodological limitations. The use of Danish translators enabled us to overcome some cultural and language barriers. Their presence helped landowners express themselves more confidently, but hindered conversational flow and may have concealed important nuances. Hence, some misinterpretations and missed perspectives may have influenced the findings.

As the Odsherred Municipality sent out the online survey via e-Boks some older landowners who do not use e-Boks fell out, which may have affected the representativity. A Danish survey tool could have overcome frustrations due to English survey instructions.

Furthermore, the purpose of our study was unclear to some landowners, although the survey clarified our academic intentions. Nevertheless, multiple informants mistook us for being responsible for the rewetting proposal. This suspicion may have negatively influenced how landowners responded to our questions. In interviews, the sense of trust was generally perceived as high and misconceptions could be clarified directly, however, this process could not occur with survey respondents and may have misled the results. To avoid this confusion, the survey should have been tested to a greater extent, including also landowners of Trundholm Mose, and a greater emphasis could have been placed on perfecting our verbal and written introduction of project intentions.

Moreover, many landowners were unfamiliar with the concept of rewetting. This could be clarified in interviews while it may have decreased the reliability of certain survey results as some questions required an understanding of rewetting. Correspondingly, lack of knowledge on the rewetting proposal may also have impacted the validity of landowners' claims of support or non-support. To avoid such errors, more clear-cut explanations of rewetting should have been provided without assuming any kind of preexisting knowledge. Next to other reasons like low engagement with the land, this lacking understanding could have caused the relatively low response rate with only 21 survey participants out of 80 contacted landowners. To increase the number of participants, additional landowners were contacted via phone and visited in person with printed forms of the online survey, mostly following up on a semi-structured interview.

Most semi-structured interviews took place in person but due to distance, availability, and

the ongoing COVID-19 pandemic, some interviews were conducted over Zoom. The personal interviews were more informative and enabled informants to talk more openly and generate a connection with researchers and comfortably elaborate on their perceptions. For on-site interviews, we brought a map over the area. This functioned well as an icebreaker and allowed informants to point out specific areas within the bog. Yet, this often caused standing instead of walking around at the site. Transect walks were further hindered by limited consent for entering parts of the area. In the future, meeting more landowners on their plots could enable superior data collection and understanding of the physical environment. Also, next to the many SSI's that helped to generate credibility and to identify patterns in landowners perceptions, focus groups could have been useful to reveal common or conflicting interests and ideas within certain landowner groups like for example hunters in TM.

Land-use determinations were mainly based on direct observations. Although this provided a general indication of current land-use, it would have been meaningful to make a more exact distinction through a botanical assessment. For instance, random plots could have been selected to identify the occurrence of plants typical to certain land-use types. This would have enabled a more precise carbon emission estimate and allowed for better triangulation of the qualitative biodiversity data.

The grid size (5m x 30m) suited the P assessment well since this method assumes homogeneous soils. Given that P is site-dependent, it would have been useful to increase the number of samples taken from each plot to generate a more representative overview. Furthermore, a larger grid size (e.g. 50m x 300m) and additional samples would have improved the estimation of the carbon content but were limited by the lack of access to the plots.

The content of P in the study site could have been potentially over- or underestimated as the primary data points associated with the GPS points are extrapolated to the entire plot in which the P content was measured. Furthermore, the calculations on the estimated costs related to the requirements of the Executive Order BEK 191 (Figure 5.2.3) overestimated the total carbon emissions that can be mitigated in the area. The analysis included the total area (ha) of the plots that are only partly included in the project area proposed by BoP. By this, we systematically overestimated the total CO_2 emissions in tonnes and thus also the costs associated with the preliminary study and the full implementation of the project. In general, the overall sampling strategy could have been improved by using the texture2014 map and the indicated carbon distribution.

Overall, the different methodologies complemented each other well and the data collection allowed for triangulation, even if this could have been done more extensively to identify more valid correlations and linkages, e.g. between the lack of trust and transparency. In this regard, it needs to be emphasized that even though distrust was a major theme in our qualitative data, that survey data suggests it is not so prolific. This mismatch may be a result of interest in participating in SSIs may correspond with landowners with stronger opinions. Therefore claims around the concepts of distrusts and lacking communication may not play as strong a role as the data suggests.

The quantitative survey data was used to identify patterns among landowner attitudes through statistical tests and observations while the qualitative data provided a deeper understanding of the perceptions. In the same way, the soil sampling and land-use data could be triangulated with survey or interview data. Thanks to preexisting maps, cadastral data, and GPS points, we were able to spatially allocate the gathered data.

The diverse academic background of all researchers was beneficial and essential in investigating the multi-dimensional process of rewetting. The group had a very good dynamic and everyone was keen on participating in all aspects, including those in which they lacked previous experience. In terms of data analysis, the framework generally helped to structure the analysis in terms of different factors. Yet, slightly different interpretations of the analytical dimensions and the overlapping nature of the factors complicated a cohesive analysis of the data. To make sure everyone was on the same page, such struggles could be overcome by group discussions, which proved very helpful to maintain a balance between different analytical aspects of the results. In summary, not only the group dynamic but also the results and the associated analysis benefitted from the interdisciplinary team constellation.

7. Conclusion

This report explored rewetting as a piece of the Danish strategy to reach 2030 Paris Agreement targets. To assess what factors hinder and facilitate climate mitigation rewetting schemes, TM's proposed rewetting site was analyzed. For this purpose, four analytical dimensions of hindering and facilitating factors were identified: socio-economic, environmental, emotional, and institutional.

Calculations of TM's carbon emission mitigation potential suggests the executive order on wetland projects' requirements will be met and a lack of emission potential will not hinder project implementation. Results suggest considerable difficulties towards meeting requirements surrounding phosphorus leakage and protected area biodiversity. Scaling down project size may mitigate phosphorus' hindering role. No definitive answer on rewetting's biodiversity impact can be made, although many locals associate rewetting with a decline in biodiversity.

The consideration of additional socio-economic and emotional factors reveal that landowners fear mainly personal loss rather than climate change, which can hinder support for project implementation. Landowner perceptions of loss are informed by attachment to the land, hunting activities, and reliance on EU subsidies. While interest in land swapping and monetary compensation have generated project support, scepticism, transparency concerns, and confusion hinder project implementation. Communication and inclusivity improvements have the potential to mitigate these hindering factors. A low sense of community may hinder the municipality's ability to generate this suggested inclusive, bottom-up, project implementation, but under more top-down approaches, the lack of community may facilitate implementation by decreasing social costs and project resistance.

Our results suggest that institutional inadequacies are partially responsible for these environmental, socio-economic, and emotional hindering factors. Areas with room for improvement in an institutional context include; streamlining EU subsidy schemes to match climate mitigation objectives, encouraging more bottom-up approaches that take into account local complexities and allowing for greater flexibility in governance to holistically assess a climate mitigation project. Without these profound structural changes, the hindering factors found in TM may manifest throughout Denmark. Thereby, hindering nationwide rewetting implementation and reducing the likelihood of meeting the Danish 2030 emission reduction targets. Considering these significant challenges that stretch from the local context of TM to an international climate governance level, rewetting may not be the low-hanging fruit with immediate returns that many policymakers want to see. Rather, at the moment, rewetting seems to be more of a lengthy process that requires careful consideration and negotiation between a plethora of environmental, socio-economic, emotional and institutional factors.

8. References

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9. Appendices

9.1 List of Informants

Identification	Role	Occupation or Employer	Citation in text
Informant 1	Trundholm Mose Landowner	Retired	(SSI 1)
Informant 2	Trundholm Mose Landowner	Retired	(SSI 2)
Informant 3	Trundholm Mose Landowner	Local Business Owner	(SSI 3)
Informant 4	Trundholm Mose Landowner	Baker	(SSI 4)
Informant 5	Trundholm Mose Landowner	Organic Farmer	(SSI 5)
Informant 6	Trundholm Mose Landowner	Organic Farmer	(SSI 6)
Informant 7	Trundholm Mose Landowner	Retired	(SSI 7)
Informant 8	Trundholm Mose Landowner	Retired	(SSI 8)
Informant 9	Trundholm Mose Landowner	Organic Farmer	(SSI 9)
Informant 10	Trundholm Mose Landowner	IT Professional and Hobby Farmer	(SSI 10)
Informant 11	Trundholm Mose Landowner	Conventional Farmer	(SSI 11)
Informant 12	Trundholm Mose Landowner	Conventional Farmer	(SSI 12)
Informant 13	Trundholm Mose Landowner	Hobby Farmer	(SSI 13)
Informants 14 & 15	Trundholm Mose Recreational Users		(SSI 14)
Informants 16 & 17	Trundholm Mose Recreational Users		(SSI 15)

Informants 18, 19 & 20	Trundholm Mose Recreational Users		(SSI 16)
Informants 21 & 22	Trundholm Mose Recreational Users		(SSI 17)
Informants 23, 24 & 25	Trundholm Mose Recreational Users		(SSI 18)
Informant 26	UCPH professor in the department of Geography	University of Copenhagen	(SSI UCPH professor)
Informants 27 & 28	Project Manager & Engineer on Trundholm Mose feasibility study	Bangsgaard og Paludan Aps	(SSI BoP representatives)
Informant 29	Head of Outreach & Education	UNESCO Global Geopark Odsherred	(SSI Odsherred Geopark representative)
Informant 30 & 31	Sidinge Fjord Project Manager & Coordinator	Danish Nature Agency	(SSI DNA Employees)
Informant 32	Local entrepreneur with a forestry background	Self employed, previously partners with 2006 Naturplan project	(SSI Naturplan 2006 project representative)
Informant 33	Trundholm Mose Project Manager	Municipality of Odsherred	(SSI Municipality representative)
Informant 34	Responsible for Landowner Communications	2006 Naturplan project	(SSI 34)
Informant 35	Chairman of the Danish Society for Nature Conservation (DN) in Odsherred	Danish Society for Nature Conservation	(SSI DN representative)
Jette Jacobsen	Vice-Chairman of the DCCC	Danish Council for Climate Change	(SSI Jette Jacobsen)
Tage Duer	Senior Analyst at the DCCC	Danish Council for Climate Change	(SSI Tage Duer)

9.2 Overview of Applied Methods

Method	Sample Size	Details
Online Survey	21	Sent out to all landowners in Trundholm Mose (80) by the Municipality of Odsherred, 21 conducted a useful survey
SSI's with authorities and experts	10	With the Municipality of Odsherred, the DCCC, with DNA employees, with Odsherred Geopark Representative, with DN representative, with Bangsgaard og Paludan Aps representatives, with Naturplan 2006 project representative, with UCPH professor
SSI's with landowners	13	
SSI's with recreational users	5	
Land-use Assessment (ha)	270	
Plots visually categorised	64	
Plots categorised via satellite images	65	
Soil Samples (in total)	52	
Carbon and Bulk Density	28	
N/P	28	These 28 samples consist of already 'pooled' data from 4 subsamples taken in the field per each of the 28 samples

9.3 Interview Guidelines

9.3.1 Guideline for Authorities and Experts

General

- Confirm job title and relationship to Trundholm Mose.
- Ask for oral consent
- Ask for audio-recording
- What to bring: Notebook
- 1 interviewer
- 1 note-taker

Introduction to the research project

- Field-based research project with a focus on testing out methodologies
- The overall idea of our research project is to investigate what the challenges are for the implementation of rewetting projects in Denmark
- The result collected from this interview as well as other methods will be used to inform our final report. This report is an analysis of our topic as well as a reflection on the type of methods we wanted to try out during our research. The report will be shared with our professors, any participants who are interested and potentially the Municipality and relevant consulting company.

Specific Interviewee Guidelines

UCPH professor

S01: Governance & Participation

- What is the principle of volunteering/ freedom of choice? Is it well known by Danes in general and Danish authorities? Or is it an unspoken assumption?
- Trust
- To what extent do you feel this 'principle of volunteering' can act as a barrier in project implementation? What happens if 5 % say no -- can you still go forward

Bangsgaard & Paludan Aps

- Zoom interview
- What happens if 5 % say no -- can you still go forward
- Phosphorous threshold -- how serious of a barrier is this, will threshold change? short term P leakage worth it? → we need to know the threshold value <u>beforehand</u> =
- Technical view on:
    - What happens after the rewetting in terms of nutrient cycling, vegetation succession, etc.

    - Elaborate on the positive and negative environmental side effects of rewetting
- What about an initial biodiversity assessment of the area to compare with biodiversity status after rewetting
- How were the calculations done for the reduction of CO2 emissions? Cf. the instant effect of rewetting on the emissions + active process of CO2 sequestration

DNA
What happens if 5 % say no -- can you still go forward
Biodiversity outcomes?
Phosphorus outcomes?
Livelihood outcomes?

- What lessons have you learnt from Sidinge Fjord and how does it relate to the national application of rewetting projects?
- Paludiculture & its potential + is there a willingness for adoption by local farmers? Is it actively promoted?
- Carbon tax proposition of the Climate Council - how applicable is it and how should it be implemented in the field? All farmers with emitting lands or just the agricultural areas with wet laying potential?

Note
So far all local interviews are scheduled to be in person. If certain participants prefer zoom adaptations to participatory methods are required. Additionally, questions should be streamlined as energy levels tend to drop more quickly over zoom than in-person conversations.

Interview Guidelines
Estimated Time per interview: 45 minutes to 1.5 hours
The exact order of questions and themes does not need to be maintained throughout interviews. But it is important to include the majority of questions and themes at some points to generate comparative data.

START
1. Identify participant background and relationship to Trundholm Mose.
   Title, occupation, age, how long they have lived here, land ownership status etc.

S01 - SOCIO-ECONOMIC BARRIERS
2. Does this land contribute to the economic well-being of local people?
3. How would the re-wetting of Trundholm mose impact <u>individual</u> land-use and economic well-being? (risks and opportunities)

4. How do you think the re-wetting would impact the community's land-use and economic well-being? (risks and opportunities)
5. What kind of negative economic impacts do you foresee with this project?
6. How would you like to see negative economic impacts mitigated?

7. What are your thoughts on compensation and being given replacement land? Do you trust potential compensation would be adequate?
8. Do you think people would be interested in keeping their land after it is rewetted? What could be possible alternative pathways for future land-uses?
9. To your knowledge, what key stakeholders are involved (local international)
10. What are the project's main intentions?
11. Do you trust the authorities to implement this project in a considerate manner? (SO1)
12. To what extent do you feel access to information is provided to the affected local population?
13. What kind of platforms do exist for people to let their voice heard regarding projects like this?
14. How would you describe the involvement of landowners and other affected people in this project?
15. Do you think the project is a good idea?
16. How do you think others in the community perceive the project?
17. If there is conflict within the community, ask the participant to explain where they think conflict arises from.
18. After rewetting, what kind of alternative land-uses do you foresee?
19. Who would decide on the future land-uses in the area? Would locals be implicated in how the landscape would transform after rewetting?

SO2 - EMOTIONAL BARRIERS

20. How would you describe the involved community?
21. Is the Trundholm Mose community distinct in any way from the rest of Odsherred Municipality?
22. How has the community changed over time? *Please use the map to help explain physical changes.*
23. What potential challenges do you foresee the community facing after rewetting?

24. Discuss and rank how the participant values Trundholm Mose. The end goal to gain an emotional insight into what the land means to the participant. Have scrap paper and pen ready to note down more categories. Photograph the end result.
    Prepared values written down for discussion/ranking:
    - Biodiversity

- Natural Resources
- Agriculture
- Tourism
- Beauty
- Healthy living
- Carbon sequestration
- Sense of belonging
- Familial roots/history
- (rural) Identity

25. Do you feel the community members trust the authorities & experts in projects like this?
    Feeling of involvement
    Feeling of 'being heard' and 'implicated' in project deployment

26. Do you feel people are emotionally involved since it implicates their land? To what extent do you think people fear uncertainties (cf. risks) or look forward to change (cf. opportunities)?

SO3 - ENVIRONMENTAL BARRIERS

27. How will re-wetting impact the immediate environment? (risks and opportunities; flooding, biodiversity, drainage systems, pollution) Trundholm Mose
28. How will rewetting impact the neighbouring environment (cf. Natural 2000 sites, ecological corridors, flooding, etc.)

29. What environmental barriers would you identify, related to this project? And ranking them, which ones are more urgent to address or overcome?

30. How would you like to see authorities mitigate negative environmental impacts of the re-wetting?

31. What are your attitudes towards climate change?
    Is it a top concern?
32. How would you describe, to your current knowledge, the attitudes of local landowners towards climate change?
    Is it something that lives in the community?
    Is it something that people internalize and act on concerning their land & practices?
    Is it something that impacts the decision-making of locals daily?

33. Do you think climate change will impact you in the future?

34. How would you like to see your Municipality respond to the threat of climate change?
35. About ecosystem functioning and biodiversity, what risks & opportunities would you identify?
    How will locals react to this?
36. Do you think/envision problems in terms of phosphorus content in the soil?
37. How do you feel about the proposal of lowering the threshold on acceptable P-levels in soils? Would this shift ecological externalities to different places?
38. Reflecting on the possible environmental barriers, what kind of mitigation strategies would you propose?

REFLECTION

To confirm we have accurately understood the participant's answers we will review key themes mentioned in the interview. **During the interview, a researcher will note down keywords and themes on separate pieces of paper.** We will then give these keywords to the participants to have them organize their meanings and relationships. We will ask them to identify the most important keywords. We will ask them to place selected keywords onto our laminated map. We will continuously ask why and how the participants decide to organize the words. This is to enable reflection from the participant. Photographs of significant layouts will be taken.

WRAP-UP

Would it be okay to contact you again if we have any follow up questions?

9.3.2 Guidelines for Landowners

General

- Confirm title and relationship to Trundholm Mose.
- Ask for oral consent
- Ask for audio-recording
- What to bring: Notebook
- 1 interviewer
- 1 note-taker
- Laminated Map for participatory stuff

Introduction to the research project

- Field-based research project with a focus on testing out methodologies
- The overall idea of our research project is to investigate what the challenges are for the implementation of rewetting projects in Denmark
- The result collected from this interview as well as other methods will be used to inform our final report. This report is an analysis of our topic as well as a reflection on the type of methods we wanted to try out during our research. The report will be shared with our professors, any participants who are interested and potentially the Municipality and relevant consulting company.

“Locals” - Semi-structured Interview Guidelines

- Estimated Time per interview: 30 minutes to 1 hour
- The exact order of questions and themes does not need to be maintained throughout interviews. But it is important to include the majority of questions and themes at some points to generate comparative data.

Structure

profit margins so small, only use own labour if they cultivate land → may be positive about future land-uses or getting compensation

What kind of activities do you and/or the community use Trundholm Mose for? How much time are you out on the land?

What are the strengths in your community? Is there anything that makes your community special?

What challenges does your community face? Are there any threats to your community?

climate change threats: sea-level rise, erosion, salinity ...

1. Identify stakeholder (relation to Trundholm Mose, occupation, position in the community etc.). If the participant has taken our stakeholder survey, begin the interview by confirming basic information from the survey. Such as name, occupation, land ownership status, land-use etc.

2. How did you hear about the project to re-wet Trundholm Mose? How was the project framed? Do you feel the project is progressing transparently? Do you trust the institution involved in the project? Do you trust you will receive adequate compensation or be supported throughout the transition?

3. Do you feel informed about the project? Would you like to be more informed? Are you involved in the project? Do you plan to be involved? Do you want to become involved in the project? Would it be difficult to get involved?

4. Could the authorities do a better job at disseminating information? Could the authorities do a better job of involving local stakeholders and their voices? If so, how would you like to see this happen?

5. What do you use your land in or surrounding Trundholm Mose for now? Have you also used your land for this?

6. How would the re-wetting of Trundholm Mose impact you? Do you see any potential opportunities or risks? Which opportunities do you most look forward to? Which risks are the

most concerning to you? How did you come to these conclusions? Have you/what have you heard about the Sidinge Fjord project?

Potential topics to keep an ear out for: Environmental (flooding, nature). Economic (loss of land productivity, subsidies, compensation, wetland agriculture, solar farms, tourism). Daily life (road access, land access, recreation for themselves and their children).

7. If you have identified risks or concerns, how would you like to see your concerns addressed?

8. Discuss and rank how the participant values the land. End goal to gain an emotional insight into what the land means to the participant.

9. Preconceived values are written on pieces of paper for the participant to rank:
    - Value of untouched nature (biodiversity, health of an ecosystem etc.)
    - Income value (ask the participant to specify)
    - Carbon sequestration/ climate change mitigation value (focus on the general local perception of climate change, what is their role? Are they responsible for the change in any way?)
    - Recreation value (for hiking etc)
    - Have scrap paper and a pen ready to generate more value categories if required.

10. Ask about consent to take phosphorus sampling etc. on their land

11. Closing Comments
    - Thank you for your help! Would it be okay to contact you again if we have any follow up questions? Additionally, would you like to receive a copy of our report?

9.4 Online Survey

9.4.1 Online Survey Form

Timeframe

- Start: Thursday 3rd of March
- End: Sunday 6th of March

Survey Structure

1. *Introduction*

   Hello,

   We are five masters students from the University of Copenhagen studying Environment and Development. For our preparatory fieldwork course, we are exploring local challenges surrounding the proposed wetland creation project in Trundholm Mose. The project, which transforms the drained land into lower carbon-emitting wetland, was proposed to help Denmark meet their 70% emission reduction target by 2030.

   Regarding this project in Trundholm Mose, no data has been collected on local experiences and attitudes. We would like to begin closing this knowledge gap by collecting data from local landowners and other relevant local stakeholders such as yourself.

   Thank you for sharing your story and assisting us with our research!

   Please contact us at +45 91 11 85 84 or dqt382@alumni.ku.dk [LMH1] if you have any questions.

   Kind regards,

   Ebba Rosendahl, Maria Heines, Thibaut Vandervelden, Jasmina Rust and Salomé Lepercq

   Hej

   Vi er fem kandidatstuderende i naturressourcer og udvikling fra Københavns Universitet. Som en del af et kursus i natur- og landbrugsrelateret feltarbejde er vi i gang med at undersøge lokale udfordringer omkring Trundholm Mose og forslaget om at genskabe det som vådområde. Projektet, som vil udtage kulstofrige, drænede lavbundsjorde og genskabe vådområder, som udleder mindre carbon, er foreslået som en del af Danmarks plan om at reducere klimagasudledninger med 70% inden 2030.

   I forbindelse med projektforslaget omhandlende Trundholm Mose er det aldrig blevet undersøgt hvad lokale har af erfaringer og meninger om området. Det vil vi gerne lære mere om ved at spørge folk som dig - lokale lodsejere og andre med relation til området.

Mange tak fordi du deler din historie og hjælper os med vores undersøgelse.

Hvis du har nogle spørgsmål til vores undersøgelse, så tøv ikke med at kontakte os på telefon +45 91 11 85 84 eller e-mail: dqt382@alumni.ku.dk.

Venlig hilsen,

Ebba Rosendahl, Maria Heines, Thibaut Vandervelden, Jasmina Rust and Salomé Lepercq

2. *Consent*

By completing this survey I allow my data to be used in a student report for the University of Copenhagen. Raw survey data will not be shared with the Municipality. Raw data collected here will be deleted after the final student report is written.

▢ I understand

Informeret samtykke

Ved at besvare denne undersøgelse giver jeg tilladelse til at de informationer jeg deler må benyttes i en studierapport på Københavns Universitet. Mine svar vil ikke blive delt med kommunen eller andre instanser. Data indsamlet i denne undersøgelse vil blive slettet efter den endelige studierapport er skrevet.

▢ *Jeg giver samtykke*

To begin our survey we are interested in collecting **background** data on the landowners of Trundholm Mose…
Please click the link below to open up a map of Trundholm Mose. Within the map plots of land are labelled with numbers and letters. Please state the label(s) of the plot(s) you own.

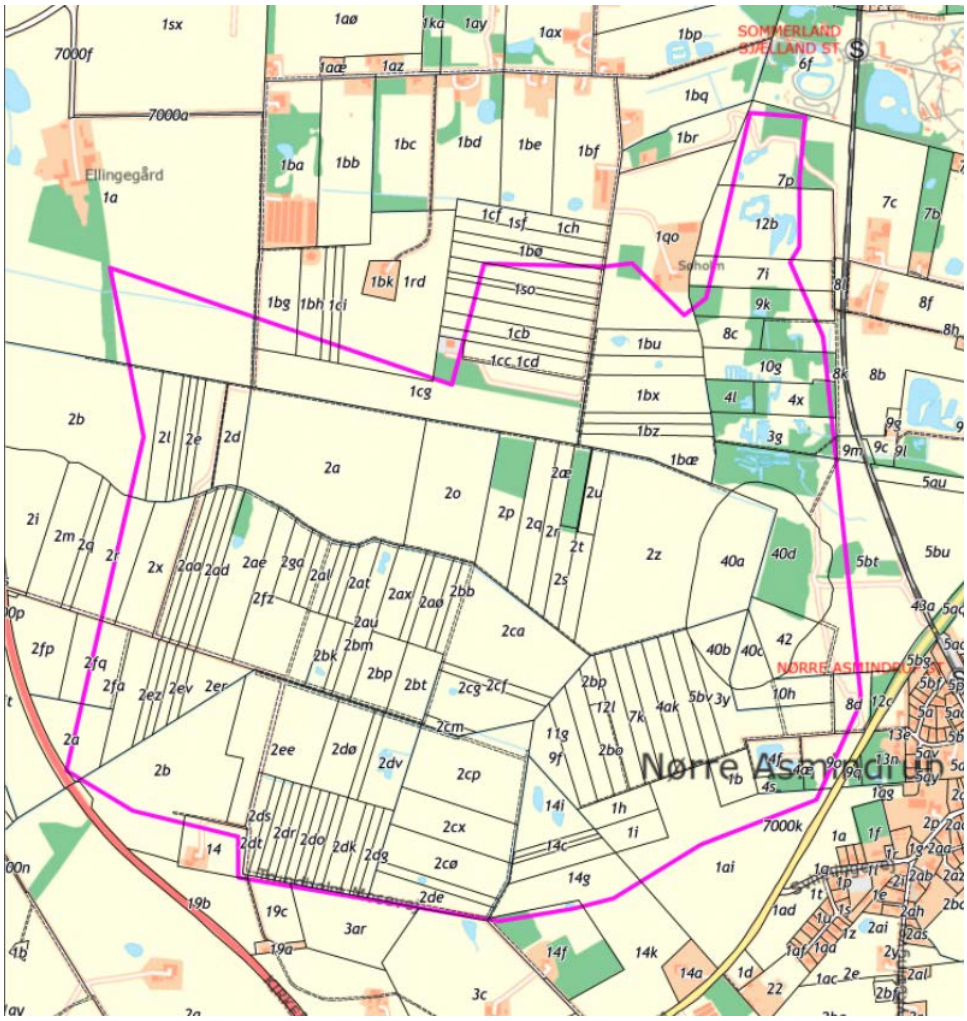
- ▢ Type the label(s) of your plot(s) here. _____
- ▢ I prefer not stating my plot.
- ▢ I don't know which of the plot is mine.

Til at begynde med vil vi gerne indsamle baggrundsdata om lodsejerne i Trundholm Mose. Klik på linket nedenfor for at åbne et kort over Trundholm Mose, hvorpå alle matriklerne og deres numre er markeret. Angiv venligst hvilke matrikler du ejer.

▢ *Skriv nummeret/numrene på dine matrikler her* _____

▢ *Jeg foretrækker ikke at angive hvilken matrikel jeg ejer.*

▢ *Jeg ved ikke hvilken matrikel jeg ejer.*



Demographic questions

1. Where do you live?
   ▢ In Trundholm Mose
   ▢ Outside of Trundholm Mose, but in Odsherred Municipality.
   ▢ Outside of Odsherred Municipality.

   Hvor bor du?

   ▢ *I Trundholm Mose*
   ▢ *Udenfor Trundholm Mose, men I Odsherred Kommune.*

▢ *Udenfor Odsherred Kommune.*

2. Gender
   ▢ Male
   ▢ Female
   ▢ Nonbinary

   Hvad er dit køn?

   ▢ *Mand*
   ▢ *Kvinde*
   ▢ *Ikke-binær*

3. Age *(Alder?)*

   _____

4. What is the highest level of education you have completed?
   ▢ Primary School (9th grade)
   ▢ High School/Gymnasium
   ▢ Vocational Education/training
   ▢ Bachelor's degree
   ▢ Master's degree
   ▢ PhD

   Hvad er det højeste uddannelsesniveau, som du har gennemført?

   ▢ *Grundskole (9. Klasse)*
   ▢ *Gymnasial uddannelse*
   ▢ *Erhvervsfaglig uddannelse*
   ▢ *Kort videregående uddannelse (3 år)*
   ▢ *Mellemlang videregående uddannelse (3-5 år)*
   ▢ *Lang videregående uddannelse (5 år eller mere, f.eks. 3 års bachelor og 2 års kandidatuddannelse)*

5. Relationship Status
   ▢ Single, living alone

▢ Single, living with a partner
▢ Married
▢ Divorced
▢ Separated
▢ Domestic partnership, living separately
▢ Domestic partnership, living together

Hvad er din civilstatus?
▢ *Single, bor alene*
▢ *Single, bor med en partner*
▢ *Gift*
▢ *Fraskilt*
▢ *Separeret*
▢ *Har en kæreste, bor hver for sig*
▢ *Har en kæreste, bor sammen*

6. Number of people in your household (*Hvor mange personer bor der i din husholdning?)*

   _____

7. Occupation (*Hvad er din hovedbeskæftigelse?)*

   _____

Land Ownership and usage

8. How long have you owned land in Trundholm Mose?
   ▢ 0 to 5 years
   ▢ 6 to 10 years
   ▢ 11 to 15 years
   ▢ 16 to 20 years
   ▢ 21 years or more

   Hvor længe har du været lodsejer i Trundholm Mose?

9. Amount of land you currently own in Odsherred, including in Trundholm Mose (in hectares).

   _____

   Hvor meget land (i hektar) ejer du i øjeblikket i Odsherred, inklusiv i Trundholm Mose?

10. Amount of land you currently lease in Odsherred, including in Trundholm Mose (in hectares).

    _____

    Hvor meget land (i hektar) lejer du i øjeblikket i Odsherred, inklusiv i Trundholm Mose?

11. Amount of land you currently own in Trundholm Mose (in hectares).

    _____

    Hvor meget land (i hektar) ejer du i øjeblikket i Trondholm Mose?

12. Amount of land you currently lease in Trundholm Mose (in hectares).

    _____

    Hvor meget land (i hektar) lejer du i øjeblikket i Trundholm Mose?

13. Have there been changes in your land ownership status in Trundholm Mose in the past 20 years?
    - ▢ I have increased the amount of land I own.
    - ▢ I have decreased the amount of land I own.
    - ▢ The amount of land I own has not changed.
    - ▢ I don't know

    Har du ændret ejerskab over land i Trundholm Mose i løbet af de sidste 20 år?

    - ▢ *Jeg har øget arealet jeg ejer.*
    - ▢ *Jeg har mindsket arealet jeg ejer.*
    - ▢ *Jeg har ikke ændret størrelsen af arealet jeg ejer.*
    - ▢ *Ved ikke*

14. Do you use your land in Trundholm Mose as a source of income?
    - ▢ Yes
    - ▢ No

    Er dit areal i Trundholm Mose en indkomstkilde for dig?

15. Estimate the percentage of your income that comes from your land-use in Trundholm Mose.

    - ▢ 0%
    - ▢ 25%

▢ 50%
▢ 75%
▢ 100%

Giv et skøn over hvor stor en procentdel af din indkomst der baserer sig på dit areal i Trundholm Mose.

16. How many people do you permanently employ with your land on Trundholm Mose?

▢ 0
▢ 1-2
▢ 3-5
▢ 6-10
▢ More than 10

Hvor mange personer er fastansat på baggrund af dit areal i Trundholm Mose?

17. How many seasonal workers do you employ with your land per year?
▢ 0
▢ 1-2
▢ 3-5
▢ 6-10
▢ More than 10

Hvor mange personer er sæsonansat på baggrund af dit areal i Trundholm Mose?

18. Please select all relevant income generating activities you use your land in Trundholm Mose for.
▢ Agriculture
▢ Rental Property
▢ Renting out for hunters
▢ Hospitality/Tourism
▢ Other (please specify) _____
▢ I do not use my land in Trundholm Mose to generate an income.

Angiv venligst alle typer af indkomstskabende aktiviteter som du bruger dit areal i Trundholm Mose til.

▢ *Landbrug*
▢ *Bortforpagtning/Udlejningsejendom*
▢ Jagtudleje
▢ *Turisme/feriebolig*
▢ *Andet (uddyb gerne)* _____
▢ *Jeg bruger ikke mit areal i Trundholm Mose til indtægtsskabende aktiviteter*.

19. If you use your land for agriculture purposes would you categorize this work as part time or full time?
▢ Part time agricultural work
▢ Full time agricultural work
▢ I do not use my land for agricultural purposes

Hvis du bruger dit areal til landbrug, vil du da karakterisere det som fuldtid- eller deltidslandbrug?

▢ *Deltidslandbrug*
▢ *Fuldtidslandbrug*
▢ *Jeg burger ikke mit areal til landbrugsmæssige formål.*

20. If you use your land for agriculture purposes, please select all relevant purposes. Please write "Not Applicable" if you do not use your land for agricultural purposes.
▢ Crops
▢ Grass
▢ Livestock
▢ Other (please specify) _____
▢ Not Applicable

Hvis du burger dit areal i Trundholm Mose til landbrug, angiv venligst alle relevante typer aktiviteter. Vælg "Ikke relevant" hvis du ikke benytter dit areal til landbrugsformål.

▢ *Afgrøder*
▢ *Græs/høslet*
▢ *Græsning*
▢ *Andet (uddyb gerne)* _____
▢ *Ikke relevant*

21. What is the main crop?

    _____

    Hvad er den primære afgrøde du dyrker på dit areal?

22. *Which crops have you grown within the last three years?*

    _____

    Hvilke afgrøder har du dyrket på dit areal i løbet af de sidste tre år?

23. If you use your land in Trundholm Mose for agriculture purposes, do you use organic fertilizer? Organic fertilizers are naturally occurring fertilizers derived from animals or vegetable matter. Examples of organic fertilizer include manure, peat, compost, crop residues and guano.

    ▢ I only use organic fertilizers.
    ▢ I use a mixture of organic and inorganic fertilizers.
    ▢ I only use inorganic fertilizers.
    ▢ Not applicable.

24. *Hvis du bruger dit areal i Trundholm Mose til landbrugsformål, bruger du da organisk gødning? Organisk gødning er gødning fra dyr og planter, f.eks. gylle eller kompost.*

    ▢ *Jeg bruger udelukkende organisk gødning.*
    ▢ *Jeg bruger en blanding af organisk og mineralsk gødning*
    ▢ *Jeg bruger udelukkende mineralsk gødning.*
    ▢ *Ikke relevant.*

25. Have you changed the intensity of your land usage (i.e. turning land into fallow, less cultivation) in Trundholm Mose over the past 10 years?

    ▢ I have decreased the intensity.
    ▢ I have increased the intensity.
    ▢ I have not changed the intensity.

    Har du ændret intensiteten af din landbrug (fx. lagt områder brak eller dyrket mindre) i Trundholm Mose i løbet af de sidste 10 år?

    ▢ *Jeg har mindsket intensiteten.*
    ▢ *Jeg har øget intensiteten.*
    ▢ *Jeg har ikke ændret intensiteten.*

26. Select all the private purposes you use your land in Trundholm Mose for.
    - ▢ All year housing
    - ▢ Seasonal/vacation housing
    - ▢ Hunting
    - ▢ Recreation (such as walking in nature)
    - ▢ Other (please specify) _____

    Angiv venligst alle private formål du bruger dit areal i Trundholm Mose til.

    - ▢ *Helårsbeboelse*
    - ▢ *Sommerhus*
    - ▢ *Jagt*
    - ▢ *Rekreationelt (f.eks. til gåture, ridning eller lignende)*
    - ▢ *Andet (uddyb venligst)* _____

Experiences in relation to Trundholm Mose

27. Were you aware of the proposal to re-wet Trundholm Mose before beginning this survey?
    - ▢ Yes
    - ▢ No

    Kendte du til forslaget om at genetablere vådområdet i Trundholm Mose før du begyndte denne undersøgelse?

28. How have you received information regarding the Trundholm Mose re-wetting project?
    - ▢ I have not received any information regarding the project
    - ▢ Phone call
    - ▢ Public meeting
    - ▢ Word of mouth
    - ▢ Letter
    - ▢ Other _____

    Hvordan har du modtaget information om projektet med genetablering af vådområdet i Trundholm Mose?

    - ▢ *Jeg har ikke modtaget noget information om projektet*
    - ▢ *Telefonopkald*
    - ▢ *Offentligt møde*
    - ▢ *Mundtligt/mund til mund*
    - ▢ *Breve*

▢ Andet _____

29. Would you be willing to re-wet your land in Trundholm Mose for appropriate monetary compensation?
    ▢ Yes
    ▢ No

    Vil du være villig til at genetablere vådområde på dit areal i Trundholm Mose for passende økonomisk kompensation?

30. Would you be willing to give up your land to the re-wetting project for adequate replacement land?
    ▢ Yes
    ▢ No

    Vil du være villig til at opgive dit areal til genetableringsprojektet mod erstatning i form af et passende stykke jord andetsteds?

31. What alternative uses would you consider for your land if it is re-wetted?
    ▢ Wetland Agriculture
    ▢ Solar farming
    ▢ Other (please specify) _____

    Hvilke alternative former for arealanvendelse vil du overveje hvis dit areal bliver genetableret som vådområde?

    ▢ Paludikultur
    ▢ *Solcelleanlæg*
    ▢ *Andet (uddyb gerne)* _____

32. Do you receive EU subsidies for your land?
    ▢ Yes
    ▢ No

    Modtager du EU-støtte til dit areal I Trundholm Mose?

Perceptions and attitudes

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

Meget uenig	*Uenig*	*Hverken enig eller uenig*	*Enig*	*Meget enig*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

33. I understand the purpose of re-wetting Trundholm Mose.
    Jeg forstår formålet med at genetablere et vådområde i Trundholm Mose.

34. There are opportunities for me to share my opinion on this project.
    Det er muligt for mig at dele mine holdninger til projektet.

35. I trust the Municipality will consider my interests regarding the re-wetting of Trundholm Mose.
    Jeg stoler på at kommunen vil tage hensyn til mine interesser i forhold til genetableringen af et vådområde i Trundholm Mose.

36. From my experience, I think the re-wetting project will be enacted in a transparent way by the Municipality.
    Jeg tror på at en vedtagelse af genetableringen af et vådområde i Trundholm Mose vil foregå med gennemsigtighed på kommunalt plan.

37. I am well informed about climate change and how it will influence Denmark.
    Jeg er velinformeret om klimaforandringer og hvordan de vil påvirke Danmark.

38. In my opinion, climate change is an urgent issue that requires immediate action.
    Jeg mener at klimaforandringer er et presserende problem der kræver handling omgående

39. Climate change has already impacted my livelihood or income.
    Klimaforandringer har allerede påvirket mit levebrød eller min indkomst.

40. I am concerned about how climate change will affect my life in the future.
    Jeg er bekymret om hvordan klimaforandringer vil komme til at påvirke mit liv i fremtiden.

41. What are your main concerns surrounding the re-wetting projection?
    Hvad er dine primære bekymringer i forbindelse med projektet om genetableringen af et vådområde i Trundholm Mose?

    _____
    _____
    _____
    _____
    _____
    _____

42. What opportunities do you see associated with the Trundholm Mose re-wetting project proposal?

    Hvilke muligheder ser du i forbindelse med projektet om genetableringen af et vådområde i Trundholm Mose?

    _____
    _____
    _____
    _____
    _____
    _____

43. I support the re-wetting of Trundholm Mose.
    Jeg støtter genetableringen af et vådområde i Trundholm Mose.

3. <u>Contact questions</u>

To generate a better understanding of local attitudes surrounding the Trundholm Mose re-wetting project, our research team will be conducting in- depth interviews with about 10 local residents.
Please let us know if you are interested in conducting an interview to support our research. We would really appreciate it. The interview will last between 30 minutes to 1 hour. Please list your telephone number and email address below if you are interested in holding an interview with our researchers. We will contact you within the first two weeks of March.

For at få en dybere forståelse for lokale holdninger til Trundholm Mose og det foreslåede projekt om genetablering af et vådområde dér, vil vores hold gerne tale mere dybdegående med omkring 10 lokale beboere.

Det vil være meget værdsat hvis du er interesseret i at hjælpe os. Et interview vil vare fra ca. 30 minutter til ca. én time. Hvis du er interesseret i at hjælpe os ved at give et interview, så angiv venligst dit telefonnummer eller din e-mailadresse nedenfor. Vi kontakter dig inden for de to første uger af marts.

44. Are you interested in participating in a follow up interview?
    - ▢ Yes
    - ▢ No

    Er du interesseret i at deltage i et opfølgende interview?

45. Would you prefer a follow up interview over zoom or in person on site?
    - ▢ Over the phone
    - ▢ Over video call
    - ▢ In person
    - ▢ I am not interest in participating in a follow up interview

    Foretrækker du et opfølgende interview over telefonen, over videokald eller ansigt til ansigt?

    - ▢ *Telefoninterview*
    - ▢ *Over videokald*
    - ▢ *Ansigt til ansigt*
    - ▢ *Jeg er ikke interesseret i at deltage i et opfølgende interview.*

46. Are you comfortable conducting this follow up interview in English or would you prefer to have a translator present?
    - ▢ I am happy to conduct a follow up interview in English.
    - ▢ I would like a Danish/English translator present at the interview.
    - ▢ I am not interested in participating in a follow up interview.

    Er du tryg ved at deltage i et opfølgende interview på engelsk eller vil du foretrække at det foregår på dansk? (Der vil være en tolk til stede)

▢ *Jeg er tryg ved at interviewet foregår på engelsk.*
▢ *Jeg vil gerne have at der er en dansk/engelsk tolk til stede under interviewet.*
▢ *Jeg er ikke interesseret i at deltage i et opfølgende interview.*

To collect more data on Trundholm Mose and the potential challenges associated with re-wetting the area we plan to walk on the land to gain first hand knowledge of the landscape. Additionally, we plan to take soil samples to test phosphorus levels, carbon content etc. We would greatly appreciate it if owners in the area would give us access to their land. Please let us know by answering the questions below.

For at lære området at kende, indsamle data og få mere at vide om potentielle udfordringer i forbindelse med genetablering af et vådområde i Trundholm Mose har vi planer om at gå ture i området. Derudover vil vi gerne indsamle jordprøver for at undersøge fosforindhold, kulstofindhold og lignende. Det vil være en stor hjælp og meget værdsat hvis du som lodsejer i området vil give os adgang til dette. Giv os besked ved at udfylde spørgsmålene herunder.

47. I consent access to my plot for research walks. We are very careful and take the greatest possible care of your land.

    ▢ Yes
    ▢ No

    *Jeg giver samtykke til at i **må gå** på mit areal i denne sammenhæng. Vi er meget forsigtige.*

48. I consent access to my plot for soil samplings. We are very careful and take the greatest possible care of your land.

    ▢ Yes
    ▢ No

    *Jeg giver samtykke til at i **må tage jordprøver** på mine jordlodder. Jordprøver udtages med et lille jordspyd – vi er forsigtige og tager os godt af dit areal.*

49. Are you interested in receiving a written report of our study? If yes, please provide your email address below.
    ▢ Yes
    ▢ No

Er du interesseret i at modtage en rapport om vores undersøgelse? Hvis ja, angiv venligst din e-mailadresse nedenfor.

50. Are you interested in receiving the results of soil sampling on your land? If yes, please provide your email address below.

    ▢ Yes
    ▢ No

    Er du interesseret i at modtage resultaterne af jordprøven udtaget fra dit areal? *Hvis ja, angiv venligst din e-mailadresse nedenfor.*

51. Please provide your telephone number if you are interested in conducting a follow up interview to support our research.

    Angiv venligst dit telefonnummer her hvis du er interesseret i at deltage i et opfølgende interview og dermed støtte vores forskning.

    _____

52. Please provide your email address if you are interested in conducting a follow up interview to support our research **OR** you are interested in receiving the results of our research.

    *Angiv venligst din e-mailadresse hvis du er interesseret i at deltage i et opfølgende interview og dermed støtte vores forskning **eller** hvis du er interesseret i at modtage resultater fra vores forskning.*

Thank you for your participation and your support in our research project!
Mange tak for at deltage i vores undersøgelse og støtte vores forskning.

9.4.2 Online Survey Data

part_nr	s_67_1	s_67_2	s_67_3	s_69	s_70	s_71	s_72	s_73	s_74	s_75	s_76	s_77	s_78	s_79	s_80	s_81	s_82	s_83	s_84	s_85
1	1	0	0	2dh	2	1	55	5	3	2	system auditor	2	6,4	0,0	0,5	0,0	1	1	1	1
3	1	0	0	11g	2	1	73	5	3	3	Manufacturer	5	17,0	0,0	1,5	0,0	3	1	1	1
4	1	0	0	2aq	2	2	61	5	3	2	Medical Laboratory Technologist (bio analysis)	5	3,0	0,0	0,5	0,0	3	2	1	1
5	0	1	0		1	2	37	3	3	3	pig advisor in VKST	3	9,0	0,0	3,0	0,0	3	1	1	1
6	1	0	0	1b, 9o, 9q, 2ds	2	1	63	1	7	2	farming	5	48,7	16,1	2,7	2,2	3	1	1	1
7	1	0	0	2cp	2	1	79	3	3	2	farmer / pensioner	4	26,0	0,0	5,5	0,0	3	1	2	1
8	1	0	0	2ds, 7k	2	1	73	3	3	2	farming	5	105,0	5,0	3,0	0,0	3	2	1	1
9	1	0	0	14f	1	1	77	3	3	2	pensioner	5	4,4	0,0	4,4	0,0	3	2	1	1
10	1	0	0	2ac, 2aa	2	1	62	3	3	2	synthesis technician	4	7,0	3,0	2,0	3,0	1	1	2	1
11	0	1	0		3	1	58	3	3	2	Director	5	26,0	0,0	26,0	0,0	1	2	1	1
12	1	0	0	1bx, 1bæ, 2au	1	1	52	3	7	2	forest contractor, Gartner	5	12,0	0,0	0,0	0,0	1	1	1	1
13	0	1	0		2	1	54	5	3	4	Director	5	8,0	8,0	8,0	0,0	3	2	1	1
14	1	0	0	5bt, 8d, 42, 40d, 5bv	2	1	54	3	3	4	Work	5	26,0	0,0	20,0	0,0	3	1	2	1
15	1	0	0	2e, 2fz, 2bk, 2ee, 2b, 2cø mfl	2	1	57	3	7	4	farming	5	370,0	100,0	40,0	0,0	1	1	1	1
17	1	0	0	7k, 10h, 40c	2	1	55	3	3	2	Farmer	4	40,5	70,0	4,5	0,0	2	1	1	1
18	1	0	0	7k, 10h, 40c	1	1	53	3	3	2	Early retiree	4	40,5	70,0	4,5	0,0	2	1	1	1
19	1	0	0	2dg	2	2	59	4	3	2	Self employed	5	7,4	0,0	0,5	0,0	3	2	1	1
20	1	0	1	1bz	2	1	49	2	3	4	Pleasures	5	60,0	0,0	2,0	0,0	3	1	1	1
21	1	0	0	2dæ	2	1	71	1	1	1	pensioner	5			0,5	0,0	3	2	1	1
22	0	0	1		3	1	72	6	3	5	doctor	5	155,0	0,0	100,0	0,0	1	1	3	1
23	1	0	0	2dg	2	1	62	4	3	2	rescuer	5	7,4	0,0	0,5	0,0	3	2	1	1

s_86	s_87_1	s_87_2	s_87_3	s_87_4	s_87_5	s_87_6	s_121	s_88	s_89_1	s_89_2	s_89_3	s_89_4	s_89_5	s_122	s_90	s_91	s_92	s_93	s_94_1	s_94_2
1	0	0	1	0	1	0	planning other activity	1	1	0	0	0	0		5	None	4	3	0	0
1	1	0	1	0	0	0		1	0	1	0	0	0		1	Grass	3	1	0	0
1	1	0	0	0	0	1		1	0	1	0	0	0		1	Grass	4	3	0	0
1	1	0	0	0	0	0		1	0	1	0	0	0		1	Grass	4	3	0	0
1	1	0	0	0	1	0	model airfield	1	1	1	0	0	0		1	Hay, silage, barley	3	3	0	0
1	1	0	0	0	0	0		1	0	1	0	0	0		1	Grass	4	3	0	0
1	1	0	0	0	0	0		2	0	1	0	0	0		1	Grass	4	1	0	0
1	1	0	0	0	0	1		3	0	1	0	0	1		2	None	4	3	1	0
2	1	0	0	0	0	0		1	0	1	0	0	0		1	Grass, hay	3	3	0	0
1	0	1	0	0	0	0		3	0	0	0	0	1		1	Grass	1	3	0	0
1	1	0	1	0	0	0		1	0	1	0	0	0		1	Grass	4	3	0	0
1	0	0	0	0	0	1		3	0	0	0	0	1		2	None	4	3	0	0
2	1	0	1	0	0	0		1	1	1	0	0	0		3	oat, rye, barley, triticale	3	1	0	0
1	1	0	1	0	0	0		2	1	1	0	0	0		3	Wheat, rape, oat	2	1	0	0
1	1	0	0	0	0	0		2	0	1	0	0	0		1	Grass	4	1	0	0
1	1	0	0	0	0	0		2	0	1	0	0	0		1	Grass	4	1	0	0
1	0	0	0	0	0	1		3	0	0	0	0	1		2		4	3	0	0
1	0	0	0	0	1	0	Area support/subsidies	1	0	0	0	0	1		4	Nature/ grass / reed	4	3	0	0
1	0	0	0	0	0	1		3	0	0	0	0	1		2	none	4	3	0	0
2	1	0	0	0	0	0		1	1	1	0	0	0		3	Wheat	1	3	0	0
1	0	0	0	0	1	1	Forcibly laid out as §3 and compensation area for road 2	3	0	0	0	0	1		2	Fallow	4	3	0	0

s_94_3	s_94_4	s_94_5	s_1	s_95	s_96_1	s_96_2	s_96_3	s_96_4	s_96_5	s_96_6	s_97	s_98	s_99_1	s_99_2	s_99_3	s_123	s_100
0	0	1	4	1	0	0	0	0	1	0	2	1	0	0	1	wetland is a bad idea - promoting e.g. mosquitoes	2
1	0	0		1	0	0	0	0	1	0	1	1	1	0	0		1
0	1	0		2	0	0	0	0	1	0	1	1	1	0	0		2
1	1	0			0	0	0	0	0	0			0	0	0		
1	1	0		1	0	0	0	0	1	0	2	1	0	1	0		1
1	0	0		1	1	0	0	0	0	0	1	2	0	0	1	I don't know what is meant	1
1	0	0		1	0	0	0	0	1	0	1	1	1	0	0		1
1	1	0		1	1	0	0	0	0	0	1	2	1	0	0		2
0	1	0		1	0	0	0	0	1	0	2	1	0	0	1	Can't be used for anything	1
1	0	0		1	0	0	0	0	1	0	1	2	1	0	0		1
1	1	0		1	0	0	0	0	1	0	2	2	0	0	1	Hunting area	1
1	0	0		1	0	0	0	0	1	0	2	1	0	1	0		2
1	0	1	1	1	0	0	0	0	1	0	1	2	0	0	1	I dont know what it means that it is layed wet. Can you grow anything at all when it is wet?	1
1	0	0		1	0	0	0	0	1	0	1	1	0	1	0		1
0	0	1	2	1	0	0	0	0	1	0	1	1	0	0	1	none	1
0	0	1	2	1	0	0	0	0	1	0	1	1	0	0	1	none	1
0	0	1	3	1	0	0	0	0	1	0	1	2	0	1	0		2
1	1	0		1	0	0	0	0	1	0	1	1	0	0	1	I would like to	1
0	1	0		2	0	0	0	0	1	0	1	1	1	0	0		2
0	1	0		2	1	0	0	0	0	0	1	1	0	1	0		1
0	0	1	3	1	0	0	0	0	1	0	1	2	0	1	0		2

s_101	s_102	s_103	s_104	s_105	s_106	s_107	s_108	s_109	s_110	s_111
2	2	2	2	4	3	2	4	loss of property, significantly more mosquitoes	None	2
3	4	2	2	4	4	2	3	Will the compensation that will be paid be of a reasonable size that can replace what we lose. The drainage has been poorly maintained for many years, which has meant that for most of the years we have not been able to get out there to make hay. After Hedeselskabet was commissioned to clean up the river, the drainage has not been in order. The first approx. 10 years I had the area, we could make 2 cuts of hay per year. 1993 to 2003. Since then, it has been difficult.	A shallow area filled with mosquitoes or botflies (Gasterophilus). Where it will be unpleasant to stay.	4
5	5	3	3	3	4	3	3	Whit such a small plot as we hold, it means nothing to us.	Nature wins	5
2	2	2	2	2	2	3	2	Can't see it as an opportunity as there are roads which binds Odsherred together – – - which will be lost– – millions	Doesn't see it as an option	1
4	3	3	3	3	3	2	3			4
4	4	4	4	3	3	3	3	None		5
4	4	2	2	3	3	4	4	We think that the municipality acts over our heads. That it will become one big reed forest.	The nature will be totally changed	4
2	1	1	2	4	4	1	1	Trundholm Mose is a very scenic area as it is now with a rich wildlife that I like a lot and want us to preserve. I like to sit on a hay bale and enjoy the silence with animals and birds. If we cannot make animal feed in the area, it must be made in other agricultural areas which then cannot be used for human food. Then we have to buy it abroad and then the environment has not won anything. I can see there is no place you can write Praise and Criticism about your questionnaire? I do not think you can send out a questionnaire where the form is writing back in English if you have not filled in correctly. It seems arrogant.	We are loosing/will loose habitats for animal life. Roe deer (Capreolus capreolus), hare, foxes, predatory birds etc.	1
2	3	2	2	4	3	4	3			2
1	1	3	3	5	5	1	5	The biggest problem for me is that I am loosing a good hunting and nature area.	None	1
3	4	3	2	5	4	4	4	Loosing a highly valued piece of unique area which has been owned by our family for more that 60 years.	beautiful, unified nature area	1
2	2	3	3	2	3	2	4	what does a wetland mean? you ask if I want to grow grass, can you drive in a wetland? have you thought about what happens to biodiversity? what about Euroasian woodcock (Scolopax rusticola), common snipes (Gallinago gallinago), nothern lapwing (Vanellus vanellus), foxes, deers, hares, grey herons (Ardea cinerea), western march harriers (Circus aeruginosus), small birds, etc. If it comes under water, there are only ducks and geese left, which are already here by the way.	hard to answer as I do not know what it is about. will it be flooded or is it "slush water/sjapvand" (in this case "sjapvand" probably means very shallow water, which is not permanent). I still can not understand the question about cultivation	3
1	3	2	3	3	3	3	3	None	Beautiful nature	4
4	4	3	4	3	4	3	3	None	recreational area	4
4	4	3	4	3	4	3	3	None	recreational area	4
4	4	4	4	4	4	1	3	None	biodiversity	5
5	3	2	2	3	2	1	3	That it stays/becomes...*(Seems like the sentence is unfinished)*	Rich bird life, tourist trips, better climate?	3
4	3	3	4	4	4	3	3			4
3	3	3	3	2	2	2	2			1
4	4	4	4	4	4	1	3	None	biodiversity	4

9.5 Municipality Letter

ODSHERRED KOMMUNE

«navn»
«adresse»
«postdistrikt»

Den 21. juli 2020

Forundersøgelse af et lavbundsprojekt i Trundholm Mose

Kære lodsejer i Trundholm Mose

Odsherred Landboforening og Odsherred Kommune skriver til dig fordi kommunen planlægger at søge den statslige tilskudsordning "lavbundsordningen" til en forundersøgelse af et lavbundsprojekt i Trundholm Mose. I dette brev vil vi fortælle om lavbundsordningen, hvad forundersøgelsesprojektet går ud på, og hvordan du som lodsejer har mulighed for at deltage.

Hvorfor ønsker vi at lave en forundersøgelse?

Lavbundsordningen handler om udtagning af lavbundsjorder for at mindske udledningen af drivhusgasser (især CO_2) og mindske udledningen af kvælstof til kystvande samt at genskabe eller forbedre natur. Udtagningen af lavbundsarealer består i praksis i, at man fremmer en naturlig hydrologisk tilstand ved at lukke dræn og grøfter. På den måde får jorden tilført mindre ilt, når vandstanden bliver hævet og dyrkningen ophører. Det betyder at nedbrydningen af jordens kulstofindhold sker langsommere eller stopper helt. I sidste ende at bliver der udledt færre drivhusgasser og man får en positiv klimaeffekt.

Odsherred Landboforening støtter op om forundersøgelsesprojektet i Trundholm Mose. Det er af stor betydning at finde en bæredygtig løsningsmodel, der er i pagt med naturen og samtidig er praktisk anvendelig for de primære lodsejere, nuværende såvel som fremtidige. Det er vigtigt for os at understrege, at der er tale om et forundersøgelsesprojekt. Hvis du er med i forundersøgelsen betyder det ikke, at du forpligter dig til at være med i et eventuelt senere anlægsprojekt.

Hvad går forundersøgelsesprojektet ud på?

Forundersøgelsen består af to dele: en teknisk forundersøgelse og en ejendomsmæssig forundersøgelse.

Natur, Miljø og Trafik

Ref.: LMB
Sag: 306-2020-9930
Dok.: 306-2020-196059

Kontakt
Center for Miljø og Teknik
Direkte: 59 66 60 61
lemba@odsherred.dk

Post
Odsherred Kommune
Nyvej 22
4573 Højby
59 66 66 66
kommune@odsherred.dk
www.odsherred.dk
CVR: 29188459

Den tekniske forundersøgelse skal beskrive nuværende forhold i projektområdet (se kortbilaget), et projektforslag og en vurdering af konsekvenser og effekter. Odsherred Kommune har en rådgiver til at udføre den tekniske forundersøgelse.

I den ejendomsmæssige forundersøgelse vil du som lodsejer få tilbudt et personligt møde med rådgiveren på forundersøgelsesprojektet og en repræsentant fra kommunen. På mødet vil du få præsenteret resultater fra den tekniske forundersøgelse og mulighederne for kompensation, hvis der senere gennemføres et anlægsprojekt. På mødet vil du også blive spurgt, om du ønsker at lægge jord til et projekt. Hvis den tekniske forundersøgelse viser, at der er mulighed for at lave et anlægsprojekt, der lever op til kravene i støtteordningen, vil det vil være helt frivilligt, om man som lodsejer ønsker at være med.

Afhængigt af om vi opnår tilskud fra Landbrugsstyrelsen forventer vi, at forundersøgelsen i Trundholm Mose kan starte i begyndelsen af 2021.

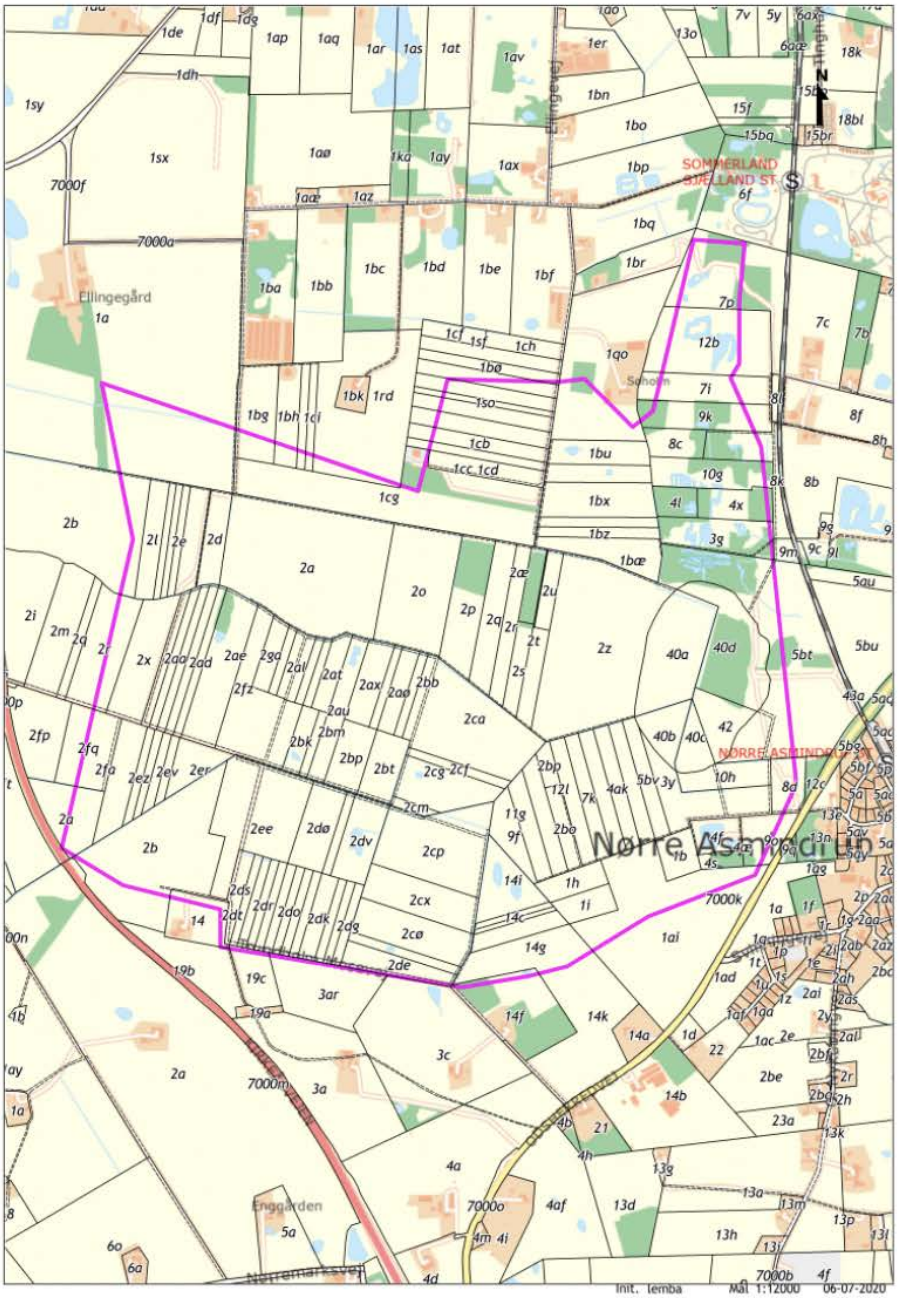
Har du spørgsmål til dette brev eller har du lyst til at medvirke i forundersøgelsen, så er du meget velkomne til at kontakte os. Du kan skrive til kommunen på natur@odsherred.dk eller ringe på tlf.: 5966 6061.

Venlig hilsen

Anders Mortensen
Formand Odsherred Landboforening

Kirsten Gyalokay
Centerchef
Center for Miljø og Teknik

Kortbilag: Forundersøgelsesområdet



«navn»
«conavn»
«adresse»
«postdistrikt»

Den 16. december 2020

Natur, Miljø og Trafik

Ref.: LMB
Sag: 306-2020-9930
Dok.: 306-2020-311998
Vedr. ejd.nr.:

Kontakt
Natur, Miljø og Trafik

Direkte: 59 66 60 61

Post
Odsherred Kommune
Nyvej 22
4573 Højby
59 66 66 66
kommune@odsherred.dk
www.odsherred.dk

Forundersøgelse af lavbundsprojekt i Trundholm Mose

Kære lodsejer i Trundholm Mose

Vi skrev til jer den 21. juli 2020 for at fortælle, at kommunen planlagde at søge den statslige tilskudsordning "lavbundsordningen" til et forundersøgelsesprojekt i Trundholm Mose.

Landbrugsstyrelsen har nu givet tilsagn om tilskud til projektet, og kommunen har indgået kontrakt med Bangsgaard & Paludan ApS, der er rådgiver på projektet og skal udføre forundersøgelsen.

Forundersøgelsen vil bestå af en teknisk forundersøgelse og en ejendomsmæssig forundersøgelse. Den tekniske forundersøgelse vil beskrive nuværende forhold i projektområdet (se kortet i bilaget), et projektforslag og en vurdering af konsekvenser og effekter.

I den ejendomsmæssige forundersøgelse vil du få et personligt møde med rådgiveren. På mødet vil du få præsenteret resultater fra den tekniske forundersøgelse og om mulighederne for kompensation, hvis der senere gennemføres et anlægsprojekt. Du vil også blive spurgt om du ønsker at lægge jord til et projekt. Det er frivilligt, om du ønsker at lægge jord til et projekt.

Vi har sammen med rådgiveren lavet en foreløbig tidsplan. I den indgår bl.a. et fællesmøde, hvor alle med jord i mosen bliver inviteret for at høre om de foreløbige resultater af den tekniske forundersøgelse.

Januar-april 2021: Teknisk forundersøgelse - besigtigelse, opmåling, prøvetagning mm. (i den forbindelse vil rådgiver tage på besigtigelse på alle arealerne)

Juni 2021: Teknisk forundersøgelse - Indledende projektforslag præsenteres for kommunen

Juni 2021: Fælles informationsmøde for alle med jord i projektområdet (under forudsætning af at det til den tid er lovligt at mødes i store forsamlinger)

August-oktober (måske november af hensyn til landbrugsdriften) 2021: Ejendomsmæssig forundersøgelse - afholdelse af individuelle samtaler med lodsejerne

December 2021: resultatet af forundersøgelsen præsenteres for kommunen

Januar 2022: Brev til lodsejerne med resultatet af forundersøgelsen

Odsherred Landboforening støtter fortsat op om forundersøgelsesprojektet i Trundholm Mose. Det er af stor betydning at finde en bæredygtig løsningsmodel, der er i pagt med naturen og samtidig er praktisk anvendelig for de primære lodsejere, nuværende såvel som fremtidige.

Har du spørgsmål til dette brev er du velkommen til at kontakte Naturteamet v. Lena Bau, lemba@odsherred.dk eller tlf.: 5966 6061.

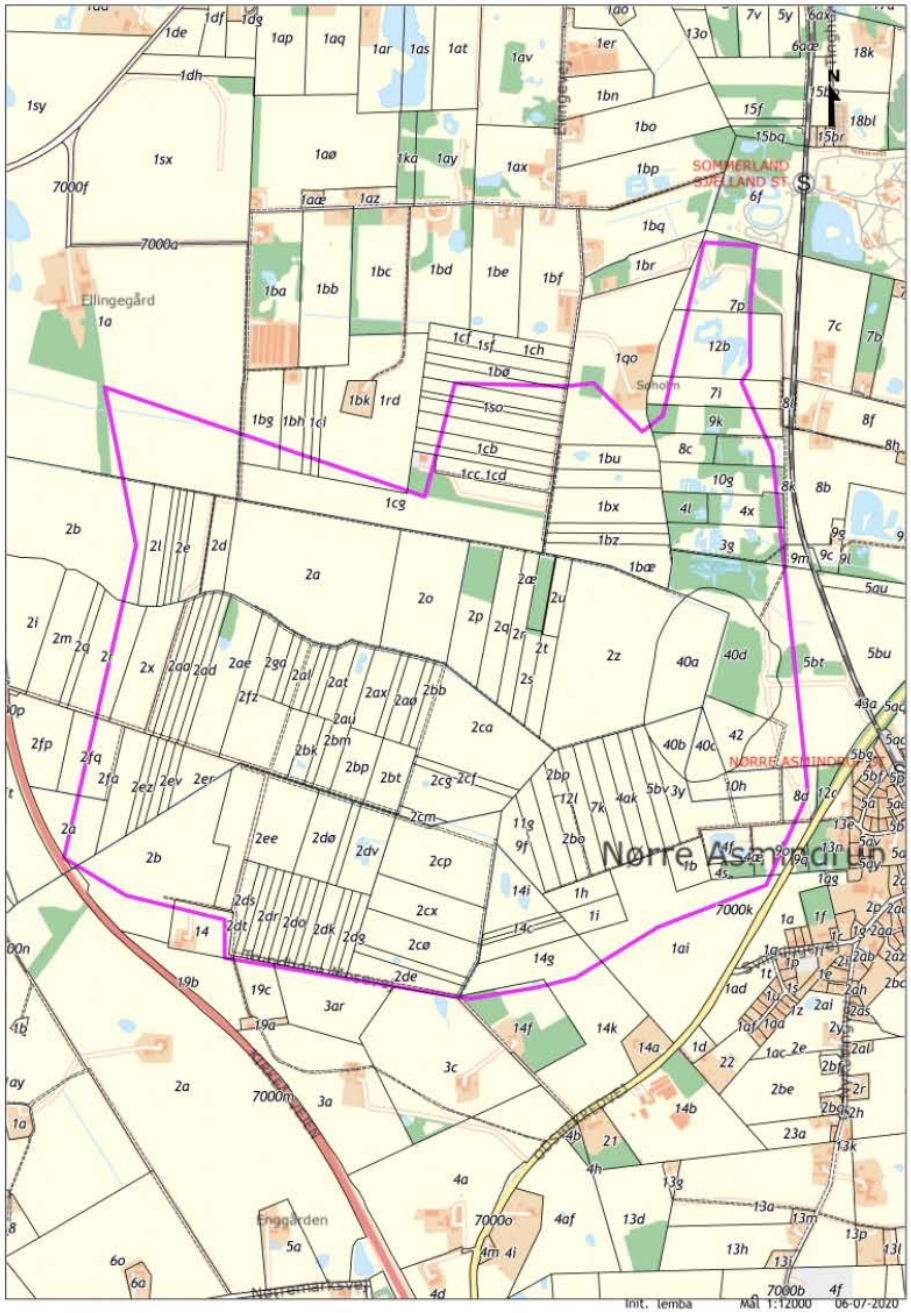
Rådgivers kontaktperson er Nicholaj Rothmann Pedersen (nico@bangsgaardogpaludan.dk).

Venlig hilsen

Formand for Odsherred Landboforening
Anders Mortensen

Afdelingsleder, Center for Miljø og Teknik
Michael Bay

Bilag. Kort over projektområdet



ODSHERRED KOMMUNE

Til lodsejere i projektområdet

23. februar 2021

Orientering om besigtigelse i forbindelse med forundersøgelse af lavbundsprojekt i Trundholm Mose

Kære lodsejer i Trundholm Mose

På fredag den 26. februar 2021 vil den rådgiver, der skal stå for forundersøgelsen af lavbundsprojektet i Trundholm Mose, begynde feltarbejdet. Rådgiveren er firmaet Bangsgaard & Paludan, og du vil i en periode kunne møde ansatte fra firmaet ude på dit areal. Har du spørgsmål i den forbindelse, er du velkommen til at ringe til Nicholaj Pedersen fra Bangsgaard & Paludan på telefon 2971 7633. Du er også velkommen til at kontakte kommunens Naturteam på telefon 5966 6061.

Feltarbejdet indebærer, at der vil blive foretaget en opmåling med GPS og eventuelt andet relevant udstyr af åbne vandløb og grøfter samt drænbrønde i det omfang, disse er synlige (markeret) i området. Der vil også blive foretaget indmåling, hvis der registreres andre ting i området, som vil kunne have relevans i forbindelse med udarbejdelsen af forundersøgelsen.

Der vil også blive udtaget en lang række jordprøver inden for undersøgelsesområdet. Jordprøverne anvendes til at bestemme jordbundens indhold af fosfor samt kulstof. Kendskab til dette er et krav fra staten i forhold til at dokumentere projekternes effekt hvis forundersøgelsen viser, at der er grundlag for at realisere et projekt, og hvis forundersøgelsen viser, at lodsejerne ønsker at lægge jord til et projekt. Jordprøverne udtages manuelt med håndholdte jordspyd. Jordprøverne udtages i en dybde af ca. 0,3 m. Der foretages herudover en beskrivelse af jordbundens opbygning ned til 1 meters dybe. Denne undersøgelse foretages også manuelt med jordspyd.

Miljø og Teknik
Sag: 306-2020-9930
Dok: 306-2021-44617

Kontakt
Direkte: 59 66 60 61
lemba@odsherred.dk

Odsherred Kommune
Nyvej 22
4573 Højby
59 66 66 66
KS: Jafra

Prøvetagning og indmåling forventes påbegyndt i slutningen af uge 8 og forventes afsluttet i løbet af marts eller i starten af april.

Det er et krav til projektet, at der bliver skiltet med, at der foretages en forundersøgelse. Derfor vil der i projektområdet også blive sat et eller to skilte op.

Har du spørgsmål til dette brev er du velkommen til at kontakte mig på telefon 5966 6061 eller via lemba@odsherred.dk

Venlig hilsen

Lena Bau
Naturteamet

9.6 Land-Use Data

Categories	Explanation	Code
Wetland	wetland, bog, nature	WT
Permanent grassland, intensive management	grassland used for harvest, plowing	IG
Permanent grassland, extensive management	grassland	EG
Planted forest	forest patch	PF
Wet forest	wetland, waterlogged soil with dense forest	WF
Agricultural	plot dedicated to growing agricultural products	AC

Plot n°	area (ha)	land-use
9o	1,5242	IG
9m	0,3678	EG
9k	2,6378	WT
9f	1,338	EG
8k	2,0756	IG
8e	1,385	EG
8d	1,2784	IG
8c	1,124	WT
7p	5,8029	PF
7k	1,404	EG
7i	2,619	WT
5bv	1,413	EG
5bt	12,803	IG
4x	1,703	WT
4s	0,1466	IG
4l	0,8452	WT
4f	1,2065	EG
4ak	1,376	EG
4æ	0,325	PF
40d	4,548	WT
40a	4,825	IG
3y	2,957	WT
3g	2,683	WT
2z	11,8664	IG
2x	3,1005	EG
2t	2,0449	AC
2s	0,9726	IG
2r	1,7333	IG
2q	2,3478	EG
2p	3,163	EG
2ø	0,853	IG
2o	5,9778	IG
2l	1,6548	AC
2k	0,5516	AC
2h	1,4874	AC
2ga	0,9072	EG
2fz	4,4822	AC
2fq	2,866	IG
2fa	2,129	IG
2ez	0,596	IG
2ey	0,543	IG
2ex	0,466	IG
2ev	0,423	IG
2er	1,326	IG
2ee	6,082	AC
2e	0,5516	AC
2dv	2,101	EG
2du	0,717	IG
2dt	0,582	IG
2ds	0,558	EG
2dr	0,56	EG
2dq	0,549	EG
2dp	0,545	EG
2dø	2,164	IG
2do	0,541	EG
2dn	0,537	EG
2dm	0,534	EG
2dk	1,056	EG
2di	0,52	EG
2dh	0,524	EG
2dg	0,515	EG
2de	1,612	IG
2dd	0,706	IG

Plot n°	area (ha)	land-use
2dæ	0,531	EG
2d	1,4874	AC
2cx	2,85	IG
2cp	5,547	IG
2cø	2,934	IG
2cm	0,286	WT
2cg	2,6176	WT
2cf	0,658	WT
2ca	6,785	WT
2bt	1,669	EG
2bp	0,4698	EG
2bo	0,9616	EG
2bm	0,41	EG
2bk	0,842	EG
2bb	0,531	EG
2b	9,4254	AC
2ax	1,52	EG
2au	1,8375	EG
2at	0,951	EG
2ar	0,414	EG
2aq	0,417	EG
2aø	1,041	EG
2an	0,426	EG
2al	0,9873	EG
2æ	0,8274	PF
2ae	3,786	EG
2ad	0,964	EG
2ac	0,964	EG
2ab	0,964	EG
2aæ	0,518	EG
2aa	0,899	EG
2a	13,117	AC
1sz	1,6798	IG
1sq	1,401	IG
1sp	1,404	IG
1so	0,564	IG
1i	1,1023	EG
1h	1,1032	EG
1dx	0,8373	WT
1cg	11,0052	AC
1cd	1,3831	IG
1cc	0,8415	IG
1cb	1,4025	IG
1bz	0,8371	WT
1bx	2,7935	WT
1bv	1,3979	WT
1bu	1,6792	WT
1bæ	2,3847	WT
1b	1,1032	IG
1ai	13,0534	IG
14k	9,5865	AC
14i	2,2798	WT
14g	1,1032	EG
14d	0,2758	EG
14c	0,2758	EG
13q	1,3829	EG
12l	1,411	EG
12b	5,6159	WT
11g	1,329	EG
10i	1,3435	EG
10h	1,5532	IG
10g	1,2532	PF
10g	1,2532	WT
42	1,72	AC

9.7 Final Synopsis

1. Introduction

1.1 Climate Mitigation through Wetland Creation

Wetlands, and particularly those with carbon-rich peat soils known as peatlands, are keystone ecosystems in terms of mitigating climate change via carbon sequestration (CS). In comparison to other ecosystems such as forests and grass/shrublands, peatlands have the highest carbon (C) density which make them highly productive systems (Were et al., 2019). In the past, natural wetlands have been transformed on a global scale into agricultural land through drainage. As a result, large areas that formerly acted as carbon sinks are now net sources of CO2 and NO2 emissions (Leifeld et al., 2019).

Despite covering only 3% of the global land surface, peatlands contain nearly 30% of all land-stored carbon and are therefore among the most efficient and cost-effective options for carbon storage (Were et Al., 2019). Accordingly, a huge potential lies within the restoration and rewetting of degraded peatlands to mitigate climate change. Besides curbing CO2 emissions, wetlands restoration leads to the extensification of cash-crop agriculture and halts associated leaching of nitrogen (N) fertilizers in nearby water bodies (Liu et al., 2020). The re-establishment of wetland ecosystems also ideally leads to increased regional biodiversity by providing habitats for birds and moisture-tolerant plants (Kløve et al., 2017). Other potential advantageous side effects include increased well-being for residents who gain greater access to nature and an increase in the area's tourism value. Additionally, although rewetted land is no longer suitable for intensive agriculture, a potential for paludiculture or wet agriculture emerges. As a sustainable land-use alternative, paludiculture can contribute to the preservation of peat, reduce GHGs, minimise nutrient run-off and potentially increase biodiversity while safeguarding its productive character (Kløve et al., 2017; Liu et al., 2020; Tan et al., 2021; Tanneberger et al., n.d).

Conversely, wetland restoration can result in harmful side effects. By rewetting formerly drained peatlands, anaerobic conditions are re-established in the topsoil leading to methanogenesis (Fletcher & Schaefer, 2019). Therefore a trade-off exists between CO2 and CH4 emissions. While CO2 is a weak but persistent greenhouse gas, CH4 is potent but short-lived.

Günther et al. (2020) argues that the climatic effects are, therefore, strongly time-dependent. However, the climate change mitigation potential of rewetted peatlands is not undermined by the risk of increased CH4 emissions as a postponement of rewetting would result in increased long-term warming effects due to continued CO2 emissions.

An additional adverse side effect of wet laying on previously drained agricultural land is phosphorus (P) leaching. The re-establishment of wet and anaerobic conditions enables the mobilisation of soluble P which increases the risk of internal eutrophication and phosphorus pollution of downstream water bodies (Zak et al., 2017). Yet much of the debate over phosphorus leaching remains open as no consensus has been reached regarding the severity of the phenomenon neither on how to avoid or solve p-leaching effectively (Vasander et al., 2003).

1.2 Background

Despite these uncertainties, interest in re-wetting drained peatland continues to grow and has been identified as a cost-effective measure to mitigate greenhouse gas (GHG) emissions (Günther et al., 2020). This movement largely stems from international pressure to mitigate climate change. Most notably, The Paris Agreement, which has been signed by 195 countries, has set an international target to limit warming well below 2 degrees Celsius. Within this agreement, Denmark has pledged to reduce emissions by 70% by 2030 and become climate neutral by 2050 (Jacobsen, 2020).

To contribute to this transition to a climate neutral-society, the Danish Climate Council has recently made a proposal for a new model of effective regulation of wet-laying projects in which they explain how the rewetting of peat soils can contribute significantly to achieving Denmark's climate and environmental targets. According to this report, if all lowland soils were turned into wetlands, approximately 4.8 million tons of CO2 could be reduced (Climate Council Report, 2020).

1.3 Local context

In order to ensure that national climate targets are congruent with local realities, the Danish government has strongly encouraged its municipalities to develop climate action plans. For the purpose of our report, we will focus on Odsherred Municipality and its current consideration of a re-wetting of the C-rich lowland soils in the area of Trumdholm Mose. Given that the project is

still under assessment, we aim to provide valuable insights by exploring existing challenges and fill in knowledge gaps regarding the feasibility of the project.

Trundholm mose is a bog, which was drained about 100 years ago and turned into agricultural land. Yet the area is marked by some heterogeneity as some lands are more productive than others. We also found out that some landowners are not necessarily aware of their ownership of land in the area affected by the project. Overall, the project area is approximately 257 ha and about 150 owners have plots in the bog (Bangsgaard & Paludan 2020).

Our main interest lies in investigating the existing socio-economic, emotional and environmental barriers that could impact the effective implementation of the re-wetting project in Trundholm Mose. This is a highly complex process involving many different actors with similar and contrasting interests. Among others, we expect from the landowners, the Municipality of Odsherred, the Danish Ministry of Environment and Food and the consulting company Bangsgaard & Paludan Aps to provide us with their respective opinions on the proposed project to shed light on aspects we would not have necessarily considered otherwise. Next to assessing relevant stakeholders' perception regarding the project, we are aware that the wet-laying project is expected to significantly impact the environment, the land usage and thus the livelihoods of landowners and other people depending on the current use of land for their livelihoods. Consequently, the rewetting project of Trundholm Mose is predicted to cause multidimensional side effects which all pose different challenges for implementation.

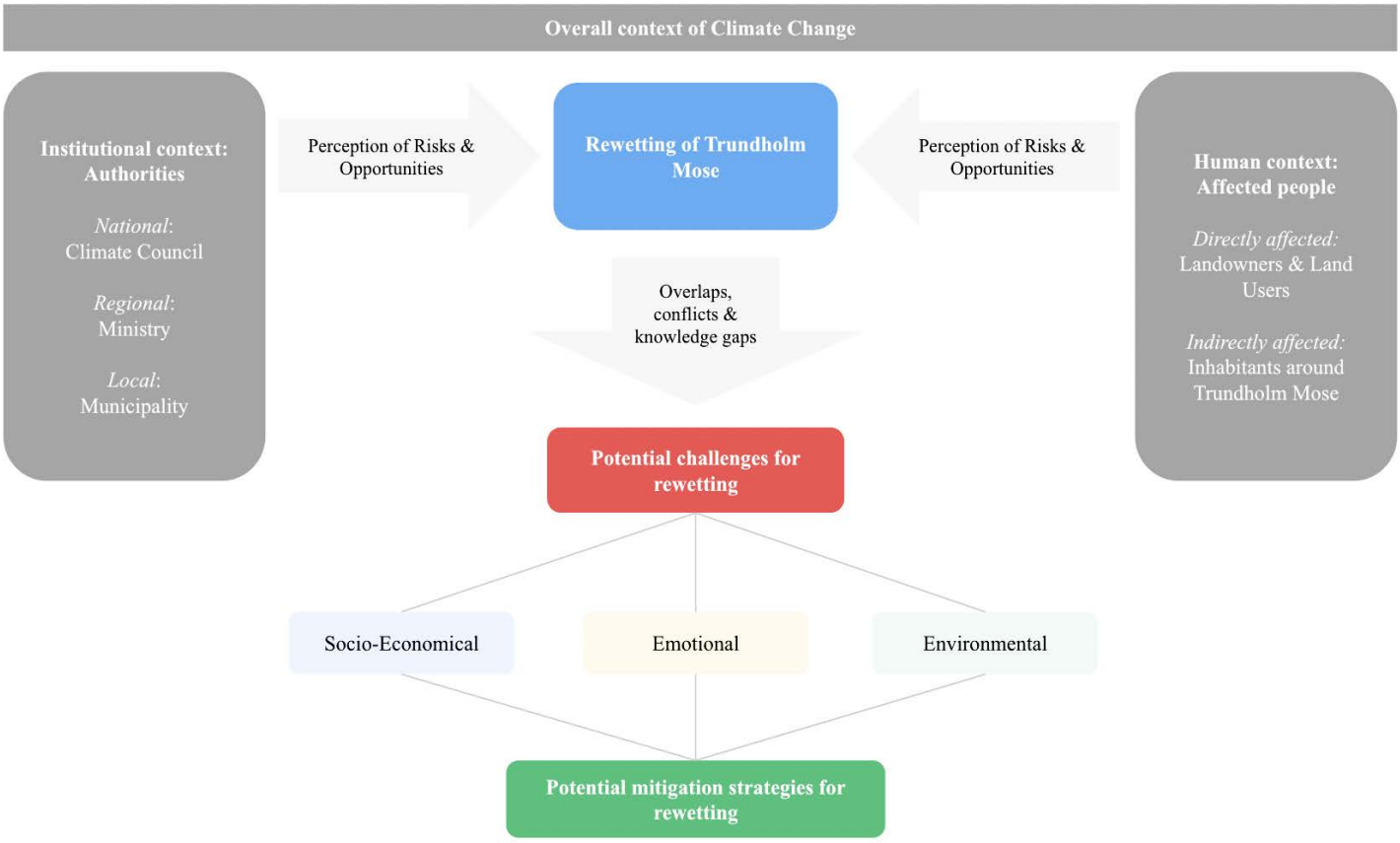
2. Framework and Research Question

To better understand our research scope, we designed a framework to outline relevant stakeholders and challenges of rewetting Trundholm Mose in the context of climate change. Building upon this framework, our overall research question and sub-objectives are as follows:

What challenges do wetland creation projects face and how do they play out at Trundholm Mose?

- *Sub-objective 1:* Explore socio-economic barriers perceived by authorities and local affected people

- *Sub-objective 2:* Explore emotional barriers perceived by authorities and local affected people
- *Sub-objective 3:* Explore measured and perceived environmental barriers



To analyze these three sub-objectives, we adopt an interdisciplinary methodological approach. This is to account for the multi-dimensional nature of re-wetting which requires analysis from different disciplines and perspectives.

3. Methodology

3.1 Literature Review

It is useful to take a look at the existing scientific literature of geography, sustainability studies, social studies and political studies. We will focus this literature search to case studies from northern European context to examine relevant challenges, risks and opportunities. We will also reference site-specific documents from Denmark's Climate Council, the Municipality etc. The

analysis of academic and site-specific literature follows an integrative approach “to show evidence on a meta-level and to uncover areas in which more research is needed” (Snyder 2019: 333). In this integrative approach, the literature review takes place less systematically and “requires a more creative collection of data, as the purpose is usually not to cover all articles ever published on the topic but rather to combine perspectives and insights from different fields or research traditions” (Snyder 2019: 336).

3.2 Online Survey

The survey will be a structured web-based questionnaire. According to Van Selm and Jankowski (2006) and Evans and Mathur (2005) the main advantages of online surveys are efficiency in cost and time, the potential to reach a larger number of respondents and the comfortable participation without direct confrontation. This is in particular important in the context of wet laying as directly affected landowners might hesitate to state their opinion and to mention their fears face-to-face. Although this way of participation creates in such an extent an anonymous situation, the study aims to collect personal data to allocate each landowner to all plots in Trundholm Mose. The goal here is to geographically locate the collected information on perceptions and land-uses within the area of Trundholm Mose to draw spatial conclusions regarding risks, opportunities and mitigation strategies. For this sake, the online survey requires consent to use individual data of each participant. It is recognized that this creates a risk for fall-outs in participation in the survey.

Regarding the sampling strategy, the questionnaire follows the census sampling principle as it is carried out with all 150 landowners in Trundholm Mose even though some fall-outs are anticipated. For privacy reasons, the survey is conducted by the Municipality of Odsherred and mailed to all relevant landowners.

In terms of structure the survey will start with introductory questions regarding the demographic background, following with questions on the socio-economic situation, land usage, how the land is valued, perceptions around climate change and ending with attitudes concerning the wet laying proposal and perceived risks/opportunities. The survey consists mostly of closed questions except for a few open questions regarding personal perceptions. The variables differ from dichotomous (e.g. yes/no) questions, over nominal questions with multiple-choice option, to ordinal questions based on the Likert Scale (ranging from strongly disagree to strongly agree)

to measure the spectrum of attitudes. The questionnaire is generated with the online survey tool SurveyXact and is translated in Danish. At the end of the survey every landowner will be asked if they're interested in a follow up interview or allowing us to use their land for soil sampling.

When it comes to the analysis, the conducted data will be analysed in three steps. First, there will be a quick analysis of the spectrum of perceptions in order to incorporate all points of views in the subsequent in-depth interviews or transect walks. This first step will happen during the fieldwork period. After finishing the fieldwork, the collected data on the closed questions will be analysed quantitatively and statistically (e.g. with a Chi- or Anova test). The open questions will be analysed qualitatively. The last step of analysis will occur at the final end of the research when all the data out of each method is collected and analysed. Here, the collected information on landowners' perceptions will be mapped spatially on the area of Trundholm Mose.

3.3 In-Depth Interviews with Locals, Experts and Authorities

Throughout our field work, we will rely on semi-structured interviews to gather qualitative data. We have chosen this methodology to allow for researchers to collect comparable data between participants while also giving researchers the flexibility to ask follow up questions based on what participants say or how they act. This flexibility gives researchers a better chance at uncovering the challenges and themes stakeholders themselves find important surrounding the re-wetting of Trundholm mose (Kallio et al., 2016).

We aim to hold 10 to 15 semistructured interviews with local stakeholders. To gather more local participants use a mixture of snowballing tactics and contact survey participants who indicate they are interested in a follow-up interview. Stratified sampling is used to interview stakeholders with diverse backgrounds and/or attitudes. Allowing analysis of differential experiences based on age, gender, land ownership status etc. Local interviews will supplement survey data with context, nuance and rationale to the socio-economic, emotional and environmental challenges faced by locals. This information will allow us to identify conflicts of interest and knowledge gaps.

Semi-structured interviews will also take place with relevant experts and authorities. These stakeholders will give us an overview of the project, Danish governance and consequences

considered in official discourses. Major discrepancies between local and expert/authority stakeholders will be noted.

Transect walks and participatory methods will be incorporated into interviews when appropriate. This will give us access to knowledge connected to the landscape and the embodied knowledge of locals.

3.4 Transect walks

At the initial stage in the field work, we will conduct around four transect walks in Trundholm Mose. Three transect walks will be held with local landowners and, at least, one with a representative from Odsherred Municipality. This methodology is chosen due to its inherent flexibility in terms of structure and the advantages of a participatory interview form.

The aim of the transect walks is thus twofold. Firstly, it will introduce us to the local context as well as give us an overview of the landscape and the elements within. By letting the participants decide on the walk, this method allows us to explore different understandings of how the site is organized and give us an initial sense of how opportunities and risks may be perceived by different stakeholders. By doing this as a first step on site, we hope to gain insights that can guide the direction of our research, questionnaires and interview guides if needed. Secondly, the transect walks will function as a way to gain in-depth understanding of local stakeholder perceptions. Accordingly, this methodology will provide data on attitudes, values, and land-use which later will be used to triangulate data from the survey and other in-depth interviews (Keller 2008).

GPS tracking and way-points will be used as tools during the transect walks. This methodology will serve us in the analysis of local stakeholders' values and perceived risks and opportunities of the project. The GPS data, together with pictures, will enable us to relate the information from the interviews to specific geographical positions as well as to easily revisit locations of importance.

3.5 Mapping Landscape Change

To further understand the landscape of the research site, a time series of remotely sensed data of Trundholm Mose will be collected from Denmark's Miljøportal (2020) prior to starting the data collection on the field. The available time series reaches from 1945 to 2018. By taking screenshots of the landscape at different points in time and then comparing them, we can observe

patterns of how landscape has changed overtime, including factors such as plot sizes, land-use, and ownership. An overview of historical trends and the current landscape is considered an important factor in understanding current attitudes of local stakeholders and land-use practices. Accordingly, the mapping of landscape change is believed to enhance our understanding of the landscape and provide data that later can be triangulated with information obtained through the survey, transect walks, and in-depth interviews.

3.6 Soil Sampling

The transformation of a drained peatland into a freshwater wetland entails several changes to the natural environment, both biotic and abiotic. To identify one of the potential environmental drawbacks of rewetting Trundholm Mose, we aim to determine soil phosphorus levels (more specifically, Iron-bound phosphorus) in heterogeneous soil type areas in Trundholm Mose in combination of soil nitrogen and soil carbon contents. Additionally, bulk density estimations will be measured in each sub-sample of the study site. The resulting measurements will be compared to national threshold values determining whether the phosphorus levels in the soil are within a safe operating limit for rewetting.

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Appendix 1: Data Matrix

Research Question	Sub Objectives	Related topics/proxies	Actions	Methodology	Outcomes	Informants	Literature
What barriers do wetland creation projects face and how do they play out at Trundholm Mose?	SO 1: Explore **socio-economic** barriers perceived by authorities and local affected people	Cooperation between authorities and local people	Identify all relevant stakeholders from national to local level	Interviews, Literature	Venn-diagram	Lena, Bruno, Consultancy, Climate Council	
			Explore how the municipality plans to involve local stakeholders in the project (PoV)	In-Depth Interviews	Typology of participation	Anne, Lena	(Pretty, 1995)
		Issue of partial participation, sharing drainage systems	Identify attitudes towards the scenario of partial participation on local and authority level	Survey, In-Depth Interviews	Discourses	Landowners, Bruno, Lena, Consultancy	
			Explore drainage system on site	Google Earth	Spatial data	Bruno, Lena, Peter	
		Livelihood Strategies, Income structures, Dependence on land, Risk of income Loss, Risk of loosing financial support (EU subsidies)	Determine socio-economic and demographic background of landowners	Survey	Land owner profiles, Input for stratified sampling	Landowners	
			Determine income structures and income from land	Survey	Distribution of income sources	Landowners	
			Determine reliance on financial institutional support	Survey	Extent of reliance on CAP	Landowners	CAP post-2020
		Land ownership, usage & historical changes	Determine current land use and practices	Survey, In-Dept Interviews, Transect wallks, Unstructured interviews, Ortho-pictures (Google Earth)	Map of different land usages, land owner profiles	Landowners, pedestrians, Hunting / Bird associations	
			Demonstrate land use change over time	Ortho-pictures (Google Earth)	Broader patterns in land-use over time ('85-'21)	Bruno, Hunters association	
		Alternative land usages after rewetting, Paludiculture, Recreation, Hunting	Explore knowledge and attitudes about alternative land usages	Survey, In-Depth Interviews, Transect walks	Visions of future land use	Landowners, Bruno, Lena, Hunter/Bird associations, Climate Council, Consultancy, Jens & Morten	Northern Europe Cases
		Compensation	Identify attitudes on compensation by local affected people	Survey, In-Depth Interviews	Discourses	Landowners, Bruno. Lena, Climate Council, Consultancy, Jens & Morten	Northern Europe Cases
		Other perceived socio-economic risks and opportunities	Identify perceived socio-economic risks and opportunities	Survey, In-Depth Interviews, Transect walks	Discourses	Landowners, Bruno. Lena, Climate Council, Consultancy, Jens & Morten	Northern Europe Cases
		Mitigation strategies for socio-economic barriers	Identify mitigation strategies of socio-economic challenges	In-Depth Interviews, Transect walks	Discourses	Landowners, Bruno. Lena, Climate Council, Consultancy, Jens & Morten	Northern Europe Cases
	SO2: Explore **emotional** barriers perceived by authorities and local affected people	Value of Land, Heritage, Tradition, Home, Mission in Life, Recreation, Connection to nature, Displacement	Identify perceived values of land from local affected people (How would rewetting change your life?), Explore what locals wish to be preserved	Survey, In-Depth Interviews, Focus groups if we enough contacts/time	Discourses and personal experiences	Local people	
		Relationship to authorities, trust	Explore the attitude by local people towards authorities	Survey, In-Depth Interviews	Discourses and personal experiences	Local people	
		Other perceived emotional risks and opportunities	Determine perceived emotional risks and opportunities	Survey, In-Depht Interviews	Discourses	Local people	
	SO3: Explore measured and perceived **environmental** barriers	Perceptions on Climate change, Soil pollution, footprint, peat land	Determine the overall knowledge and attitudes towards climate change and pollution from soil	Survey, In-Dept Interviews, Transect walks	Discourses, Knowlegde gaps	Landowners	(Woods et Al, 2019)
			Explore what locals wish to be preserved	Survey, In-Dept Interviews, Transect walks	Discourses and personal experiences	Landowners, Pedestrians, Hunting / Bird associations	
		Environmental outcomes of re-wetting	Examine measured environmental outcomes of re-wetting	Literature review, In-Depth Interviews	Expert knowledge/perceptions	Consultancy, Climate Council, Lena, Jens & Morten	
		Phosphorus leakage, thresholds	Identify soil phosphorous levels in heterogenous soil areas in Trundholm Mose and combine these with thresholds	P-Method, Bulk density, Literature	Soil data, threshold values	Dorette, Jens, Lena, Consultancy, Climate Council	Thresholds of ministry of environment and food
		Carbon & Nitrogen	Identify carbon and nitrogen content in the soil and the level of pollution	Total C and N	Soil data, threshold values	Dorette, Jens, Lena, Consultancy, Climate Council	Thresholds of ministry of environment and food
		Ecosystem functioning, Biodiversity	Explore risks and opportunities for the flora	In-Depth Interviews, Transect walks	Expert knowledge and discourses	Landowners, Bruno. Lena, Climate Council, Consultancy, Jens & Morten, Danish Hunter Association	Northern Europe Cases
			Explore risks and opportunities for the fauna	In-Depth Interviews, Transect walks	Expert knowledge and discourses	Landowners, Bruno. Lena, Climate Council, Consultancy, Jens & Morten, Danish Hunter Association	Northern Europe Cases
		Other perceived environmental risks and opportunities	Determine other perceived environmental risks and opportunities	Survey, In-Depth Interviews, Transect walks	Discourses	Landowners, Bruno. Lena, Climate Council, Consultancy, Jens & Morten, Danish Hunter Association	Northern Europe Cases
		Mitigation strategies for environmental barriers	Identify mitigation strategies of environmental challenges	In-Depth Interviews, Transect walks	Discourses	Landowners, Bruno. Lena, Climate Council, Consultancy, Jens & Morten, Danish Hunter Association	Northern Europe Cases

		Mitigation strategies for environmental barriers	Identify mitigation strategies of environmental challenges	In-Depth Interviews, Transect walks	Discourses	Council, Consultancy, Jens & Morten, Danish Hunter Association	Northern Europe Cases

Appendix 2: Time Schedule for Field Work

Time Schedule Data Collection					
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Week 9	First small transect walk on site Transect walk and test of online survey Informant 1 &2 Transect walk with Informant 3 (Chairman association)	Transect walk with Municipality representative First exploration of fields and land usages for soil sampling Transect walk and test of online survey with Informant 11 Finalize Online Survey and send to translator	Send out online survey to landowners by Municipality First wrap up of collected information Work on soil sampling strategy First GPS walks	In-Depth Interview with DNA employees Zoom Interview with Bangsgaard og Paludan Aps representatives	Zoom Interview with UCPH Professor Geography Final outline of soil sampling strategy End of Online Survey First analysis of Online Survey and contact landowners for follow up interviews
Week 10	In-Depth Interviews and transect walks with landowners (approx. 10-15) Soil Sampling GPS Mapping				

Appendix 3: Online Survey Protocol

Participants:

- The survey will reach all 150 landowners in Trundholm Mose, who have an email address
- As the survey takes place online, there will be no researches present

Preparation:

- Two test sessions in printed form with two landowners of Trundholm Mose (Bruno & Peter) with Christian as interpreter (on 1st and 2nd of March)
- Afterwards, the survey will be translated into Danish by a translator and also send out in Danish

Execution:

- The survey will be executed by the online survey tool SurveyXact
- Link to online survey will be send out to all landowners by the Municipality of Odsherred
- Once the Survey is sent out, the survey can no longer be edited

Timeframe:

- Start: Wednesday 3rd of March, 12:00
- End: Friday 6th of March, 16:00

Survey Structure:

1. *Introduction*

   "Hello,
   We are five masters students from the University of Copenhagen studying Environment and Development. For our preparatory field work course, we are exploring local challenges the proposed wetland creation project in Trundholm Mose faces. The project, which transforms the drained land into lower carbon emitting wetland, was proposed to help Denmark meet their 70% emission reduction target by 2030. Regarding this project in Trundholm Mose, no data has been collected on local experiences/attitudes. We would like to close this knowledge gap by collecting data from local landowners such as yourself. This data will then be used to inform authorities and promote your voice.

   In the next step we will ask you for your consent to our study. We will inform you about the usage of your data and why we ask for certain data.

   Thank you for sharing your story and assisting us with our research!

   Please contact us at +45 91 11 85 84 or dqt382@alumni.dk.ku if you have any questions.

Kind regards,

Ebba Rosendahl, Jasmina Rust, Maria Heines, Salomé Lepercq and Thibaut Vandervelden

2. *Consent*

We are collecting the following information regarding your interests, perceptions and your background in order to analyse these findings spatially together with the results from soil sampling, transect walks and in-depth interviews. Our aim is to map all these results spatially in the area of Trundholm Mose and by doing so, to identify possible risks and challenges in the rewetting process of Trundholm Mose.

In this regard, we need information about the ownership of the land and we need to know which land is yours. You may or may not provide us with this information below. In addition, we would like to make some transect walks and take a few soil samples. For this we ask for your permission in the following.

I understand that:

- I may withdraw information at any given moment previously supplied by notifying one of the researchers orally or by email before 12 March 2021 and that information will be destroyed following such notice.
- Information that is retained for the project will be retained securely until the end of April 2021, in accordance with UCPH standards, after which it will be destroyed.
- The results will inform a report related to the SLUSE course seeking to address the challenges related to rewetting Trundholm Mose, Odsherred Municipality.
- The resulting report mainly serves as course exam SEEN by the lecturers of SLUSE course at the University of Copenhagen
- The report will also be made available to the participants of this survey upon request.
- It is possible that the report will be shared also with authorities and experts associated with the Municipality and the Trundholm Mose project proposal.

I consent to the above usage of my data described above.

▢ Yes
▢ No

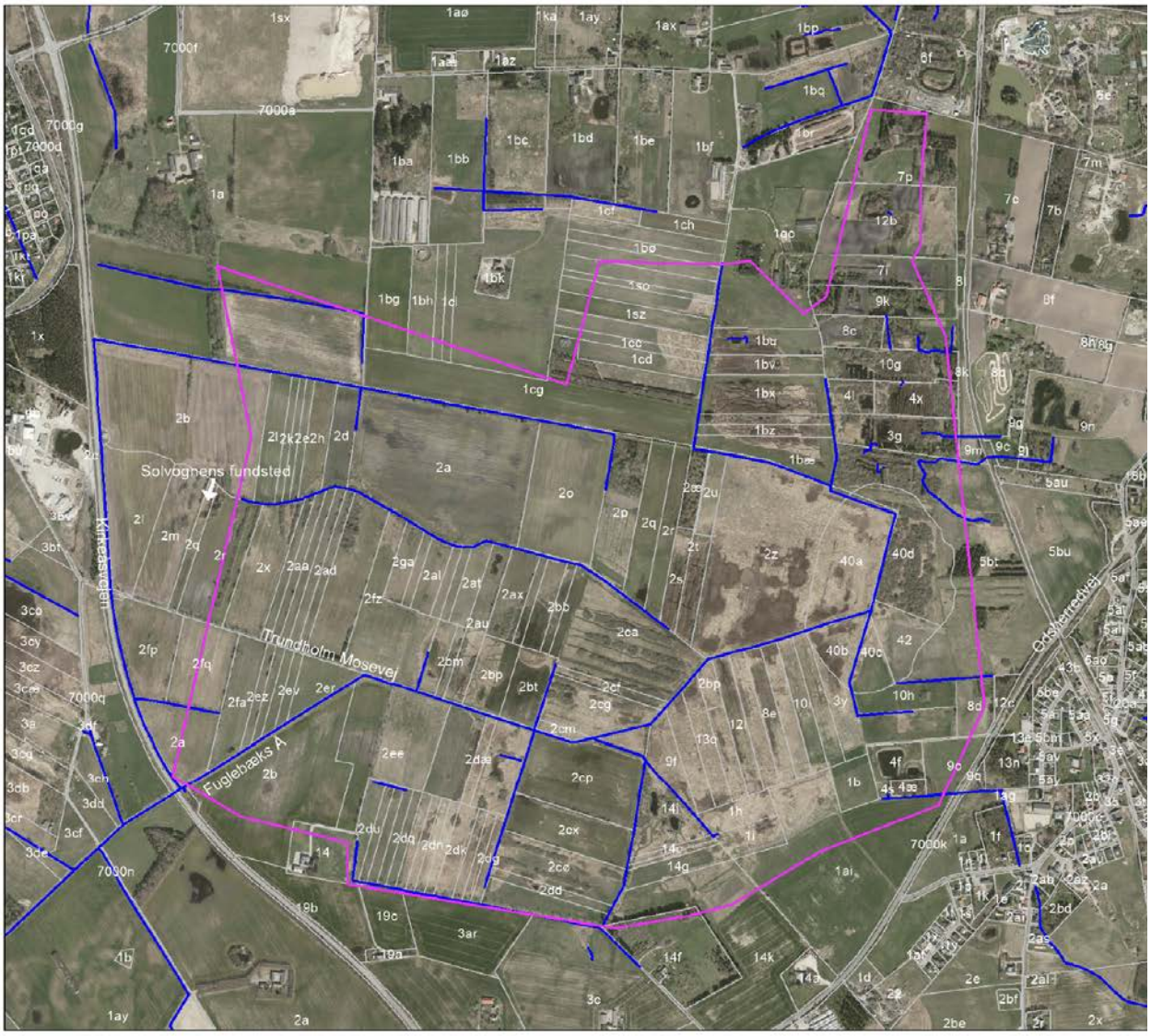
Do you own land in Trundholm Mose?

▢ Yes
▢ No
▢ I don't know

The following map shows the area of Trundholm Mose and it's various plots with numbers for each plot. Please state the belonging number of your plot:

▢ _____ (Number)

▢ I prefer not stating my plot.
▢ I don’t know which of the plot is mine.



I consent access to my plot for research walks. (We are very careful and take the greatest possible care of your land)
▢ Yes
▢ No

I consent access to my plot for soil samplings. (We are very careful and take the greatest possible care of your land)
▢ Yes
▢ No

3. *Demographic questions*

1. Nationality

   _____

2. Place of Birth

   _____

3. Gender
   - ▢ Male
   - ▢ Female
   - ▢ Nonbinary

4. Age

   _____

5. What is the highest level of education you have completed?
   - ▢ Lower Secondary Education
   - ▢ Upper Secondary Education
   - ▢ Vocational Education
   - ▢ Bachelor's degree
   - ▢ Master's degree
   - ▢ PhD

6. Occupation

   _____

7. Relationship Status
   - ▢ Single, living alone
   - ▢ Single, living with a partner
   - ▢ Married
   - ▢ Divorced
   - ▢ Separated
   - ▢ Domestic partnership, living separately
   - ▢ Domestic partnership, living together

8. Number of people in your household

   _____

9. Do you have children?
   - ▢ Yes
   - ▢ No

4. <u>State of knowledge questions</u>

10. Were you aware of the proposal to re-wet Trundholm Mose before beginning this survey?
    - ▢ Yes
    - ▢ No

11. How have you received information regarding the Trundholm Mose re-wetting project?
    - ▢ I have not received any information regarding the project
    - ▢ Phone call
    - ▢ Public meeting
    - ▢ Word of mouth
    - ▢ Letter
    - ▢ Other _____

12. Are you politically active in your Municipality?
    - ▢ *Yes*
    - ▢ *No*

13. I understand the purpose of re-wetting Trundholm Mose.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

14. There are opportunities for me to share my opinion on this project.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

15. I trust the Municipality will consider my interests regarding the re-wetting of Trundholm Mose.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*

(1)	*(2)*	*(3)*	*(4)*	*(5)*

16. From my experience, I think the re-wetting project will be enacted in a transparent way by the Municipality.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

5. *Socio-economic questions*

17. How long have you lived in Odsherred?
    - ▢ 0 to 5 years
    - ▢ 5 to 10 years
    - ▢ 10 to 15 years
    - ▢ 15 to 20 years
    - ▢ 20 years or more

18. Amount of land you currently own Odsherred (in hectares)

    _____
    - ▢ I don't know

19. Have there been changes in your land ownership status in the past 20 years?
    - ▢ I have increased the amount of land I own in Odsherred in the past 20 years.
    - ▢ I have decreased the amount of land I own in Odsherred in the past 20 years.
    - ▢ The amount of land I own has not changed in the past 20 years.
    - ▢ I don't know

20. Do you use your land as a source of income?
    - ▢ Yes
    - ▢ No

21. If you use your land as source income, please select all relevant activities. If you do not use your land as a source of income select "Not Applicable".
    - ▢ Agriculture
    - ▢ Rental Property
    - ▢ Livestock
    - ▢ Hospitality/Tourism
    - ▢ Hunting

▢ Other (please specify) _____
▢ Not Applicable

22. If you use your land for agriculture purposes please specify the type production. If you do not use your land for agricultural purposes select "Not Applicable".
    ▢ Traditional Agriculture
    ▢ Organic Agriculture
    ▢ Other (please specify) _____
    ▢ Not Applicable

23. What type of crops do you produce? Please write "Not Applicable" if you do not use your land for agricultural purposes.

    _____
    ▢ Not Applicable

24. Estimate the percentage of your income that comes from your land-use.
    ▢ 0%
    ▢ 25%
    ▢ 50%
    ▢ 75%
    ▢ 100%
    ▢ I don't know

25. How many people do you employ with your land usage?
    ▢ 0
    ▢ 1-5
    ▢ 5-10
    ▢ More than 10

26. If you use your land for agriculture purposes would you categorize this work as part time or full time?
    ▢ Part time agricultural work
    ▢ Full time agricultural work
    ▢ I do not use my land for agricultural purposes

27. If you use your land for agricultural purposes, are you part of a cooperative or another relevant organization? If so, please specify.
    ▢ Cooperative _____
    ▢ Other organization _____
    ▢ I use my land for agricultural purpose, but I am not part of any relevant organizations.
    ▢ I do not use my land for agricultural purposes.

28. Select all the private purposes you use your land for.
    - ▢ All year housing
    - ▢ Seasonal/vacation housing
    - ▢ Hunting
    - ▢ Recreation (such as walking in nature)
    - ▢ Other (please specify) _____

6. <u>Rewetting and climate change questions</u>

29. I am well informed about climate change and how it will influence Denmark's environment.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

30. In my opinion, climate change is an urgent issue that requires immediate action.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

31. Climate change has already impacted my livelihood or income.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

32. I am concerned about how climate change will affect my life in the future.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

33. What is your main concern about climate change?

    _____

34. What are your main concerns surrounding the re-wetting projection?

    _____
    _____
    _____
    _____
    _____
    _____

35. Would you be willing to give up your land to the re-wetting project for appropriate monetary compensation?
    - ▢ Yes
    - ▢ No

36. Would you be willing to give up your land to the re-wetting project for replacement land?
    - ▢ Yes
    - ▢ No

37. Would you be willing to re-wet your land and maintain ownership?
    - ▢ Yes
    - ▢ No

38. What alternative uses would you consider for your land if it is re-wetted?
    - ▢ Wetland Agriculture
    - ▢ Solar farming
    - ▢ Other (please specify) _____

39. Do you receive EU subsidies for your land?
    - ▢ Yes
    - ▢ No

40. I am financially very dependent on the EU subsidies.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

41. I support the re-wetting of Trundholm Mose.

Strongly Disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly Agree*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

7. *Contact questions*

To generate a better understanding of local attitudes surrounding the Trundholm Mose re-wetting project, our research team will be conducting in depth interviews with about 10 local residents. Please let us know if you are interested in conducting an interview to support our research. We would really appreciate it. The interview will last between 30 minutes to 1 hour. We are happy to accommodate your preferences on how this interview takes place (over zoom, outside, at home etc.). Please list your telephone number and email address below if you are interested in holding an interview with our researchers. We will contact you within the first two weeks of March. Additionally, if you are interested in the results of our study please state your email address below. Our project will conclude at the end of April and we will send you our results

42. Are you interested in participating in a follow up interview?
    - ▢ Yes
    - ▢ No

43. Would you prefer a follow up interview over zoom or in person on site?
    - ▢ Over zoom
    - ▢ In person
    - ▢ I am not interest in participating in a follow up interview

44. Are you comfortable conducting this follow up interview in English or would you prefer to have a translator present?
    - ▢ I am happy to conduct a follow up interview in English.
    - ▢ I would like a Danish/English translator present at the interview.
    - ▢ I am not interested in participating in a follow up interview.

45. Are you interested in receiving the result of our study?
    - ▢ Yes
    - ▢ No

46. Telephone Number (please list if you are interested in conducting a follow up interview to support our research).

    _____

47. Email Address (please list if you are interested in conducting a follow up interview to support our research OR are interested in receiving the results of our research).

    _____

8. *End of the survey*

   Thank you for your participation and your support in our research project!

Appendix 4: In-Depth Interviews with Locals, Experts and Authorities

4.A Practicalities

General tasks

- Introduce project and project scope to interviewee
- Confirm interviewee title and relationship to Trundholm Mose.
- Ask for oral consent to use inter
- Ask to record audio of interview

Equipment needed:

- Notebook
- Pen
- Scrap paper
- Laminated map of Trundholm mose with plots numbered

Researchers present:

- 1 interviewer
- 1 note-taker

Introduction to our research project

- Field-based research project with a focus on testing out methodologies
- The overall idea of our research project is to investigate what the challenges are for the implementation of rewetting projects in Denmark
- Informed Consent: The result collected from this interview as well as other other methods will be used to inform our final report. This report is an analysis of our topic as well as a reflection on the type of methods we wanted to try out during our research. The report will be shared with our professors, any participants who are interested and potentially the Municipality and relevant consulting company.

4 B. Local In-Depth Interviews

Identified Relevant Stakeholders

- Bruno Gjertsen: farmer, Trundholm mose plot owner
- Peter Fischer: farmer, Trundholm mose plot owner
- Cartsen Nielson: chairman of Trundholm mose landowners association

Note

So far all local interviews are scheduled to be in person. If certain participants prefer zoom adaptations to participatory methods are required. Additionally, questions should be streamlined as energy levels tend to drop more quickly over zoom than in-person conversations.

Interview Guidelines
Estimated Time per interview: 45 minutes to 1.5 hours
Exact order of questions and themes does not need to be maintained throughout interviews. But it is important to include the majority of questions and themes at some points to generate comparative data.

START
Identify participant background and relationship to Trundholm mose.

- Title, occupation, age, how long they have lived here, land ownership status etc.

S01 - SOCIO-ECONOMIC BARRIERS
Please identify which plot(s) of land on this map is yours? If the participant does not own land ask; what areas on this map do you frequent?
What do you use this land for?
Does this land contribute to your economic well-being?
How would the re-wetting of Trundholm mose impact your individual land-use and economic well-being? (risks and opportunities)
How do you think the re-wetting would impact the community's land-use and economic well-being? (risks and opportunities)
How would you like to see negative economic impacts mitigated?
What are your thoughts on compensation and being given replacement land? Do you trust potential compensation would be adequate?
Would you be interested in keeping your land if it is re-wetted? What would you do with this re-wetted land?

Have you/ How did you hear about the project proposal to re-wet Trundholm mose?
To your knowledge, what authorities are involved?
What are the project's main intentions?
Do you trust the authorities to implement this project in a considerate manner? (SO1)
Would you like better access to information on the subject?
Do you feel like there is a platform to have your voice heard on the subject?

Do you think the project is a good idea?
How do you think others in your community perceive the project?
If there is conflict within the community, ask the participant to explain where they think conflict arises from.

SO2 - EMOTIONAL BARRIERS
How would you describe your community?

What makes your community special?
Is the Trundholm mose community distinct in any way from the rest of Odsherred Municipality?
How has the community changed overtime? Please use the map to help explain physical changes.
What challenges does your community face?

Discuss and rank how the participant values Trundholm mose. End goal to gain an emotional insight of what the land means to the participant. Have scrap paper and pen ready to note down more categories. Photograph end result.
Prepared values written down for discussion/ranking:

- Biodiversity
- Natural Resources
- Agriculture
- Tourism
- Beauty
- Healthy living
- Carbon sequestration
- Sense of belonging
- Familial roots/history

SO3 - ENVIRONMENTAL BARRIERS
How will re-wetting impact your immediate environment? (risks and opportunities; flooding, biodiversity, drainage systems, pollution)
How would you like to see authorities mitigate negative environmental impacts of the re-wetting?

What are your attitudes towards climate change?
Is it a top concern?
What concerns do you prioritize before climate change mitigation?
Has climate change impacted your land-use?
Does climate change impact your decision making? (on a daily basis and in terms of how you use your land)
Do you think climate change will impact you in the future?
How would you like to see your Municipality respond to the threat of climate change?

REFLECTION
To confirm we have accurately understood the participant's answers we will review key themes mentioned in the interview. During the interview a researcher will note down key words and themes on separate pieces of paper. We will then give these key words to the participants to have them organize their meanings and relationships. We will ask them to identify the most important key words. We will ask them to place selected keywords onto our laminated map. We will

continuously ask why and how the participants decide to organize the words. This is to enable reflection from the participant. Photographs of significant layouts will be taken.

WRAP-UP
Would it be okay to contact you again if we have any follow up questions?
Would you be interested in giving us access to your land for soil sampling?
Would you like to receive a copy of our final report?
Thank you for your help!!

4 C. Experts and Authorities In-Depth Interviews (Thibaut)

Identified Relevant Stakeholders

- Claus Paludan, CEO & biologist Consultancy
- Lena Bau, project leader Odsherred Municipality
- Jens Peter Simonsen, Head of the Central Zealand region (Danish Nature Agency)
- Morten Elling, projectmanager Sidinge Fjord (DNA)
- Anne Gravsholt Busck, Associate professor Geography, Governance

Note
So far all local interviews are scheduled to be in person. If certain participants prefer zoom adaptations to participatory methods are required. Additionally, questions should be streamlined as energy levels tend to drop more quickly over zoom than in-person conversations.

Interview Guidelines
Estimated Time per interview: 45 minutes to 1.5 hours
Exact order of questions and themes does not need to be maintained throughout interviews. But it is important to include the majority of questions and themes at some points to generate comparative data.

START
Identify participant background and relationship to Trundholm mose.

- Title, occupation, age, how long they have lived here, land ownership status etc.

S01 - SOCIO-ECONOMIC BARRIERS
Does this land contribute to the economic well-being of local people?
How would the re-wetting of Trundholm mose impact individual land-use and economic well-being? (risks and opportunities)
How do you think the re-wetting would impact the community's land-use and economic well-being? (risks and opportunities)
What kind of negative economic impacts do you foresee with this project?

How would you like to see negative economic impacts mitigated?

What are your thoughts on compensation and being given replacement land? Do you trust potential compensation would be adequate?
Do you think people would be interested in keeping their land after it is rewetted? What could be possible alternative pathways for future land-uses?

To your knowledge, what key stakeholders are involved (local international)
What are the project's main intentions?
Do you trust the authorities to implement this project in a considerate manner? (SO1)
To what extent do you feel access to information is provided to the affected local population?
What kind of platforms do exist for people to let their voice heard regarding projects like this?
How would you describe the involvement of landowners and other affected people in this project?

Do you think the project is a good idea?
How do you think others in the community perceive the project?
If there is conflict within the community, ask the participant to explain where they think conflict arises from.

After rewetting, what kind of alternative land-uses do you foresee?
Who would decide on the future land-uses in the area? Would locals be implicated in how the landscape would transform after rewetting?

SO2 - EMOTIONAL BARRIERS
How would you describe the involved community?
Is the Trundholm Mose community distinct in any way from the rest of Odsherred Municipality?

How has the community changed overtime? *Please use the map to help explain physical changes.*
What potential challenges do you foresee the community to face after rewetting?

Discuss and rank how the participant values Trundholm Mose. End goal to gain an emotional insight of what the land means to the participant. Have scrap paper and pen ready to note down more categories. Photograph end result.

Prepared values written down for discussion/ranking:

- Biodiversity

- Natural Resources
- Agriculture
- Tourism
- Beauty
- Healthy living
- Carbon sequestration
- Sense of belonging
- Familial roots/history
- (rural) Identity

Do you feel the community members trust the authorities & experts in projects like this?

Feeling of involvement

Feeling of 'being heard' and 'implicated' in project deployment

Do you feel people are emotionally involved since it implicates their land? To what extent do you think people fear uncertainties (cf. risks) or look forward to change (cf. opportunities)?

SO3 - ENVIRONMENTAL BARRIERS

How will re-wetting impact the immediate environment? (risks and opportunities; flooding, biodiversity, drainage systems, pollution) Trundholm Mose

How will rewetting impact the neighbouring environment (cf. Natural 2000 sites, ecological corridors, flooding, etc.)

What environmental barriers would you identify, related to this project? And ranking them, which ones are more urgent to address or overcome?

How would you like to see authorities mitigate negative environmental impacts of the re-wetting?

What are your attitudes towards climate change?

Is it a top concern?

How would you describe, to your current knowledge, the attitudes of local landowners towards climate change?

Is it something that lives in the community?

Is it something that people internalize and act on in relation to their land & practices?

Is it something that impacts decision making of locals on a daily basis?

Do you think climate change will impact you in the future?

How would you like to see your Municipality respond to the threat of climate change?

In relation to ecosystem functioning and biodiversity, what risks & opportunities would you identify?

How will locals react to this?

Do you think/envision to encounter problems in terms of phosphorus content in the soil?
How do you feel about the proposal of lowering the threshold on acceptable P-levels in soils? Would this shift ecological externalities to different places?

Reflecting on the possible environmental barriers, what kind of mitigation strategies would you propose?

REFLECTION

To confirm we have accurately understood the participant's answers we will review key themes mentioned in the interview. During the interview a researcher will note down key words and themes on separate pieces of paper. We will then give these key words to the participants to have them organize their meanings and relationships. We will ask them to identify the most important key words. We will ask them to place selected keywords onto our laminated map. We will continuously ask why and how the participants decide to organize the words. This is to enable reflection from the participant. Photographs of significant layouts will be taken.

WRAP-UP

Would it be okay to contact you again if we have any follow up questions?

Appendix 5: Transect Walks

5 A General Guidelines

Researchers present:

- 1 interview facilitator
- 1 notetaker
- 1 handles GPS and takes pictures

Equipment needed:

- GPS & back-up batteries
- Audio recorder
- Logbook & pens
- Laminated map of Trundholm Mose
- Interview guide/list of topics

Before/during transect walk:

- Set-up GPS logbook
- Check battery level every evening prior to next day
- Set-up GPS: 'map project' → UTM; 'map datum' → WGS84
- START → 'clear current track' before start tracking → do it between all current tracks
- Take waypoint at beginning of walk → give ID number & log + picture
- Take waypoint at every significant event → give ID number & log + picture
- END → save current track

After finished transect walk:

- Upload GPS data in Google Drive + insert in Logbook
- Upload audio recording in Google Drive
- Upload pictures in Google Drive
- Upload notes in Google Drive

5 B. Specific Guidelines

Lena Bau (Trundholm Mose project manager)

- 10:00 Tuesday March 2nd, 2021
- Meet at "Solvognens Fundsted" the end of Trundholm Mosevej
- Ask her about the details of sending her the survey and how she can disseminate the survey to land owners.

- Generally, we will let Lena lead discussion to obtain an overview of the site and her knowledge. Although we will tailor the conversation to our three sub objectives and have a few important specific questions listed below.
- Where is this iniativate to re-wet Trundholm mose coming from (which authorities and legal frameworks)?
- What is your role as project manager? Who do you represent? Who do you work with?
- What is your relationship to landowners? Do you plan to increase contact in the future?
- What are the major challenges/barriers to achieve re-wetting?
- What are the positive and negative environmental outcomes of rewetting? Question her certainty on the subject/ask for nuances.
- What are the positive and negative community outcomes? Question her certainty on the subject/ask for nuances.
- What are your next steps in the implementation process?

Appendix 6: Mapping Landscape Change

General guidelines:

1. Time series of remotely sensed data is available at Danmarks Miljøportal https://arealinformation.miljoeportal.dk/

2. Elicit the project area of Trundholm Mose on the map

3. Apply relevant layers:
    - *Matrikelkort:*
        - *Ejerlavsgræser*
        - *Jordstykker*
    - *Administrative grænser*
        - *Adresser*

4. Under "Baggrundskort" select "Ortofoto" from 5 different years reaching from 1945 to 2018. For example:
    - 1945
    - 1995
    - 2004
    - 2010
    - 2018

5. For each "Ortofoto" take a screenshot

6. In a document, place the screenshots next to each other to illustrate change over time

Appendix 6: Soil Sampling

Equipment needed:

- GPS + back-up batteries
- Sample bags (cf. refrigerator bags, sealable) **x200**
- Bulk Density device x1
- Soil 'core' sampler (N,P,C) x4
- Spade x1
- Rope 100m at least (cuttable) → making grid so we can deploy it in field (mobile)
- Stickers (for coding) **x200**
- Permanent markers black **x5**
- Large refrigerator box **x2**
- Cooling elements for ref. box **x8**

Protocol:

1. Divide study site according to current **land-use type**
    a. agriculture - high-value crops
    b. agriculture - low-value crops
    c. grassland
    d. etc. → ID other land-use types on the field and mark on map
2. Divide study site along **height gradient-lines** (relative):
    a. 'high'-elevation (7m - 9m)
    b. 'medium'-elevation (4m-6m)
    c. 'low'-elevation (0m - 3m)
3. Code 'plots' per category (e.g. high-value crop + 'medium'-elevation = AB)
4. Sample min. 3, max. 5 plots per category → used for results pooling (analysis)
5. **On the field**
6. Sample **bulk density (blue) 1x** per grid (**blue**)
    a. max 30 cm deep
    b. measure exact length of soil core
    c. transfer soil sample in container (+ water)
    d. take **GPS point**
    e. keep soil sample refrigerated (<4°C)
    f. CODE 'bulk density' sample
7. Sample **N,P,C** content **4x** per grid (**orange**)
    a. 30 cm depth
    b. take picture of soil core
    c. transfer **each** soil sample **in different bag**

d. CODE N,P,C-sample

8. CODING strategy
   a. ***example***: grid placed on a 'medium-elevation' **(B)**, 'high-value agricultural land' **(A)**
      i. Date → 110321
      ii. Type (BULK or NPC)
      iii. sample N° → AB_1 (= 1st sample taken in an AB-type soil)
      iv. Result:

110321	110321
BULK	NPC
AB_1	AB_1