

OPERATIONS IN A WOUNDED LANDSCAPE

MINIMAL INVASIVE ARCHITECTURE FOR COLLABORATIVE SURVIVAL



DIPLOMA PROGRAMME 2020

Sophie Dorn

Political Architecture: Critical Sustainability

The Royal Danish Academy of Fine Arts

School of Architecture

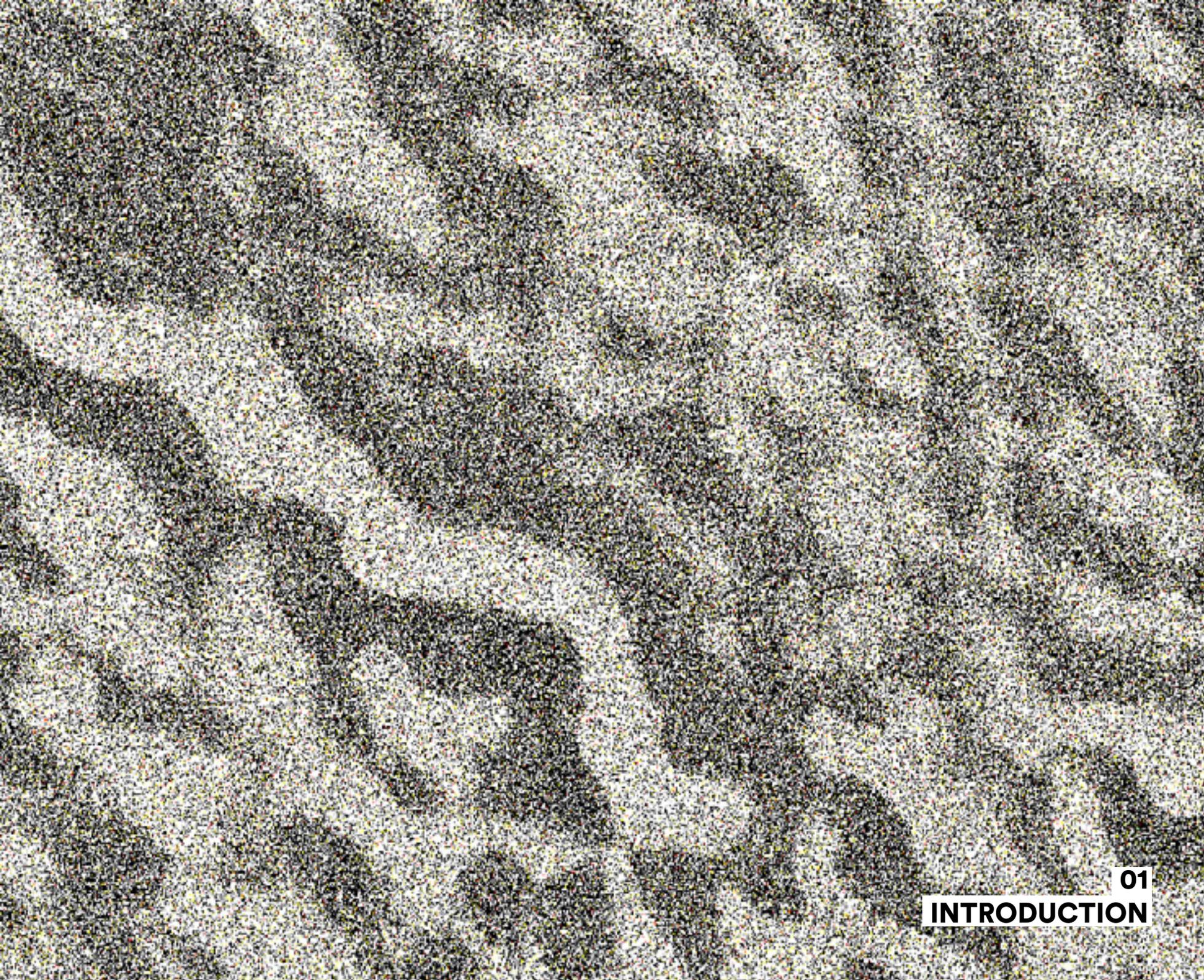


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1.1
CONTEXT

In our anthropocentric understanding of the world, we have been exploiting landscape as a commodity or reducing it to a backdrop for human activity.

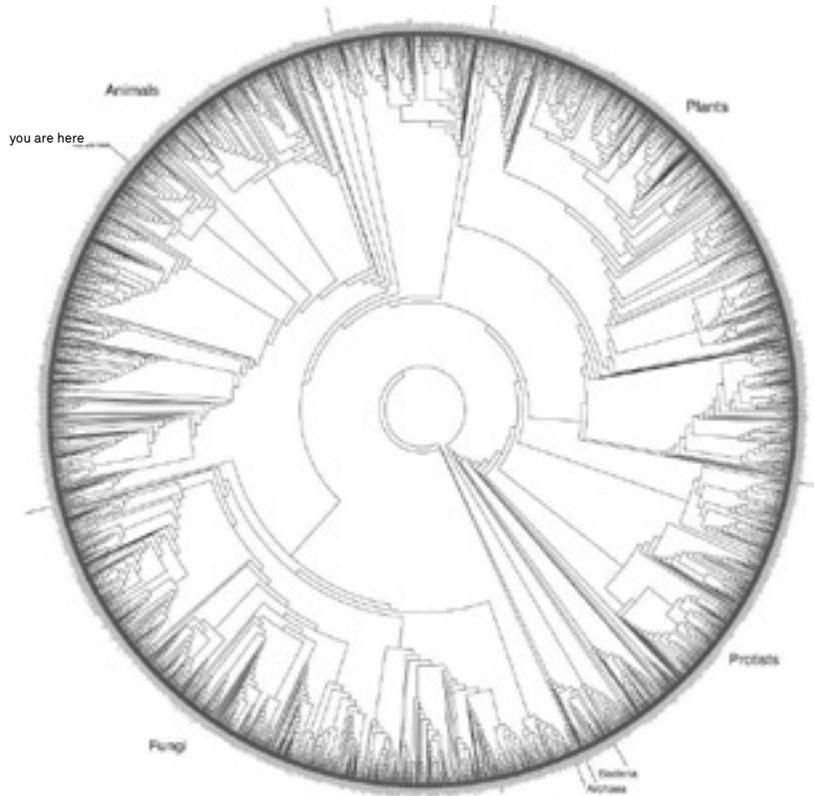
This mindset is increasingly coming under criticism as it is considered to be one of the main causes of climate change and mass extinction of various species. We now know of the relevance of complex interactions and the degree to which human life is dependent on the lives of innumerable other beings. As a result, a new holistic view of the interconnection of all things and a knowledge of these mutual interdependencies is needed.

The so called Hillis Plot published by evolutionary biologist David Hillis, together with scientists Derrick Zwickl and Robin Gutell from the University of Texas, is an attempt to visualize our place in the world in contrast to historic hierarchic systems that place the human on top of all other beings. It shows us not only as being in direct relation to, but also as a part of animals and other species including fungi, plants and protists.¹

In light of the complex relation between human impact and the environment's reaction, this diploma programme is an inquiry into a more integrative understanding of the world.

Since this is a very broad inquiry, the programme will ground itself in a specific geographic area, which has been drastically altered by human disturbance: the former battlefield of Verdun, which was a site of massive decimation of soldiers and the near extinction of all life forms during the First World War. A century later, it is now a forest, still bearing the scars and contaminants of war, but also a place where new species are emerging.

With this layering of events, it bears potential as a study field for this architectural investigation of how we can better relate to our surrounding in times of ongoing environmental destruction.



David M. Hillis,
Derrick Zwickl
and Robin Gutell,
„Plot”, 2003¹

1.2
PROGRAMME
STATEMENT



Relating to the landscape:
Body mapping of a shell crater with Sho Murayama, fieldtrip fall 2019, Verdun
[own image]

The anthropogenic violence on the lithosphere came drastically to the fore with the first industrialized war. During the trench warfare of the First World War the volume of earth violently altered by military means equaled 40.000 years of natural erosion.²

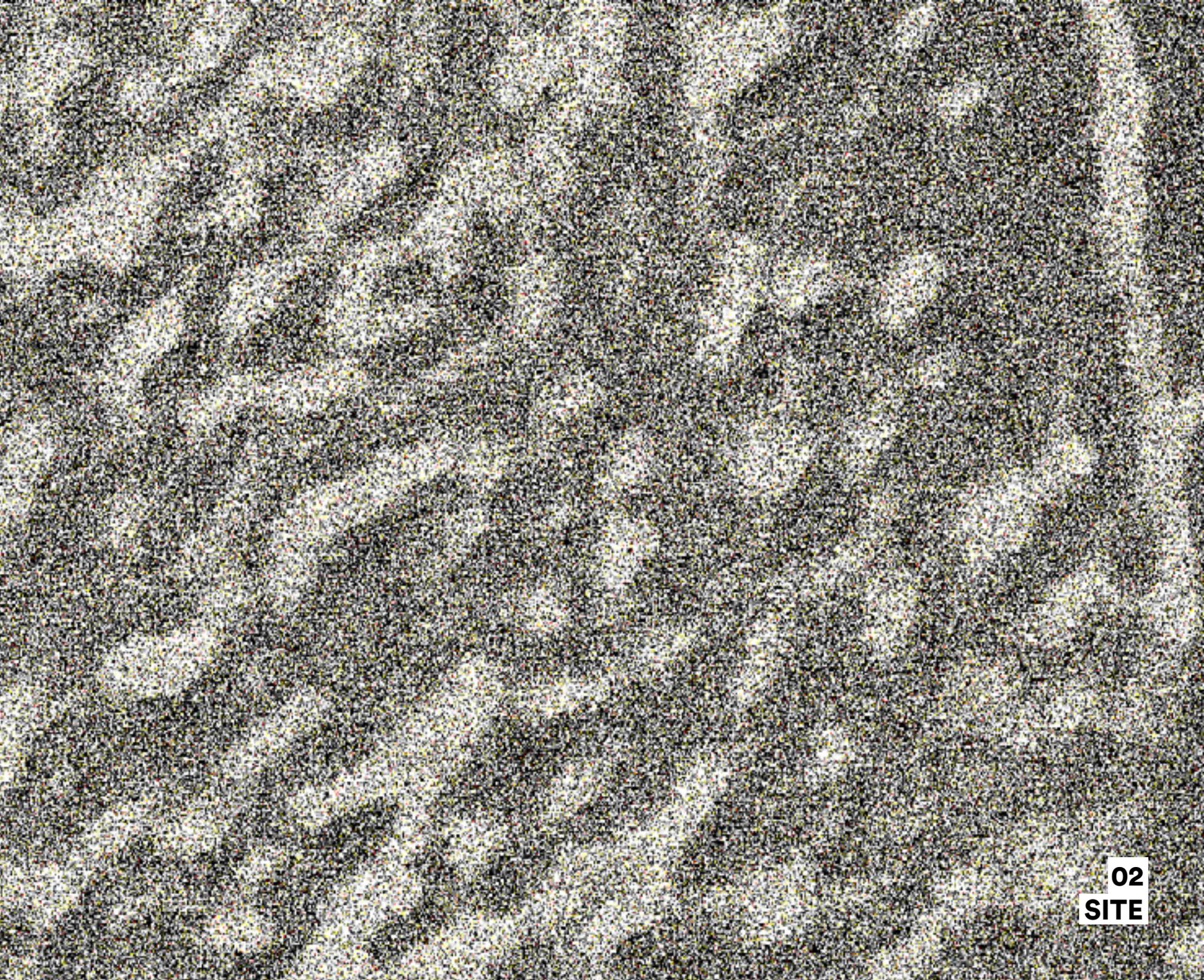
In this backdrop, more specifically, in the forest of Verdun, a wounded landscape still shaped by the impact of the most devastating battles of the First World War, this diploma programme engages critically with the ambivalent relation of humans and their habitat on the one hand, and the object of disturbance on the other.

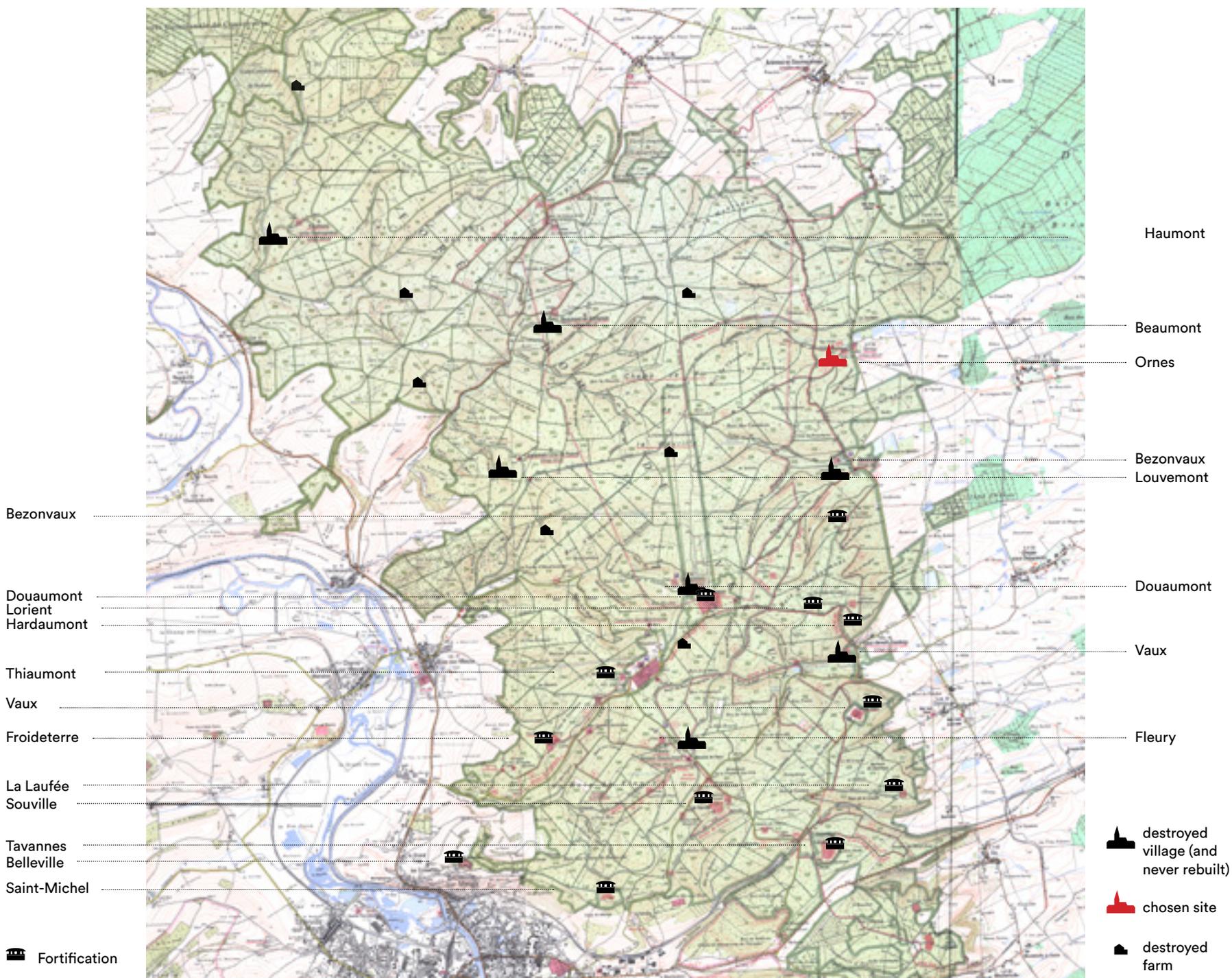
The architecture operates site specifically, in relation to the war-caused topography characterised by numerous shell craters and pre-war structures of a destroyed village. The architecture tries to be minimally invasive, respecting on the one hand the historic value of the topography, and on the other, the ecosystems that have emerged and shaped this landscape.

The projects juxtaposes this highly eventful site with a contemplative programme, the one of a conservation centre. A settlement that revolves around reforestation, but also reflection and investigation of its history. In this way it seeks dissect the dichotomy between the human construct of 'Nature' on the one hand and 'Culture' on the other.

The project is based on fieldwork conducted in fall 2019 and continued in February 2020 in the context of an overarching interest in contaminated landscapes, such as post industrial areas and post mining landscapes. The approach is of a multidisciplinary character. Consequently, readings from anthropologists, biologists and ecologists as well as the work of artists that deals with the topic of the Anthropocene, will inform the process.

It requires an extended understanding of architecture. It makes use of practices that are commonly associated with biology, such as **archiving, observing, experimenting**. These methods will inform the planning process.





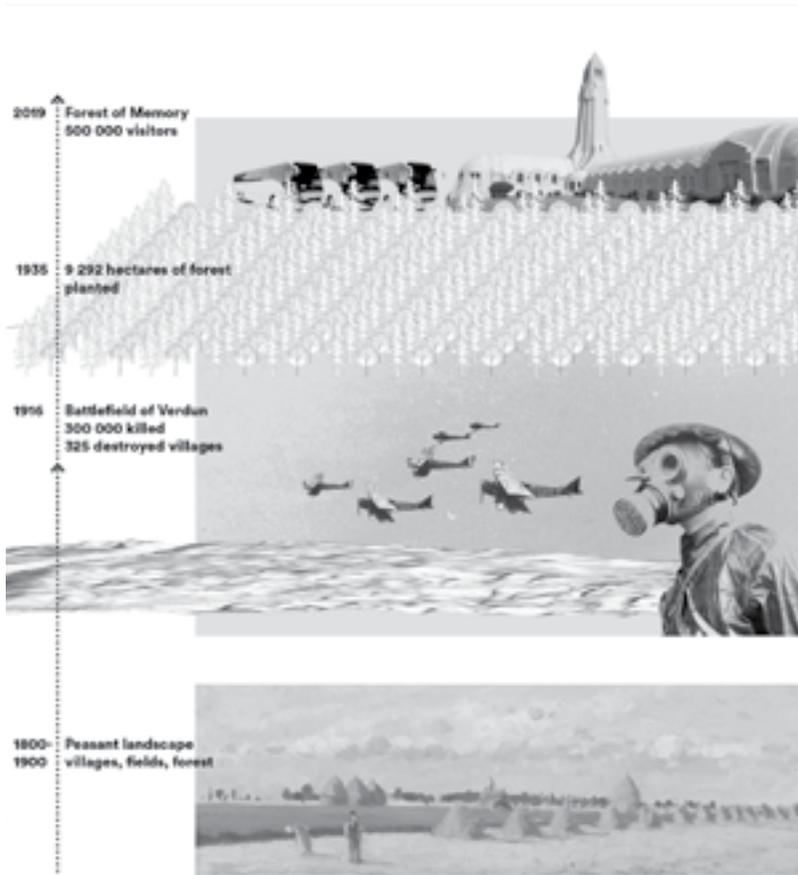
2.1
PAST: BATTLE OF
VERDUN

The site we find now is the result of layering of events over time. Within a time span of 100 years, the war turned the area from a peasant landscape into a wasteland; following the war, the area was developed into a forest of memory. To understand this complexity, I will examine the separate layers of the history of Verdun that manifest themselves in the landscape to eventually show their interrelation diagrammatically.

The event with the most crucial impact on the site was the battle of Verdun, one of the most devastating events of the the First World War. The site, where today the forest of Verdun is located, used to be peasant landscape with small villages scattered over fields and patches of forest in the hilly landscape north of the region Verdun-sur-Meuse. Verdun has been a strategic point of defence in France's history and has been fortified with twenty major forts and forty smaller ones that had historically defended the eastern border of France and had been modernised in the early years of the Twentieth Century. Aiming for these forts in their offensive, the Germans intended to capture a point of national pride for the French and thus change the course of the war.³

The battle, today often referred to as the 'Meat Grinder', took place between February and December 1916, after the Germans captured the fort of Douaumont. The front lines moved back and forth very slowly during the battle, which meant intense bombing of the landscape over a nine month period.

The technical advancements at the time allowed the use of chemical weapons, employing poison gases such as mustard gas and arsenic. Planes were used for the first time in history, supporting the heavy artillery with shell bombing from above. The battle cost around 300 000 lives; it also decimated the landscape: intense artillery fire felled nearly all of the region's trees, and millions of exploding shells left deep depressions, exposing the limestone bedrock.⁴



2.2

POST WAR

General Sir Charles Harington, wrote on the eve of the battle Messines June 7, 1917, a battle that used 19 mines containing an average of 21 tons of explosives. The explosion was allegedly still felt in England:

‘I am not sure if we are about to change history, but certainly we are going to change the landscape’⁵



Trench warfare⁷

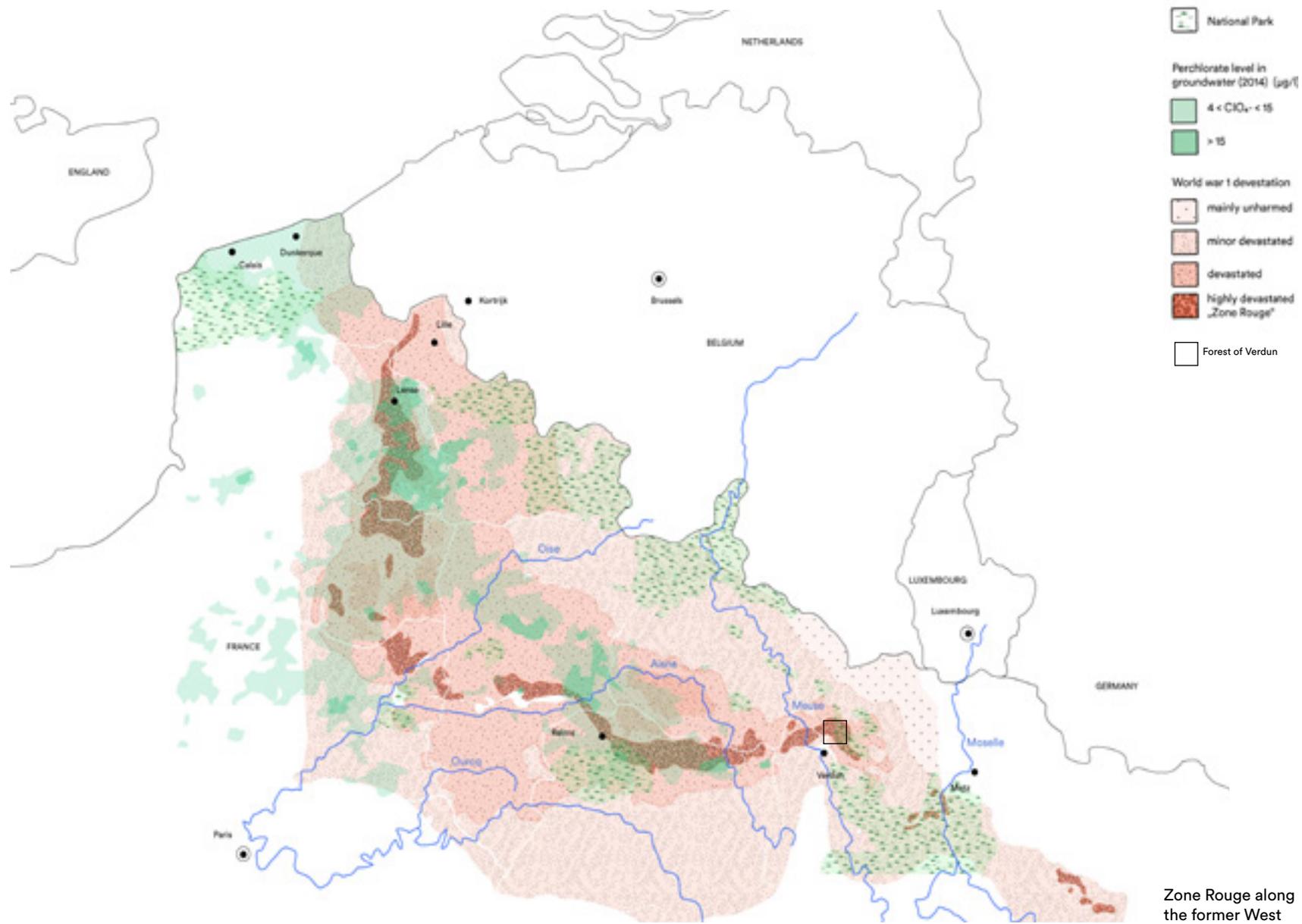


State of forest at the end of the battle of Verdun⁸

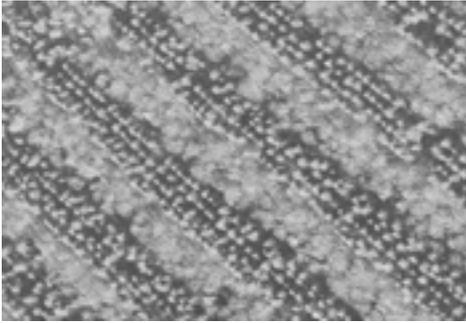
Below the coastline of the north of France, along the border with Belgium and Germany, stretches the so called “**Zone Rouge**“, an area left devoid of vegetation and marked with millions of craters of varying sizes as a result of the battles of 1916, with its hundreds of thousands of artillery. French officials declared the area as the ‘Red Zone’ in 1924. It marked a territory of total devastation and thereupon was not considered fit for human inhabitation or other uses.⁴

By the end of the war the land was uninhabitable and not arable due to the high amount of pollution and unexploded mines - a landscape of toxic mud scattered with the leftovers of the war. At this point in history, the area declared as the Zone Rouge, was effectively a dangerous wasteland. The war left almost two million hectares of agricultural lands either devastated or abandoned.

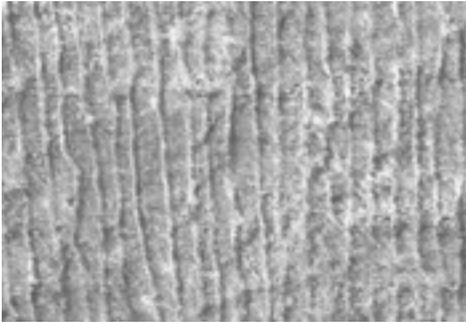
While efforts of restoring farmland all along the Western Front were ongoing, things around Verdun moved slower than elsewhere as the intensity of the destruction meant it was considered too dangerous to quickly recultivate the land. 185 000 hectares of forest were destroyed or damaged and left a landscape littered with the detritus of war. The once fertile soil was transformed into a landscape of waste.⁶



Zone Rouge along the former West Front of the First World War



< Rigid arrangement of deciduous and coniferous trees and traces from harvesting processes



2.3 RESTORATION OF THE LAND

In the immediate post war period, the French government was planning the rehabilitation of the devastated land. While most of the land was simply given back to their original use of farmland, the most severe sectors of the Zone Rouge, including the area around Verdun, were given to the Ministry of Agriculture for purposes of afforestation. After roughly clearing the battlefield, more than 36 million trees were planted without leveling the landscape. The forestation was part of German reparation payments and a lot of the trees (fast growing spruce) were replanted directly from the German Black Forest.

While the woods before the war consisted of unmanaged forest, a century later, the extensive forest (10 000 hectares) covering the former battlefield is now composed of a third of softwood and two thirds of hardwood. It has largely contributed to the conservation of the remnants of war and the specific topography of the war torn landscape, by building a protective cover above the soil with its canopy of leaves, and stabilizing the ground with the root system. The Verdun Forest has thereby preserved the memory of one of the largest battlefields of the First World War, including many of the trenches, bunkers and other war time structures.

What turned into a romantic idea of a forest of memory is still contaminated below the surface. Not only the topography, but also the sediments of the earth still tell the story of the past. The process of de-mining unexploded bombs is ongoing and is expected to last over 300 more years, while the soil remains highly polluted with heavy metals such as copper, lead and zinc as well as with highly toxic arsenic, mercury and cadmium. The ground itself is considered as a sort of sacred burial ground as it is the resting place for around 80,000 soldiers whose bodies were never recovered.⁹



< Unleveled terrain of the forest of Verdun



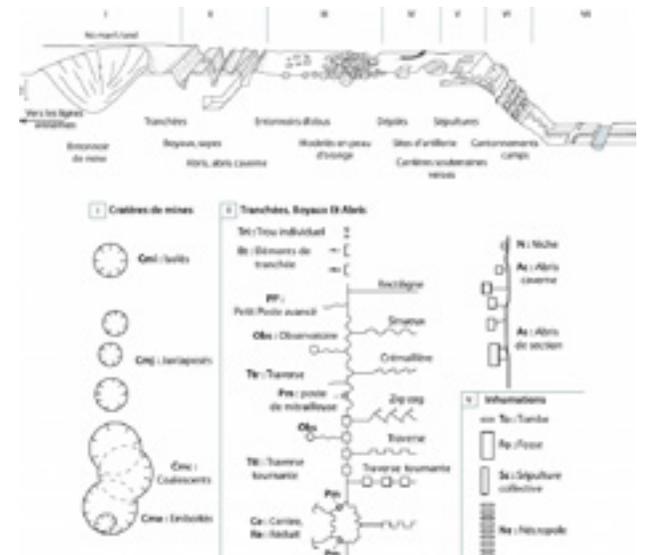
2.4
RECENT
DEVELOPMENTS

SCIENTIFIC
ACTIVITIES

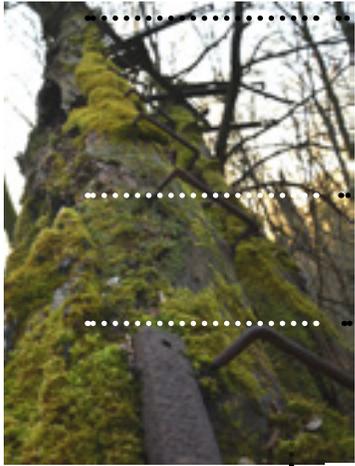
< LiDAR image showing shell holes and network of trenches and shelters
The LiDAR (Light Detection and Ranging) Technology uses pulsed laser rays to measure distances to the Earth. Not reacting to vegetation it is possible to map the ground.¹¹

The forest of Verdun has since the end of the war been an interesting place of field studies, especially for historians and archeologists. In 2003, the forest was awarded with the title “Forêt d’Exception®”, a label created by the French National Forestry Office, aiming to distinguish the most outstanding French national forests from the perspective of their natural and cultural heritage and for their exemplary approach to sustainable development.

In the course of the period since 2003 and in preparation to the centenary of the First World war, a LiDAR mission scanned the entire 10 000 hectares of forest, revealing the land deformations (shell holes, trenches, shelters) hidden under the forest canopy, in 3-D images at high resolution. The technology allowed geologists to map the entire area’s geomorphologic and archaeological findings that were hidden by the canopy of trees. This was an urgent task as these historically valuable sites were threatened by natural erosion, but also by the activities of forestry and tourism. The mappings helped historians to a better understanding of the battle.¹⁰



> Extract from a mapping study by Rémi de Matos Machado on different war caused deformation: bomb craters, trenches, and



Birds



> Military area north from the fort of Douaumont



Insects



Mosses
Mushrooms

^ Surviving tree with steel structure left from the war
Image courtesy: Rémi de Matos Machado



Alpine Newt



Yellow bellied toad



Common Toad



Fire Salamander



Great Crested Newt



Sand Lizard



MILITARY ACTIVITIES



NATURAL DEVELOPMENT

Although considered a forest of memory and peace, a central strip in the forest is still operated as an active military area under the ministry of defence. On a site visit, I observed shooting exercises and helicopter flights in the area around Douaumont. This duality conveys a quite paradoxical image of the site branded as a forest of memory and peace.

Further research by the National Forestry Office (ONF), has shown that the population of certain rare species stand in relation to the earth deformations of war. Plants and animals that have not been in the area before the war, have discovered the former battlefield as their new habitat. They are adapting to the unique landforms of shell craters and underground shelters created by the war.

Rare species like the yellow bellied toad, the crested newt and other amphibians are populating the shell holes that create water ponds, while bats inhabit bunkers and other underground infrastructures left over from the war. A few relic trees that have survived the war, recognizable with their scars and embedded steel fragments, have turned into habitats for vegetation, mushrooms, insects and birds.¹² The Natura 2000 programme enabled an inventory of protected species that can be found in the forest. An illustration based on this inventory of species can be found in the Appendix.

Viewed in this context and seen over time, one can say that the war did not necessarily have a disturbing effect on the ecosystems. It conditioned the landscape in a radical way, producing new ecological niches that would not have developed without the land forming impact of the war. It has also resulted in an unexpected sense of beauty, a landscape of picturesque quality, which represents another paradox: a sense of rare beauty resulting from the violent and destructive acts of a devastating war.



^ Logo of the ONF (founded 1966) and the forest of exception that aims to protect to cultural and natural heritage of the site

< Examples of species found in habitats shaped by bombing during the war

**DISTURBANCE
TODAY:
BARK BEETLE**

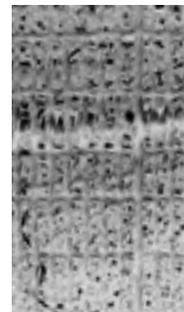


< Traces that the larvae of the bark beetle leave in a found piece of wood

The major focus in the post war years was a quick transformation of the wasteland. Therefore fast growing spruce which is not a native species to the area was the main choice in the forestation process.

The choice enabled a radical and fast transformation of the war torn landscape, a way of forgetting the brutality and reconcile with nature. Now in times of climatic changes with warmer summers, the trees are vulnerable to new forms of disturbance. They are not sufficiently supplied with water and thus an easy victim for the bark beetle. The parasite does neither care about history nor about preservation of a landscape. It is nature's tool to enhance its metabolism. A way of getting rid of old life to make space for new life.

This species is in vast areas in Europe a major threat to forestry. It spreads freely in monoculture plantations as it is especially attacking softwood like spruce, in central Europe the most common forestry product. The only current solution to the spreading of the beetle is the clearing and instant de-barking of the wood on site. In this way the larvae that live in the bark of the tree die and cannot spread further. However this leads to an over-saturation of the market dropping the value of spruce by more than 60%. As a result a lot of wood is exported to Asia or stored in the forest in hope of better market developments.¹³



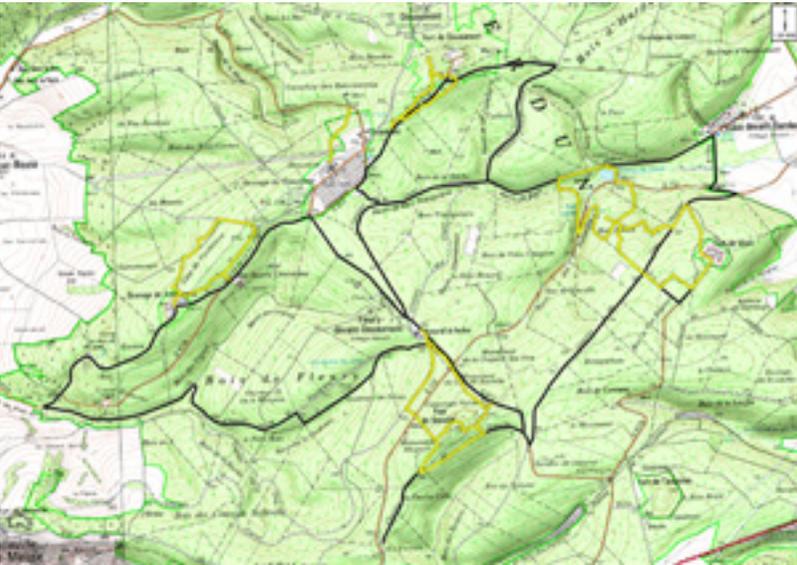
^ Traces of harvesting machines on a LIDAR image show the destruction of the war traces below

In the forest of Verdun the impact of the bark beetle and the subsequent clearing of the forest is additionally threatening the heritage landscape. First of all because the trees have been protecting the ground from erosion, but also because the techniques of harvesting wood in a big scale require heavy machinery that compresses the ground and thus destroy the landscape and its ecosystem. A dilemma for the forestry office, as its scope is both a economic forest production and the commitment to preserve a heritage landscape.

TOURISM



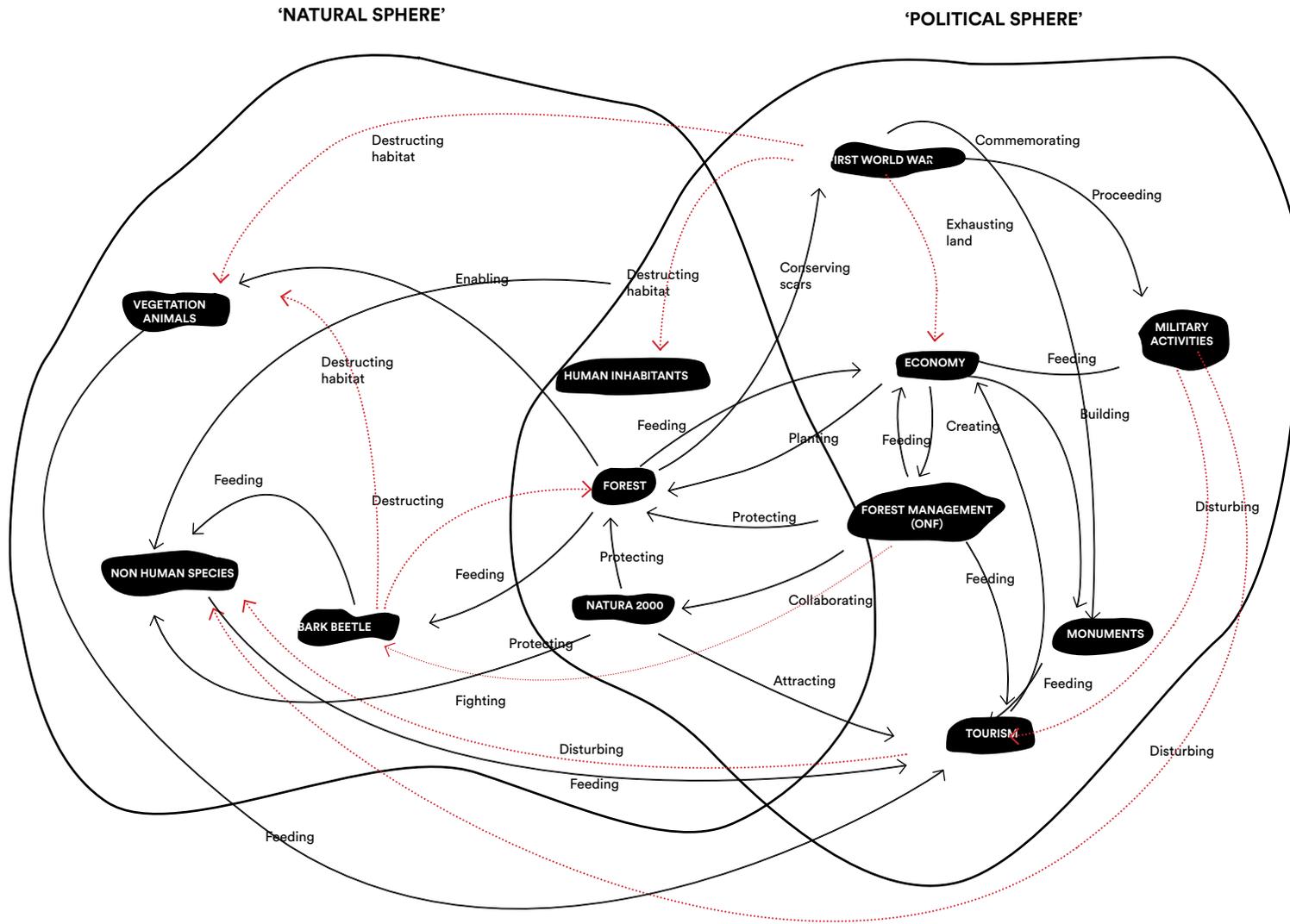
< Ossuary of Douaumont



< Hiking trail network around the battle field connecting sites of interest for visitors and starting to make the landscape accessible (image courtesy: ONF)

The forest of Verdun with its vast offer of memorials and museums draws between 100 000 to 180 000 tourists annually. According to a study (Protourism 2011)¹⁴, tourists requested more guidance in the battlefield itself and more assistance in relation to understanding the landscape. 63% of the people asked were willing to go on a guided tour through the forest. Additional infrastructural offers like signage, wash rooms, hospitality offers like kiosks are necessary. Tourists are clearly drawn to the exceptional landscape preserved by the forest.¹⁵

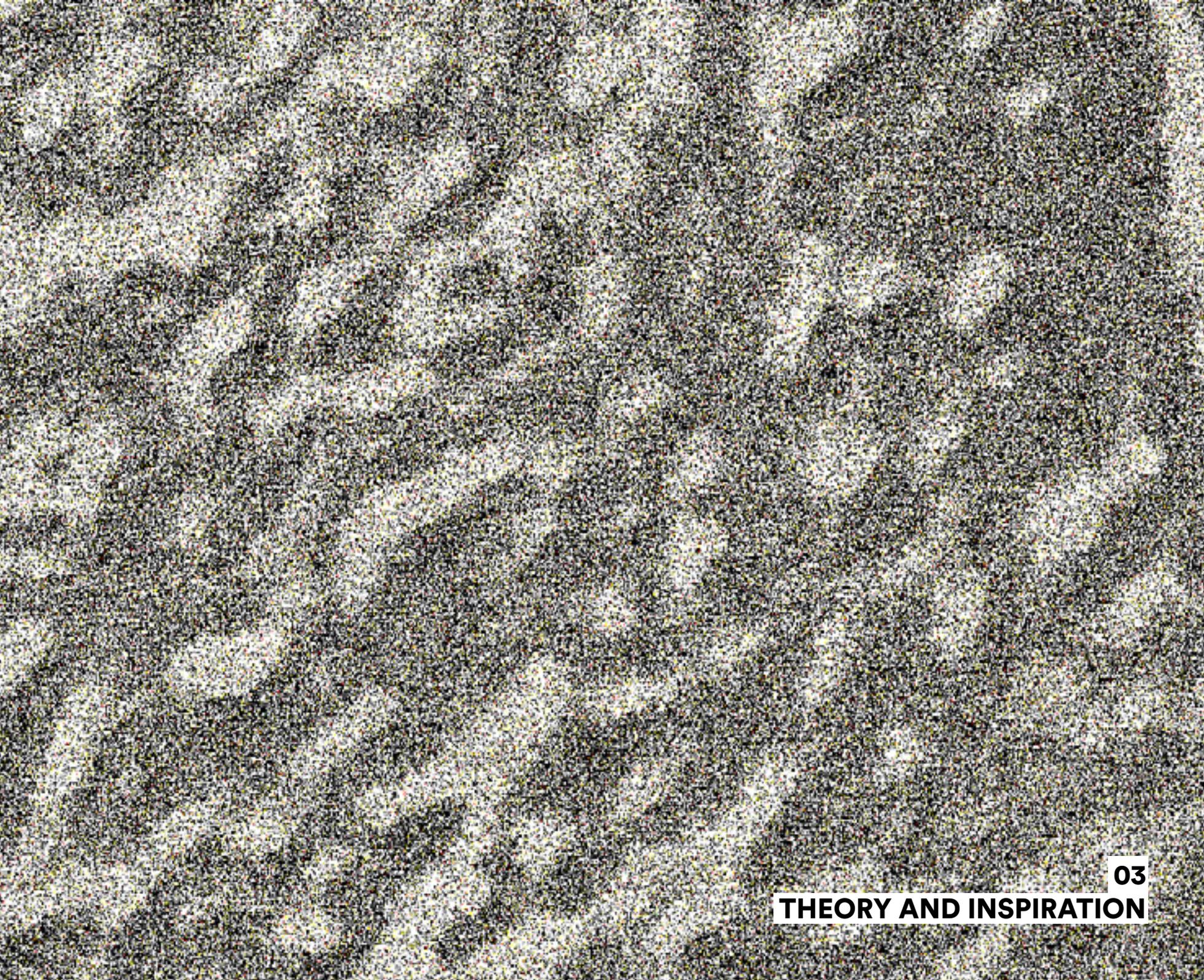
Hiking trails across the landscape have been established next to a number of mountain bike trails taking advantage of the numerous bumps caused by shell craters. The challenge of allowing access to tourism are to keep the risks for visitors down on the one hand (unexploded shells, metal pieces, soil pollution, possible pollution of drinking water wells, contamination of plants and animals), and, on the other hand, the risk of disturbing wildlife that so far thrived as a result of human abandonment of the area. Nevertheless, the way in which the environment has coped with the destruction caused by the war, is exceptional and demands attention. Avoiding further unnecessary disturbance of the area's natural qualities, while at the same time allowing access to visitors, is a challenge. It is part of the project's goal to guide and sensitize visitors. The aim is to provide them with a historical understanding of the battlefield, but at the same time also make them aware of the impacts of the war. Parts of the programme will be to render visible the pollution that is usually invisible for the visitor. The positive aspects as the biodiversity that has emerged as a result of the absence of human activity for an extended period of time, should likewise be highlighted.



constructive relation →
→
 destructive relation →
→

< Diagram of relations between actors, objects and events shaping the landscape of Verdun

The diagram shows how the landscape of the former battlefield is still a highly political object, both of economic, and natural actors that are at times cooperating or working against each other. The political decision of protecting nature is selective and is above all serving economic interests, primarily tourism. The multiplicity of events stand in relation to each other. Their effects are reaching back in time (conservation) and into the future and are never positive or negative per se.



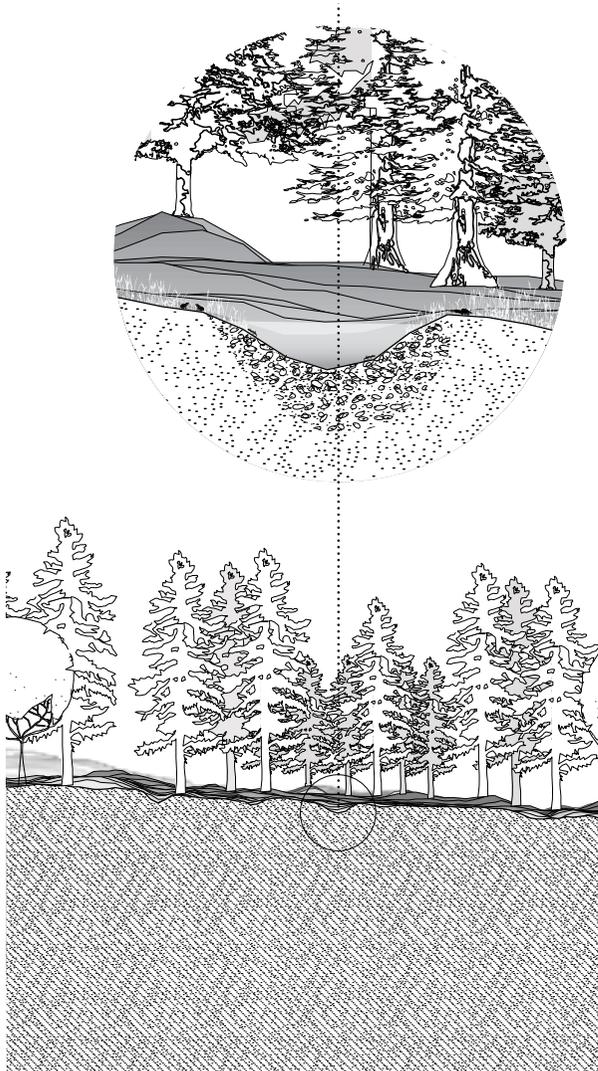
3.1

CONTAMINATED DIVERSITY

The events in the forest of Verdun can be seen as an example of what anthropologist Anna L. Tsing describes as 'contaminated diversity'. With this term she

“refer[s] to cultural and biological ways of life that have developed in relation to the last few hundred years of widespread human disturbance. Contaminated diversity is collaborative adaptation to human-disturbed ecosystems. It emerges as the detritus of environmental destruction, imperial conquest, profit making, racism, and authoritarian rule - as well as creative becoming. It is not always pretty. But it is who we are and what we have as available working partners for a liveable earth.”¹⁶

The forest of Verdun is an example of the precarious life situation we are left with by human interference. It is littered with war debris and a high concentrations of toxic arsenic. At the same time it shows the brutality layered with the life that emerged from it. A new ecosystem emerged from the forest and the war topography. Frogs and other amphibians thrive in the niche of flooded shell craters. Bats inhabit former bunkers and tunnels that are abandoned since the war has ended. These all are cases of contaminated diversity. The area is a wild assemblage of different interests and actors. It is a landscape of memory and relics that humans want to preserve with the help of companion species: trees that form a protective layer and conserve the topography. Nature has found its place in the wasteland and has given it another purpose. This is something humans profit from using the forest for recreation and leisure. Anna Tsing's work is a helpful tool to grasp the complexity of relations in the landscape of the Zone Rouge. By putting on her lens of seeing the world, I attempt to design in a less human centred way.



< Emergent ecosystems profiting from morphological changes caused by shell bombing during the war. The earth around the crater is compressed by the force of the explosion. Accumulating water stays and forms ponds that are inhabited by amphibians.

< Section through a sample site in the Forest of Verdun

3.2

STAYING WITH THE TROUBLE



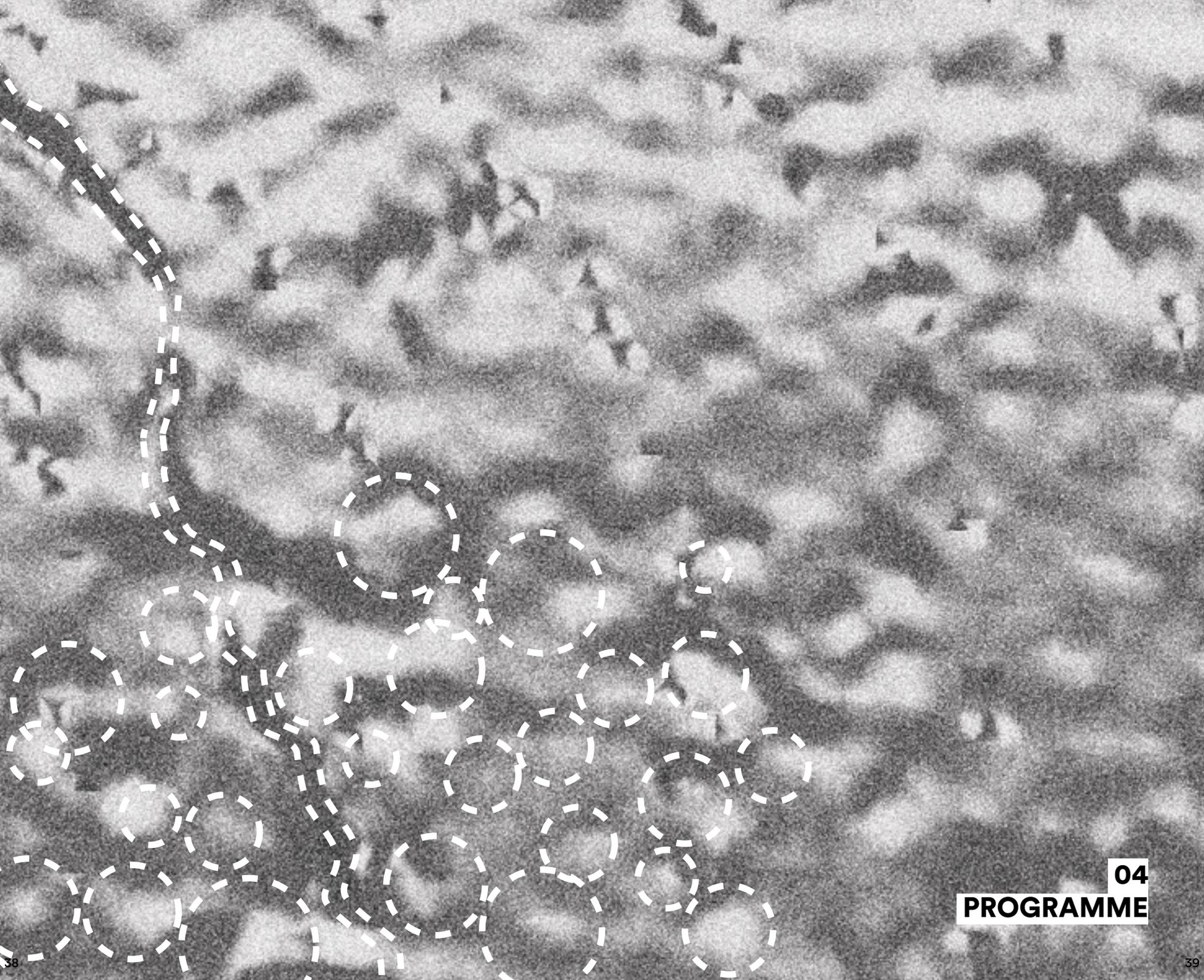
< picture by
Olivier Saint-Hilaire

“Staying with the trouble” means accepting the layers of organisms, as well as the technological layers that shaped our time to find new ways of living on this damaged planet.

In times of ecological destruction that can seem apocalyptic, ‘multispecies feminist’ and theorist Donna J. Haraway provokes with her radical new ways of reconfiguring our relationship to other species and to the environment. With her book “Staying with the trouble” (2016), she encourages a less cynical view in these times of human disturbance. She wants to find new ways of living on a damaged planet by accepting the impacts of organisms on the ecosystem and the technological developments that shape our time.

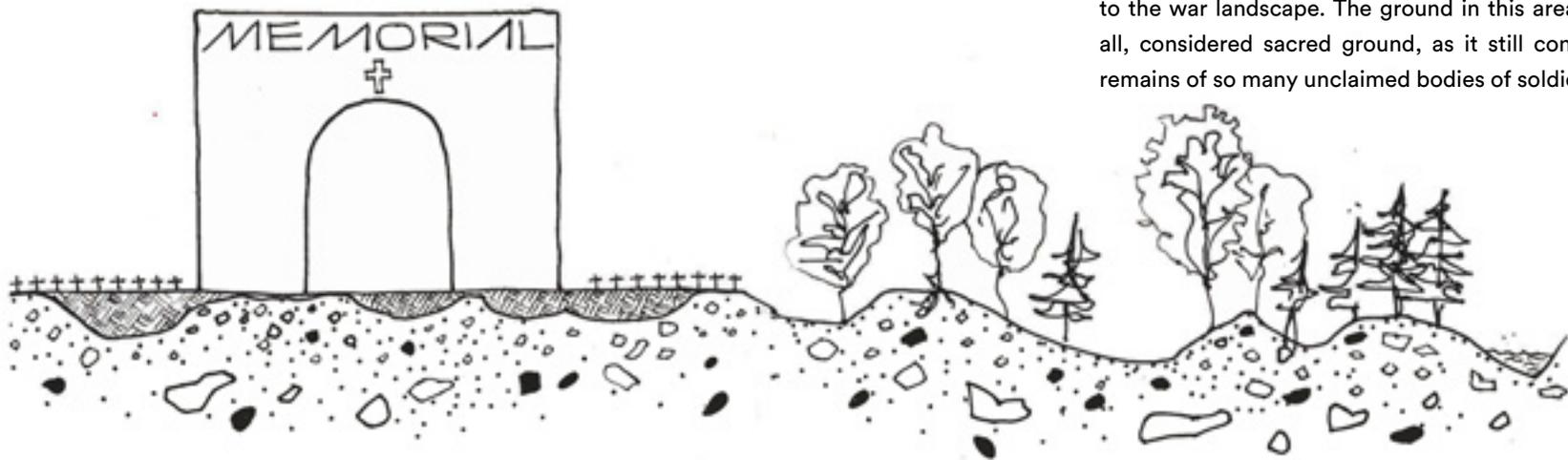
With her background in biology she involves other species into the understanding of our presumed human-dominated world of forces and powers. By suggesting that we are living in the era of the ‘Chthulucene’, Haraway critiques the notion of human exceptionalism as implied by the ‘Anthropocene’. With Chthulucene, she describes the complex multispecies assemblages that form our world - and of which humans are a part of - Our world as an open ended ‘becoming’, never-ending relations and unknown outcomes.¹⁷ By telling stories of these often less apparent entangled happenings and relations, she aims to create another view of our place in the environment.

Her theory will inform the narrative of my architectural proposition. The spatial language should form a tool to grasp invisible relations between the different organisms inhabiting the forest (including humans), and the different times and political circumstances that shaped the site.



04
PROGRAMME

One has the impression that memories most carefully built up with memory architecture, with architectural places reflected within. The art of memory is an invisible art, it reflects real places but is about, not the places themselves, but the reflection of these within the imagination.²⁵ Francis Yates



4.3
COMMEMORATION
THROUGH
LANDSCAPE

The project's main objective is not to commemorate the First World War. Nevertheless, making the landscape more accessible, can enable a relation with the events and consequences of the war. Through out the process of researching and writing during the first semester, I critiqued the monumentality of the architecture built around the Zone Rouge. The omnipresence of memorials and soldier's cemeteries, evokes a feeling of moralization. The ground had been flattened and the scars of the landscapes have been erased in the building process of these sites. This can be because the architects of the time often used ancient references of massive forms responding to their own sensitivity and their own background. But perhaps also to put back a sense of order in what was left in horrible disorder after the war.

The landscape offers a different experience: Nature was an important actor in the preservation of history, as the debris left from the conflict becomes part of nature. The merging layers are going to be the focus of my architectural inquiry. Hence the practices covering up the scars of war, in order to provide foundations for structures, should be viewed critically throughout this project. The architecture should utilize the preservation of the characteristics of the ground and thus intentionally enabling a relation to the war landscape. The ground in this area is, after all, considered sacred ground, as it still contains the remains of so many unclaimed bodies of soldiers.



‘To no man does the earth mean so much as to the soldier. When he presses himself down upon her long and powerfully, when he buries his face and his limbs deep in her from the fear of death by shell-fire, then she is his only friend, his brother, his mother; he stifles his terror and his cries in her silence and her security; she shelters him and releases him for ten seconds to live, to run, ten seconds of life; receives him again and again and often forever.’¹⁸

Erich Maria Remarque, All Quiet on the Western Front

4.1

CONSERVATION CENTRE

The objective of the **Conservation Centre** is to engage visitors in the conservation of the landscape by reforesting the area. In order to facilitate this process a settlement, the ‘Refugium’, is built on the footprint of the destroyed village of Ornes. The task of the inhabitants is to find out which species can benefit from the condition of the landscape and therefore can benefit the conservation of the landscape that is since the attack of the bark beetle under threat of erosion.

These labour intense activities will have a personal benefit to the inhabitants. They form contemplative routines, rituals that give purpose to the inhabitants of the Refugium. As Byung-Chul Han puts it: ‘rituals are stabilizing elements, things to hold on to in time. Rituals have the same value in time as the house has in space.’¹⁹

I suggest that one can find a source of inspiration and reflection in this place of destruction and adaptation, as much as in unspoiled nature. To recalibrate our understanding of ‘nature’ can only happen through direct engagement with the matter.

The settlement aims for a direct interaction with its location and a drive for a deeper understanding of the ground that it is built on, with all its history and present processes. This is based on an understanding of the human as a ‘Ortswesen’ (Byung-Chul Han), a being that relates to a certain place. Han describes the ‘Ent-Ortung’ (rendering of places as irrelevant), a process encouraged by globalization, as counter productive to humans nature. ‘It is levelling differences and just leaving behind variations of the same.’²⁰ This can apply equally well to architecture. Contrasting a global modern style, the Refugium should thus ground itself on this specific place, reliant on all its characteristics.



< 'GeoMerce', an installation by Giovanni Innella is exhibiting the process of phytomining juxtaposing the amount of extraction of the plants with the real-time value of the metals on the market ²¹



ACTORS: PLANTS

The facilities of reforestation are a **tree nursery**, where suitable species are tested and raised to withstand the conditions on site in combination with **Phytoremediation fields** that indicate the local pollution level.

The minimally invasive approach that the programme aims for requires collaboration with non human actors such as plants. These actors play a crucial role in the project. The methods of collaboration are described as follows.

Some plants have been proven to be helpful collaborators in cleaning soil from heavy metals and other toxins. The process that takes use of these plants that tolerate and accumulate high amounts of toxins in their organism is called **Phytoremediation**.

Hyperaccumulators are already helping to restore the environment around the mines in New Caledonia, where the world's largest nickel deposits have been exploited for decades and the environment has been badly affected. They do not only detox the polluted soil around and on former mining pits, but actually mine the metals to a considerable amount.

The plants are cut, dried and burned to ashes so the desired metal can be extracted.²³

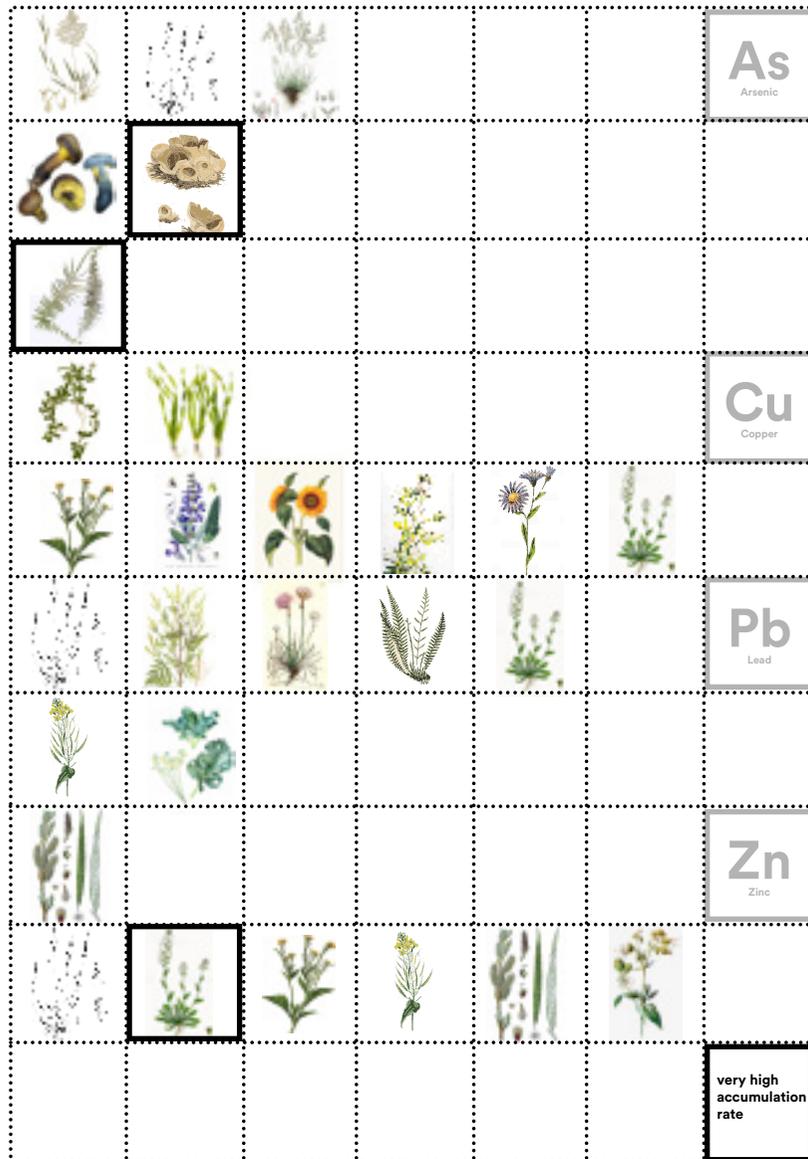
The project aims to test the efficiency of various species on different parts of the polluted soil, thereby making the otherwise invisible pollution visible. This has not yet been studied to a large degree.

The following page shows an inventory of species (plants and fungi) that extract chemicals that are part of the pollution spectrum of the former battlefield of Verdun. Some of the species show higher rates of accumulation than others. However the rates also differ according to other natural conditions at the various sites.

< The sap of this tree (*Pycnandra acuminata*) contains 25 % nickel.²²

ATLAS OF HYPERACCUMULATORS ²⁴

Plants that are accumulating high amounts of metals are called Hyperaccumulators



Metal or toxin	Rate (mg/kg dry weight)	Species (Latin)	Species (English)
Arsenic (As)	100	Agrostis capillaris L.	Common Bent Grass
		Agrostis castellana	Highland Bent Grass
	1000	Agrostis tenerrima Trin.	Colonial bentgrass
		Cyanoboletus pulverulentus	Ink Stain Bolete
	27 000 (fronds)	Pteris vittata L	Ladder brake fern
Copper (Cu)	100-7000	Sarcosphaera coronaria	violet crown-cup
		Bacopa monnieri	Smooth Water Hyssop
	1000	Brassica juncea	Indian Mustard
		Vallisneria americana	Tape Grass
		Haumaniastrum robertii	Copper Flower
Lead (Pb)	1000	Helianthus annuus	Sunflower
		Larrea tridentata	Creosote Bush
	1000	Thlaspi caerulescens	Alpine pennycress
		Agrostis castellana	Highland Bent Grass
		Ambrosia artemisiifolia	Ragweed
		Armeria maritima	Seapink Thrift
		Athyrium yokoscense	Japanese spleenwort
		Thlaspi caerulescens	Alpine pennycress
		Brassica napus	Rapeseed
		Brassica oleracea	Cabbage
Zinc (Zn)	1000	Salix viminalis	Common Osier
		Agrostis castellana	Highland Bent Grass
	7000	Thlaspi caerulescens	Alpine pennycress
		Brassicaceae	Mustard
		Brassica napus	Rapeseed
1400	Salix viminalis	Common Osier	
	Silene vulgaris	Bladder campion	
+ Perchlorates			

4.2 ACTORS AND ARCHITECTURES



^ Still from the movie "Stalker" by Andrej Tarkovsky

The three characters: Scientist, Poet and Stalker are inspiration for the Stewards of the landscape

STEWARDS

The Stewards of the wounded landscape are people with a specific interest and knowledge on the site or the practices of the Operations. These could be **foresters**, **historians** or **archeologists**. These experts become mediators to visitors. They pass on the knowledge of planting and inform about risks and dangers of the area.

VISITORS

Visitors to the 'Operations in a wounded Landscape' are groups or individuals that want to engage in the reforestation of the area, want to know about its historic context or seek a contemplative experience. The programme is especially directed to school groups or young people, who might find better access to the past by direct engagement with the landscape as a contemporary witness than acquiring theoretic knowledge about it.

LOCATION

The Operations are sited along the still existing street of the destroyed village of Ornes that I studied closer on my second field work in February 2020. Its location has proven beneficial as it is located off the main 'touristic gateway' and therefore presents a less frequently visited area. The impact of the bark beetle in the area is already very severe and according to the ONF a big concern. I want to reactivate this village to become a new gate to the forest. Unlike other destroyed villages or towns that got rebuilt "as they were before" and therefore foster amnesia about the destruction and their still toxic condition, this village should engage with its history and reveal its scars.

ARCHITECTURES



**Operation 4
Possible Futures**

Fields for testing
Hyperaccumulators
and tree species withstanding
the toxic soil conditions

Raising trees for reforestation

Soil
Plants
Sheep

planting
sowing
cultivating
watering
observing

**Operation 3
Excavation as Contemplation**

The excavation of a shell crater
creates a chapel under the
earth

Earth
Light

digging
resting
contemplating

**Operation 2
Connecting to the Past**

Conditioning the landscape by
flooding it

Making destruction visible by
accentuating topography

Designing a interdependency
between humans and non
human species

Water
Ruin

relating
washing
watering

**Operation 1
A Layer of the Present**

Conservation of the
topography and dying trees

Dwelling on the ground

Light
Wood
Moss

dwelling
sleeping
socializing
eating
reading

**ARCHITECTURAL
OPERATION**

**CO-ACTOR IN
DESIGN**

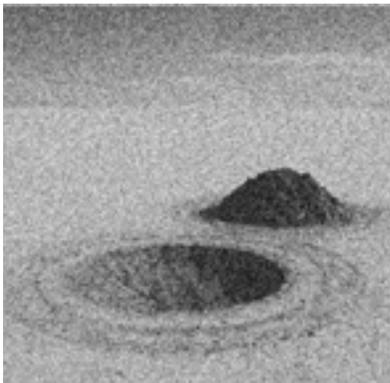
HUMAN ACTION



< Monastery of Panagia, Amorgos, Greece



< Christo & Jean Claude "Running Fence", Photo: Wolfgang Volz



< Nick Pena "Untitled" 2005

4.4 TOOLS FOR PLANNING

Several tools inspired by vernacular construction techniques will be helpful in the form finding process along with selected examples of land art.

ADAPTIATION

- Emphasizing the characteristics of the landscape by mimicking its formal language.
- Rethinking fundamental architectural elements, such as foundation (interaction with the ground), roof (shelter) and walls (barrier).
- Adaptation in terms of materiality; making use of materials including earth, clay and limestone found on site. The already harvested spruce and spruce awaiting to be cut due to a bark beetle infection will be used as a main structural element

RELATION TO THE PAST

- Relating to the history of the landscape by considering remnants of the destroyed village as well as war relics
- Relating to the daily life of soldiers, using techniques used during the war and reflecting on the soldiers' daily life. I will specifically use Erich Maria Remarques 'All Quiet on the Western Front' as a reference

FRAMING/ STAGING

- Rendering the invisible layers of the past visible
- Staging, exhibiting natural processes such as phytoremediation
- Highlighting the existing deformations of the landscape, by casting selected areas of the shell craters.
- Water as an actor that can reveal landscape deformations
- A simple architecture to shift the focus on the complex landscape.

SUBSTRACTION/ EXCAVATION

- Using techniques and tectonics that mimic trench making techniques, using excavation material for building for example, in the form of rammed earth.
- Creating 'cuts' in the landscape exposing sections of the layers of earth, giving insight into history with all of the embodied detritus of war.

v Concept model showing the characteristics of the landscape condition (fragility, porosity), plaster and dry leaves



^ Study model: Cast of the topography shaped by shell craters, 1:100, plaster and flax fibres

4.5 METHOD AND SUBMISSION

The working method is oscillating between a scientific and artistic approach. The scientific method includes techniques commonly associated with archeology (excavating), biology (the botanical atlas) and geographic analysis (mapping). This is juxtaposed with an artistic approach including exploration of the territory with physical models. In the first phase I worked with intuitive study models that allow growth, decay and unforeseen changes. Therefore I aim to include organic material such as soil, clay, seeds, natural fibres, and wood. The second phase will include work with exact representations of the landscape by using the LIDAR data. This will allow light and material studies as a way of exploring the physical potential of the landscape.

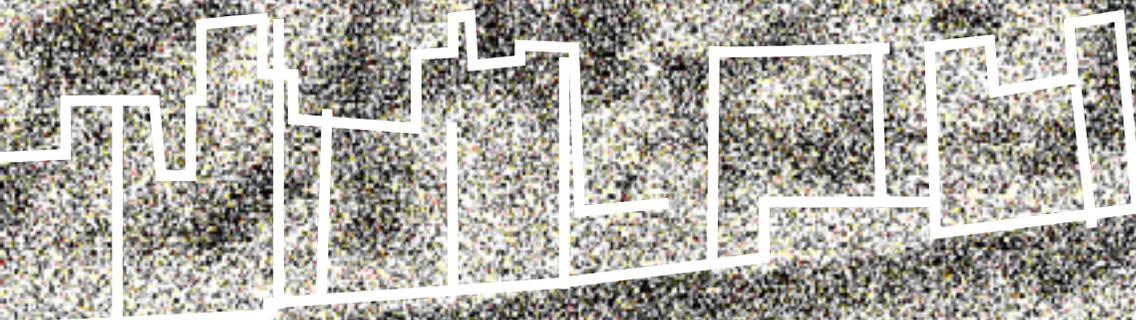
COLLABORATION

The second fieldtrip in February informed me with more observations and findings on site and established a collaboration with the local department of the ONF in Verdun. A presentation of my research and project intentions at the Forest Management, and the resulting discussions, has further informed the process of programme planning. The ongoing dialogue with the local institution and the geologist Rémi de Matos Machado, will further influence the project.

SUBMISSION MATERIAL

- Site models focusing on representing the characteristics of the landscape (1:200)
- Model studies including the architectural Operations (1:50/1:100)
- Drawing sets (1:50/1:100) with a focus on sections which I consider most helpful in showing the interaction with the ground

An integral part of the project is continuous research, testing, and critique. Hence the submission material is indicative, and may be adjusted based on the project's progression. All indicators of scale are therefore guiding and subject to change.





**5.1
RETURN TRIP**

**SEMINAR AT THE
ONF**

< Cleared forest at the destroyed village Douaumont and remnants of the village

A second fieldwork was conducted between the 10th and 14th of February 2020 and included a seminar at the ONF and further explorations of the field.

The seminar started with a presentation of my research aimed at confronting the very scientific approach of the members with artistic research. That would function as a starting point for a discussion with the forest management about their development plans and figure out possible overlaps and interests between us. I learned that there was a vague plan of a facility that gives access to the forest, a starting point for guided tours and a help to read the war landscape as this is a major problem for visitors. Further brainstorming suggested that this entry point to the forest could be tied to one of the destroyed villages and exemplary explain the different stages of the landscape on site over time.

**SITE VISITS TO
DESTROYED
VILLAGES**

In direct vicinity to the chapels of the destroyed villages Louvemont and Douaumont, a large area of trees (Spruce) have recently been cut down which, according to the forest office, was related to the harm of the bark beetle. The clearing of the trees requires the use of heavy machines and damages to the ground could not be avoided. To limit further harm the villages were closed to public access. The ONF's plan is to replace the spruce population with beech and oak trees, that are natural habitants to the area. My project should consider these plans and possibly incorporate the new beech trees into the programme.

Recent storms with heavy rainfalls encouraged the creation of ponds in the numerous shell craters all over the area, highlighting the particular qualities of the landscape as if they were the features of an intentionally created park. The shell holes were rendered more visible, especially in the areas where a vegetation usually covers the land deformations. (See following spread)

< Cleared forest and relics of the destroyed village Louvemont



^ Ponds in an area with an overgrown forest ground make the deformations more visible



> Well preserved trench near Fort de Souville
> Pond landscape at Ouvrage de Thiaumont



v LIDAR plan of
the destroyed
village of Ornes.
The road is
the only still

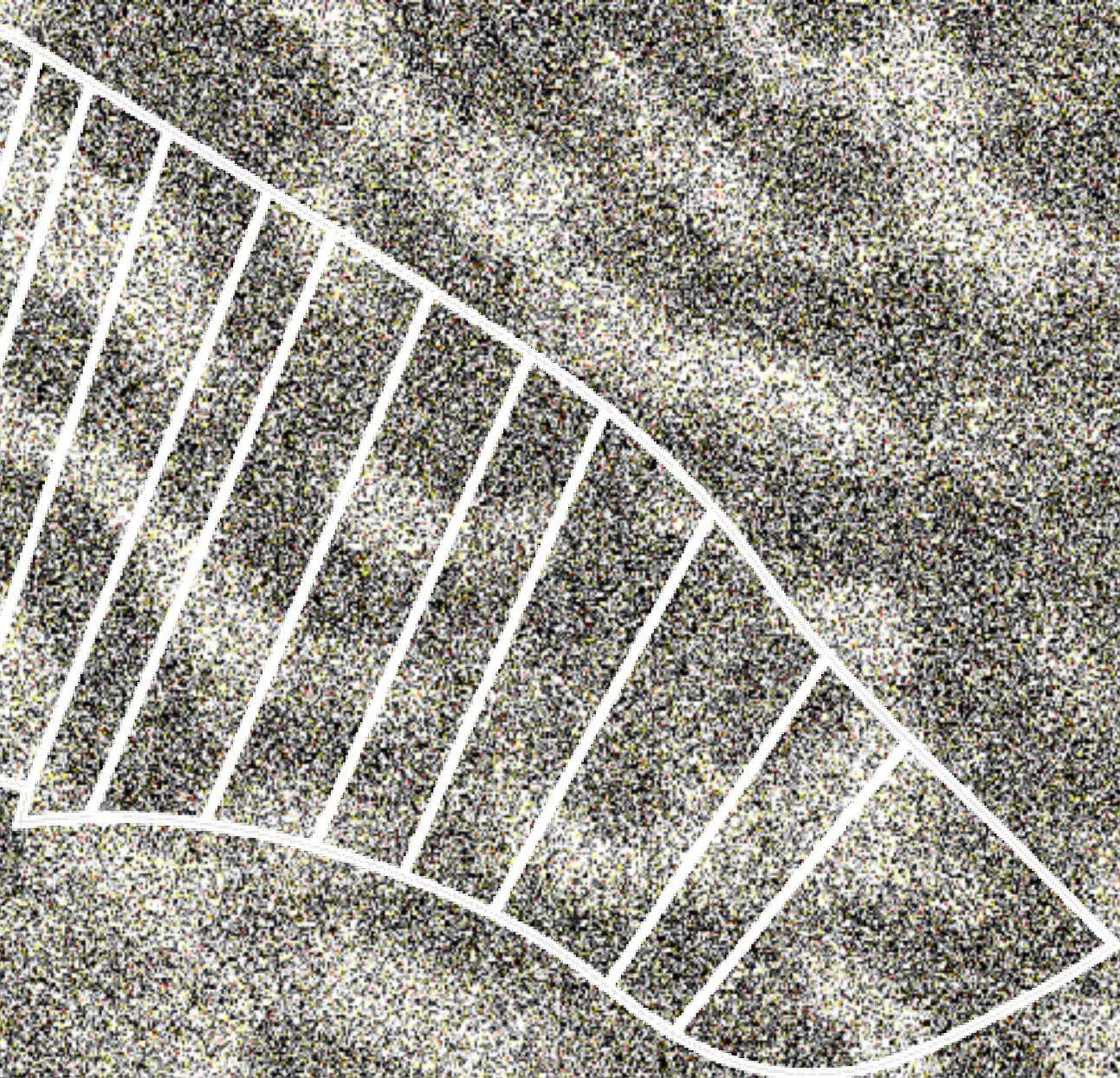


5.2
SITE ORNES

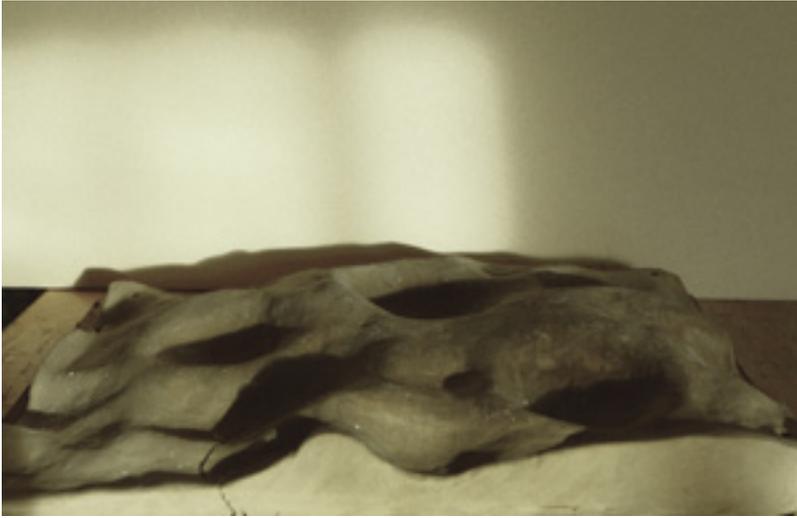
v historic picture
of Ornes before
destruction
(Courtesy of ONF)



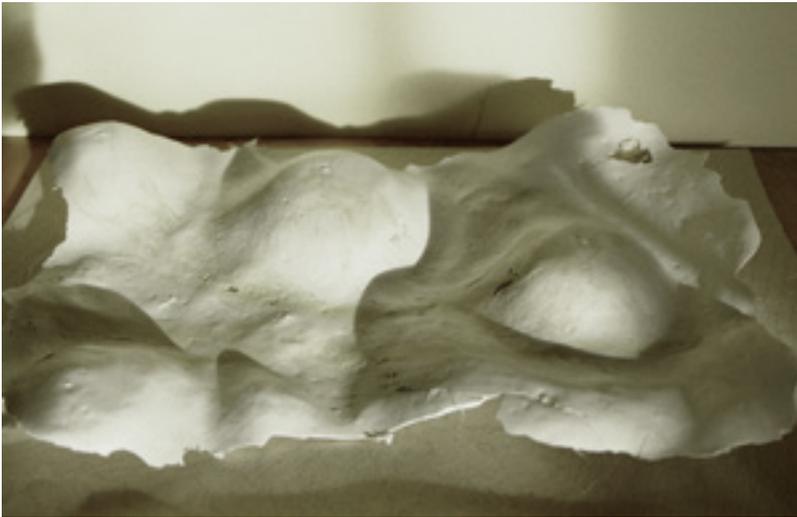
^ Ornes with the
ruin of the church
on the site visit



Modelling of a
sample site in clay
scale 1:100



Exploring the
formal potential
and the material
qualities of the
war deformed
landscape of
Verdun



Cast and
Inversion of shell
holes
Plaster and flax
fibres



**Porosity and
Fragility**
Cast on landscape
with plaster and
dried leaves

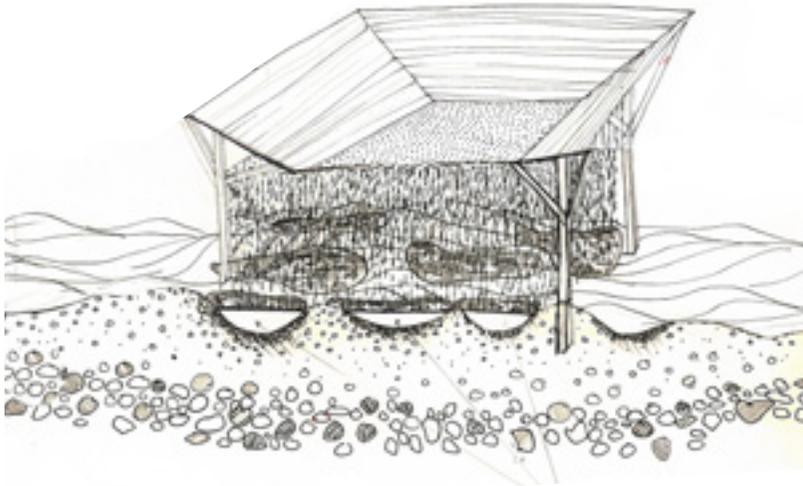
Probe: Operation
The Pondmaker

The structure is placed on site where it collects rain and distributes it on an area of about

The shell holes on the ground accumulate water and keep it due to the compression of the earth around the holes

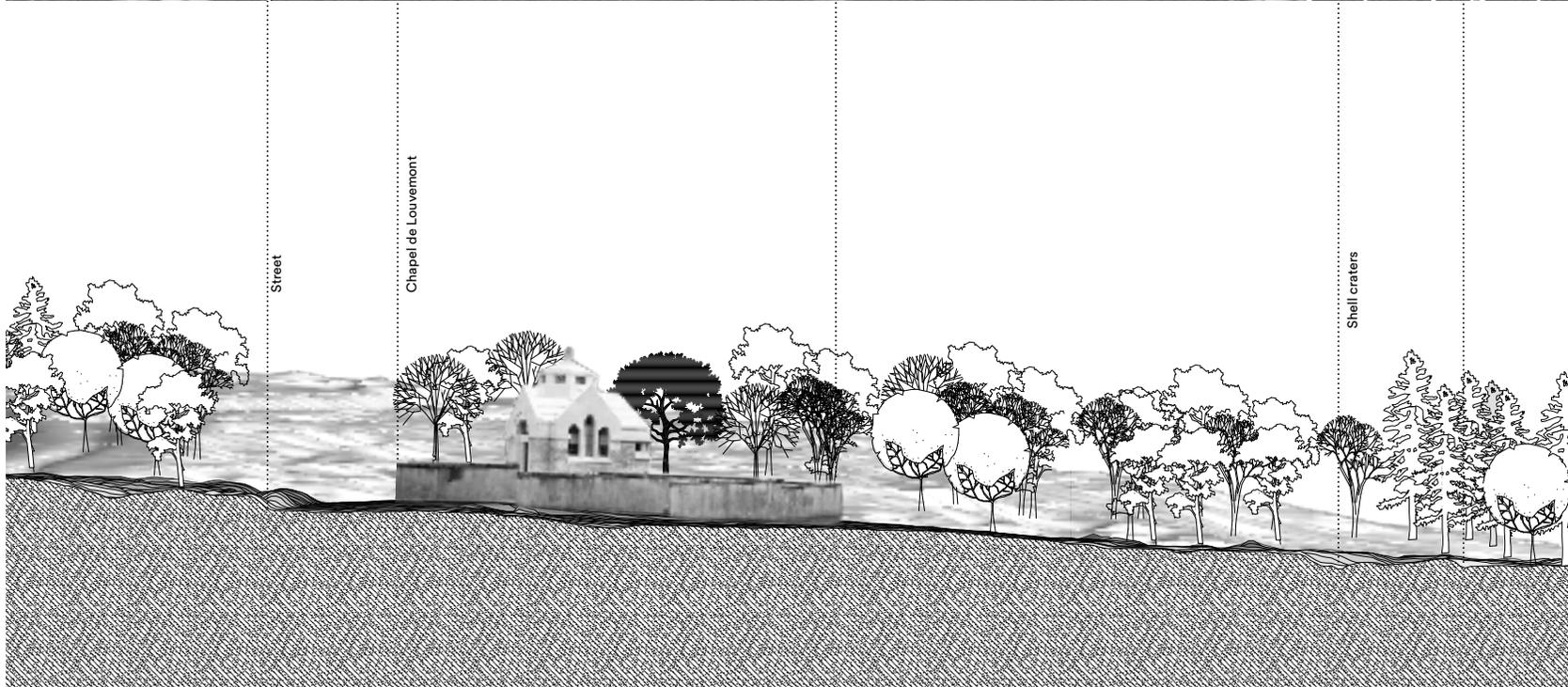
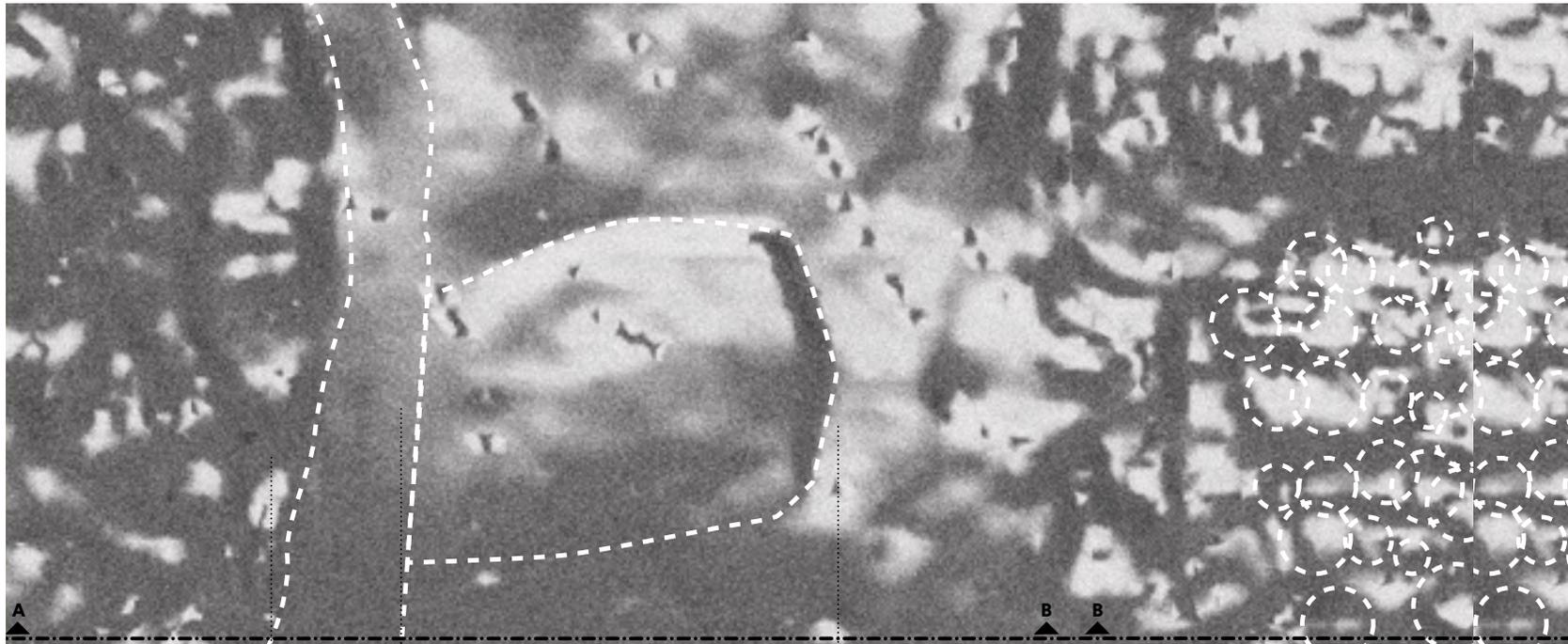


Study model of the Pondmaker

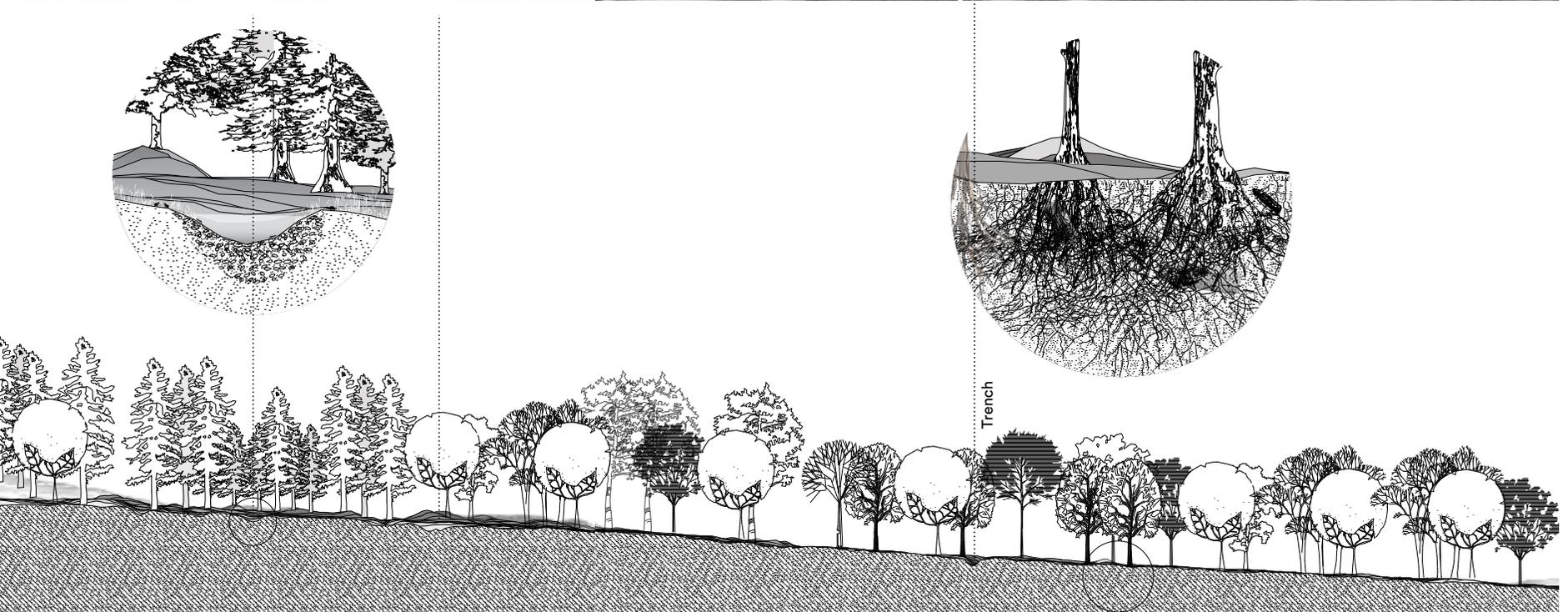
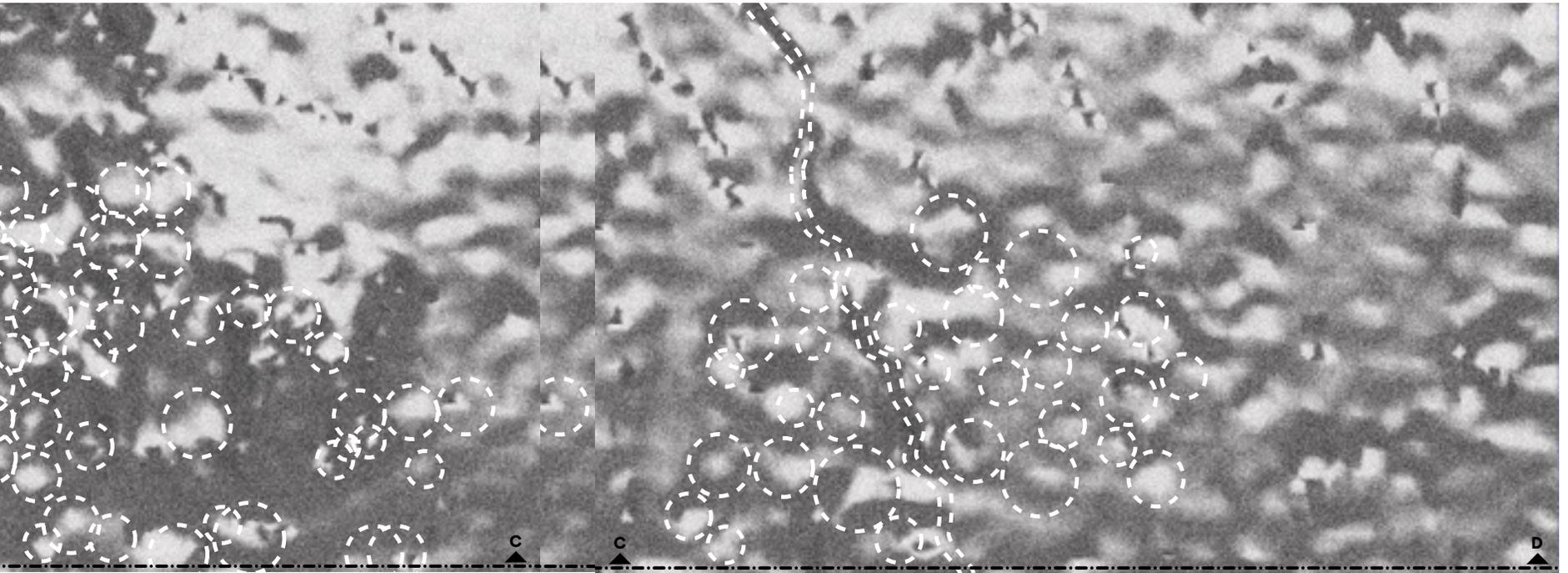


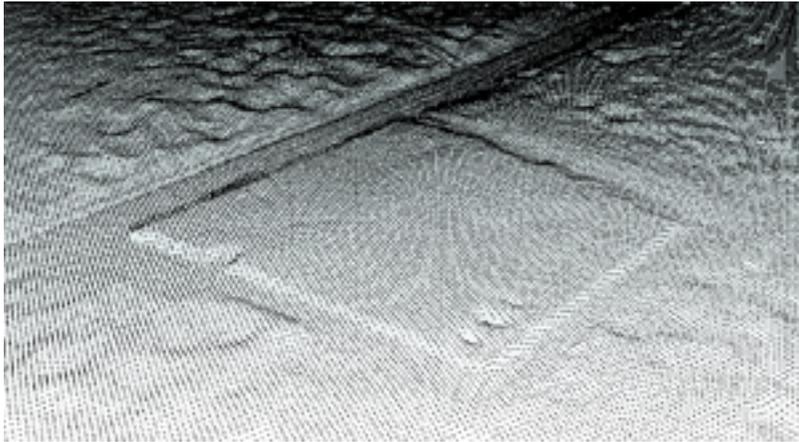
Once ponds are created the structure can be moved to another site leaving behind habitats for frogs, newts and other amphibians





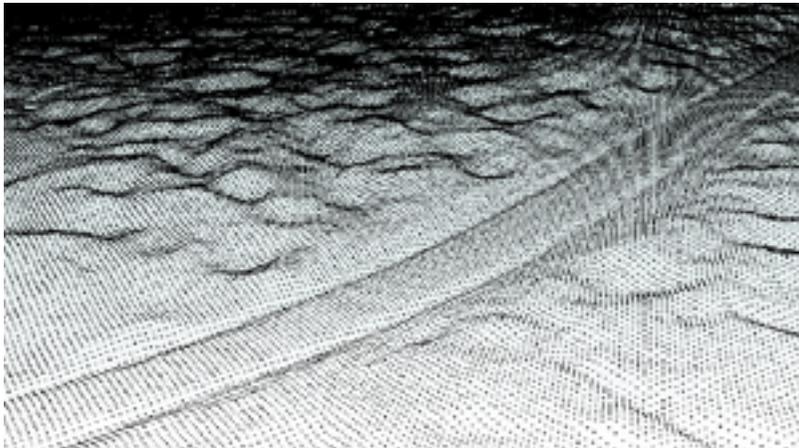
Investigative
Method:
Sectioning
through the
destroyed village
Louvemont
from LIDAR Data
received by the
ONF



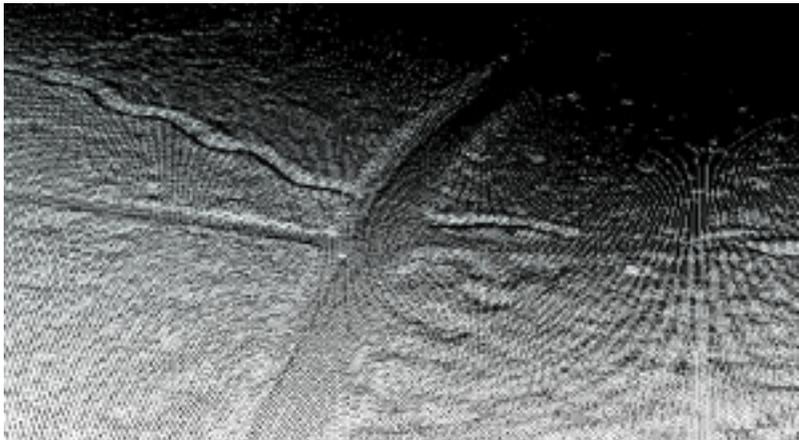
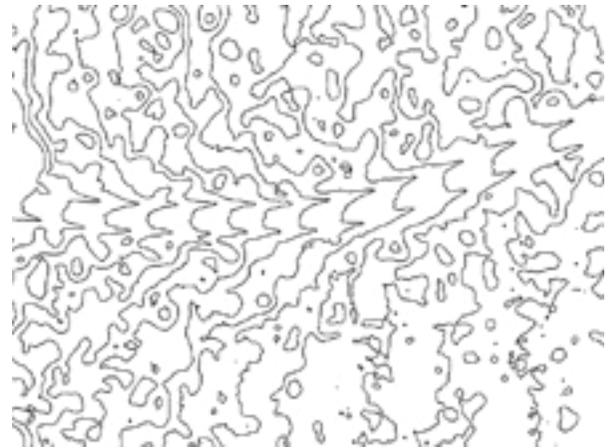


READING
TRACES OF
DISTURBANCE

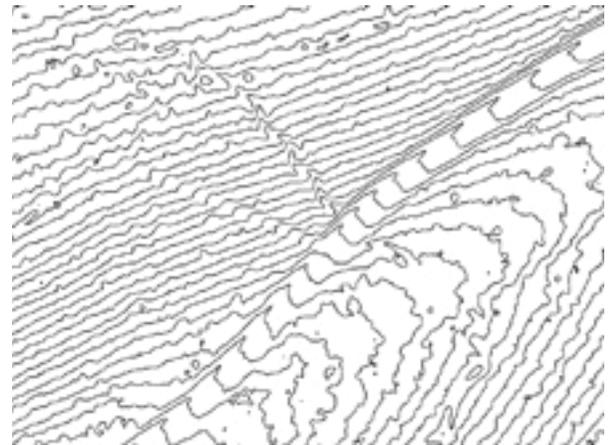
Imprint of a
leveled memorial
site on the point
cloud of the lidar
scan

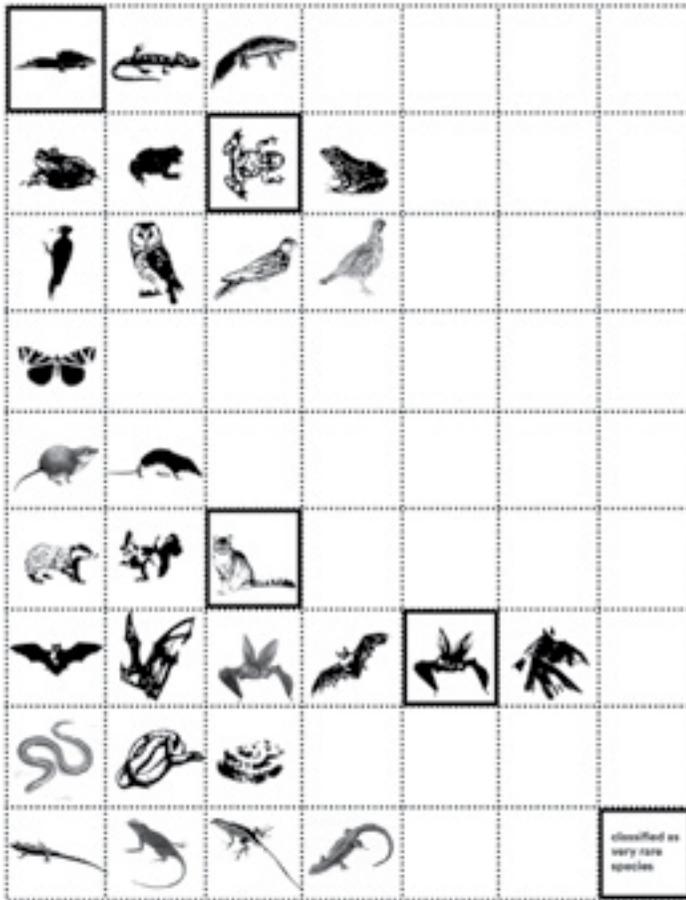


Street going
through the
landscape of war
conserved by
the forest which
is not captured
by the scanning
technique



Intersection of a
trench, a street,
and an access
road for forestry
purposes





Inventory of Fauna

[Natura 2000 listed species]

Total area: 12705 ha

+ Triturus cristatus	+ Great Crested Newt	+ Toads and Frogs	+ Toads and Frogs
+ Bombina variegata	+ Yellow-bellied Toad	+ Butterflies	+ Butterflies
+ Bufo bufo	+ Common Toad	+ Newts	+ Newts
+ Pelophylax lessonae	+ Pool Frog	+ Birds	+ Birds
+ Euplagia quadripunctaria	+ Jersey Tiger	+ Shrews	+ Shrews
+ Salamandra salamandra	+ Fire Salamander	+ Bats	+ Bats
+ Ichthyosaura alpestris	+ Alpine Newt		
+ Lissoisriton helveticus	+ Palmate Newt		
+ Lissoisriton vulgaris	+ Smooth Newt		
+ Angolius funereus	+ Tengmalm's Owl		
+ Caprimulgus europaeus Linnaeus	+ European Nighthawk		
+ Dryocopus martius	+ Black woodpecker		
+ Bonasa bonasia	+ Wood grouse		
+ Neomys fodiens	+ Eurasian Water Shrew		
+ Crocidura leucodon	+ Bicoloured Shrew		
+ Eptesicus serotinus	+ Serotine Bat		
+ Myotis mystacinus	+ Whiskered Bat		
+ Myotis brandtii	+ Brandt's Bat		
+ Myotis nattereri	+ Natterer's Bat		
+ Nyctalus leisleri	+ Lesser noctule		
+ Nyctalus noctula	+ Noctule Bat		
+ Pipistrellus pipistrellus	+ Common Pipistrelle		
+ Plecotus auritus	+ Brown Long-eared Bat		
+ Plecotus austriacus	+ Grey Long-eared Bat		
+ Rhinolophus hipposideros	+ Lesser Horseshoe Bat		
+ Rhinolophus ferrumequinum	+ Greater Horseshoe Bat		
+ Myotis emarginatus	+ Geoffroy's Bat		
+ Myotis bechsteinii	+ Bechstein's Bat		
+ Myotis myotis	+ Greater Mouse-eared Bat		
+ Myotis daubentonii	+ Daubenton's Bat		
+ Meles meles	+ Eurasian Badger	+ Mammals	+ Mammals
+ Sciurus vulgaris Linnaeus	+ Eurasian Red Squirrel	+ Lizards	+ Lizards
+ Felis silvestris	+ Wild cat	+ Snakes	+ Snakes
+ Lacerta agilis Linnaeus	+ Sand Lizard		
+ Zootoca vivipara	+ Viviparous Lizard		
+ Anguilla fragilis Linnaeus	+ Slow Worm		
+ Coronella austriaca austriaca	+ Smooth coronella		
+ Natrix helvetica	+ Grass Snake		

Inventory of Trees

[Most frequent species]

+ Pinus nigra	+ European black pine		
+ Picea	+ Spruce		
+ Fagus	+ Beech		
+ Betula	+ Birch		
+ Quercus	+ Oak		
+ Alnus glutinosa	+ European alder		
+ Fraxinus excelsior	+ Ash		

Inventory of Flora

[Natura 2000 listed species]

+ Aster amellus	+ European Michaelmas-daisy		
+ Dactylorhiza praetermissa	+ Southern Marsh-orchid		
+ Epipactis muelleri Godfrey	+ Mueller's Epipactis		
+ Linum catharticum	+ French Flax		
+ OphioGLOSSUM vulgatum	+ Adder's-tongue		

Inventory of Species present in the forest of Verdun:

Extract of an Inventory of Fauna, listed by the Natura 2000 programme¹¹

Inventory of Trees stated by the forest management ONF¹¹

Extract of an Inventory of flora by the Natura 2000 programme¹¹

5.2

UN GOALS



15.2

By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.5

Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

13.1

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

13.2

Integrate climate change measures into national policies, strategies and planning

13.3

Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction

^ Extracts from the targets

Goal 15 addresses the protection of threatened species and the protection of forests, which is fundamental in my programme.

Target 15.2 and 15.5 in particular, point out the urgency of protecting forests and natural habitats from degradation. However, I would argue that it is necessary, in times of ongoing land sealing, to include not only well established ecosystems into the protection programme, but also to restore exhausted areas, such as post mining areas and industrial wastelands. We need to provide all landscapes - irrespective of whether they are natural habitats or have been the object of human exploitation and destruction - with functioning soil, fundamental to all kinds of ecosystems on land.

My project aims to become an example of how we can deal with areas that have been suffering from extinction and pollution. The projects aims to be an example for how to approach areas that bear the potential for new life and the sensitization of those who inhabit or visit them.



With regards to **Goal 13: Climate Action**, I particularly want to stress **Targets 13.1 to 13.3**. In Verdun one can see how a functioning forest is able to deal with hazards like pollution. This capacity of the forest, could be a useful role model for other areas exhausted by human practices, such as agricultural areas, urban areas and mining areas. **Target 13.2:** With the collaboration of the French National Forestry Office ONF, I aim to pursue a discussion on a political level, regarding planning the development of this particular area.

In general, I want to address the impact that our built environment has on the climate. My programme reflects on this issue and aims to demonstrate the potential for a less harmful impact, using local and sustainable materials for the proposed architectural interventions, while fundamentally considering cohabitation and collaboration with other species.

5.3

CV

MA Architecture
 Royal Danish Academy of Fine Arts,
 School of Architecture (KADK),
 Copenhagen
 2018 - 2020

BA Architecture
 Technical University of Innsbruck,
 School of Architecture,
 Austria
 2013 - 2016

Internship
 Vermland
 Snedkeri & Tegnestue
 Copenhagen,
 2019

Internship
 Snøhetta Oslo,
 Architecture,
 Landscape Architecture
 Design and Interior
 Norway,
 2017-2018

part of.....

Exhibition
 snedkers efterårsudstilling
 Re-think, Re-use, Re-duce
 "Mycelium Table"
 Copenhagen
 2019



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5.4

NOTES

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- 3 C N Trueman 'The Battle Of Verdun' historylearningsite.co.uk. The History Learning Site, 17 Apr 2015. Accessed 06 Feb 2020
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