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University / School UiT The Arctic University of Norway
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Title of the project Reconnecting the Trail - the Bottlenecks of Duokta
Authors Sofie Randall King

TECHNICAL DOSSIER

Title of the project	Reconnecting the Trail - the Bottlenecks of Duokta
Authors	Sofie Randall King
Title of the course	Contested Landscape Practices - Mitigating Measures
Academic year	2022-2023
Teaching Staff	Kjerstin Uhre (Course Leader), Magdalena Haggårde and Marc Ihle (teachers)
Department / Section / Program of belonging	Academy of Arts, Landscape Architecture
University / School	UiT the Arctic University of Norway



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 Duokta 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.

For further information

Master d'Arquitectura del Paisatge - UPC

Contact via email at:
masterpaisatge.comunicacio@gmail.com

biennal.paisatge@upc.edu

Master d'Arquitectura del Paisatge - UPC Sede

ETSAB - Universitat Politècnica de Catalunya

Calle Jodi Girona, 15. Edificio Omega 1-3
08034 Barcelona - Spain

COAC - Colegi oficial d'Arquitectes de Catalunya

Carer Arcs, 1-3
08002 Barcelona - Spain

12th International Biennial Landscape Barcelona

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SCHOOL PRIZE

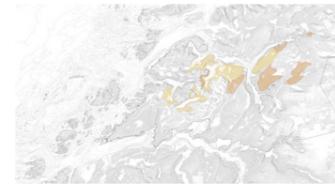
26 Duokta reinbeitedistrikt

Reconnecting the trail - the bottlenecks of Duokta

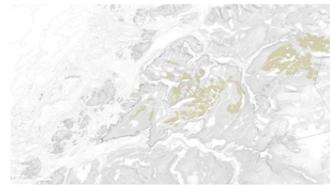
When interventions in reindeer herding regions are discussed, we typically refer to large-scale projects like wind turbine development, mining or large infrastructure projects. However, in my analysis and project I have chosen to look into a number of smaller interventions and interests that restrict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

Seasonal pastures

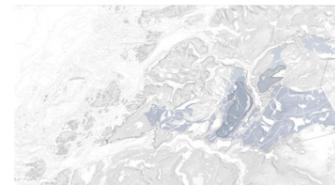
Duokta is located in Nordland (northern Norway) and stretches from the Swedish border in the east to the Norwegian Sea in the west. What captivated me was the district's diverse landscape, which includes big mountain ranges, deep valleys, and a coastal strip with numerous islands and peninsulas. This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



This map shows spring pastures (yellow) and calving lands (orange).



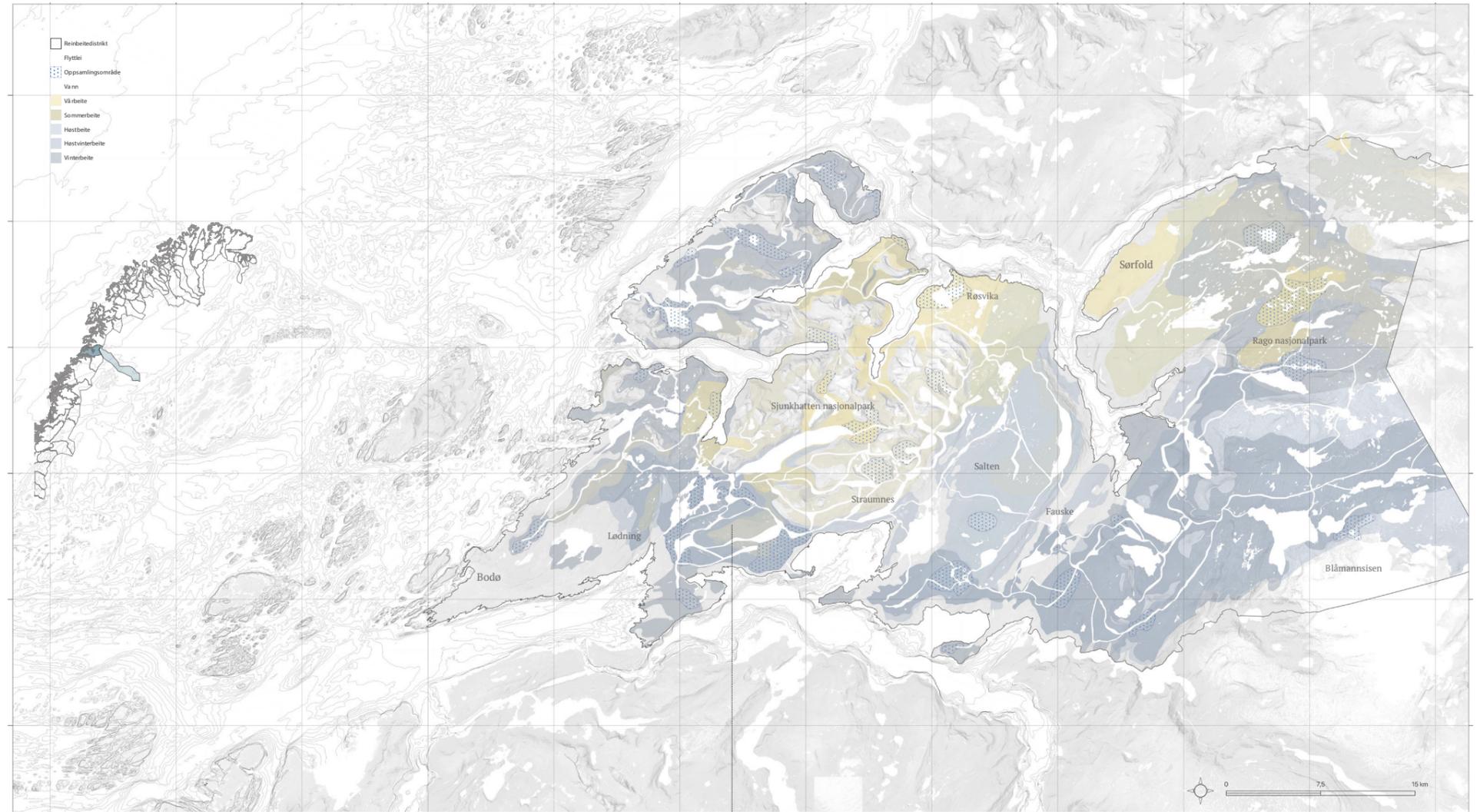
This map shows summer pastures.



This map shows fall and fall-winter pastures (light blue), and mating lands (dark blue).

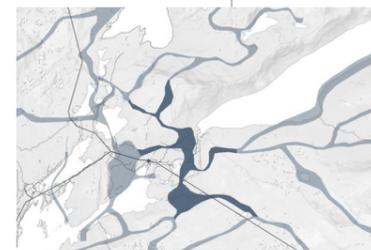
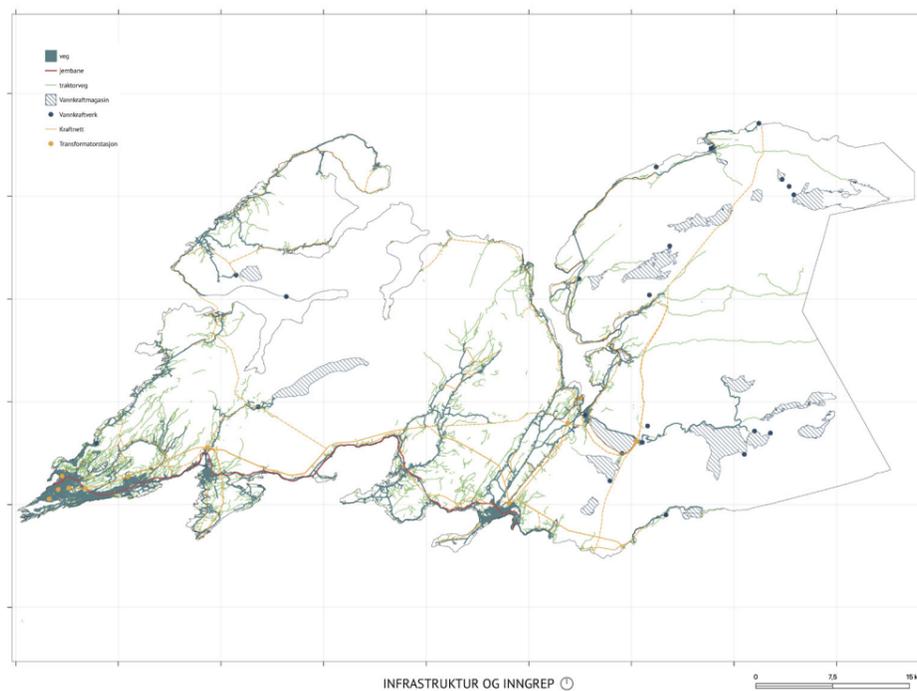


This map shows winter pastures, which are by the coast and in the mountains.



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 effect 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.



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



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

Bottleneck passages

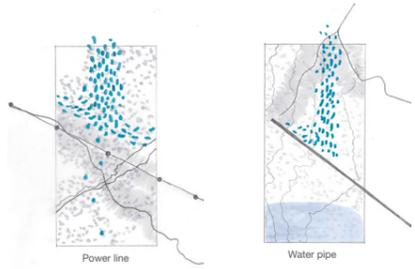
The terminology "Bottlenecks" are used in reindeer husbandry describing "naturally narrow passages (migrating and herding trails) or man-made bottlenecks that the reindeer have difficulty passing due to disturbances or technical interventions" (Risvoll et al. 2019). This is a current issue in the district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



Collage visualizing a bottleneck passage

The bottleneck of Heggmoen

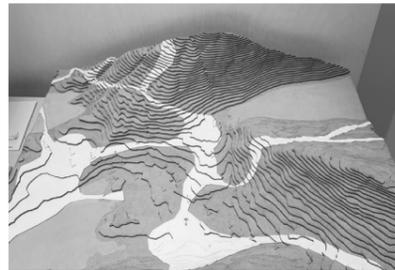
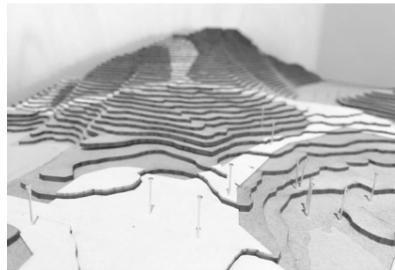
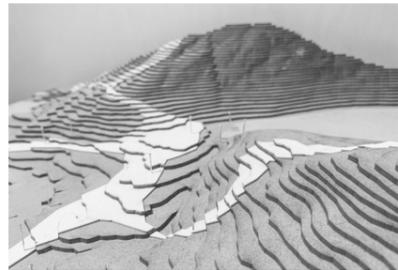
Heggmoen is situated east of the city of Bodø, and is a valley area between three lakes and steep mountains. It is a crucial location in the district because it's the only place the reindeer can move between the winter pastures in the west and the calving grounds in the east. It's where herding routes from all directions meet, which together with increasing tourism and interventions makes Heggmoen 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.



Diagrams showing how minor interventions can impact the herding trails



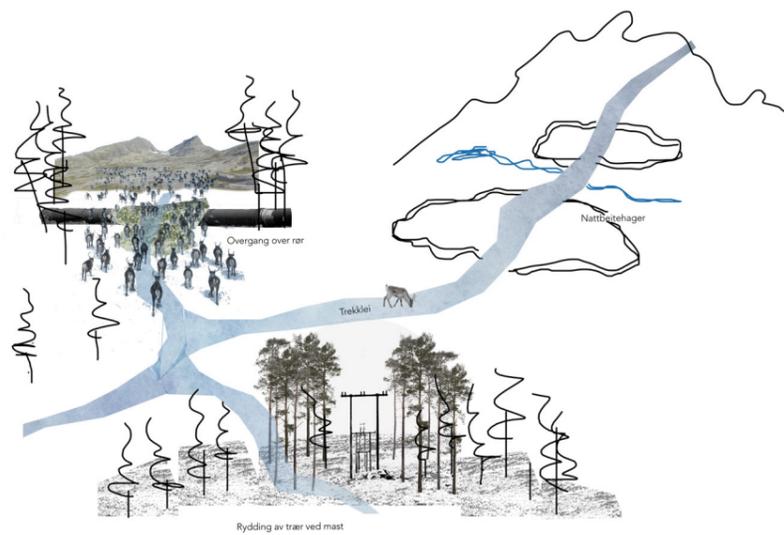
Diagram showing Heggmoen's location in the district, and how the hydroelectric power station supplies the surrounding cities with electricity.



Contour model showing the herding trails and the location of the interventions (pins), where you can see the steep terrain the reindeer have to navigate through.

Concept

The project focuses on how the totality of all the interventions that occur in reindeer herding areas can cumminate 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 becoming increasingly difficult to pass? and How can areas that has become inaccessible areas be made accessible again?**



Conceptual drawing of three interesting situations and design ideas

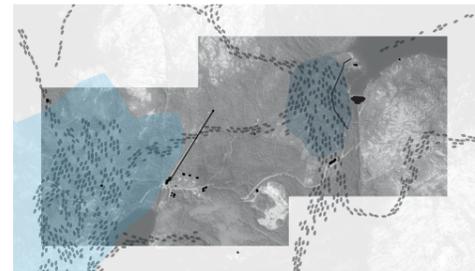
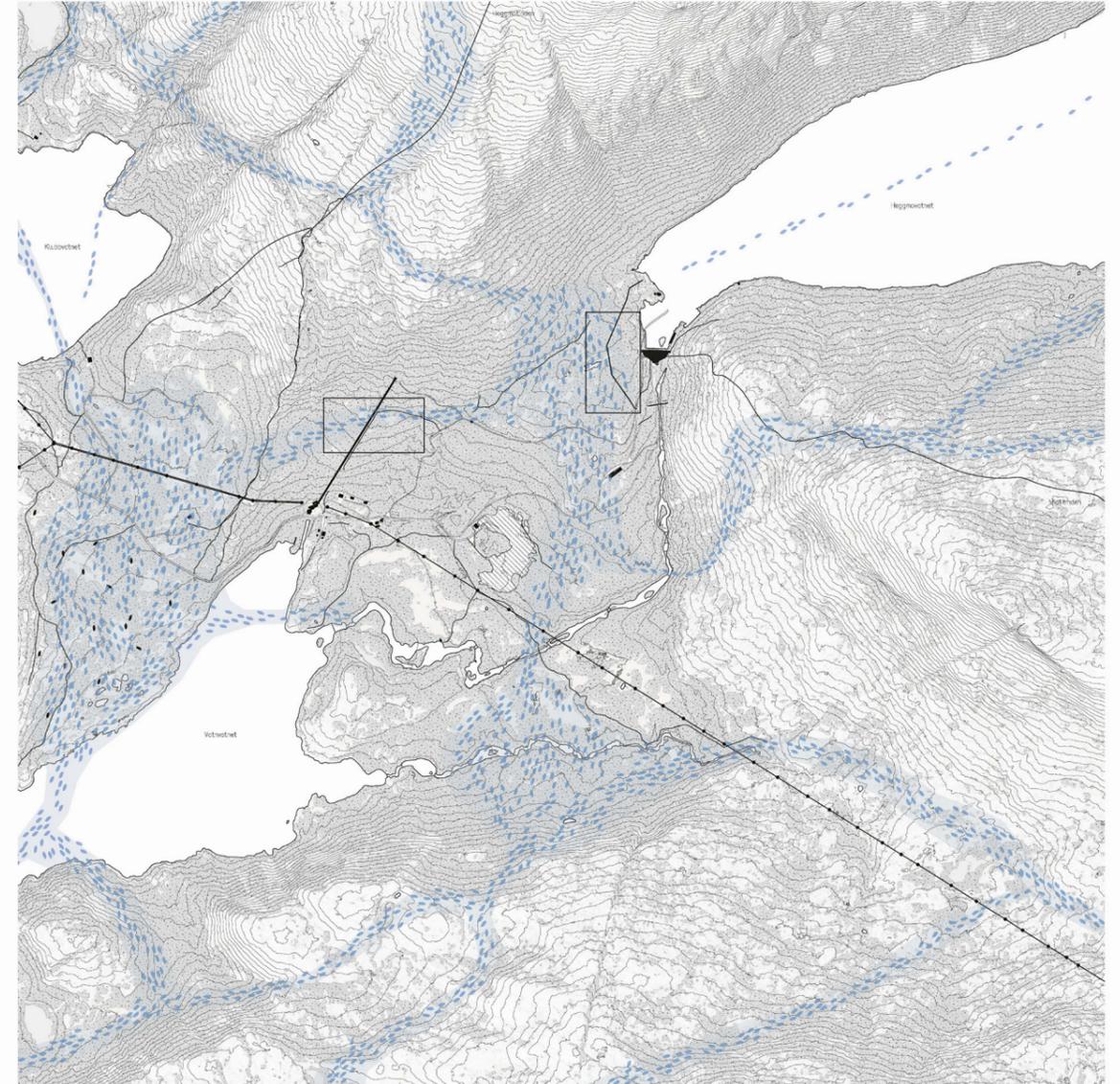


Diagram showing the areas of interest in the context of herding trails and important pastures



HEGGMOEN

0 250 500 m



Power station

- has generated a number of interventions such as water pipes, dams, roads and more.



Power station

- built in an area where there initially was quite untouched nature. - generates traffic and people.



Dog walking

- scares the reindeer with noise and hunting when not on a leash. Several incidents has happened.



Power lines

- Have an avoidance zone of approximately 50 m. - Several are located on the narrowest parts of the herding trail



Hikers

- more popular in the recent years. - More people means more cars, dogs and small buildings and other installations.



Dam

- a small road leading up to the dam. - Near the dam there is also a 600 m long fence



Shooting

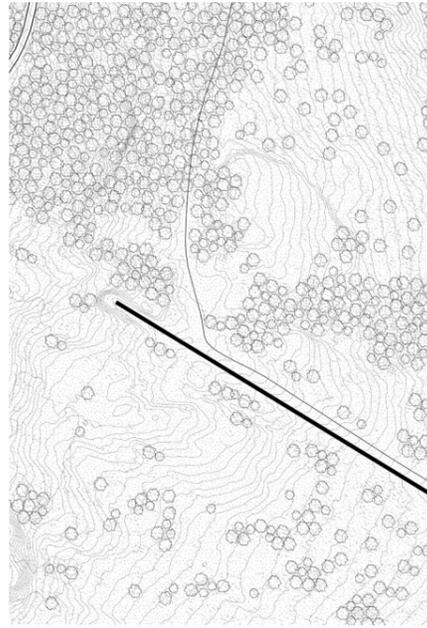
- Military shooting range and soft gun field. - more people and loud noises that's impossible to pass.



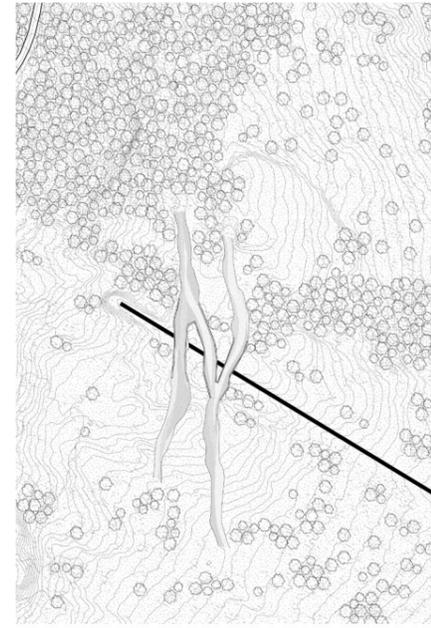
Woods

- a good climate for scrubs and a lush forest, which makes it more difficult to control the reindeer herd to pass.





Ekstisterende situasjon 0 25 m

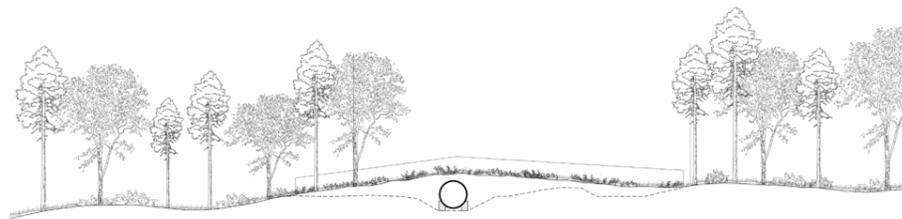


Vegetasjonsbro 0 25 m

Site 1: reconnecting by an ecological passage

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.

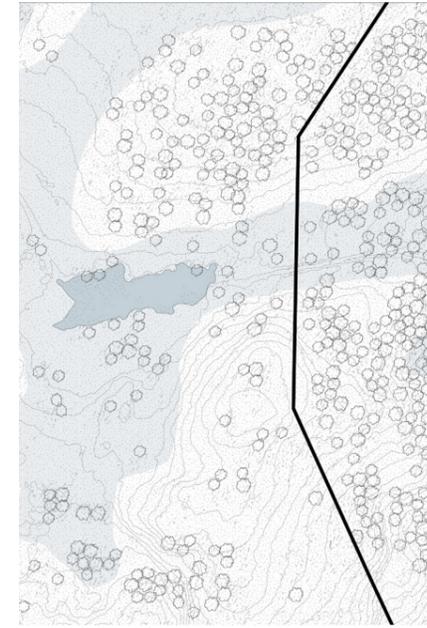
The design proposal is to make an ecological passage. I have explored with both geometrical and organic approaches, ended up with a design that simulated the non-linear movement of a reindeer. The passage is defined by terrain changes (shown in section), clearing of parts of the forest and revegetation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



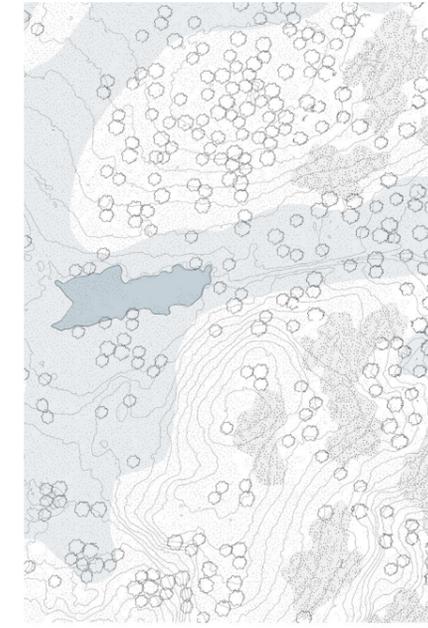
Section of the ecological passage with existing and new terrain



Collage of the passage with the pastures in the horizon



Ekstisterende situasjon 0 25 m



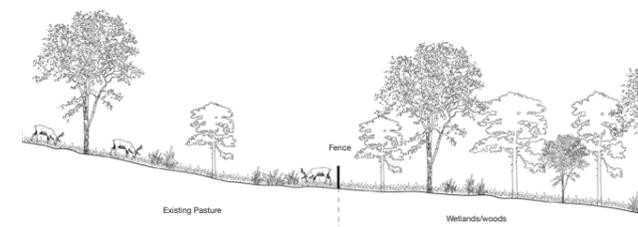
Etablering av beite 0 25 m

Site 2: revegetating a night pasture

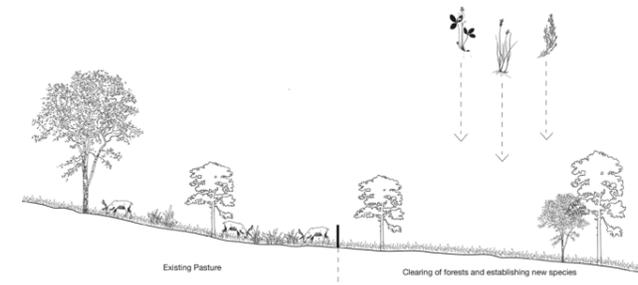
This barrier is a 600 meter long fence that runs along Hegmovatnet. The fence keeps people (and animals) away from the drinking water lake, but also separates an important night pasture.

My design suggestion is to remove the fence after restoring and revegetating the unavailable side. The removal of the releases a large area of 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.

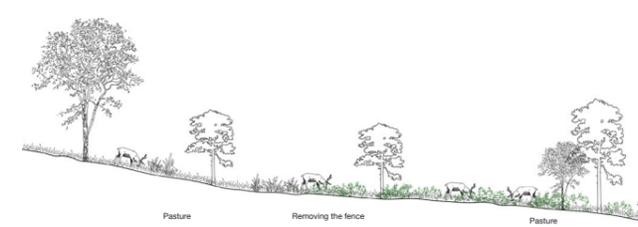
Existing situations



1 years



3 years



Sections of the revegetation strategy

