Gardening the Globe: Historicizing the Anthropocene through the production of socio-nature in Scandinavia, 1750-2020 (GARDENING)

1.1 State of the art, knowledge needs and project objectives

> We humans are not just influencing the present. For the first time in Earth's 4.5 billion year history, a single species is increasingly dictating its future. In the past, meteorites, super-volcanoes and the slow tectonic movement of continents radically altered the climate of Earth and life-forms that populated it. Now there is a new force of nature changing Earth: *Homo sapiens*, the so-called "wise" people. (Lewis and Maslin 2018, 3)

This quote from two leading Anthropocene scholars, the geographers Lewis and Maslin, is a typical way of describing how humankind has become a geological force in the Anthropocene. Human interaction with nature is viewed on a grand scale, spatially, temporally, and quantitatively. Human history is inscribed into a systemic, scientific frame that facilitates a specific historical narrative of 'us' – *Homo sapiens* – that is both progress-oriented and a history of decline, with the Anthropocene as the lamentable other side of the story (cf. Bonneuil & Fressoz 2017). Such a narrative has no room for describing agency, ideologies, politics, social structures, or cultural values. In other words, it has no room for specifically human experiences, nor for the perspective of the humanities. This has led scholars in the humanities to criticise the original Earth system notion of the Anthropocene for being colonialist and imperialist, and not necessarily useful for understanding the present deep and dramatic changes on the planet. A number of alternative concepts have been launched to incorporate social and historical aspects, such as the *Capitalocene*, *Growthocene* and *Econocene* (Malm & Hornborg 2014; Moore 2016, Chertkovskaya & Paulsson 2016; Norgaard 2013), and to incorporate more-than-human perspectives, such as the *Plantationocene* and the *Chthulucene* (Tsing 2015a; Haraway 2016). Similarly, a variety of definitions and delimitations of the Anthropocene concept have also been proposed, leading to the multiplicity of "Anthropocenes" at play in the humanities presently (Tsing et al. 2020; Horn & Bergthaller 2020; Fagan 2019). These concepts work productively from within the humanities and social sciences, by emphasizing the implications of historical and social processes. They emphasize how different aspects of Western modernity and the economic and technological development in the Western world have had global and planetary impacts. However, these terms do not necessarily correspond with the understanding of "the Anthropocene" in Earth system science, as an aggregated systemic concept, or with the understanding of the concept as a stratigraphic term. There is a gap between the notion of the Anthropocene in Earth system science and notions of nature-culture entanglements and more-than-human perspectives in the humanities. This is not just a matter of scaling, but an epistemological gap in ways of understanding agency, in the sense that the Earth system concept was never meant to capture historical, social, and economic processes as such. Consequently, the debate on the Anthropocene in the humanities is only remotely related to the debate within the geosciences.

Most environmental scholars would agree that a better understanding of the present complex planetary crisis requires interdisciplinary research across the divide between the humanities and the sciences. However, in order for the historical and cultural disciplines to make fundamental contributions to a common understanding of planetary macro-processes, it is necessary to bridge the aforementioned epistemological gap between Earth system science and the humanities. It is our contention that this requires a shared understanding of key concepts such as the Anthropocene. The Anthropocene will most likely be formally accepted as a chronostratigraphic unit in the near future (cf. Zalasiewicz et al. 2015), giving the concept a clearly defined starting point and a geographic reference point, and this cementation of the concept in the natural sciences will necessarily influence – and possibly narrow down – the various uses of "the Anthropocene" as a humanistic concept as well. There is therefore an urgent need for establishing a common conceptual ground for the humanities and natural sciences when it comes to issues related to the Anthropocene (cf. Ekström & Svensen 2014; Svensen et al. 2019). GARDENING acknowledges the uses of the term "Anthropocene" as an Earth system concept. Yet, the project also recognizes that transferred to the human sciences, the term often represents a de-historization of history. Therefore, rather than contributing to the production of new humanistic definitions of "the Anthropocene", the project sees a need for concepts and methods that mediate between historical studies and the natural sciences in other ways. Based on the team members' interdisciplinary and co-produced research on climate change and the Anthropocene (Kverndokk et al. 2021; Ekström & Bergwik forthcoming; Svensen et al. 2019; Ekström & Svensen 2014), GARDENING aims to develop new ways of scaling between the aggregated systemic level of the Anthropocene and the historical and societal level, and thus to develop a broader understanding of how certain practices and technologies have led to the Anthropocene, as well as how these practices and technologies are historically situated and involve certain ideologies, cultural imaginaries, considerations and ambiguities.

In order to do so, it is necessary to study historical actors and processes that have attempted to model, change, conquer and control nature in the name of progress, social control, economy and welfare. It is necessary to study processes that at the same time are intentional and non-intentional, that do not necessarily point towards a linear development. GARDENING aims to do this by exploring the historical processes that have led to the Anthropocene as an increasing intensification of attempts to conquer, control and utilize nature – the production of "socio-natures" (cf. Latour 1993). Such processes were heavily intensified from the mid-18th century. At the same time, the modern notion of the intrinsic value of nature emerged. Thus, the processes that utilized and controlled nature also involved a process of separating this "socio-nature" from "pure nature" – that is, nature that is uncontrollable or nature that is regarded as valuable and being the object of conservation (cf. Coates 1998; Marris 2011). GARDENING sets forth to study these processes through a number of historical, ethnographic and geological case studies on the production of socio-natures. Using the production of socio-natures as a methodological approach makes it possible to showcase such processes on a number of different scales, from single cases to the Anthropocene as a whole, and also to emphasize the similarity between the socio-natural practices that take part in efforts to remediate environmental problems and the practices that produced them in the first place – thereby underlining the paradox that fixing the Earth seems to demand even more management and control of nature. To study such complex historical processes will therefore give new insight into how the planetary state called the Anthropocene emerged, and at the same time open possibilities for imagining and planning for alternatives to the deterministic future embedded in the notion of the Anthropocene.

The case studies are located in Scandinavia, and focus on the tension between a highly-developed welfare system and the environmental consequences of the choices that are continually made to produce it. They will, however, also be related to planetary processes by an emphasis on interspatial links, paths and patches (cf. Tsing et al. 2019) that are present in each case, connecting the cases with related studies from other countries and regions (e.g. Tsing et al. 2020; Hecht 2018; Barak 2015). **The project has three main objectives:**

- Explore how notions and practices that divide "socio-natures" from "pure nature" have evolved historically in Scandinavia from the mid-18th century to the present.
- Explore how these practices are embedded in trans-local and trans-temporal networks of humans, non-humans, ecosystems, geology, technology and materialities.
- Develop methods for bridging the epistemological gap between qualitative, historical studies and Earth system science.

1.2 Research questions and hypotheses, theoretical approach, and methodology

Research questions: Humans have always attempted to conquer and control nature and have been transforming nature into economic resources. GARDENING is, however, based on the assumption that an increasing intensification of such processes is integrated in Western modernity. This includes the longer history of modern agriculture and industrialization and the shorter history of the emergence of the welfare state (cf. Hastrup & Lien 2020). This project will explore such processes in Scandinavian history. Although the Scandinavian countries are small, they have played an active role in international environmental politics for many decades. Sweden initiated and hosted the United Nations Conference on the Human Environment (the Stockholm conference) in 1972, which led to the establishment of UNEP, while Norway established the world's first Ministry of Environmental Protection that same year. At the same time, all the Scandinavian countries are technologically advanced and have highly-developed welfare systems, and these systems are connected with high per-capita carbon footprints, based on high demands for energy and high levels of consumption. In addition, Norway is also a large oil and gas provider. There is therefore an inbuilt tension in the Scandinavian notion of environmental responsibility. While technological development and welfare systems make up the foundation of the countries' active roles in international environmental policymaking, the same structures govern their contributions to global environmental problems through emissions, pollution, and species extinction. This tension between the production of environmental problems and the development of welfare embedded in Scandinavian history and politics makes the Scandinavian countries a good case for grasping the ambiguities between ecological trouble and economic success.

Some of the most important ways in which nature has been changed into resources have been through the relocation, removal, and eradication of species, and through the production of new landscapes. **GARDENING therefore asks:**

1. How have the processes of moving and relocating animals, plants and minerals been part of the production of different socio-natures in the Scandinavian countries? (WP 2)

2. How are socio-natures produced through practices of removal or eradication of species? (WP 3)
3. How have different kinds of landscapes and landforms been produced in modern Scandinavian history? And how do such practises relate to long-term geological processes and timescales? (WP 4)

Theoretical approach: GARDENING will use theories on modernity to find ways to approach the emergence of the Anthropocene from a historical point of view. The concept of "the Anthropocene" is tightly connected to Western modernity in two ways. First, the contemporary planetary crisis summed up by the term is to a large extent a consequence of the economic and technological processes of Western modernity. Second, the concept itself is typically modern, reflecting a Janus-faced modernity at once describing historical progress and environmental decline. Thus, from a historical and social scientific point of view, the study of the emergence of the Anthropocene is intrinsically a study of modernity and late modernity.

The key concept of the project will be *socio-natural gardening* understood as a continual process. The use of the gardening metaphor is not primarily inspired by garden and landscape studies (cf. Diogo et al. 2019), but leans instead on Bauman's thesis on modernity as intensified and institutionalized gardening of society. As a sociological concept, "modernity" is also a macro-concept used to characterize a type of society rather than a device for analyzing the complexity of historical processes. Yet, Bauman's notion of modernity and his gardening model does not only pay attention to sociocultural structures, it also emphasizes the importance of understanding historical processes, actors and practices. Bauman understands modernity as a process of transforming what he has termed "wild culture" into "gardening culture" (1987:51). In the essay "Gamekeepers turned gardeners" he writes:

> There is a sense of precarious artificiality in every garden; it needs the constant attention of the gardener, as a moment of neglect or mere absent-mindedness would return it to the state from which it has emerged (and which it had to destroy, evict or put under control to emerge) (Bauman 1987:51).

The gardening metaphor is here used as an ideal-typical model for how social institutions are continuously cultivating unruly social life. Bauman uses this model as the theoretical foundation in the seminal book *Modernity and the Holocaust* (1989). In this study, he relates the notion of the gardener to Elias' concept of the civilizing process (Elias 2000). He further emphasizes the emergence of a modern, specialized bureaucracy as an instance of social gardening that keeps the potentially unruly society under control, and which improves and constantly reconfigures it (Bauman 1997:52). This modern bureaucratic society was a necessary premise for the Holocaust, he argues. His model of the civilizing process as social gardening has an analytical potential beyond how the modern bureaucracy, in its most perverted forms, might facilitate genocide. The model is meant to be an analytical model for understanding the intensification of social control and purification processes as an integrated part of modernity. Thus, it may also be used for gaining an insight into such processes of control and purification in a culture-nature interface, such as the eradication of species and organisms, and other technologies for controlling a nature that does not comply with human demands. GARDENING will use Bauman's model to describe and analyze a history of the production of socio-nature, and how modern expertise, bureaucracy, regulations and standardizations work as technologies for the social gardening and cultivation of nature.

GARDENING combines Bauman's model with another well-recognized understanding of modernity that deals with the relationship between nature and culture. Latour claims that what he metaphorically terms the modern Constitution – the idea of modernity – is founded on a distinction between these ontological zones. However, we continually produce hybrids of nature and culture, and we continually strive to eliminate these hybrids through practices and technologies for ontological purification (Latour 1993). Such processes of purification may also imply practices of separating two kinds of nature: 1) socio-nature, nature that is controlled, utilized and commodified for production and exploitation of resources; 2) natural nature or "pure nature", which both includes nature that is protected against exploitation and human interventions, and nature that is uncontrollable, not utilizable and is threatening to reconquer socio-nature. GARDENING investigates the production of socio-nature and the process of separating "socio-nature" from "pure nature", as constant processes of social gardening in Bauman's sense and as purification processes in Latour's sense.

The case studies in GARDENING cover a range of nature-culture entanglements and technologies for ontological purification between nature and culture; between socially preferred nature and nature conceived as threatening and uncontrollable, between nature conceived as economic resources and nature defined as "wild". The project covers the period between the mid-18th century and early 21st century. The case studies examine production of socio-nature and practices controlling nature that are typically embedded in modernity, involving regimes of expertise (Bauman 2000; cf. Warde et al. 2018), a separation of nature from knowledge of nature

(Latour 1993; Daston 2019) and notions of social progress. Through these case studies, GARDENING will study the stewardship of the Earth and human influence on the Earth system as an incorporated part of the civilizing process.

The case studies are designed to cover the production of several kinds of socio-nature. They are designed for seeing beyond particularity in every case, and map historical patterns across the specific cases. The case studies cover topics such as breeding programs in agriculture (Hastrup), aquaculture and invasive species (Bjærke), wild fauna management, including studies of measurements and programs concerning invasive species (Bjærke and Ekström), exploitation of natural resources (Eriksen, Kaijser and Nilsen) and landscaping (Eriksen, Kverndokk and Svensen). They are thematically organized as three WPs: **1) Moving nature** (WP 2) explores how practices of moving and relocating animals, plants and minerals have contributed to the construction of different socio-natures and have been incorporated in the civilizing process. **2) Cultivating eradication** (WP 3) explores how different understandings of nature produce – and are produced through – different socio-natural practices of removal or eradication, and how some species are managed and eradicated to enhance the cultivation and growth of others. **3) Making landscapes** (WP 4) explores modern Scandinavian history of human production of landscapes and landforms related to the exploitation of natural resources, agriculture, and even leisure. In addition, the project will have one administrative WP (WP1) and one WP for public outreach (WP5). Each case study will be involved in at least two of the thematic WPs. The research team represents disciplines such as cultural history, cultural studies, ethnology, anthropology, history of ideas, marine biology, and geoscience. Yet, by using a shared theoretical framework and by co-writing articles, the project is designed for genuine co-production of interdisciplinary research results.

Methodological approach: A main concern of the project is the problem of scaling between the micro-level of the case studies and the aggregated systemic level of the Anthropocene without losing track of the practices, ideologies, imaginaries and ambiguities examined through the case studies. The Scandinavian cases are therefore not studied in isolation. As the Anthropocene can be regarded both as a planetary state and as a global history of how Western industrialization, capitalism and imperialism have transformed the socio-natural world, the case studies are rather considered as focal points of global concerns. This approach makes it possible to incorporate colonial and post-colonial aspects of the global distribution of plants, animals, and geological masses (Tsing et al. 2020; Diogo et al 2019; Hecht 2018; Barak 2015; Tsing 2015b; Adams & Mulligan 2003).

The project will emphasize the qualitative aspects of scaling from the local cases to the global and Earth system level. That said, the cases are also selected because they represent phenomena that, on a quantitative, aggregated level, are of crucial importance for the emergence of the Anthropocene. Thus, this project aims to highlight how spatial scales (from local to global), temporal scales (from the present to geological time), and numerical scales are of qualitative as well as quantitative significance (cf. Svensen et al. 2019). Rather than being presented as either local or global, either short term or long term, or either qualitative or quantitative, GARDENING emphasizes the importance of the continuous oscillation between the global and the local, between long and short timescales, and between decisions that are based on numbers and those that are based on value judgements. To scale qualitatively between particular cases and systemic concepts therefore includes doing case studies that highlight how quantitative and qualitative aspects intertwine.

According to this approach, scaling will not be regarded as a way of simply generalizing the single cases. Instead, the project will methodologically explore different practices and technologies of scaling in the particular cases. Following Richardson and Weszkalnys, GARDENING regards the production of socio-nature as "practices of abstraction, homogenisation and standardisation" (Richardson & Weszkalnys 2014:22). The project regards the modern history of the production of socio-nature to be tightly connected to standardization and governmental regulations. Such standardization and abstractions through regulations are devices for scaling between the single case and larger issues. The history of the Scandinavian countries is particularly suitable for exploring such practices and potential for scaling, as it is characterized by comprehensive nature acts and nature regulations, and a relatively high degree of exploitation of natural resources (cf. Hastrup & Lien 2020). These regulations articulate the inbuilt ambiguity between preserving and exporting nature through separating "socio-nature" from "pure nature". Identifying and following such regulations and standardization, the analysis of the single cases will give significant insight into entanglements of nature and culture on a wider scale. The analysis of regulations and standardizations will also include the interplay between actors and semiotics; between actants and textual technologies from popular media to governmental reports (Asdal 2011; Callon 1989). It will also involve analysis of environmental technologies of shaping and sensing nature (Sörlin & Wormbs 2018). The case studies analyze how specific phenomena and practices are entwined in trans-local and trans-temporal networks. This methodology draws on ANT, by tracking networks and relations between humans,

non-humans, ecosystems, geology, technology and materialities (Law 1992:384). In order to develop methodology in the continuation of such approaches, the project will organize methodological workshops in relation to each of the thematic WPs. Co-production of publications will also be an important tool for getting the historical and ethnographic perspectives in dialogue with perspectives from Earth system science. As an earth system scientist, Svensen will play an important role in this process, both as a discussant and as a co-writer.

Empirical material: The project will use written sources such as policy documents, management reports, official guidelines and regulations, scientific journals, and popular magazines. As the project focuses on practices, including contemporary ones, four of the case studies will combine the historical sources with geological and ethnographic fieldwork, including participatory observations and qualitative interviews.

Ethics and risks*:* The main risks are related to the fieldwork. There is always a risk that a critical ethnographic study will negatively affect informants by exposing their private or personal lives. There is also a risk that some of them will withdraw from an ethnographic project because they feel negatively affected or alienated by the academic approach to their everyday life. Such risks will be minimized by being handled by experienced fieldworkers that have dealt with such challenges several times. The scholars that will conduct ethnographic fieldwork have experience from challenging ethnography, such as fieldwork at the Auschwitz-Birkenau memorial site and in a south Indian costal village in the aftermath of the 2004 tsunami (Kverndokk 2007; Hastrup 2011). They also have experience from ethnographic work similar to this project, such as fieldwork among small-scale apple farmers in Norway (Hastrup 2018). Svensen will conduct geological analyses and fieldwork. He is a trained geologist with 25 years of experience of fieldwork from South Africa, Russia, Argentina and Norway. Thus, the members of the research team are trained in dealing with ethical issues relating to fieldwork. The fieldwork and the handling of other research material will follow the Norwegian *Guidelines for Research Ethics in the Social Sciences, Humanities, Law and Theology*. The research conducted in Denmark and Sweden will follow the national guidelines for research ethics in these countries as well.

The risk that the consortium will not be able to co-operate and work efficiently as a group is small. The team members have successfully worked together on books and research projects for a number of years, including the two RNC projects lead by Kverndokk; "The Future is Now: Exemplarity and Temporality in Climate Change Discourse" (2017-2021) and "Cultures of Disasters" (2012-2013).

2. Impact

2.1 Potential for academic impact of the research project

Although much has been written on the entanglement of nature and culture in modernity, few studies combine historical approaches to socio-natures with both theories of modernity and Earth system science. As stated in section 1.1, there is a need for establishing a common conceptual ground for the humanities and natural sciences when it comes to issues related to the Anthropocene, and further to bridge the epistemological gap between Earth system science and the humanities. Through its theoretical approach and interdisciplinarity, GARDENING has the potential to find new ways around this gap and develop concepts and methods that have the potential to affect how humanists approach the nature-culture divide. GARDENING will develop methods and concepts for scaling between societal and historical micro-levels and the systemic level of the Anthropocene. It is our contention that such scaling is crucial for understanding the close and complex relationship between economic welfare and ecological problems, optimized production and overproduction and valuation and exploitation of nature. By giving new historical insight into ideologies, imaginaries and ambiguities embedded in socio-natural practices in Scandinavia, and to how these practices have contributed to the production of the Anthropocene, GARDENING also brings the historical connections between nature and welfare state into focus in a new way. In this way, GARDENING will contribute to the theoretical and methodological development in the field of Environmental humanities, as well as the disciplines involved.

2.2 Potential for societal impact of the research project

Although large systemic concepts such as the Anthropocene have an important rhetorical function in showing the vast size of environmental problems, such concepts also have a way of turning complex environmental problems into single, global events, far removed from the spatial and temporal scales of political solutions (Bjærke forthcoming). The way GARDENING instead highlights the negotiations, ambivalences, and actions that have led to the Anthropocene is therefore an important contribution to understanding and challenging the socio-natural practices imbued in present and future environmental problems. More concretely, our ambition is that the output of WP 2 and 3 will inform ongoing discussions on how to manage so-called invasive species and other species that are considered pests. The project will attain this partly through planned outputs such as

the popular science book (see 2.3), but also by initiating regular dialogue meetings where we invite representatives from the Ministry of Climate and Environment's Knowledge and Global Unit, as well as other central policymakers and NGOs. This will enable us to discuss preliminary findings and to ensure that our planned outputs are relevant to these stakeholders. Bringing both more-than-humans and historical connections between nature and the welfare state into focus, the project has the potential to add new perspectives to policy and management discussions both within the Norwegian Environment Agency and the Ministry of Climate and Environment, and between these and sector-oriented ministries such as the Ministry of Trade, Industry and Fisheries and the Ministry of Agriculture and Food. Results from WP 4 will inform current public debates on land use in the Scandinavian countries, especially in connection with area-intensive climate measures. By increasing the general knowledge of the transformation of natural landscapes during the last centuries, as well as the historical processes and reasoning behind the changes, the project aims to widen the scope of ongoing environmental discussions of themes such as land-based wind power, forest planting and forest fertilization. The main measure for informing a larger audience will be a documentary on domestic gardening and landscaping, in addition to the popular science book and opinion pieces (see 2.3). As changes in land use are considered by IBPES to be the primary driver of biodiversity loss on land, while harvesting and invasive species are two of the most important drivers in marine environments (Diás et al. 2019), the results from the project are directly relevant for discussions on how to achieve UN Sustainable Development Goals 15 (Life on Land) and 14 (Life Below Water). In addition, the understanding of climate measures as a kind of socio-natural gardening provides perspectives relevant for SDG 13 (Climate Action), especially related to different types of climate measures and the land use connected with them. For our findings to influence these debates, we plan to address relevant SDGs both in our dialogue with policymakers and NGOs, in our planned popular science book, and in essays and opinion pieces.

2.3 Measures for communication and exploitation

The target audience is primarily academic, including scholars and students within the fields of cultural history, anthropology, ethnology, environmental humanities and Earth system science. The research results will also have high relevance for a larger audience, including public administration, policymakers, and NGOs. The project will have a WordPress-based webpage presenting project activities and findings for a popular audience, combined with a social media presence. The webpage will work as a site for public documentation of project activities and will be used actively by team members when presenting the research results to scholars, public administration, and popular media.

Academic communication: WP2 will result in an edited volume, for example in the series Routledge Explorations in Environmental Studies, in which Kverndokk, Bjærke and Eriksen have recently published an edited volume (Kverndokk et al. 2021). Two special editions of international journals will be disseminating the results of WP 3 and 4. Possible journals will be *Environmental Humanities*, *Environmental History*, *Ethnologia Europaea* or *Culture Analysis*. A theoretical article on gardening and scaling will be written by Bjærke and Kverndokk and be published in a similar journal. Kverndokk, Bjærke and Ekström will also publish monographs. The PhD candidate's main contribution will be a dissertation. The participating scholars have a high publishing rate, and the project will result in at least 4–5 additional peer reviewed articles in international top-rated journals. The project will write a cross-disciplinary textbook aimed at MA-students on methods across the nature–culture divide. It will be based on the outcome of the methodological workshops and edited by Ødemark and Kverndokk. Additionally, a methodological course for PhD-candidates will be organized in co-operation with the Norwegian Research School in Environmental Humanities, 2019–2025 (RNC no. 299199). The research results will also be incorporated in teaching at all levels at the partner institutions. Two international conferences will be organised: an opening conference where the advisory board and the WP-leaders will be presenting, and a final conference at the end of the project period, designed as a CfP-conference. It will be modelled after the RCN-SAMKUL funded conference "Cultures of Disaster" (2013) organized by Kverndokk and Ekström. The final conference will work as both an arena for networking and a way of disseminating the research results for scholars and promoting the project internationally.

Public outreach: A 45-minute documentary will be produced. The film will focus on domestic gardening as a kind of landscaping embedded in complex global socio-natural networks. The documentary will knit together the project's focus on the moving of nature (WP 2) with landscaping (WP 4). It will primarily be based on the case study conducted by Kverndokk, but will also be informed by the other case studies. The documentary will be an important part of the public outreach strategy and will be produced for a Scandinavian audience and the Scandinavian public service TV-channels. The production team for the documentary will be selected

according to Norwegian procurement legislation. The project will also publish a popular book in Norwegian, similar to the critically acclaimed book *Kollaps* (Bjerregard & Kverndokk 2018). Based on experience from former research projects, we believe this to be a good strategy for disseminating research results to a broader audience and public sectors. The book will be promoted through essays and opinion pieces in relevant newspapers, magazines and websites, such as *Bergens Tidende*, *Klassekampen*, *Morgenbladet* and *Forskning.no*.

3. Implementation

3.1 Project manager and project group

The project management and main research group is located at the Department of Archaeology, History, Cultural Studies and Religion, University of Bergen (AHCR, UiB). The consortium will also include researchers from the Department of Cultural Studies and Oriental Languages, University of Oslo (ICOS, UiO), Centre for Earth Evolution and Dynamics, UiO (CEED, UiO), the Department of Social Science, Western Norway University of Applied Sciences (DSS, HVL), Department of Ethnology, History of Religions and Gender studies, Stockholm University (ERG, SU), Department of History of Science and Ideas, Uppsala University (HSI, UU) and Saxo Institute, University of Copenhagen (SAXO, UCPH).

The project leader, **Kyrre Kverndokk,** is Professor of Cultural Studies (AHCR) and a specialist in climate change temporalities and the cultural history of natural disasters. He is experienced in project management and is currently leading the RCN project "The Future is Now: Exemplarity and Temporality Climate Change Discourses" (2017–2021), which is a consortium including seven researchers from AHCR, ICOS and CEED (RCN no. 268094). He has been leading the RCN-funded Scandinavian network project "Cultures of Disasters" (2012–2013, RCN no. 218483). From 2021–2024 he will also be part of the leadership group of the large-scale RCN infrastructure project "SAMLA: National Infrastructure for Cultural History and Tradition Archives" (RCN no. 295964). **Marit Ruge Bjærke** holds a PhD in Marine Biology and a MA in History of Ideas. She is currently a Postdoctoral Research Fellow (2017–2021) at "The Future is Now". She is an expert on marine Invasive Alien Species (IAS) and biodiversity loss, both from a biological and a humanistic point of view. She has several years of experience as head of section in the Norwegian Environment Agency and thereby has a special competence in the dissemination of research for government administration. She will be hired as a researcher, and she will, together with Kverndokk, form the leadership group of the project.

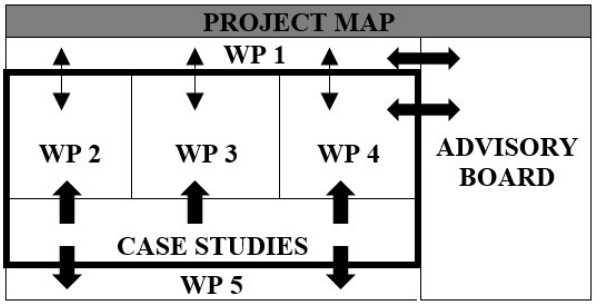
The consortium includes in total eight named scholars and a hired PhD. In addition to Kverndokk and Bjærke, it consists of experienced senior scholars. **Anders Ekström** is Professor of History of Science and Ideas, UU, and Professor II in Cultural History, UiO. He has published widely on disaster history, media history, and cultural theory. He has a special interest in integrative humanities and the interface between the humanities and the natural sciences. He will be hired as Professor II at AHCR. **Lars Kaijser** is Professor of Ethnology, SU, and an expert on how habitats and natural environments are displayed. He has published extensively on aquariums and the experience industry. He will be visiting AHCR three times as a guest researcher.

Participants located at the partner institutions will be: **Frida Hastrup,** who holds a PhD in Anthropology and is Associate Professor of Ethnology and director of Centre for Sustainable Futures at UCPH. She has a special expertise in environmental anthropology and has published widely on agriculture and utilization of natural resources. As director of Centre for Sustainable Futures at UCPH she will host one of the project workshops. **Anne Eriksen** is Professor of Cultural History, UiO and Professor II of Cultural Studies, UiB. She is a leading expert in history of knowledge and has published extensively on early modern history and science. **Henrik H. Svensen** is Research Professor in Geology, UiO, and an expert on paleoclimate and rapid environmental changes. He has also published on the cultural history of both natural disasters and mountains. **John Ødemark** is Professor of Cultural History at UiO. He has a special competence in the long history of cultural theory and the knowledge history of the human sciences. He has published extensively on early modern cultural translation, and the intersections between eco-politics, popular culture and cultural theory. **Yngve Nilsen** is Professor of History at HVL, and an expert in the history of sciences. He has published several books on topics such as Norwegian climate politics, meteorology, and energy production.

Advisory board: The project further includes an international advisory board of 5 scholars. These are: **Heather Swanson,** Associate Professor in Anthropology at Aarhus University and an expert in environmental anthropology. She has a special competence in human-nonhuman globalizations, with a special interest in trans-disciplinary methodologies. **Karen Rader**, Professor of History at Virginia Commonwealth University. She is trained in biology and STS and a specialist of human-animal history, such as the usage of genetically

standardized mice in science. **Nina Cyrén Wormbs**, Professor of History of Technology at KTH Royal Institute of Technology. She is an engineer by training and has been working on climate change in the Arctic at the interface between natural sciences and politics for several years. **Gunhild Setten**, Professor of Geography at the Norwegian University of Science and Technology, who is an expert in landscapes and moral geographies and on the connection between IAS and landscape practices. **Frode Iversen,** Professor of Archaeology, at the Museum of Cultural History, UiO, is an expert in Iron Age Scandinavian landscapes and works at the intersection between archeology, geology, and climatology. He will especially be important as a discussant for WP 4. The advisory board will be invited to hold talks at the opening conference and will also be consulted for advice during the project period, through participating in workshops and being used as readers of drafts of project publications.

3.2 Project organisation and management



GARDENING is designed as **five WPs**, three of them thematic and two administrative. The thematic WPs (WPs 2–4) are based on the three research questions, each with a separate main output (see section 2.3). Each of the scholars is responsible for conducting one case study, and each case study will be included in a minimum of two of the three thematic WPs, while the WP-leaders will be responsible for synthesizing the results from their WP in the introductions to the outputs. This design enables the scholars to co-produce publications, exchanging ideas both across and within WPs, while at the same time it links each WP directly to a specific output. **Case studies:** As stated in section 1.2 (Methodological approach) the cases are selected to inform the research questions directly, but also because they represent phenomena that, on an aggregated level, are of crucial importance for the emergence of the Anthropocene, and as such highlight how spatial, temporal and numerical scales are of qualitative as well as quantitative significance. The cases cover a range of professional and vernacular socio-natural practices that can throw light on how such practices in Scandinavia are embedded in trans-local and global more-than-human networks in a historical perspective.

Bjærke will use the management and movement of marine Invasive Alien Species (IAS) such as pacific oyster and red king crab to investigate the tension between ideas of nature protection, invasiveness, and resource utilization. To be an IAS is not a property of the species itself, but of its relation to humans (cf. Frawley & McCalman 2014), and many IAS are economically important and ecologically problematic at the same time, their status today resulting from a range of both intentional and unintentional human actions. Through close-readings of documents from different levels of management and policymaking, the case of the marine IAS will be used for studying practices and discussions connected with the removal of invasive species, and for following the complex global transportation networks that such species are part of. (Included in WP 2 and 3)

Ekström will be examining the political-natural history of the botanical piscicide rotenone in the context of modern fish conservation and local practices of underwater gardening. Starting with the journey of plant knowledge in colonial botany in the 1890s, he will trace the use and impact of rotenone in the lives of fish and humans in Scandinavia. He will follow the uses of rotenone from the formation of Swedish fish conservation and fishing management in the late 19th century, through its relation to the recreational exploitation of freshwater lakes and rivers in Sweden and Norway to the controversies surrounding the role of rotenone in the management of Norwegian rivers in the 21st century, and especially the ongoing efforts to reintroduce Atlantic salmon in rivers infected by the parasite *Gyrodactylus salaris*. (Included in WP 2 and 3)

Eriksen will investigate *the economy of nature*, as the term was used in 18th century Denmark–Norway. Comparing the interconnectedness found in nature to the management of resources in a household, the term also reflected critically on the consequences of human intervention in these systems. Through a *politics of nature*, governmental initiatives for agricultural development and other "improvements" were put forward. Investigating texts discussing such initiatives in 18th century Denmark-Norway, she will explore how this phrase reflected understandings that sprang from the actual work of gathering and processing knowledge as well as from practical experience with the suggested improvements. (Included in WP 2 and 4)

Hastrup explores the recent cultural history of Danish pig production with a focus on dilemmas entailed in the dual efforts of protecting the national production and up-scaling it for export and income. Analytically, this implies a view to practices of 'fencing in' and 'opening up'. Danish agriculture is among the world's most

efficient, contributing vitally to state finances, but scaling up also requires micro-management. Infectious diseases spread easily in large, homogenous populations and antibiotics have been central to herd health management, but this has led to the appearance of multi-resistant bacteria, ultimately also affecting human health. Other contaminants, too, are closing in on Danish borders, resulting for example in the recent construction of a fence along the German-Danish border to keep wild boars out, as they may carry African swine fever. By collaborating with applied veterinary and animal science, Hastrup explores how, by intention or accident, pig pens in Denmark are fenced, permeated, and structured, as goods, microbes, knowledge, regulations, and production animals travel in and out. (Included in WP 2 and 3)

Kaijser explores the heritagization and preservation of landscape through Scandinavian mining history as presented at Falun Mine Museum in Sweden. Considered one of the most important producers of copper during the 17th and 18th centuries, the mine allegedly produced two thirds of the European supply. It closed in 1992 and was listed as a UNESCO *World Heritage Site* in 2001. Thus, it was ascribed "outstanding universal value" and considered as "so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity." Kaijser examines how technological development, a changed natural and cultural landscape, and environmental problems interact in the curated story of mining. How is the balance between exploitation and nature protection characterized? (Included in WP 2 and 4)

Kverndokk will study the cultural history of suburban domestic gardens. The numbers of such gardens have increased enormously in the Western world over the last 150 years. This increase is firmly related to urbanization and suburbanization, and is enabled by modern infrastructure, social politics and economic growth. Vernacular gardening brings together species and geo-masses from around the world, and gardens are arenas for aesthetic modeling of landscapes and micro-ecosystems by separating cultivated nature from uncontrollable nature. Kverndokk will study vernacular gardening in Norway through the 20th and early 21st century as a lens for understanding cultural notions of landscaping and cultivation of nature. (Included in WP 2 and 4)

Nilsen will study the ongoing "Green shift", with the contemporary history of the Norwegian regional power company BKK as a point of departure. During its 100 years of history, the company has been an important developer of hydropower in western Norway. The impacts from hydropower on biodiversity and landscapes are considerable, but it is a renewable source of energy. In the 21st century, BKK experiences a new wave of expansion through its efforts to replace fossil energy with "green" electricity in the communications sector. In this process, not only has the company's heritage and its traditional activities been important, but also market liberalization, the company's strengthened consumer focus and its growing interest in wind power. (Included in WP 2 and 4)

Svensen will study the human production of landscapes and landforms from a geoscience point of view. Though often neglected in the geosciences, humans have been producing new landforms and landscapes through their entire history. This production has been intensified after the industrial revolution and especially during the 20th century. Still, there is limited information about how, when and why the Holocene landscape has been anthropogenically changed. In co-operation with MA-students in geoscience, Svensen will explore *how* landscapes have been created by focusing on case areas in Eastern Norway and Central Sweden. There is an urgent need to make landscape classifications and understand how large a portion of the Scandinavian landscape is changed. Available LIDAR data and GIS will be used in key areas to interpret the current status, and to track changes back in time using aerial photos, historical and archeological data. The model results will be verified by fieldwork. (Included in WP 2 and 4)

Ødemark will be responsible for developing new methodologies across the WPs. He will co-ordinate the discussions on how qualitative understandings of the production of socio-natures might be relevant for the aggregated systemic level of the Anthropocene: in other words, between the humanities and geoscience. He will be co-operating closely with Kverndokk, Svensen, and Bjærke. (Included in WP 1)

A **three-year PhD position** on national parks or other protected areas will be announced. National parks are especially suited as a case for historicizing the shifting notions of wilderness and pristine nature, and the candidate will be expected to examine how ideas about environmental protection also relate to how unprotected nature is understood. The study will work as a case study of purification techniques for dividing between socio-natures and "pure nature". The PhD will be located at AHCR, UiB. (Included in WP 3 and 4)

Work package 1: Project organization: WP leader: Kyrre Kverndokk

This WP is responsible for the overall organization and will administer the other WPs. The leadership group

Gantt chart, GARDENING. Milestones/deliverables are numbered in accordance with the progress plan in the application.

Work Packages	2021		2022				2023				2024				2025			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
WP 1: Administration			1.1	1.2	1.3								1.4				1.5	
WP 2: Moving Nature					2.1				2.2		2.3							
WP 3: Cultivating Eradication							3.1			3.2		3.3						
WP 4: Making Landscapes										4.1			4.2		4.3			
WP 5: Dissemination			5.1			5.2						5.3			5.4			

will also include Bjærke. In addition to the economic and administrative responsibility, WP 1 will be responsible for communication with the advisory board and for monthly online meetings with the WP leaders. The opening conference and final conference will be organized by WP1. WP1 will organize video-linked reading groups for the participants every second months, discussing theoretical and methodological literature, especially theories of modernity and the Anthropocene. This WP will also be responsible for the textbook and the theoretical article on the concept *gardening* and the problem of scaling. Participants: Bjærke, Kverndokk, Ødemark.

Work package 2: Moving nature: WP leader: Marit Ruge Bjærke

This WP investigates research question 1: How have the processes of moving and relocating animals, plants and minerals been part of the production of socio-natures in the Scandinavian countries? To answer this question, the WP will focus on how national and local practices of moving nature have been entwined in networks of trans-local and global significance and on how notions and practices of the economy of nature have evolved in Scandinavia from the mid-18th century to the present. This WP will use the "small stories" of the case studies to approach the Anthropocene as the result of an accumulated set of transportation processes. As species, individuals or masses are moved from place to place, the understanding of them and of their ascribed value undergoes changes. In addition to producing historical knowledge through the included case studies, this WP will contribute to the project by giving a historical overview of notions of nature and the production of resources from a Scandinavian point of view. As such, it will inform the thematically and historically more focused WPs 3 and 4. Participants: Bjærke, Ekström, Eriksen, Hastrup, Kaijser, Kverndokk, Nilsen, Svensen.

Work package 3: Cultivating eradication: WP leader: Anders Ekström

This WP investigates research question 2: How are socio-natures produced through practices of removal or eradication of species? To answer this research question, the WP will empirically focus on attempts to control or combat IAS, crop weeds, garden weeds and animal diseases through herbicide, antibiotics and government regulations. It will also focus on how other species in the wrong place and in wrong numbers are managed and eradicated to enhance the cultivation and growth of other species. The WP will focus especially on how choices related to cultivation or eradication often result from negotiations between different actors, but also from different conceptions and valuations of nature. This WP will focus on the period from the late 19th century to present. Participants: Bjærke, Ekström, Hastrup, PhD candidate.

Work package 4: Making landscapes: WP leader: Anne Eriksen

This WP investigates research question 3: How have different kinds of landscapes and landforms been produced in modern Scandinavian history, and how do such practices relate to long-term geological processes and timescales? The WP studies the reshuffling of geological masses, including their weights and volumes, rhythms and durations, addressing the spatial and temporal scales of the socio-natural practices through which landscapes are produced. It will approach the formation of the Anthropocene not only through the reshuffling of bodies, plants, and animals, but also through the different scales and locations, weights and volumes, rhythms and durations that conjoin them. The WP will therefore include both studies on large-scale land forming, coupled to industrialization and energy needs, such as hydropower, and small-scale processes such as suburban gardening. The historical timeframe will extend from the late 19th century to the present, with an emphasis on contemporary ethnographic and geological fieldwork. Participants: Eriksen, Kaijser, Kverndokk, Nilsen, Svensen, PhD-candidate.

Work package 5: Dissemination: WP leader: Marit Ruge Bjærke

This WP will coordinate the dissemination of the project, with a focus on the non-academic output. The WP leader will be responsible for the webpage and will make sure that the participants deliver short updates of their work on a regular basis to be published on the page. This webpage will be used to present the project results for both academic, professional, and general audiences. The WP leader will be the contact node between the project and popular media in order to disseminate the project results through for instance opinion pieces.

The WP leader will also be the contact node between the project group and the director of the documentary. This WP will also be responsible for the popular science book.

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