Country / City: Norway, Tromsø
University / School: UiT The Arctic University of Norway
Academic year: 2022-2023
Title of the project: Drifting as Agency - More-than-human marine spatial planning in the Fram Strait
Authors: Aniella Sophie Goldinger
Drifting as Agency - More-than-human marine spatial planning in the Fram Strait

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Diploma
2022-2023
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Written statement, short description of the project in English, no more than 250 words

Current climate change models predict an ice-free Arctic Ocean as early as 2035. This is expected to advance opportunities for increased human activities such as trans-polar marine traffic, sea-bed mining and oil/gas exploration. Meanwhile, there is huge uncertainty on the repercussions for marine ecosystems and its dependence on the remaining sea-ice. In response to potential conflicts and disruptions, this innovative research and speculative design project draws attention to the current and prospective planning and management of the Arctic Ocean. A key question posed in this project asks how this vulnerable marine environment could be managed if commercial infrastructure and extractive industries were not the main organizing agencies. This is addressed through a multi-method approach that incorporates in-situ fieldwork on board a research vessel in the Arctic Ocean, critical cartographic explorations, model making and scenario visualizations. The project culminates with a series of planning strategies that prioritizes more-than-human drifting stakeholders. These stakeholders include drifting ice, migrating fish, birds and mammals, and marine vegetation. The project concludes that a future management plan for the Arctic Ocean must operate on various tempo-spatial logics and one that can adapt to the seasonal and long-term dynamics of a changeable and unpredictable environment. This project demonstrates how landscape architects have a key role to play in the future planning, management and protection of our vulnerable oceans.

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THE TRANSPOLAR DRIFT AND THE FUTURE TRANSPOLAR ROUTE. Sea ice extent (per 23/03/23) superimposed with a decades marine traffic intensity and the Transpolar Drift. Neither land, nor water, the sea ice emerges as a dynamic, tentacular positive figure, clearly encroached on by the increasing marine traffic. b. Composite diagram exploring the multitudes of environmental changes currently happening in the Arctic Ocean, and how the planning proposal for a more-than-human TSS can address them. c. SEA ICE AS AN ECOLOGICAL FACILITATOR; CURRENT AS INFRASTRUCTURE. Section cut along the central area of the Transpolar Drift (TPD) as a critical piece of infrastructure; a sediment and nutrient distributor. d. Close up. e. SEA ICE RELATED CONDITIONS NOW AND IN THE FUTURE.
MODEL EXPERIMENTATION: FIELD OF NEGOTIATIONS. Speculating in future Arctic territorial conditions through material movements. (sand, oil, baking soda, and vinegar on a light table)

I. BATHYMETRIC AND GEOLOGIC CONTEXT (SECTION)

j. Fram Strait anno 2023: April sea ice extent) and current marine traffic intensity

k. Fram Strait anno 2100: A completely ice-free scenario, SPECULATIVE MARINE TRAFFIC INTENSITY.

l. Fig 21. IMPLEMENTATION OF A DYNAMIC MSP. Design language borrowed from the field work drawings #1-3.
CURRENT CONDITIONS. Perspective section depicting the current spring sea ice extent of the Fram Strait, with yet little annual marine traffic, but a high export of drifting sea ice.

DYSTOPIAN SPECULATION. Perspective section exploring a potential future for the Fram Strait if no adequate marine spatial planning is regulating the increasing marine traffic as a consequence of future sea ice loss.

IMPLEMENTATION OF PLANNING STRATEGY. Perspective section exploring the Fram Strait with the proposed planning strategy in place. By taking each passing actor, human as non-human, into account as a "drift passenger" the dominating hierarchy of marine spatial planning and TSS is turned around. Thinking of the actors through their movements and velocities (SEE drawing key) has been a tool to further de-categorise the affected stakeholders. A.01-03, B.01, C.01 signifies the design strategy intervention in place.
i. Water cascades across opening in the pond, further eroding the opening over time; ii. Existing drainage ditch is further excavated to accommodate surface melt and pond drainage; iii. Designed steel wall behind day building slows down the decay of plateau; iv. Wooden tables re-purposed as display for UNIS, when no longer functioning the tops are removed, leaving the oak posts to decay in place; v. Steel wall at entrance guides visitors to the coal conveyor structure while also reducing erosion and meltwater from damaging the Svea Silos below; vi. Svea Silos remain in place until destabilized, they are then moved to Longyearbyen.
In 2028, Norway’s last and longest-operating coal mine is expected to cease operations in Longyearbyen, Svalbard. The context of the mine is quite unique in that most of the mine’s coal shafts are situated under Foxfonna glacier, and the remaining areas are set within and on top of a permafrost landscape. These cryogenic conditions, however, are currently undergoing rapid degradation due to an increasingly warmer and wetter climate resulting in glacier melt, ground de-stabilization and geo-hazards. This project proposes a decommissioning strategy and design for the coal mine that considers its cultural and environmental qualities and values. A key question addressed in this project asks how the closure of the coal mine can address cultural and cryo-geological changes impacting the landscape above and below ground, as well as the community’s future relationship to this landscape. The project adopts a concept coined by geographer Caitlin de Silvey called palliative curation. This recognises the finite lifespan of structures and artifacts through dignified and sensitive modes of curation. The design interventions take reference from the existing and predicted fluidity and entropy of the site where materials, structures and processes are concealed and revealed over different spans of time. It caters for a gradual transition of the diverse physical states of the site while maintaining social encounters. In doing so, it invites relations to evolve between humans and more-than-humans as the mine and cryogenic conditions slowly fade from this landscape.

A palliative design for the (after)life of mine #7
Caitlin Jakusz Paridy
Diploma
2022-2023
Mari Bergset (Course Leader); Eimear Tynan (student supervisor)
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Written statement, short description of the project in English, no more than 250 words

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Mine #7 is located to the East of Longyearbyen, accessible via a paved road which follows along the network of mines and mining infrastructure which litters the valley (top). It is the longest running mine in operation and is expected to close in 2028. This coincides with climate change events drastically impacting the cryogenic and cultural landscape of this community.

Alongside the mining and glacial infrastructure, research facilities from the University Centre of Svalbard, maintain a presence on the site (top).

While visiting the site, a series of collages depicting the spatial implications of the mining and cryogenic infrastructure were created (left).
Mine #7 is located directly below the Foxfonna glacier which has resulted in severe flooding events above and below ground, influencing the landscapes formation. To understand these processes, a lexicon of cryogenic conditions (left) was created alongside a series of model experiments which worked to develop the design in ways which reveal these processes (top).
The palliative design for the decommissioning of Mine #7 is done over time in three parts (timeline; top); the reprogramming of the site’s facilities to accommodate the storage, and display of geological samples by UNIS (section; right), an incremental land art intervention which integrates existing materials into the axis and contours of the site (site plan; left), and a series of events designed to draw the community to the site to witness and grieve its melting processes; the gradual draining of the site’s pond and the annual release of glacial meltwater from the underground chambers (perspectives).

Through these works, visitors may witness the fluidity of Longyearbyen’s landscape and come to develop a new understanding of this site and relationship to the cryogenic processes which shape the island.

Perspectives (above; left to right)

04.09.2029; Approaching the site from the road below, water channel releases meltwater across the cliff side
23.03.2035; Walking up the road to the newly established UNIS facility, steel walls from the intervention create sight lines across the way
02.11.2036; Walking through the underground pathway as meltwater trickles beside before releasing out the cliff side
04.06.2030; Group gathers as the underground meltwater is dispersed along the coal conveyor path
08.08.2060; Pond has drained, establishing a mossy, marshy, bird habitat

Scan QR code to listen to the designed soundscapes which accompany each of the perspectives (above).
Country /City: Tromsø, Norway
University / School: UiT The Arctic University of Norway
Academic year: 2022 - 2023
Title of the project: The Gardens at Roahtoviiŋjarga
Authors: Didrik Leslie Hembery
The Gardens at Roahtoviiknjárga
Didrik Leslie Hembery
2022 - 2023
UiT The Arctic University of Norway
Kjerstin Uhrs (Course Leader), Magdalena Haggärde and Marc Ihle (teachers)
Academy of Arts, Landscape Architecture
UiT The Arctic University of Norway

Written statement, short description of the project in English, no more than 250 words
The planned electrification of the Norwegian oil and natural gas industry caters for unprecedented wind energy and infrastructural development in coastal mountain areas. Based on media records, government documents on energy development politics, map analysis of reindeer migration routes, seasonal pastures, and cultural heritage sites in the Nordkinn peninsula/Corgäshnjárga in North Norway, this project touches on major dilemmas in the transition to a carbon emission free society. Analytical diagrams demonstrate understanding and visualize the time-space dynamics of Sami reindeer husbandry as well as the planning and operation timespan of several proposed and operating wind industry projects. In managing landscapes, the municipalities face several conflicting responsibilities in safeguarding Sámi reindeer husbandry, protecting important culture heritage areas, hosting wind energy development, and the upgrading of a weak electric energy grid. Wind power concessions are granted for 25-30 years, due to the endurance of the wind turbines. When the concession period is over, either the wind power plant is renewed for a new concession period, or the areas are supposed to be restored to its “original” state. Discussing the afterlife of the Kjøllefjord windfarm in reindeer grazing district 9 Oggut Corgä/Čorgaš-Oarje-Deatnu, this project asks how rehabilitation strategies can incorporate dislocated or lost landscape practices in the design solutions. Inspired from ancient stone works at nearby cultural heritage sites, the project transforms the installation spaces and materials to a series of gardens with pasture plant species that over time reclaim the landscape.

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In my project, I want to gain an understanding of conflicting landscape practices on the Nordkinn peninsula in Northern-Norway. The site presents several challenges with regard to important Sámi reindeer grazing pastures, energy development, important cultural indigenous areas and a weak energy network.

The reindeer herding is based at the Nordkinn peninsula in summer and spring. During the autumn and winter, the reindeer move towards the Tana valley. To get to the winter pastures in West-Tana, the reindeer move over the Duolbagáisáfjellet and Laskefjordvidda. The Sámi annual cycle starts in April when the female give birth to the calve. This is often in smaller groups to prevent separation. The ideal calving spots are often on the wildest and most desolate. The summer and an important time back at the mother and the calve begins light grazing.

During autumn, the long trek to the winter pastures begins. During this trek, slaughter takes place. After the calving season is over, when the females have calves, non-pregnant females are slaughtered. It is also time for estrum and mating. When winter sets in, the animals move towards areas with light grazing, which is usually dry snow-free. If it is too hot, crowding can occur which makes it difficult for the animals to find food.

The Nordkinn Peninsula and the Tana River have had settlements dating back to more than 10,000 years. On the peninsula, you can find traces of previous use of the landscape. Stone formations tell of the past practices, such as shooting hides and stone walls. These monuments tell the story of the time before the tame reindeer. The early Sámi population lived in harmony with the animals. Especially Gartefjellet project took into consideration the existence of these formations. These dates the wall back to older Stone Age. The wall was even even important for the local reindeer herders.

Sámi Cultural & Historical sites

The Sámi Cultural & Historical sites have determined dates that are more than 10,000 years. On the peninsula, you can find traces of previous use of the landscape. Stone formations are part of the landscape, such as shooting hides and stone walls. These monuments tell the story of the time before the tame reindeer. The early Sámi population lived in harmony with the animals. Especially Gartefjellet project took into consideration the existence of these formations. These dates the wall back to older Stone Age. The wall was even even important for the local reindeer herders.

Conflicting Green-Energy development

The government declared in June 2021 that the break for wind turbines was over, but the only municipality that has shown interest for land-based wind power is Lebesby and Gamvik municipality. Previously, the development of energy plants has been very limited due to weak central energy network. But the electrification of the gas processing plant on Melkøya has caused several untreated or refused licenses to be reopened. This has a direct negative impact on the traditional Sámi reindeer husbandary.
According to Norwegian law, the wind power plant’s license has a lifetime of 25-30 years, this is because of the wind turbines’ limited lifespan. When the time has passed, the wind power plant can either be improved or the area can be returned to its original state.

But how do you repair damage to the cultural landscape?

I use Kjøllefjord windfarm as a case study to discover ways to interweave rehabilitation on a cultural and ecological level.

- Landfills used as a platform for installation of the wind turbines.
- Using the material from the removed roads as a base for the walls.
- The turbines will be taken down.
- Only the most essential roads are left, the reason is to make the reindeer herders’ job easier.
- After 100 years all the roads have been removed.
- The wall will over time start disintegrate and the plants within will be one with the landscape.
- After a while only remnants will be left.
- In the future nothing will be left.
Site #1: Spring and summer grazing for reindeer

The plants have been chosen on the basis of their different adaptations to wind conditions. Site 1 has the plants already extend beyond the leeward zone, which is because the plants are adapted for exactly such areas. Further in, the walls will provide more protection. The shape of a circle makes it easier for the reindeer to navigate around or move through.

Site #3: Areas with increased moisture

Site #3 has qualities in the typography that creates the build-up of moisture and water. Therefore in the garden, there are several plants which the reindeer eat. The plants on site #3 are especially suited for areas with higher moisture.

Site #4: Research projects

One of the areas is adapted to research, the form has been chosen because of the study to create stable growth conditions. Doing research so close to reindeer husbandry will increase the dialog between the research community and the Sami reindeer herders.

Site #7: Other use

Some of the areas have been adapted for other uses. The idea is that the space is adapted to the needs of reindeer herding, to set up camps, to park vehicles, or even to use as a place to store. The areas can be used for specific activities or use but also as reindeer practitioners to use them for the time they need it.

Site #9: Plants that both reindeer and people can use

The plants in the garden have qualities that are beneficial for us humans, as well as for reindeer. We adapt our way of life to the plants, we adapt our way of life, by using the plants in the garden in different ways for both humans and reindeer.
Country /City: Tromsø, Norway
University / School: UiT The Arctic University of Norway
Academic year: 2022-2023
Title of the project: Cumulative Mitigation Plan
Authors: Sverre Oranges Selås
Written statement, short description of the project in English, no more than 250 words

Fragmented planning processes of energy, infrastructure, and natural resource development projects represent unpredictable pressures on landscapes and landscape practices. Sámi reindeer husbandry is dependent on functioning ecosystems with an intact system of migration routes and seasonal pastures. This project addresses the cumulative effect of historic, current, and future landscape encroachments, and asks how its consequences on reindeer husbandry can be mitigated. The project is based on studies of historic and contemporary maps of reindeer husbandry, literature, fieldwork, ecological registration of local plant species, and publicly available information on the summer reindeer grazing district 33 Spalca and Kvænangen municipality. Proposing an innovative, Cumulative Mitigation Plan (CMP), the project showcases a continuous and holistic practice of landscape restoration of past and current encroachments and proactive planning of mitigation measures for future development. A main part of CMP is the collection of traditional reindeer husbandry knowledge disseminated through animated maps projected directly on physical models. A feasibility study for relocating a planned field of recreational cottages from an important pasture area to an emptied gravel quarry serves as an example of CMP as a holistic planning tool. CMP works as a buffer between developers, the reindeer grazing district, a facilitator for cooperation, a knowledge platform, and a model for shared financial responsibility between developers operating in the municipality for more ambitious mitigation projects.
Fragmented individual planning processes create pressure on the district. CMP will act as a bureaucratic buffer between the intervention and districts.

The CMP facilitates that different intervention actors have shared responsibility in already planned mitigating measures.

CPM facilitates a knowledge base and a platform that future planners can use in feasibility studies and impact assessments.

By having a broader knowledge base and shared financial responsibility, CMP opens up more ambitious mitigation projects.
Communication of traditional knowledge

One of the most important mitigating measures within the CMP is the communication of traditional knowledge. When and where does the reindeer move throughout the landscape, and most importantly why? Our best sources to answer these questions are traditional sources such as the work of Ørnulf Vorren and Mikkel Nils Sara. Communicating this knowledge early in the planning process is essential for both planning and designing other mitigating measures within the CMP.
Quarry as future cabin site

As shown in the CMP, cabin sites are planned in two different areas in Baderdalen. Based on the movement pattern in Mikkel Nils Sara’s text “Praktisk reinbeitebruk”, we see that these planned cabin sites come into direct conflict with the areas used by the reindeer, especially in early spring, which is a critical period for the survival of the fawns and calves. As a future mitigating measure, I have therefore explored the possibility of an alternative location for cabins. As part of the progress plan for the quarry located further down the valley, can it be established as future plots for cottage development? With the help of solar studies, water analyses, spatial design and strategies for ecological restoration, I have designed a proposal for here the quarry can be established as a cabin site in the future.

Ecological study

From here, we can start from the following principles to start planning the process for establishing biodiversity:

1. Fertilization and seeding have a good effect in the short term, but in a longer perspective (7-16 years). It has little effect compared to only tillage. Here one should make the right decision with regard to the time perspective of the project.

2. Removal of top gravel is absolutely necessary for revegetation. If this is not done, the establishment of species is extremely slow.

3. Regular monitoring of the species establishment is absolutely necessary. This provides knowledge about further planning.

4. Active use of reference biotypes and processing of seed banks is absolutely necessary to form species compositions that work locally.

Biodiversity process

In addition to planning abiotic conditions such as water and solar conditions, it is also absolutely essential to plan well for the establishment of biotic conditions in order to initiate ecological processes for the restoration of species diversity. Inspired by the work and methodologies we were presented with by Dagmar Hagen from her work at the Hjerkinn shooting range. We see that it is achievable to restore species diversity, even in heavily affected areas such as shooting ranges, according to Dagsmar Hagen’s work. This requires that you largely design for processes rather than finished results.
Country /City  Norway /Tromsø
University / School  UiT The Arctic University of Norway
Academic year  2022-2023
Title of the project  Reconnecting the Trail - the Bottlenecks of Duokta
Authors  Sofie Randall King
Written statement, short description of the project in English, no more than 250 words

The consequences of large development projects in Sámi reindeer husbandry areas are central to the discourse of the green transition. This project addresses the cumulative effect of several smaller landscape encroachments in the valley of Heggemoen, that is a popular recreation area. It is a crucial area for the Dukta reindeer grazing district because it is the only passage between the winter pastures and the calving grounds. Taken together the different obstacles in the landscape and the human activities produces a bottleneck situation for the reindeer herd that makes it difficult for the herders to make the herd graze and move through the area. The central question is how a landscape architect can design for reindeer in an area that becomes increasingly difficult to pass. Based on maps and models and media analysis the project demonstrates understanding of the landscape practices in reindeer grazing district 26 Doukta. Taking a more than human perspective, the design interventions answers to the reindeer’s needs by making an inaccessible areas accessible again and reconnecting a severed passage. An ecological passage facilitates the crossing of a waterpipe leading to a hydropower plant. Revegetating an area that previously served as a night pasture area, and removing a fence opens an important resting place along the migration route.
26 Duokta reinbeitedistrikt

Reconnecting the trail - the bottlenecks of Duokta

When interventions in reindeer herding regions are discussed, we typically refer to large-scale projects like wind turbine development, mining or large infrastructure projects. However, in my analysis and project, I have chosen to look into a number of smaller interventions and interests that restrict the reindeer husbandry practice in Duokta.

Seasonal pastures

Duokta is located in Nordland (northern Norway) and stretches from the Swedish border in the east to the Norwegian Sea in the west. What captivated me was the district’s diverse landscape, which includes big mountain ranges, deep valleys, and a coastal strip with numerous islands and peninsulas. This makes Duokta an unpredictable and complicated place to for reindeer herding, which is reflected in the district’s name meaning unavailable.

Infrastructure and Interventions

This map shows some of the overall interventions in Duokta, such as important highways, railways, buildings, hydropower plants, and others, which increase strain on parts of the herding trails, which are already naturally tough. How does the totality of all interventions affect such a fragile practice? I’ve further zoomed in on smaller locations to better grasp the complexities of how herding trails and pastures are affected.

Bottleneck passages

The terminology “Bottlenecks” are used in reindeer husbandry describing “naturally narrow passages (migrating and herding trails) or man-made bottlenecks that the reindeer have difficulty passing due to disturbances or technical interventions” (Risvoll et al. 2019). This is a current issue in the district of Duokta and my entry into the project.

The bottleneck of Siso: here, a new transformer station and power line makes the already demanding move to winter pastures in the east even more challenging.

The bottleneck of Heggmoen, where herding trails from all directions meet.

The termonolgy “Bottlenecks” are used in reindeer husbandry describing “naturally narrow passages (migrating and herding trails) or man-made bottlenecks that the reindeer have difficulty passing due to disturbances or technical interventions” (Risvoll et al. 2019). This is a current issue in the district of Duokta and my entry into the project.
The bottleneck of Heggmoen

Heggmoen is situated east of the city of Bodø, and is a valley area between three lakes and steep mountains. It is a crucial location in the district because it is the only place the reindeer can move between the winter pastures in the west and the calving grounds in the east. It’s where herding routes from all directions meet, which together with increasing tourism and interventions makes Heggemoen one of the biggest bottlenecks in the district. It’s not due to one huge intervention but several “small” ones (shown in the site map), for instance roads, buildings, power lines, pipes etc.

Concept

The project focuses on how the totality of all interventions that occur in reindeer herding areas can cumulate in major challenges for the reindeer husbandry practice. Through the “bottleneck” of Heggmoen investigated various barriers and disturbances in the landscape, and how some simple measures may have a positive effect on the entire herding route. My design questions are: How can a landscape architect facilitate for reindeer herding in a place that’s becoming increasingly difficult to pass? and How can areas that has become inaccessible areas be made accessible again?

Diagram showing how minor interventions can impact the herding trails

Diagrams showing Heggmoen’s location in the district, and how the hydro-electric power station supplies the surrounding cities with electricity.

Conceputal drawing of three interesting situations and design ideas

Diagram showing the areas of interest in the context of herding trails and important pastures
Removing the fence

Existing Pasture

Wetlands/woods

Clearing of forests and establishing new species

This barrier is a 160m long, 1.8m wide pipeline that runs up the hillside and divides a narrow, steep passage towards a pasture in the west. It's blocking parts of the herding trail, making it inaccessible.

Site 1: reconnecting by an ecological passage

The design proposal is to make an ecological passage. I have explored both geometrical and organic approaches, ended up with a design that simulates the reindeer movement of a reindeer. The passage is defined by terrain changes (shown in section), clearing of parts of the forest and revegetation of pasture species.

Site 2: revegetating a night pasture

The fence is a 600 meter long barrier that runs along Hegnomvatnet. The fence keeps people and animals away from the drinking water lake, but also separates an important night pasture.

My design suggestion is to remove the fence after restoring and revegetating the pasture. This will allow the inhabitants to use the area as potential reindeer pasture, which has since grown into forest and scrubland due to the lack of disturbance and grazing. This species should be established within 3-4 years.