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Beavers over Concrete. Creating space for non-human others on a Damaged Planet.

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Abstract English:

Beavers over concrete! The title of this thesis is also a rallying cry for conservation in the 21st Century. Mainstream conservation cannot create the necessary space for beavers at scale, as it lacks the financial and political muscle. Consequently, beaver-managers are largely confined to *firefighting*, trapping beavers and managers in an undesirable middle ground, rendering stakeholder perception of beavers precarious. Well funded and competent beaver management is essential on a short and mid-term basis. However, as conflicts with beavers for the most part emerge in damaged wetlands, a long-term solution to beaver conflicts is tied to central Europe's wetland crisis. My study of central Europe's landscape history reveals the *concrete riparian regime*, with *technocentrism* as its ideological corollary as a political and economic force in conflict with conservation and beavers. Through adopting the *castorian perspective* it becomes possible to view beavers as utopian *world-makers* whose projects significantly overlap with the designs for a *livable planet* of the *ecological class*. I argue that beavers, beaver managers and the environmental movement at large, in order to stem the rising tide of extinction, must form an alliance and supersede the *common sense* of *technocentrism*, in what Latour and Schultz have called the formation of the *ecological class* as a political subject. Based on expert interviews, participant observation, *new materialist* theory and the consultation of historical, anthropological and ecological literature; I offer a framework for conservation thought and action beyond Modernist Dualisms, opening conservation to the often-marginalized social sciences. In doing so, my research contributes to debates on the *Anthropocene*, rewilding practices, nature-based solutions, and transdisciplinary conservation and *New Materialism*.

Abstract German:

Lieber Biber als Beton! Der Titel dieser Masterarbeit ist ein Aufruf für den Naturschutz im 21. Jahrhundert. Traditionelle Formen des Naturschutzes können nicht ausreichend Platz für Biber schaffen, denn es fehlt an finanziellem und politischem Macht. Als Resultat sind Biber-Manager größtenteils auf die Rolle der Feuerwehr beschränkt. Biber und ihre Manager finden sich in einem undankbaren Zwischenfeld wieder was die ihre akzeptanz prekär macht. Kurz-, und mittelfristig ist ein gut finanziertes und kompetentes Bibermanagement essentiell. Da die meisten Konflikte mit Biber in beschädigten Feuchtgebieten entstehen, ist eine langfristige Lösung zu Biberkonflikte eng mit der europäischen Feuchtgebietskrise verbandelt. Meine Untersuchung zur Landschaftsgeschichte in Mitteleuropa hat gezeigt, dass das zementierte Flussregime als politisch-ökonomische Macht, mit dem Technozentrismus als ideologische Stütze, im Konflikt zum Naturschutz und Bibern steht. Durch die Annahme der Perspectiva Castoris wird es möglich Biber als utopische welt-schaffende zu beschreiben, deren Projekte sich signifikant mit den Plänen der ökologischen Klasse für einen bewohnbaren Planeten decken. Ich argumentiere, dass Biber, Biber-Manager und die Umweltbewegung als ganzes, sich miteinander verbünden müssen um dem sechsten Massensterben entgegenzutreten zu können. In der Formierung eines politischen Subjekts, namentlich der ökologischen Klasse nach Latour und Schultze muss also der Technozentrismus als *sensu commune* überwunden werden. Basierend auf Expert*inneninterviews, Teilnehmender Beobachtung, anthropologischer und ökologischer Literatur; biete ich einen Rahmen für Naturschutztheorie an, die modernistische Dualismen mit dem Ziel hinter sich lässt den Naturschutz gegenüber den oft marginalisierten Sozialwissenschaften zu öffnen. Dadurch trägt meine Forschung zu Debatten um das Anthropozän, Rewilding, Natur-basierten Lösungen, transdisziplinärem Naturschutz und dem Neuen Materialismus; bei.

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This thesis would not have been possible without the contribution of all those who worked with me. Special mention deserve: Mag. Agnes Steininger, DI Bernhard Schön the two beaver managers without whom fieldwork for this thesis would not have been possible. I would further like to thank my advisor Dr. Franziska Müller for their support and patience. Another important contribution to this thesis has been made by the State of Vorarlberg through its financial contributions. In addition I would like to thank my partner for reading this thesis possible more times than myself, offering support and a critical perspective. Finally, I would like to thank my parents for always having fostered as sense of curiosity, which brought me to pursue my passionate studies.

Prologue

On the border between Germany and Austria, Bavaria and Vorarlberg, between *Lindau* and *Lochau-Hörbranz* there flows a small river into *Lake Constance*, the *Laibach*. Apart from its job marking out an international border, the *Laibach* since 2002, lies at the center of a trans-border Natura 2000 conservation area (Europaschutzgebiet Leiblach on the Austrian side and Laiblach und Oberreitnauer Ach on the German side). Constrained to a narrow riverbed, for the majority of its course, the rivers' mouth as well as the adjacent area form a complex patchwork of wetland habitat and meadows. The conservation area on the Austrian side amounts to 21.45 ha. The majority of which known as "*Schmelzwiese*", runs along the coast of *Lake Constance* stretching inland for no more than 300 and no less than 150 meters where a rail line cuts through the landscape. Towards *Bregenz* the area is bounded by a small marina (Lochau Hafen) and a large hotel (Seehotel Kaiserstrand).¹

The hotel used to be a barracks following the Second World War, but was acquired in 2005 by private investors for €6.8 million and renovated for another €45 million, with the plan to turn the property into a hotel, which eventually was opened in 2010.² *Schmelzwiese* had been part of the barracks grounds and is still used by the military as a training grounds.³ However, the area is now also used as a public space of leisure. As such, the area is busy year-round with people coming for a refreshing dip in the lake, joggers, cyclists or teenagers getting up to innocent mischief out of sight and away from supervision. Following the general population increase in Vorarlberg as well as a number of recent housing developments across the rail line, the area can be quite busy during the day and sometimes remains so even after the sun has set across the lake. Despite the intensive use, small size and varying claims on the wetland, the area remains an important conservation site.⁴

Wetland sites, given the annual flood pulse of river and lake and gentle yet significant differences between freshwater, wetland and upland conditions, host a patchwork of habitats. In consequence a surprising amount of biological diversity can be found even within small

¹ *Amt der Vorarlberger Landesregierung* (2021): Europaschutzgebiet Leiblach. Schutzgüter und Erhaltungsziele, 3.

² *Denkmal-Heer: Rhomberg-Kaserne*

³ *Militärkommando Vorarlberg* (2019): Der Garnisonsübungsplatz in Lochau/Hörbranz ist zum Naturschutzgebiet geworden.

⁴ *Amt der Vorarlberger Landesregierung* (2021): Europaschutzgebiet Leiblach. Schutzgüter und Erhaltungsziele, 3.

areas. The mission of the *Leiblach* conservation area is to maintain, or recreate, the ecosystem characteristics and its locally specific communities and species (“gebietsspezifische Lebensgemeinschaften und wertgebende Arten”⁵). One of the species of particular interest in this area is *Castor fiber*, the European beaver.⁶



Images 1 and 2 were taken by the author on 6th September 2022 at beaver Bridge. Both images face South overlooking Lake Constance.⁷

In accordance with the management plans and targets set for the conservation area there currently is a beaver family in residence. Their works are easily visible from a little bridge – we will call beaver bridge – crossing their stream. Along this small stream a series of three dams has been erected by them. Their lodge lies above the first dam almost out of sight from the bridge. The water table as well as the dam height vary in accordance with the practice of the regional beaver manager Agnes Steininger. Here, beavers enjoy relative freedom to engage in world-making. Yet, despite their conspicuous architectural designs and my many visits to the area over the course of three years, I have never been able to spot any of the local beavers.

For context, I spent much of August 2022 in Vorarlberg with my partner and we had been out and about. Cycling up and down many of the watercourses in Vorarlberg, always on the lookout for beavers and other creatures. Beaver bridge was a place I had been frequenting for the entire period at an interval of a couple of days or so. In early September 2022, during several days of heavy rain, causing floods in the valleys and landslides in the mountains had mostly confined me to the indoors. Once the rains ceased, the first place to visit was Beaver Bridge.

⁵ *Amt der Vorarlberger Landesregierung* (2021): Europaschutzgebiet Leiblach. Schutzgüter und Erhaltungsziele, 3.

⁶ *Amt der Vorarlberger Landesregierung* (2021): Europaschutzgebiet Leiblach. Schutzgüter und Erhaltungsziele, 5.

⁷ Images 1-2 courtesy of the Author.



Image 3 was taken from a commercial airplane flying from Istanbul to Zurich July 2022. The image faces South overlooking the bay of Bregenz, and the New Rhine valley. At the distance the Silvretta mountain range, the highest mountain range in Vorarlberg is visible.⁸

Arriving at Beaver Bridge, we noticed that two of the three dams were gone. Given the heavy rains of the previous days, we were uncertain whether it was the rains, or human interference that was to blame for the disappearance of these two dams. Looking closer, we soon realized that branches with clearly identifiable beaver markings had been piled up on either side of the stream. Confused, I assumed the removal of dams must have been an effort by the local beaver manager Agnes Steininger. But as I was still at the beginning of my beaver studies and did not fully comprehend under which circumstances exceptions to the *Habitat Directive* and its strict prohibitions regarding the hunting, killing, trapping, or otherwise interference with beavers such as the removal of dams and burrows, could be made, I remained suspicious.

A few days elapsed from our last visit until we returned in the evening of the sixth of September 2022. Arriving there some twenty minutes before sunset, we made the best use of the last light and inspected the beaver dams. Considerable progress was made by the local beavers, but the works had not yet been completed. The second dam was still considerably lower than before. The pond at its back exhibited a lowered water table as well as reduced water surface area. Yet, freshly cut branches, again with beaver markings, had been added to

⁸ Image 3 courtesy of the Author.

the dam. Wanting to take account of the changes with notions of monitoring progress I walked off the bridge and squatted on the stream bank to get as close to the dam as possible. While still avoiding falling into the stream. With the light conditions exceeding the capabilities of my camera and my calves burning from squatting down low, I was ready to accept my displeasure at the insufficient quality of the photos I had taken so far, when I heard the voice of an unknown woman.



Images 4 and 5 were taken on 6th September 2022. Image 4 shows the last image I took before the incident with the beaver lady occurred. Image 5 shows the beaver lady taking apart one of the three dams at Beaver Bridge.⁹

The woman asked me a question I at first did not understand. Approaching her, she asked again. This time I understood. She wanted to know what I was doing there. I responded and told her that I was writing my master's thesis on Beavers and therefore was taking pictures of the dam. I told her that I had been here a few times before and that I had noticed the dam had been destroyed. Changing the topic, the middle-aged woman asked what use there is in beavers (*Was bruchts' dean Biber überhaupt?*).¹⁰ She did, however, not wait for my response, but preferred to give her own answer. She went on to explain to me that Beavers were not useful at all. Worse still, beavers cut down trees which makes them unstable and a risk to people walking under those trees, especially during a storm. Feeling that I had read about a simple remedy to this ill, I responded that trees can easily be protected by fencing. What I was not prepared for was her response. To her as a former prison guard, seeing these trees fenced made her feel as though she were in prison. And further, the entire area had lost its natural character since the beavers had arrived. Worst of all, the beaver dams would cause water tables to rise and basements to flood.

⁹ Images 4-5 courtesy of the Author.

¹⁰ This is a verbatim quote from memory.

In the context of my recent conversion to the noble cause of beavers, it was clear that I could not leave such misinformation unchallenged. I swiftly attempted to explain to the lady:

*'Beavers in fact create habitat for a plethora of species, the beaver is very much a natural component of wetland ecosystems. Beyond that he regulates water levels in drought and flood conditions and plays a role in filtering out of toxins. In addition, all of this he does for free!'*¹¹

Having been converted to the crusade against beavers, the woman equally could not let this stand. In response she bulldozed over my explanations and exclaimed, quite angrily at this point, that weavers, like wolves, were useless. And that she doesn't see the point in wolves either. *'It's the same story!'* she argued.¹² Fortified in my mission to educate I made my final attempt to convince the woman:

*'Your negative perception of beavers is a consequence of the human destruction of Nature! The only reason that beavers seem more noticeable is that we humans have encroached upon their habitat too much. If we were to just let Nature be, all our problems would be solved immediately. The science is very clear on this, just look into the literature and educate yourself!'*¹³

This was the straw that broke the camel's back. Erupting into a fully-fledged furry, the lady began to dismiss anything I said accusing me of talking non-sense (*Blödsinn*) and that the area we were standing on was her private property and my opinions didn't matter anyway. Rather, sometime soon she would bring a digging machine with a construction crew (I assumed) and revert the river to *'its natural state'* (by thoroughly destroying the Beaver dams of course).

I was baffled, clearly this person could not be serious. Not only were we standing on public land, but a conservation area! At every point of access signs even designated the area as such. Thus, beyond the seriously doubtful claim of her ownership any significant modification would have to undergo an environmental impact assessment (EIA) to begin with. And who would sign off at the removal of a beaver dam in a conservation area, with beavers listed as a target species? Surprised, yet slightly intimidated by the deep conviction with which the lady had made that claim, I merely advised her to investigate the legality of the matter.

¹¹ This is a verbatim quote from memory.

¹² This is a verbatim quote from memory.

¹³ This is a verbatim quote from memory.

It was then that she turned and walked off cussing and calling me an idiot, only to return about two minutes later. Upon her return, the lady did not deign to talk to us. But she proceeded towards the lowest of the three dams and began to tear branches from it i.e. actively destroying it. After brief deliberation my partner and I decided that we had to intervene. Walking towards the woman I asked her to stop and again informed her of the illegal character of her actions. She thanked me for my kind legal advice by yelling at me. She informed me that it was her right to do whatever she wanted on *her* land. I repeated to her, that if she would not stop, I would call the Police. As a matter of securing evidence, I took a flash-photo of the lady, catching her red-handed. To this measure she did not react very kindly but informed me that it was illegal to take a photo of anybody in public, without their consent, and that she would herself now call the police. First however the woman called me an asshole and stepped out of the stream and left, cussing and cursing.

My partner and I stayed behind for a few minutes to make sure that she was gone. After a good while we judged the coast to be clear, and the beavers to be saved. Being sure of our victory we made our way back to where we had left our bicycles. Discussing everything that just happened and having to narrate the entire scene, as my partner spoke no German, least of all the local dialect, we pushed our bicycles along the footpath until we came to the edge of *Schmelzwiese*. There we found a triangular sign posted on a metal pole. The signs' edges were ringed by a green strip. The center depicted a beaver in black on a white background. On the additional sign below was written in black letters: '*Beaver*'. The image of the beaver had been defaced. An X was etched into its face and the word '*kill*' carved into its body. Apparently, the angry woman had allies.



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The intent of this vignette is to present in condensed fashion two of the most common environmental approaches in contemporary Austria. Following Lorimer, we will call the first the *dream of mastery* and the second the *dream of naturalism*.¹⁵ Two mutually opposing yet – as we will soon find out – intimately linked positions, both deeply flawed and part of the *environmental common sense* were in a stand-off in that place on that September evening and still are everywhere and always. What is so remarkable about the encounter of the 6th of September was this lady's strong hatred towards beavers specifically, a quality of unblemished emotion I had not yet encountered in my work and haven't since. Usually, people mince their words and code their messages more carefully. At other times people will be more ambiguous. Rarely if ever will anybody be that blunt. What appears striking to me in retrospectively thinking about this encounter is how wrong both of us were on that September evening. After having travelled profusely through beaver lands I have found that neither the domination of *nature* nor its protection is what will ultimately help beavers and other *wildlife* in the face of the sixth mass extinction.

¹⁴ Image 6 courtesy of the Author.

¹⁵ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 22.

Introduction

The inspiration for this thesis came in January 2022. I spent two semesters at the National Taiwan University as an exchange student. There I was enrolled in an introductory ecology class held by a visiting American professor. Towards the end of the course we watched a YouTube video on the return of beavers to the Yellowstone National park. In this video beavers were introduced as ecosystem engineers. Considering the ecological knowledge I had gained in this introductory class, the effects of beavers in Yellowstone struck a profound chord with me. I soon began to read about beavers and their management in Europe. The more I learned about beavers the more intrigued I became with not just their biology and ecological relations but also with their history. At the same time – combing through the scientific and management literature on beavers, scouring the web for newspaper article and blessing everybody I met with the dubious honor of engaging them in a conversation about beavers – I began to notice a number of interesting patterns.

First, beavers were described as ecosystem engineers and therefore bringing net benefits to ecosystems. But it was this very ability of beavers that got them into trouble with local stakeholders such as farmers, anglers, homeowners, water managers, hydropower companies to name a few. At the same time several newspaper articles I found on beavers seemed to downplay the ecological benefits beavers can offer and appeared to highlight the damages they caused.¹⁶ Such framing of wild animals as either useful or a nuisance was familiar to me from my study of hunting practices in Austria.¹⁷ Based on these experiences I knew that such framing operations tend to leave out a lot of historical context.

Second, much of the management literature highlighted that beavers need space to enact their ecosystem engineering but acknowledges that space – in the present landscape – is scarce.¹⁸ Some of the literature accepted this scarcity as fact, other literature argued that this scarcity of space was not only a driver of the biodiversity crisis but also exacerbated the adverse effects of climate change. Consequently – the argument goes – rivers need more space for

¹⁶ *ORF Vorarlberg* (2022): Ausbreitung der Biber könnte zum Problem werden.

¹⁷ *Knoflach, Lukas Tobias* (2021): Research Report. The Hunt, for Biodiversity in Austria? (Unpublished seminar paper).

¹⁸ *Campbell-Palmer, Róisín et al.* (2016): The Eurasian Beaver Handbook: Ecology and Management of *Castor fiber*. Conservation Handbook Series. Pelagic Publishing, Exeter.

biodiversity conservation and climate adaptation as well as mitigation. In this, beavers, as ecosystem engineers, could play an important role.

Third, narratives about beavers tended to revolve around beavers being recent returnees to the landscape. This was acknowledged by all participants. However, while the scientific and management literature welcomed this. Some members of the public I had been having conversations about beavers with were skeptical about the return of beavers. One such position we have encountered in the Prologue. Many members of the public not only discussed beavers as a terrible nuisance, but even as unnatural and out of place. Such positions seemed to be connected to a denial of the present ecological and climate crisis. This especially so, since to me, beavers had become one of the central solutions to this crisis. This last issue seemed the most intractable to me.

Not only intrigued by beavers but having been converted to a scholarly champion of beavers I wanted to better understand why so many members of the public, stakeholders and the state have an understanding of beavers that so strongly obviously contradicts the knowledge about beavers produced by biologists, ecologists and beaver managers. Of course this interest did not come to me in a vacuum. The period from 2017 to 2023 may be described as the most recent high tide of the ecological movement. In light of its successes and the stakes involved, to many of us this seemed like a time to be loud, to make claims and to shift practices, discourses and systems towards finally beginning to enact the designs of the *ecological class* for a *livable planet*. In this struggle against the fossil fuel industry, and its machine of misinformation taking a principled stance and calling out their lies motivated many of our actions.¹⁹ Even now, after this wave has receded – following a pandemic, rampant inflation, recession, state repression of the ecological movement and a roll back of environmental legislation – the spirit of anger, hope and a notion of the possible lingers.

But who is this *ecological class*? The *ecological class*, as defined by Latour and Schultz, includes those who share ecological concerns and values, which cut across traditional class lines.²⁰ As a class we must distinguish between the '*class in itself*' and a '*class for itself*'. While the former

¹⁹ Oreskes, Naomi; Conway, Erik M. (2012): Merchants of doubt. How a handful of scientists obscured the truth on issues from tobacco smoke to global warming. Bloomsbury, London.

²⁰ Latour, Bruno; Schultz, Nikolaj (2022): On the emergence of an ecological class – a memo: subject: how to promote the emergence of an ecological class that's self-aware and proud. Translated by Julie Rose Cambridge, Polity.

theoretically includes every human being as a biological entity that is dependent on the biosphere and stable climate. The latter reduces this constituted subject to those who are actively engaged in the designs for a *livable planet*.²¹ Consequently, agents of the fossil industry, politicians affiliated with parties who fail to act on the climate and biodiversity crisis, public persons who engage in climate denial, and professionals who are complicit in maintaining the status quo producing the climate and biodiversity crisis are excluded from this understanding of the *ecological class* as long as they continue being complicit. To give a however tentative positive definition of who belongs to the ecological class. Whenever I use the word 'we' in this thesis, this is the subject I intend to construct.

How the struggles between the *ecological class* and its adversaries unfold is a central part of this thesis. I explicitly conceive of this conflict as a class struggle. Consequently, where there is class there is class consciousness and there is the paradox of explaining how a minority is able to dominate the vast majority. Of course, we can identify the coercive apparatus of the state and empire as mechanisms underlying domination and subjugation, and we do. However, as this thesis focuses on the contradiction between the scientific knowledge on beavers and the prevalent narratives on beavers produced by stakeholders, we must engage with the Gramscian concept of *hegemony*.

Through this concept Gramsci explains how social orders detrimental to the economic interests of the vast majority of people are maintained without the predominant use of force. Coercion, albeit latent, only manifests when necessary. The political order primarily relies on the production and reproduction of *consent*. This is created by the *hegemonic* group by presenting their narrow corporate interests as the universal interest of society at large. In doing so the *hegemonic* group forges an ideology which privileges its political, economic and social position. A reliance on what Gramsci calls '*common sense*' is crucial in generating political purchase for such an ideology. Gramsci defines the *common sense* as a conception of the world that has not been critically reflected upon. Consequently it is dissociative, contradictory and vastly underdeveloped if compared to critical examination, or scientific knowledge. '*Organic intellectuals*' – in a bid to legitimize the existing political and economic structure – exploit the shortcomings of this *common sense* in order to rationalize dominant

²¹ Tsing, Anna; Swanson, Heather; (Ed.) (2017): Arts of Living on a damaged planet. Ghosts of the Anthropocene. (University of Minnesota Press, Minneapolis, London).

ideology. Historically formed social groups produce organic intellectuals who present the narrow corporate interest of their group as identical with the interest of wider society. The more important a social group is the more numerous its *organic intellectuals* and the more elaborate their views. *Organic intellectuals* of subaltern groups, while having a critical and oppositional potential, can be co-opted by the ruling group and may end up serving as 'deputies'.²² Such *cooptation* reflects on how, according to Gramsci different social groups in transcending lines of class form alliances and attendant *political subjectivities*. To counteract *hegemony*, it is necessary to engage with the *common sense* and form a *buon senso* in an attempt to reform *political subjectivities*.²³

The formation of a *buon senso* when it comes to beavers consequently is the purpose of this thesis. As discussed briefly in the prologue the environmental *common sense* in the Global North is dominated by the *dream of mastery* and the *dream of naturalism*. Both, however, are subject to *technocentrism*. In discussing the environment scientists, engineers, politicians, activists and members of civil society employ either of these two *dreams* in their *meaning making*.

The *dream of naturalism* has a particular hold on the ecological movement, especially conservationists. A longstanding debate has been brewing between what we may call the red and green camps of the *ecological class*. The former are members of the political left, affiliated with socialist or social democrat parties, their intellectuals tend to be adherents of Marxist, feminist and postcolonial theory, and are trained in the humanities and social sciences. The latter tend to be members of the ecological movement, are affiliated with green parties, while their intellectuals tend to be inspired by liberal political and economic theory and are trained in the hard sciences. The *dream of naturalism as common sense* represents a roadblock to the *designs for a livable* of the *ecological class*. It presents an avenue of *cooptation* for members of its green camp and serves to *depoliticize* the environmental crisis. It does so by making invisible how systems of oppression are the foundation of the environmental crisis. To form the *ecological class as a class for itself* the two camps must engage in the formation of a *buon senso* that furthers their designs for a *livable planet*.

²² Short, Nicole (2014): The International Politics of Post-Conflict Reconstruction in Guatemala. (Pro Quest LLC, Ann Arbor), 27f.

²³ Short, Nicole (2014): The International Politics of Post-Conflict Reconstruction in Guatemala. (Pro Quest LLC, Ann Arbor), 29.

Methodology

This thesis aspires to be a multispecies ethnography.²⁴ The empirical data was gathered through participant observation and expert interviews.^{25,26} The sampling method employed was the snowball principle.²⁷ The process of research for this thesis, from the beginning, has been conceived of as circular.²⁸ This methodology has been chosen in accordance with the principles of grounded theory (GTM).²⁹ While the basic principles of GTM were observed for this thesis. The constraints of a master thesis only permitted the partial application of GTM principles.

My work started with an explorative reading of the Eurasian Beaver handbook.³⁰ From then I undertook a first expert interview with one beaver manager, followed by three more. After this first round of interviews with beaver managers, water managers emerged as an important player. I consequently expanded my focus to riparian wetlands and their history. In the second round of interviews I interviewed water managers, as well as beaver managers. This was followed by theoretical work and complemented by the third round of interviews with stakeholders in other fields. Ultimately the scope of this thesis continued to expand this is reflected in its great length.

My participant observation included a total of 14 days in the field. The majority of which I spent with one beaver manager.³¹ The rest of the field days were spent participating in stakeholder outreach events, one of which co-organized by the WWF Austria, as well as single day field visits with beaver managers. My fieldwork experiences were, whenever informed

²⁴ Helmreich, Stean; Kirksey, Eben S. (2010): The Emergence of Multispecies Ethnography. In: Cultural Anthropology Vol.25 (4), 545-576.

²⁵ Russell, Bernard H. (2011): Research Methods in Anthropology. Qualitative and Quantitative Approaches Fifth Edition (Altamira Press, Lanham, New York, Toronto), 256-290.

²⁶ Mey, Günter; Mruck, Katja (2010): Interviews. In: Mey, Günter; Mruck, Katja (Ed.) (2010): Handbuch Qualitative Forschung in der Psychologie. (VS Verlag), 427.

²⁷ Schreier, Margit (2010): Fallauswahl. In: Mey, Günter; Mruck, Katja (Ed.) (2010): Handbuch Qualitative Forschung in der Psychologie. (VS Verlag), 243.

²⁸ Wichmann, Angela (2019): Quantitative und Qualitative Forschung im Vergleich. Denkweisen, Zielsetzungen und Arbeitsprozesse (Springer, Berlin), 47.

²⁹ Mey, Günter; Mruck, Katja (2010): Interviews. In: Mey, Günter; Mruck, Katja (Ed.) (2010): Handbuch Qualitative Forschung in der Psychologie. (VS Verlag), 617.

³⁰ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter).

³¹ Russell, Bernard H. (2011): Research Methods in Anthropology. Qualitative and Quantitative Approaches Fifth Edition (Altamira Press, Lanham, New York, Toronto), 256-290.

consent of participants was obtained, recorded via audio recordings on my smart phone.³² In addition, my fieldwork was documented via photographs I took with my Canon 600D. Finally where recording was not possible, I documented my fieldwork in a field diary.³³ In addition to the field days spent with beaver managers, I spent countless hours roaming various wetlands on my own or with personal relations always on the lookout for beavers, their dams, lodges and other signs of their presence. This part of my research took place from September 2022 to August 2023.

In total I conducted seventeen interviews. I conducted eight interviews with beaver managers, three interviews with water managers, three interviews with environmental governance agents, two interviews with politicians and one interview with an angler. I conducted an analysis of ten of these interviews according to the grounded theory methodology. Six of these interviews feature directly in the text of this thesis. They include five interviews with beaver managers and one interview with a water manager.

Three considerations guided the final inclusion of these interviews. Firstly, the interviews included in this text were chosen due to their empirical relevance to the crisis of the *concrete riparian regime* and the *castorian perspective*. Thirdly, the interviews included in a detailed discussion in the chapter 6 reflect the main lines of conflict which emerged from my data. The lines of conflict I found present in my interviews and fieldwork, I contextualized through my theoretical work, and historical analysis. The two most relevant categories which emerged from the interviews with beaver managers were *space*, and *firefighting*. Thirdly, the limitations of a master thesis prevented me from thoroughly analyzing and including a greater number of interviews in the final draft of this thesis. Ultimately, while saturation had been reached regarding beaver managers, this is not the case for water managers or other stakeholders.

All interviews were conducted as semi-structured expert interviews. Out of these seventeen interviews fourteen have been transcribed, eight of which have been transcribed manually, while six have been transcribed with the help of a transcription software. As all interviews were conducted either in variations of Austro-Bavarian or Austro-Alemannic I have sought to preserve this linguistic variety in my transcription. This also means that interviews transcribed

³² Smith, Linda Tuhiwai (2012): Decolonizing Methodologies. Research and indigenous Peoples Second Edition (Zed Books, London, New York).

³³ Russell, Bernard H. (2011): Research Methods in Anthropology. Qualitative and Quantitative Approaches Fifth Edition (Altamira Press, Lanham, New York, Toronto), 294.

with help of a software still had to be 'cleaned up' significantly. The use of transcription software halved the manual labor required for transcription. Whenever statements from the interviews are cited, I give the original transcription in a footnote while I provide an English translation in the text. Given legitimate interest all interview transcripts are available in German upon request in accordance with the protection of personal data and my professional discretion regarding the safety and well-being of my research participants.

Beyond conducting interviews and participant observation I made extensive use of the ecological and scientific literature on beavers, wetlands and their management. As this thesis has been conceived of as a transdisciplinary account of beaver management, I further made extensive use of the social science literature on conservation and its history. I also consulted regional and global histories where relevant. My theoretical approach, as we shall see in chapters 1 to 3, is grounded in New Materialist literature, science and technology studies, the ontological turn in anthropology, eco-feminism and Marxism.

Chapter outlay

In chapter 1, I will discuss the various approaches to the *Anthropocene*. In doing so I will provide the basic assumptions which guide our discussion of beavers and their management in the early twenty-first century in Austria. These basic assumptions are that the rupture of the stable Holocene conditions which the *Anthropocene* presents threatens the very existence of human civilization. This realization not only forces us to accept the reality of the climate and ecological crisis, but it also forces us to accept that the promises of Modernity, Progress and Growth have utterly failed. From this realization emerges the necessity to reconsider the ontological and epistemic assumptions of *Modernity*. Consequently I will position myself within the biological *Anthropocene* and the Capitalocene. The crisis of the *Anthropocene* therefore primarily presents as a crisis of *accumulation*. Through the blueprint of the plantation, progress and modernity have created blasted landscapes on a damaged planet which we now temporalize as the *Anthropocene*. In congruence with this approach I adopt a multispecies ontology.

In chapter 2, I engage with the question: what is *Nature*? I will argue that *Nature* is a keyword in the semantic rule book of the *modern ontology* which serves to enforce ontological hygiene through purification. The *modern ontology* has emerged as a way of engaging with the world

in the context of the rise of capitalism, and the *scientific revolutions* of the early modern period. Through a series of interlocking mechanisms predicated on the cartesian Subject Object divide the *modern ontology* creates an identity of the master i.e. *technocentrism*.

Technocentrism as master identity systematically constructs the other as inferior through the mechanisms of *incorporation, hyperseparation, instrumentalization, homogenization* and *backgrounding*. Consequently, *technocentrism* provides an ideological corollary to the activities of capital, the state and empire. Ultimately the strength of *technocentrism* lies in justifying power over *Nature* and *Society*. *Technocentrist* knowledge is constructed as objective and is intended to increase control over humans and nonhumans. Increased control is equated with Progress. I will discuss the role *technocentrism* has played in the emergence and history of conservation as it was complicit in violently displacing and dispossessing local and indigenous communities as it enforced a spatialized and temporalized *wilderness*. *Conservation nature* must therefore be understood as a distinct form of land use intimately tied to capital accumulation, the administrative state, empire and *technocentrist* conservation science.

In our analysis of conservation since the 1990s, the introduction of ecological modernization and ecosystem services we argue that these concepts are rooted in a technocentrist desire of rational management. Confronted with the history of conservation we will discuss the possibility that ecological modernization may be an attempt to co-opt members of the ecological movement while being unable to solve the environmental crisis and at the same time increasing historic North South inequalities. As such conservation as ecological modernization does little to address the historical relations of capital, class and empire at the root of the *Anthropocene*.

After this critical examination we will turn towards the construction of a multispecies ontology, epistemics and ethics designed to form the basis of the environmental buon senso we will apply in our study of beavers and their management in the following chapters of this thesis. A multispecies ethic seeks to take seriously that human life takes places within fundamental and constitutive relationships with *wildlife*. I will argue that *situated knowledge: embodied, historically situated, conflictive, non-innocent, incomplete* and open to *partial relations* must replace the *disembodied, innocent* and disinterested knowledge of the *god trick*.

Based on this requirement I will construct a processual and relational multispecies ontology of *wildlife* as *companion species*. As we conceive of human life as becoming in constitutive relation with *wildlife* the question of how-to life well with *wildlife* while accepting its agency becomes a central concern. I will argue that every living thing expresses agency through *world-making*. Where the *world-making* projects of different beings overlap *multispecies* landscapes emerge. Ethical living in a *multispecies* world, then means to consider the *nonhuman* other as an ethical subject who requires *care* and deliberation, without the possibility of making entire categories of *wildlife* killable. *Care* involves embodiment, it involves *affect*. Conservation depends on the process of learning to be affected by *wildlife*. This process is underpinned by the desire of conservationists for *affective encounters* with *wildlife*. I will thus argue that conservationists interact with *wildlife* through an *affective logics of care*. Consequently conservation is not just a rational practice. Through the concept of *affective logics* we can describe conservation as a technological practice that takes place in an assemblage of skilled bodies, artefacts and technologies.

In chapter 3, we put the ontological, epistemological and ethical requirements I have sent out into practice as I attempt to develop buon senso understanding of beavers. I do so by drawing from various scientific and scholarly registers. In the course of this chapter I will discuss the ecological and management literature on beavers. In addition I will discuss beavers based on historical literature on the fur trade, as well as recent anthropological literature. In doing so I will propose the *castorian perspective*. I construct this conceptual tool from the building blocks of an *embodied subjecthood*, a political ally, a *nonhuman zoomian anarchist* and the economics of *swiddening*. From this *situated, embodied* and *partial* perspective it will be possible to recognize various continuities between humans and beavers. In applying the *castorian perspective* to the history of beavers and their relations with humans it will be possible to argue that beavers once had a larger impact on the earth system than humans in what I call the Northern Hemisphere *Beaverocene*. The rupture of the *Beaverocene* occurred due to the fur trade, a process that fundamentally altered the political, social, economic and ecological relations of North America. On this basis I argue that beavers contributed significantly to the stable Holocene conditions that allowed the *flourishing* of human civilization. Consequently, the *ecological class* must incorporate beavers into its designs for a *livable planet*.

In chapter 4, I will demonstrate beaver management as one way of incorporating beavers into the designs of the *ecological class*. In congruence with the deconstruction of the dream of naturalism in chapter two I will demonstrate that beaver management is a passionate practice predicated on *affective logics of care* and *learning to be affected by wildlife*. At the same time, we will also see how beavers remain contested in the Austrian landscape as they are tolerated by stakeholders, capital and the state only as long as they neither threaten private property or the accumulation of capital. However, as I will demonstrate beavers will continue to come into conflict with stakeholders as the proliferation of concrete structures continues. While this process continues and intensifies beaver managers will be limited to firefighting rather than facilitating the *flourishing* of beavers and *wildlife*. From the account of my fieldwork with a beaver manager in Vorarlberg the category of *space* will emerge as a central matter of concern.

In chapter 5, I will undertake the labor of historically situating this lack of space. In the first part of the chapter I will discuss the basic geology, hydrology and ecology of riparian wetlands generally and the Alpine Rhine in particular. As this chapter is primarily written with an audience of social scientists and scholars from the humanities and social sciences in mind, I consciously chose to write distinct paragraphs with highlighted key terms in an almost indexical style akin to an encyclopedia. In the second part of the chapter I return to the prose of the previous chapters. In the second part of the chapter I will narrate the multispecies history of the Alpine Rhine in the *longue durée*, how it became harnessed as a multispecies peasant river.

In the third part of the chapter I will deal with regulation of the *Alpine Rhine* during the 19th and 20th centuries. I will argue that it was the logic of accumulation, nation building the rise of hydropower and later Cold War development which brought forth the *concrete riparian regime* and its global proliferation. As it emerged in the 19th and 20th centuries, the *concrete riparian regime* turned rivers into *organic machines* harnessed for the production of space, hydropower, the control of water and people. It was a hydraulic mode of production. However, car centric single-family suburban housing, industrial plants and industrial agriculture ate away at the land made cheaply available through the reclamations of the *concrete riparian regime*. After seven decades, once abundant land has become scarce. This scarcity of cheaply available land manifests in the scarcity of space for *wildlife* as well as in scarcity of *space* for housing. Both find a common denominator in high land prices.

Beyond its material effects the *concrete riparian regime* has established techniques for managing rivers which today remain hegemonic. The ecological movement has been mobilizing against the *concrete riparian regime* since the 1960s, as signs of the looming ecological crisis became evident. I will argue that the *concrete riparian regime* today has become a *hydraulic mode of consumption* and stands in the way of the kind of *resurgence* necessary to achieve the designs of the *ecological class* for a *livable planet*. Consequently the politics of the *concrete riparian regime* become increasingly contested as conservative politicians continue in their attempts to expand and cement the *concrete riparian regime*.

In chapter 6, I will discuss the acknowledgement of the crisis of the *concrete riparian regime* by the environmental movement, scientists, engineers, inter-, and transnational organizations like the United Nations and European Union, as well as the nation state of Austria. I will argue that this acknowledgement and the solutions proposed for solving the crisis of the *concrete riparian regime* are limited to *ecological modernization* and tend to be presented as issues of (ir-)rational management. Consequently, the solutions presented in this official discourse remain within the *hegemonic* techniques of managing rivers established in the 19th and 20th centuries. Contrary to such a *depoliticization* of the crisis of the *concrete riparian regime* specifically and the *Anthropocene* at large I will argue that the differing and in part mutually preclusive claims on the river and its products by the state, capital, local stakeholders and beavers must be conceived of as a *wicked* i.e. ultimately unsolvable rivalry involving *hard choices*.

In the second part of this chapter I will discuss four of the interviews I conducted, transcribed and analyzed for this thesis. Three of which were conducted with beaver managers and one of them was conducted with a water manager. In doing so I will show how beavers not only face the material obstacles of the *concrete riparian regime*, but they are also opposed in the realm of narrative and meaning making. The disagreements about beavers are rooted in the contested status of beavers in terms of ontology, epistemology, ecology, political economy, and society. The positions on beavers I have encountered in this context are: beavers as nuisance, objects of conservation, ecosystem engineers or political allies. As I will demonstrate each of these concepts have specific ontological, epistemological, ethical, political and economic implications.

In the application of these narratives we see how the concepts and categories discussed in earlier chapters of this thesis serve to situate this discussion. Based on the work of these earlier chapters I will demonstrate how the various ways of narrating beavers directly relate to whether the narrator acknowledges or denies the crisis of the *concrete riparian regime* and more broadly the *Anthropocene*. The first two narratives of beavers allow for a denial of this crisis and can serve to legitimize the status quo. At the same time this strategy displaces riparian conflicts onto beavers and turns them into scapegoats. As we will see the technocentrist dream of mastery is mobilized in the first case, while the dream of naturalism is mobilized in the second.

The latter two narratives require an acknowledgement of the crisis of the *concrete riparian regime* and logically require the person in question to present potential solutions to this crisis. As we will see in the first part of chapter 6 the official sources mobilize *ecological modernization* to confront the crisis of the *concrete riparian regime*. Beaver managers on the other hand may argue to mobilize a *common sense* understanding of the *castorian perspective*. However both technocentrist dreams are present as well and compete for truth in the internal discourse of beaver managers.

1. The Anthropocene(s)

In this chapter I present an overview of the *Anthropocene* debate. I draw on a wealth of historical literature to situate the earth systems science dominated *Anthropocene* in the broader context of historical debates surrounding *Capitalism* and *Modernity*. I aim to demonstrate how different conceptualizations of the *Anthropocene* are dependent on institutional, epistemic, disciplinary and anthropological commitments. For the purposes of this thesis, and the study of biological life in the context of the sixth mass extinction generally, I hold the *biological Anthropocene* with the *Columbian exchange*, together with the emergence of the capitalist world-system and the *Capitalocene*; as the relevant point of inflection.

Earth system scientists propose the *Anthropocene* as a new geological epoch. They argue the *Anthropocene* began once human's *world-making* became visible in the fossil-record. Faced with the fundamental realization that humans have unintentionally changed the ecology and climate of the planet on a global scale – leading to qualitative changes in the earth system – this concept has increasingly gained traction in academic circles. Far from being the triumph of enlightenment science, rationality, Modernity or Capitalism; the unintended, uncontrolled and unforeseen dynamics of these planetary changes are an accepted *matter of concern* and a sign of crisis.³⁴

As the earth system increasingly presents as Haraway's trickster Coyote, rather than Bacons' subjugated and docile woman;³⁵³⁶ it becomes increasingly clear that no endeavor be it of a political, economic, philosophical, scientific or social; kind can afford to *not* situate itself within the *Anthropocene*. As a concept the *Anthropocene* not only raises an existential question for humans but also throws into doubt the *common sense* ontological and epistemic certainties of *Modernity*. As the diagnosis of the *Anthropocene* stands on par with the revolutionary ideas of Copernicus, Lyell, Darwin or Freud. Its consequences prove difficult to accept for many

³⁴ Latour, Bruno (2004): *Politics of Nature. How to Bring the Sciences into Democracy*. Translated by Catherine Porter (Harvard University Press, Cambridge, Massachusetts, London, England).

³⁵ Haraway, Donna J. (1988): *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*. In: *Feminist Studies* Vol.14 No.3, 575-599.

³⁶ Merchant, Carolyn (1980): *The Death of Nature: Women, Ecology, and the Scientific Revolution*. 40th anniversary Edition (Harper Collins Books, New York).

whose ontological commitments lie with deities and uniquely social humans.³⁷³⁸ Critically, the diagnosis of the *Anthropocene* challenges the figure of *Nature* which lies at the basis of western environmental *common sense* central to the dream of naturalism and the green camp of the *ecological class*. I will focus on this problem in chapter 2.

Briefly put, Steffen and Crutzen who first coined the term, materially grounded the *Anthropocene* in indicators ranging from the changing climate effected by green-house gas build up in the atmosphere and subsequent ocean acidification, to the spread of impervious surfaces, disrupted water and nutrient cycles, rapid species extinction build-up of toxins in soils, air and water as well as the spread of plastics and the uptake of microplastics into food webs; as well as the massive increase in the human population and its *companion species*.³⁹ Earth system sciences are the precondition for talking about the *Anthropocene*.

The Earth system is defined as the interaction between: Atmosphere, Lithosphere, Hydrosphere and Biosphere. This system is kept in a state of dynamic equilibrium through coupled processes. In the *Anthropocene*, as defined by Steffen und Crutzen, humans are added as a further factor. This change is traditionally inscribed through 24 separate curves, covering the period 1750-2000 that illustrate: *'the increasing rates of change in human activity since the beginning of the Industrial Revolution.'*⁴⁰ The indicators expressed through curves cover socio-economic factors (drivers) such as population growth, urbanization, GDP, the damming of rivers, or the rate of tourism, as well as their ecological consequences in greenhouse gas concentration in the atmosphere, median terrestrial temperatures, and global biodiversity loss. The authors illustrate the synchronic increase of several of these factors from the 1750s onwards and its massive spike in the second half of the 20th century.⁴¹

³⁷ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 1.

³⁸ Harraway, Donna J. (2008): *When Species Meet*. (University of Minnesota Press, Minneapolis, London).

³⁹ Horn, Eva; Bergthaller, Hannes (2019): *Anthropozän. Zur Einführung* (Junius Verlag GmbH, Zürich, Koblenz, Sankt Gallen), 9ff.

⁴⁰ Steffen, Will; Grinevald, Jacques; Crutzen, Paul; McNeill, John (2011): The Anthropocene: conceptual and historical perspectives. In: *Philosophical Transactions of the Royal Society* 369, 842-867.

⁴¹ Steffen, Will; Grinevald, Jacques; Crutzen, Paul; McNeill, John (2011): The Anthropocene: conceptual and historical perspectives. In: *Philosophical Transactions of the Royal Society* 369, 842-867.

Mehr Beton als Bäume.

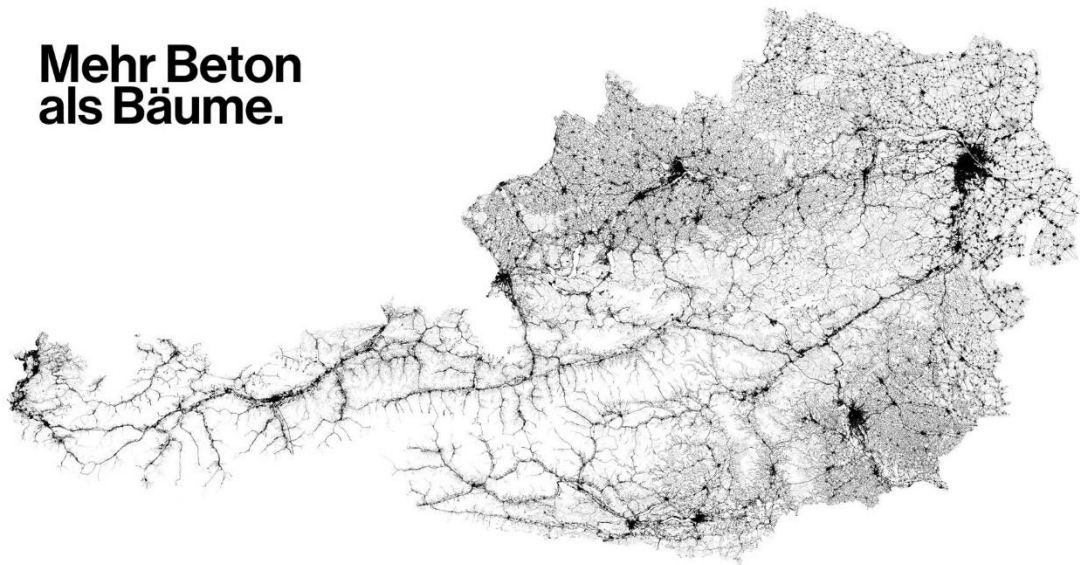


Image 7 serves as an illustration of the concrete proliferation of the 20th century. This image was created in a collaboration between the university for life sciences Vienna and the Museum of applied Arts in Vienna.⁴²

Massive global disruptions at global scale make the *Anthropocene* not a crisis that will pass but identify it as a rupture of the stable *Holocene* conditions which created the space for agriculture, cities and complex state societies, long-distance trade and writing. In short, these stable *Holocene* conditions created the conditions which allowed the *Neolithic Revolution* to unfold and human civilization to *flourish*. Beyond the material disruptions that characterize the *Anthropocene*, the appreciation of living in a new and wholly different epoch shapes parameters under which knowledge about this world can proceed. Consequently, a range of fundamental categories, narratives and ways of carving up the world becomes obsolete.⁴³

One of these obsolete knowledge practices is the compartmentalization of knowledge into disciplines. In addressing the *Anthropocene* this must give way to inter-, multi-, and ultimately transdisciplinary knowledge production.⁴⁴ The antagonism of the two cultures in academia poses a particular problem to an understanding of the *Anthropocene*, that researchers from both sides of the divide must contend with.⁴⁵ As Latour has argued, the traditional division of labor between a concern with '*matters of fact*' for the sciences which understands itself as

⁴² <https://www.mak.at/digitalandcircular#gallery-4>

⁴³ Horn, Eva; Bergthaller, Hannes (2019): *Anthropozän. Zur Einführung* (Junius Verlag GmbH, Zürich, Koblenz, Sankt Gallen), 12f.

⁴⁴ Transdisciplinary knowledge production

⁴⁵ Snow, Charles P. (1998): *The Two Cultures and the Scientific Revolution*. With an introduction by Stean Collini (Cambridge University Press, Cambridge, New York, Melbourne).

unpolitical and objective, and a limitation to '*matters of concern*' for the humanities which understands itself as political yet has often been hiding behind a cultural relativism becomes increasingly untenable.⁴⁶ This issue and a potential partial solution to it will be the focus of chapter 2.

Conceptualizing the Anthropocene

Several possible periodizations and conceptualizations of the *Anthropocene* exist; each stretches further back in time. Different traditions of knowledge focus on respective aspects and provide variegated narratives of the *Anthropocene* with differing implications for who to blame, what to do and how to talk and think about it. The most recent starting date for the *Anthropocene* provided is the period of the *Great Acceleration* ca. 1950.⁴⁷ From an earth system science perspective, it is convincing since it correlates with the fallout from nuclear testing from 1945 onwards. As the nuclear fallout has settled as a distinct layer in the sedimentary record globally, it satisfies the requirements of stratigraphy.

An earlier start date for the *Anthropocene* is the industrial revolution ca. 1750. This periodization combines a focus on rising CO₂ concentrations in the atmosphere, slowly from 1750 significantly from 1850. The beginning of modern industrial society. The shift from annual agricultural cycles with relatively fixed limits to growth, to a world governed by business cycles and gigantic yet finite reservoirs of cheap fossil energy.⁴⁸ The rapid political, social, economic, technological and ecological transformations of this period – analogous to Hobsbawns' *Age of Revolutions*⁴⁹ – stand in a tension with the creation and immiseration of the urban working classes, the beginning of North South inequalities^{50,51}, as well as the '*reinvention*' of *Nature* as a resource to be used, exploited, worked and traded.⁵²

⁴⁶ Latour, Bruno (2004): *Politics of Nature. How to Bring the Sciences into Democracy*. Translated by Catherine Porter (Harvard University Press, Cambridge, Massachusetts, London, England).

⁴⁷ Steffen, Will; Grinevald, Jacques; Crutzen, Paul; McNeill, John (2011): The Anthropocene: conceptual and historical perspectives. In: *Philosophical Transactions of the Royal Society* 369, 842-867.

⁴⁸ Malm, Andreas (2016): *Fossil Capital. The rise of steam power and the roots of global warming* (Verso, London, New York).

⁴⁹ Hobsbawn, Eric J. (2007): *The Age of Revolution: Europe 1789-1848*. (Abacus, London).

⁵⁰ Pommeranz, Kenneth (2000): *The Great Divergence: China, Europe, and the Making of the Modern World Economy*. (Princeton University Press, Princeton, Oxford).

⁵¹ Davis, Mike (2001): *Late Victorian holocausts. El Niño famines and the making of the Third World* (Verso, London).

⁵² Horn, Eva; Bergthaller, Hannes (2019): *Anthropozän. Zur Einführung*. Junius, Zürich, Sankt Gallen), 35.

Somewhat further back in time, the *Columbian exchange* has been proposed as the beginning of the *Anthropocene*. The ‘discovery’ of the Americas not only re-instated the lost land bridge between the Americas and Eurasia-Africa but for the first time allowed for the formation of truly global trade networks, global empires and world war. Ecologically, the world has been fundamentally altered through the exchange of living things – humans, animals, plants, and microbes. Terrible epidemics reduced the indigenous populations of ‘discovered’ continents, and islands. Introduced crops and animals changed agricultural and land use practices the world over. This focus on the *Columbian Exchange* brings the ‘*organic Anthropocene*’ into view. Not only the colonial context of *Modernity* but also the beginning of the sixth mass extinction, are thus highlighted.⁵³⁵⁴⁵⁵ A similar approach to narrating the *Anthropocene* is Jason Moore’s *Capitalocene*. We will elaborate his approach in greater detail further below. As a brief situating practice and disclosure my position is closely aligned with this approach to the *Anthropocene*.

Venturing deeper into history still, there are several proposals for an *Early Anthropocene*. Some authors have argued that the utilization of fire, stone tools and the hunting of big game; degraded the environment and ecosystems. A somewhat later start for the *Anthropocene* would be the neolithic period, when the emission of green-house gases through the cultivation of rice, as some authors argue, prevented the next ice age and created the stable climate conditions of the *Holocene*.⁵⁶

Situating Beavers in the Anthropocene

The problem with the *Early Anthropocene* is that it shifts the focus away from the qualitative rupture of the *Anthropocene* to questions of human ontology as such, this critique extends to the *Anthropocene* concept as proposed generally. An important building block of the *Early Anthropocene* is the hunting of big game by ‘*Man the hunter*’ in combination with the *overkill hypothesis*. This theory posits, that humans played the decisive factor in the extinction of Pleistocene Megafauna, particularly in the Americas, but also in Africa, Eurasia, Australia and

⁵³ Kolbert, Elizabeth (2014): *The Sixth Extinction. An Unnatural History* (Bloomsbury, New York).

⁵⁴ Brooke, John L.; Otter Christopher (2016): Concluding Remarks: The Organic Anthropocene. In: *Eighteenth-Century Studies*, Vol. 49 (2), 281-302.

⁵⁵ Crosby, Alfred W. (1973): *The Columbian exchange: biological and cultural consequences of 1492*. (Greenwood Press, Westport Connecticut).

⁵⁶ Ruddiman, William F. (2003): The Anthropogenic Greenhouse Era Began Thousands of Years ago. In: *Climatic Change*, 61 (1), 261-293.

the island world colonized by humans, before the 1400s.⁵⁷ *Man the Hunter*, is the anthropological theory that hunter-gatherer groups had a universal gendered division of labor between men who hunted and women who gathered. The former practice was understood to be the main source of calories for Pleistocene hunter-gatherers.⁵⁸ The implications such an understanding of the *Anthropocene* has, are well illustrated in the following quote taken from Edward O. Wilson:

*"Human hunters help no species." This is a general truth and the key to the whole melancholy of the situation. As the human wave rolled over the last of the virgin lands like a smothering blanket, Paleo-Indians throughout America, Polynesians, across the Pacific, Indonesians into Madagascar, Dutch sailors ashore on Mauritius (...) they were constrained by neither knowledge of endemism nor any ethic of conservation. (...) What counts is food today, a healthy family, and tribute to the chief, victory celebrations, rites of passage, feasts.*⁵⁹

As becomes clear in this statement, from an Early *Anthropocene* emerges universal *Man* external and in opposition to *Nature*. Ecological disruption is part of the human condition. The historical 'progress' from hunter-gatherers to sedentary agriculture, to early modern capitalism, and eventually industrial capitalism is merely a difference in technology, not one of political, economic or social structures. While the debate on the *overkill hypothesis* is ongoing and is unlikely to be settled in this context.⁶⁰⁶¹ Yet, the feminist scholarship on *Man the hunter*, as well as the recent anthropological literature on hunter-gatherers, allows us to refute this theory with strong confidence.⁶³ Not only has it been demonstrated long ago that historical hunter-gatherers, depended and continue to depend more on gathering than on hunting⁶⁴, it has also been shown that hunter-gatherer societies were diverse, particularly

⁵⁷ Wroe, Stephen; Field, Judith; Fullagar, Richard; (Ed.) (2004): Megafaunal extinctions in the later Quaternary and the global overkill hypothesis. In: *Alcheringa*. Vol. 28 (1), 291-331.

⁵⁸ Milan, Erika Lorraine (2019): *Creatures of Cain. The hunt for human nature in cold war America*. (Princeton University Press, Princeton, Oxford).

⁵⁹ Wilson, Edward O. (2001): *The Diversity of Life*. Second edition (Penguin Books), 241.

⁶⁰ Wroe, Stephen; Field, Judith; Fullagar, Richard; (Ed.) (2004): Megafaunal extinctions in the later Quaternary and the global overkill hypothesis. In: *Alcheringa*. Vol. 28 (1), 291-331.

⁶¹ Grayson, Donald K.; Meltzer, David J. (2002): A requiem for North American overkill. In: *Journal of Archaeological Science*. Vol. 30, 585-593.

⁶² Denevan, William M. (1992): The Pristine Myth: The Landscape of the Americas in 1492. In: *Annals of the Association of American Geographers* Vol. 82 No.3, 375 (369-385).

⁶³ Kelly, Robert L. (2013): *The Lifeways of Hunter-Gatherers. The Foraging Spectrum 2nd Edition* (Cambridge University, Cambridge, New York).

⁶⁴ Lee, Richard B.; DeVore, Irvén (Ed.) (1968): *Man the Hunter. The first Intensive Survey of a Single, Crucial Stage of Human Development – Man's Once universal hunting way of life*. (Aldine de Gruyter, New York).

regarding gender roles.⁶⁵⁶⁶ From this research *Man the hunter* emerges as a product of 'stereotypes about the human condition created by dominant contemporary urban elites of European descent'⁶⁷, rather than the synthesis of robust scholarship and empirical data. This scholarship notwithstanding the overkill hypothesis, which strongly depends on an underlying assumption of *Man the hunter* continues to hold sway, both academically as well as in the conservation community and the wider ecological movement.⁶⁸⁶⁹⁷⁰ In the terms of this thesis it is part and parcel of the *dream of naturalism* holding back the green camp of the *ecological class*.

The other proposed starting point of the *Anthropocene*, the *Neolithic Revolution* proves unhelpful for similar reasons as the earlier date. Rudimman argues that greenhouse gas emissions through rice paddies stopped the onset of another ice age and created the stable conditions of the *Holocene*.⁷¹ This claim proves doubtful if we take into account the argument put forward by Mitch and Gosselink. They argue that the GHG emissions of wetlands generally, but rice paddies in particular, have been overestimated due to an underappreciation of the GHG sequestration of wetlands, and rice paddies in the present day. In any case they argue that more research is needed.⁷² In addition, an inception of the *Anthropocene* in the neolithic period contradicts core tenants of conservation where human altered landscapes of premodern countryside, or peasant landscapes – characterized by extensive agricultural systems which tend to form the backbone of the European conservation architecture – enhance ecological production, diversity and resilience.⁷³⁷⁴ This claim requires a critical evaluation in itself. Anthropologists are now largely convinced that swiddening practices, as

⁶⁵ Dahlberg, Frances (Ed.) (1981): *Woman the gatherer*. (Yale University Press, New Haven).

⁶⁶ Milan, Erika Lorraine (2019): *Creatures of Cain. The hunt for human nature in cold war America*. (Princeton University Press, Princeton, Oxford).

⁶⁷ Tsing, Anna Lowenhaupt (2005): *Friction. An Ethnography of Global Connection*. (Princeton University Press, Princeton, Oxford), 173.

⁶⁸ Goderie, Ronald; Helmer, Wouter; (Ed.) (2022): *The Aurochs. Born to be Wild*. Second revised edition (Roodbont, Zutphen), 36.

⁶⁹ Svenning, Jens-Christian (2017): *Future Megafaunas. A Historical Perspective on the potential for a wilder Anthropocene*. In: Tsing, Anna; Swanson, Heather; (Ed.) (2017): *Arts of Living on a damaged planet. Ghosts of the Anthropocene*. (University of Minnesota Press, Minneapolis, London), 67-86.

⁷⁰ Terborgh, John (1999): *Requiem for Nature* (Island Press, Washington D.C.).

⁷¹ Ruddiman, William F.; Guo, Zhengtang (2008): Early rice farming and anomalous methane trends. In: *Quaternary Science Reviews* Vol. 27 No. 13-14, 1291-1295.

⁷² Mitch, William J.; Gosselink, James G. (2015): *Wetlands*. (John Wiley & Sons, Newark), 566f, 583f.

⁷³ Bätzing, Werner (2015): *Die Alpen*. 4th completely revised edition (C. H. Beck, München).

⁷⁴ Tsing, Anna L. (2015): *The mushroom at the end of the world: on the possibility of life in capitalist ruins*. (Princeton University Press, Princeton), 179-190.

much as various forms of pastoralism have contributed to the *flourishing* of ecosystems throughout the *Holocene*.⁷⁵ Therefore, if the *Anthropocene* marks a rupture with these conditions, the early *Anthropocene* does not fulfill this purpose of marking qualitative change. Rather, the neolithic as the beginning of the *Anthropocene* creates a seamless, teleological and gradual flow into the present and at the same time negates the very significant differences between non-state peoples practicing subsistence-agriculture and the historical relations of capital, class and empire and their respective impacts on the earth system.

Two somewhat compatible approaches to the *Anthropocene* are the *Capitalocene* developed by Moore, and the Plantationocene theorized by Tsing, Haraway and others.⁷⁶⁷⁷ Both authors depart from the long sixteenth century and position themselves at a critical distance from the original *Anthropocene* concept. What unites the unqualified *Anthropocene* and early *Anthropocene* is their narration of *Man/Anthropos* as an undivided subject acting on *Nature* as undivided object. What these approaches fail to do is to adequately distinguish between various humans and to highlight the manyfold complex relations between humans and nonhumans in the *Anthropocene*. Through this operation classical '*Green thought*', which is built on a cartesian dualist ontology, neo-Malthusian population dynamics, a reduction of historical change to technology and resource complexes, and finally the abstraction of the condition of scarcity from historical relations of capital, class and empire; fails to adequately address issues of human inequality, justice and intersectionality.⁷⁸⁷⁹

Against this foil Moore develops his theory of *Capitalism* within the web of life as a *world-ecology*. Building on the long tradition of Marxist, feminist and postcolonial scholarship; Moore develops the *Capitalocene* wherein *Capitalism* is embedded in the web of life. As such he shifts our understanding from *Anthropos*, or *Man* as a destructive force, to *Capital* as the cause of the environmental changes associated with the *Anthropocene*. From this perspective, *Capitalism* is a project compelling ever greater quantities of work from humans as well as living

⁷⁵ Tsing, Anna L. (2005): *Friction. An Ethnography of Global Connection*. (Princeton University Press, Princeton, Oxford), 171- 202.

⁷⁶ Moore, Jason W. (2015): *Capitalism in the Web of Life. Ecology and the Accumulation of Capital* (Verso, London, New York).

⁷⁷ Haraway, Donna J. (2015): *Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin*. In: *Environmental Humanities* Vol. 6 (1), 159.165.

⁷⁸ Moore, Jason W. (2015): *Capitalism in the Web of Life. Ecology and the Accumulation of Capital* (Verso, London, New York).

⁷⁹ Haraway, Donna J. (2015): *Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin*. In: *Environmental Humanities* Vol. 6 (1), 159.165.

and nonliving things, to serve the goal of *accumulation*. To Moore the *Anthropocene*, first and foremost, is a crisis of *accumulation*.

While some *historians*, such as Hobsbawm⁸⁰ and Pommeranz⁸¹ would locate the emergency of *Capitalism* and Modernity firmly in the 19th century. Moore⁸², Wallerstein⁸³, Vries⁸⁴ and Quijano⁸⁵ have argued for their respective starting point in the long 16th century. Such byzantine debates between scholars can appear opaque and sometimes even counterproductive, in the case of the *Anthropocene* I hold that these different readings reflect the complexity of diagnosing the *Anthropocene*. In other words, the respective historical *situatedness* makes us see different things. Going beyond a desire for transcendental truth in any one approach, or to see everything from nowhere,⁸⁶ I believe there is sense in tackling the *Anthropocene* from various angles, or rather to hold various strings at once.⁸⁷

This I argue not based on a relativism where everything goes. Rather, I hold it with Holbraad and Pedersen that the reflection on, conceptualization of and experimentation on this *anthropological problem*, rather than the concern with the *really real*; will take us much further in our understanding of '*the really real*'.⁸⁸ It is in keeping with the sociology of science that we understand science and the laboratory, through their shaping of policy, to have taken over the world. Consequently, science and the laboratory have turned the *Anthropocene* into a global experiment at the scale of one to one. Their influence results in the authoritarian governance by scientists and politicians, mostly white, male and Western. To counter these tendencies a shift in our understanding of experiments generally associated with the field

⁸⁰ Hobsbawm, Eric (1994): The Age of Empire 1875-1914. Reprinted in 2014 (Abacus, London).

⁸¹ Pommeranz, Kenneth (2000): The Great Divergence: China, Europe, and the making of the modern world economy. (Princeton University Press, Princeton).

⁸² Moore, Jason W. (2015): Capitalism in the Web of Life. Ecology and the Accumulation of Capital (Verso, London, New York).

⁸³ Wallerstein, Immanuel (2011): The Modern World-System I. Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century. With a New Prologue (University of California Press, Berkeley, Los Angeles, London).

⁸⁴ De Vries, Jan; Van der Woude, Ad (1997): The first modern economy: success, failure, and perseverance of the Dutch economy 1500-1815. (Cambridge University Press, Cambridge, New York).

⁸⁵ Quijano, Anibal (2016): Kolonialität der Macht, Eurozentrismus und Lateinamerika. (Turia + Kand, Wien, Berlin).

⁸⁶ Haraway, Donna J. (1988): Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. In: Feminist Studies Vol.14 No.3, 575-599.

⁸⁷ Haraway, Donna J. (2016): Staying with the trouble: making kin in the Chthulucene. (Duke University Press, Durham).

⁸⁸ Holbraad, Martin; Pedersen, Morten A. (2017): The Ontological Turn. An Anthropological Exposition (Cambridge University Press, Cambridge, New York), 9.

sciences rather than the laboratory is required. Such experiments require the involvement of various publics, the abandonment of full control or exclusive access, and an openness to the immanent properties of the ecologies investigated.⁸⁹ Part of the approach required in the *Anthropocene* as experiment is a speculative approach to the *really real* as outlined by Holbraad and Pedersen. This speculative approach will figure most prominently in the chapter 3.

Building on an understanding of the *Capitalocene*, Anna Tsing, through her description of the early modern tropical sugar plantation takes us deeper into the workings of capitalism. The plantation follows a simple yet terrifying recipe: '*exterminate local people and plants; prepare now-empty, unclaimed land; and bring in exotic and isolated labor and crops for production.*'⁹⁰ As Sidney Mintz has shown, sugarcane plantations were the blueprint for industrial factories and disciplined wage earners.⁹¹ Thus, Tsing argues, the plantation: '*shaped the dreams we have come to call progress and modernity.*' With Tsing we can appreciate how *Capitalism* thrives on scalability, extermination, discipline and the single rhythm of *Progress*. In this respect the sugar plantations in the New World played a central role in the organization of labor and ecologies in ways that continue to impact our contemporary world today. In what Tsing calls the ruins of *Capitalism* – or 'blasted landscapes' – she invites us to pay attention to the '*unruly edges*'. In these she finds contrary to *Anthropos* and his forward march, that every living thing is engaged in *world-making* projects. Together, on a large enough scale, these projects form landscapes over long periods of time. An understanding of *world-making*, beyond the *Anthropos*, is the basis for an understanding of ourselves as humans that goes beyond the domination of *Nature*. In the following chapters, we will engage with the ways that beavers and humans have made and continue to make worlds. Sometimes together, sometimes against each other, but always in relation.

In this chapter we have introduced and discussed the *Anthropocene*. The original diagnosis of the *Anthropocene* was defined through a geologically identifiably stratum, understood as a rupture in *Holocene* conditions expressed through an exponential increase in human impacts

⁸⁹ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 101f.

⁹⁰ Tsing, Anna L. (2015): *The mushroom at the end of the world: on the possibility of life in capitalist ruins.* (Princeton University Press, Princeton), 38.

⁹¹ Mintz, Sidney (1985): *Sweetness and Power. The place of sugar in modern history* (Penguin Books, Harmondsworth).

on the Earth system. The impacts of the *Anthropocene* are so profound as to make obsolete fundamental epistemic categories and knowledge practices of Modernity. Beyond this baseline understanding of the *Anthropocene*, questions of definition and periodization highlight the complexity of grappling with these changes. Both depending on disciplinary background, theoretical orientation, political goals and scholarly questions of periodization. After having discussed several possible ways to grapple with the *Anthropocene*, historically, thematically, ontologically, epistemologically, ethically and politically. I have argued that for understanding beavers in our contemporary world and by extension the role that living things beyond the human have played and continue to play in our contemporary world, *Capital*, the *Columbian exchange* and the *plantation* are the most productive starting points for our purposes. In the following chapter we will engage with one of the most central questions thrown up by the diagnosis of the *Anthropocene*. As humans have become a geological force who shape the Earth System at a planetary scale, is it still sensible to speak of *Nature*?

2. What is Nature?

Let us imagine a riverbank. On this riverbank lie scattered around dozens of branches. Some thick, some thin, some long and some short and everything in between. Now enters a beaver who proceeds to build a beaver lodge by gathering some of the branches as they are and cutting others into proportion by use of their hands, teeth and body. Now enter a person into the same scene. The person themselves proceeds to build a shelter. They gather some of the branches as they are and break some of them to the size desired. Nothing but their hands, arms legs and body are used in building said shelter. The very same material, reworked for the same purpose with the same tools. Now imagine another person equipped with rudimentary stone and wooden tools, building a somewhat more permanent and comfortable shelter making use of nothing but the wood by the riverbank, their body and the tools created from the wood and stones lying around. Let us now imagine a 19th century Canadian woodchuck, who spending the winter in the forest cutting timber builds a log-cabin using the wood of the forest, as well as iron tools to build their cabin. Finally, let us now imagine another beaver in the early 21st century along a stream in the same forest. The forest cut down by the 19th century woodchucks has regrown within a protected area. The river impacted by industrial run off and agricultural fertilizers is polluted and ecologically damaged. Despite restoration efforts following environmental legislation it continues to be polluted and carries a quantity industrially produced debris, mostly plastic. A beaver, who is the direct descendant of a couple of beavers released in the 1990s builds a lodge and gathers branches lying around using some as they are cutting others to size while also makes use of the industrial plastic debris which they incorporate into the dam and lodge.

The question implicit in Theseus beaver, is the same as the question implicit in the old philosophical problem of Theseus ship: When does something, be it a biological entity, an artefact or a process cease to be 'natural' and when does it begin to be 'cultural' or 'artificial'? To make the question slightly easier, if we had to order these five instances of shelter building according to the criterion of most natural to most artificial. In what order would you place them? Before you continue reading, take five minutes to think about it!

Likely most readers would take the first case to be the most natural and the fourth case the least natural. The second case would probably be closer to *Nature* than to *Culture*, but likely

classified as artificial/ cultural. The third case certainly would not be classified as natural, but likely as a form of 'early' or 'primitive' culture. The last case, however, I believe is the most difficult. While it may be the most difficult it is also the most common reality of beavers in central Europe today. I am sure that some would place the last beaver right next to the first, others would find it difficult to decide. Others still, and I count myself amongst them would argue that the exercise itself is futile. At least in the sense of definitely and authoritatively assigning a fixed and stable position to either beavers or humans on the scale between natural and cultural. Why is that? I would like to take the rest of this chapter to explain and make the case for the necessity to abandon *Nature* as a concept, to overhaul basic ontological assumptions and to replace it with a relational ontology of multispecies becoming.

Dualism and the Master Identity

As we have seen, what counts as *Nature*, natural, Culture and cultural depends on perspective. Beyond this basic assertion, the discursive history of the term *Nature* is littered with attempts to introduce hierarchy and legitimize exploitation. More importantly, for conservation the concept of *Nature* has been a central ordering category, the core epistemic and ontological concept. However, in the *Anthropocene*, as we will see below, this concept has ceased to serve a productive function, if ever there was one. At the present historical moment, the concept in fact, does more to obscure a complex reality than to explain it. Therefore, much of the remainder of this chapter is dedicated to criticizing and deconstructing this concept from the perspective of critical social science.

According to Castree a wide array of antonyms comprise what he calls a '*semantic rule book*' which governs verbal and visual representation in modern western philosophy: '*They are the epistemic means by which we assure ourselves that there is a measure of 'ontological hygiene' abroad in the world.*'⁹² In addition, the differences described by these antonyms are understood to be inherent in reality, i.e. normative. They furthermore cast a '*conceptual shadow*' over each other. This means that one defines itself by the opposition to the other (*body-mind, sex-gender, biology- social conventions, human-animal, man-woman, ontology-epistemology, reality-representation, etc.*).⁹³ *Nature* and its collateral terms, then assume

⁹² Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 24.

⁹³ Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 23, 24, 25.

their meanings in the context of the larger family of dualisms. These dualisms bleed into each other, mutually supporting *dualist* epistemics. Hence, through its collateral concepts (environment, *wilderness*, gene, biology, race, sex, biodiversity, animal, ecosystem, etc;) *Nature* thus has sort of a ghostly presence.⁹⁴

Castree argues that these antonyms have a cognitive, moral and aesthetic dimension. As the three registers of meaning can often be enlisted at the same time, the dualistic antonyms of Western thought do not simply divide the world ontologically but also serve a normative function. Instead of describing the world, they present the world as it *ought to be*. This normative dimension means that these concepts are generally not apolitical or innocent.⁹⁵ A further characteristic of these terms is that the content of their meaning is inconsistent through time and space. This means that the meaning of each component of these pairs depends on the intent of the respective actor. Castree calls this '*repertoires of meaning*' which are attached to these categories.⁹⁶

Val Plumwood noted that there is an important distinction between *dualism* proper, and a dichotomy. This is relevant in the light of the primary operation executed by *Nature* thinking in conservation thought where the hierarchical structure of *dualism* is maintained, albeit reversed. Crucially, *technocentrism* relies on, reproduces and solidifies the ontological chasm created by the *modern Constitution*. This operation reflects Plumwoods' core insight that a *dualism* consists in a denied dependency of a subordinated other. Dualism thus both denies the relation of domination and subordination as well as the structure which shapes the identity of both relata. The interrelated field of *dualisms*, which according to Plumwood form an interlocking system wherein each element forms part of a common structure, the '*semantic rule book*' of Castree⁹⁷, this creates what Plumwood calls an '*identity of the master*' predicated on multiple exclusions: '*This perspective constructs these others by exclusion (or some degree of departure from the norm or centre) as some form of nature in contrast to the subject, the*

⁹⁴ Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 18.

⁹⁵ Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 25, 26.

⁹⁶ Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 26, 27.

⁹⁷ Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 24.

*master, who claims for himself both full humanity and reason.*⁹⁸ The identity of the master, according to Plumwood, lies at the heart of western culture. In the creation of the *master identity*, existing forms of difference are ‘*naturalized*’ and hierarchized. What then distinguishes dichotomy from *dualism* is the following. *Dualism* is a systematic construction of the other as inferior coupled to a hierarchical social relationship, which makes ‘*equality and mutuality literally unthinkable*.’⁹⁹¹⁰⁰

Crucially, the subordinated other, further is not merely different but inferior. Through the maximization and hierarchization of differences as well as the elimination of similarities, separate natures in the third sense of Castree, can be postulated through *hyperseparation*. Only through a strong polarization, where continuities are eliminated and only a vacuum remains, can the hierarchy be maintained. In reverse, the more doubtful such a *master identity* is, the more strongly it must be enforced.¹⁰¹ As both the underside, as well as the upper side of a *dualism*, rely on each other, through *incorporation* the former is defined as a lack or negativity vis-à-vis the latter.¹⁰²

It is generally presented, despite rhetoric to the contrary, that the underside must put its interests aside for those of the master. The slave is conceived of as his *instrument*, a means to its ends. The last aspect of *dualism* is the operation by which the underside is made to appear as *homogenous*: ‘*Homogenisation supports both instrumentalism, incorporation (relational definition) and radical exclusion. It produces binarism, a division of the world into two orders*.’¹⁰³ To the master, all the rest are just ‘*the rest*.’¹⁰⁴

These five key features of dualism are regularly applied to the treatment of *Nature* in the second sense of Castree. As has been observed, humans (seldom all) are considered the only proper object of moral consideration, while the rest is considered as expedient. From this arises the ability to treat the world as *instrument* to human needs, as stage to human history, as dump to the metabolism of civilization. The biosphere and its processes are taken for

⁹⁸ Plumwood, Val (1993): *Feminism and the Mastery of Nature* (Routledge, London, New York), 44.

⁹⁹ Plumwood, Val (1993): *Feminism and the Mastery of Nature* (Routledge, London, New York), 47,

¹⁰⁰ Plumwood, Val (1993): *Feminism and the Mastery of Nature* (Routledge, London, New York), 42-48.

¹⁰¹ Plumwood, Val (1993): *Feminism and the Mastery of Nature* (Routledge, London, New York), 50, 51.

¹⁰² Plumwood, Val (1993): *Feminism and the Mastery of Nature* (Routledge, London, New York), 52

¹⁰³ Plumwood, Val (1993): *Feminism and the Mastery of Nature* (Routledge, London, New York), 54.

¹⁰⁴ Plumwood, Val (1993): *Feminism and the Mastery of Nature* (Routledge, London, New York), 53.

granted, they are simply there and its needs need not be considered. This systematic not noticing, not seeing is part and parcel of *backgrounding*.

Nature is a particularly slippery word in that sense. As such Castree further dissects *Nature-as-a-keyword* into four different overarching significations: external, universal, intrinsic, super-ordinate. The first signifies the non-human world, the second designates the entire physical world, while the third carries the meaning of essential quality or the defining property of a thing, lastly the fourth consists in '*the power or force governing some or all living things*'.¹⁰⁵ A further characteristic of *Nature* as a keyword is its spatial and temporal dimension. The spatialization, in the first sense of the word, occurs through imagining *Nature* to be somewhere else, not where we are, but out there, away from human space. In the second sense of the word *Nature* is imagined to be imperceptibly small and everywhere. In the temporalization of *Nature*, which is analogous to its spatialization, *Nature* is imagined as a thing of the past and various forms of social time supersede the rhythms of *Nature*.¹⁰⁶

These complex discursive operations – or *semantic rule book* to borrow Castree's term – are central to the *Yellowstone* or *Fortress Conservation* model. Conservation discourse turns the enlightenment narrative of humanity as separate from – a single, timeless and pure – *Nature* untouched by (modern) humans, whose linear progress yields from increasing control over said *Nature* and its resources, on its head. Where *Nature*, or *wilderness* had to be subjected and made productive in the standard enlightenment narrative, or the *dream of mastery*. Early Conservationists and romanticist writers took the environmental transformations and destructions brought about by industrial capitalism as their point of departure and desired to return to, or conserve *wilderness* i.e. *conservation nature* in their *dream of naturalism*.¹⁰⁷

Both approaches reproduce the *Nature-Anthropos dualism*, share a totalizing anthropocentric belief and a linear understanding of time. At the same time, they both neglect *Anthropos'* persistent vulnerabilities to *geopowers* and downplay the resilience of other than human life. Both locate the moment of the fall in the nineteenth century and ontologically extract modern people from *Nature* by imagining a pure and ahistorical *Nature* untouched by human hands

¹⁰⁵ Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 9f.

¹⁰⁶ Castree, Noel (2014): Making sense of Nature. Representation, politics and democracy. (Routledge, London, New York), 11-15.

¹⁰⁷ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 22.

i.e. *wilderness*. Politically both approaches create a common 'us' which legitimates authoritarian intervention, where the first denies nonhumans a claim to the planet and the second holds no place for the domesticated and feral.¹⁰⁸

Anthropos, once conceived as a destructive force separate from *Nature*. In order to protect *Nature* or what remains of it, would have to be separated, delineated and protected from human destructiveness. These wild spaces, or *wilderness*, were conceived of as the antithesis to the human order of the city, civilization and progress. *Nature* thus became *spatialized*, in a cartesian topology of the territory materialized in conservation areas and national parks. Configured as the antithesis of human progress, *Nature* was coded as pre-modern, or pre-present, and thus *temporalized*. This discursive representation of Nature served as a pretext for displacement of indigenous people and subsequent colonization since the 16th century.¹⁰⁹¹¹⁰¹¹¹ Through the creation of the first National Parks, *Nature* became demarcated in space and marked in time as *conservation nature* where the permissible roles of humans are reduced to tourists consuming *Nature*, scientists studying *Nature*, and park management enforcing *conservation nature*.¹¹² Ironically, this newly minted positive understanding of *Nature*, in turn has been used to legitimize the displacement of indigenous peoples, this time in the name of conservation.¹¹³ A further central component to *conservation nature* is the assumption that *Nature* can be objectively known through science and defended and restored through management.¹¹⁴ *Wilderness*, thus conceived and enforced becomes an operative force with a *normative dimension* circularly working from and towards an *ontological hygiene*, actively taking apart the complex fabric of an ontologically *hybrid* world.

¹⁰⁸ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 22.

¹⁰⁹ Todorov, Tzvetan; (1991): *La conquete de l'Amérique: la question de l'autre*. (Éd. du Seuil, Paris).

¹¹⁰ Cronon, William (1996): *The Trouble with Wilderness; or, Getting Back to the Wrong Nature*. In: Cronon, William (ed.): *Uncommon Ground. Rethinking the Human Place in Nature* (W.W. Norton, New York).

¹¹¹ Adams, Jonathan S.; McShane, Thomas. O. (1992): *The Myth of Wild Africa: Conservation Without Illusion*. (2nd edition). (University of California press, Berkeley).

¹¹² Luig, Ute (2002): *Die Victoriafälle. Touristische Eroberung, Vermarktung und Inszenierung von Natur*. In: Luig, Ute; Schulz, Hans-Dietrich (Ed.). *Natur in der Moderne. Interdisziplinäre Ansichten*. (Geographisches Institut der Humboldt Universität, Berlin), 225-275.

¹¹³ Jacoby, Karl (2001): *Crimes against Nature, Squatters, Poachers, Thieves, and the Hidden History of American Conservation* (University of California Press, Berkley, London).

¹¹⁴ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 1f.

Technocentrism as environmental *common sense*

The environmental *common sense* dominant in Europe and its colonies, as I have argued, is built on a *master identity*, and not limited to conservation thinking. The dominant modes of relating to *Nature*, the *dream of mastery* and the *dream of naturalism* both emerge from what Pepper has called *technocentrism*. The default for environmental relations in the global North.¹¹⁵ To Pepper, *Technocentrism* has five basic tenets: 1. What is truly real is mathematical and measurable, what cannot be measured cannot have true existence. This is based on a distinction between *primary qualities* (shape, size, position, motion, quantity) and *secondary qualities* (colour, taste, smell, sound). The first are understood to be measurable and *objectively* 'out there' the second are understood as only existing in our minds 'in here' and hence *subjective*. 2. Objective knowledge is 'true', and correct, while subjective knowledge is not. In a circular argument, since some knowledge is truly objective, it is free of the interests of a person, or a group and hence it can be trusted. The birth of the *god trick*.¹¹⁶ 3. The Cartesian dualism of mind and matter, wherein objects (including nonhuman life) are ontologically separated from humans. 4. Laws thus discovered are universal, the truths of this method are *Truth*. 5. The progress of science is equitable with human progress.¹¹⁷¹¹⁸

Carolyn Merchant discusses the historical origins of *technocentrism*. She argues that the material changes in relationships between humans and the nonhuman world, as well as between humans, were paralleled by and in a dialectical relationship with changes in the ontological assumptions of early modern philosophers. In the context of the generalized upheavals of the early modern period, the earlier organic model of *Nature* was replaced by the machine model. Where the older model was a nurturing female world of parallel cosmic and social hierarchies, the new machine model was inspired by the technological advances and the mechanical laws of the *scientific revolution*. Order was now based on the predictable behavior of parts determined by a system of rational laws. Reality in the sense of the self,

¹¹⁵ Pepper, David (1996): *Modern Environmentalism. An Introduction* (Routledge, London, New York), 124.

¹¹⁶ Harraway, Donna J. (1988): *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*. In: *Feminist Studies* Vol.14 (3), 575-599.

¹¹⁷ Pepper, David (1996): *Modern Environmentalism. An Introduction* (Routledge, London, New York), 138, 139, 142, 145).

¹¹⁸ Much of the animosity between the natural and social sciences stems from these ontological and epistemic assumptions. Latour has engaged with this issue by differentiating the purview of natural science as concerned with matters of fact, while the social sciences and humanities are concerned with matters of concern. See: Latour, Bruno (2004): *Politics of Nature. How to Bring the Sciences into Democracy*. Translated by Catherine Porter (Harvard University Press, Cambridge, Massachusetts, London, England).

society and the cosmos; came to be redefined through the machine and clock metaphor.¹¹⁹ Merchant argues that in *technocentrism* order and power become the basis for control:

*'As Descartes wrote to Mersenne in 1630, "God sets up mathematical laws in nature as a king sets up laws in his kingdom."' 120 And the machine metaphor becomes the guiding metaphor of this new cosmology. What previously had formed an integrated, living and organic whole; now becomes dead, isolated matter, (...) 'Nature, society, and the human body are composed of interchangeable atomized parts that can be repaired or replaced from outside.'*¹²¹

With this reconstitution of the world as machine and the removal of animistic and organic ontological assumptions, the eponymic Death of *Nature* was thus achieved as a side effect of the *scientific revolution*.¹²² A key component of Merchant's understanding is the metaphorical homology between women and *Nature*. Merchant famously stresses Francis Bacon's metaphors of control and torture as the basis for advancing scientific knowledge in analogy to the practices of the contemporary witch trials: *'For Bacon, (...) sexual politics helped to structure the nature of the empirical method that would produce a new form of knowledge and a new ideology of objectivity seemingly devoid of cultural and political assumptions.'*¹²³ According to Merchant, thinkers like Francis Bacon conceived of both *Nature* and women as imbued with unruliness requiring subjugation, domination and control. In her analysis Merchant ties together the subjugation of women, *Nature*, the colonized and communally organized subsistence farmers in Europe; and adds *Nature* as a fourth to the intersectional triad of *Race, Class, Gender*. In her explanation *Organic Nature* was displaced by the *mechanic Nature* of *technocentrism*, precisely because it provides an ideological corollary to the activities capital, the state and empire. One of the great strengths of *technocentrism*, then lies in its function as justifying power over *Nature*, and Society.¹²⁴

¹¹⁹ Merchant, Carolyn (1980): *The Death of Nature: Women, Ecology, and the Scientific Revolution*. 40th anniversary Edition (Harper Collins Books, New York).

¹²⁰ Merchant, Carolyn (1980): *The Death of Nature: Women, Ecology, and the Scientific Revolution*. 40th anniversary Edition (Harper Collins Books, New York), 205.

¹²¹ Merchant, Carolyn (1980): *The Death of Nature: Women, Ecology, and the Scientific Revolution*. 40th anniversary Edition (Harper Collins Books, New York), 193.

¹²² Merchant, Carolyn (1980): *The Death of Nature: Women, Ecology, and the Scientific Revolution*. 40th anniversary Edition (Harper Collins Books, New York), 155, 192, 193, 227.

¹²³ Merchant, Carolyn (1980): *The Death of Nature: Women, Ecology, and the Scientific Revolution*. 40th anniversary Edition (Harper Collins Books, New York), 172.

¹²⁴ Merchant, Carolyn (1980): *The Death of Nature: Women, Ecology, and the Scientific Revolution*. 40th anniversary Edition (Harper Collins Books, New York), 215.

Let us thus define *technocentrism* in the following way: *technocentrism* constructs the natural and social world in parallel. Both consist in atomized, distinct, countable individuals. They are made of dead matter, with objective and knowable qualities, who precede their relations. These atomized individuals form part of larger systems which function according to mechanical laws wherein individual parts can be replaced without destroying the larger entity. These laws can be known through objective science. Which in turn provides the ability to control these entities. Through an increase in knowledge and control of the world human society advances in time conceived of as linear. As the knowledge produced by scientists is objective, it is presented as free of personal or subjective interest, per default. *Technocentrism* further relies heavily on the creation of a master identity through the interlocking system of *dualisms* such as: mind: matter, objective: subjective, human: animal, nature: culture. *Technocentrism* ultimately serves to rationalize and legitimize a specific kind of knowledge about the world, the purpose of which it is to control and subjugate a more than human world. At the same time *technocentrist* knowledge serves to denigrate and devalue other kinds of knowledges.

Wilderness, countryside, the city and the Fortress

Conservation outside of Europe takes the form of the *Fortress*, also known as the *Yellowstone model*.¹²⁵ The lead metaphor for *Fortress Conservation* is *wilderness*. In Europe the premodern countryside serves as the lead metaphor. A combination of science, romantic iconography, ties together aristocratic as well as bourgeoisie philanthropic patronage, state and civil society bureaucracy; and since the 1990s an increasing, though ambivalent, embrace of the market.¹²⁶

A key feature of *Fortress Conservation*, or the *Yellowstone model* as it emerged in the 19th century, particularly in the form of national parks, was the displacement and dispossession of local peoples. Particularly in Southern Africa, the expansion of *conservation* took place in the context of intensive commercial (both European and African) as well as aristocratic (white) hunting for sport, on African big game. Legislation, enclosures and later national parks regulated access to land prohibiting both subsistence as well as commercial hunting, while reserving game for sport, trophies and the elites of empire. National parks, thus emerged as a

¹²⁵ Jacoby Karl (2001): *Crimes against Nature, Squatters, Poachers, Thieves, and the Hidden History of American Conservation* (University of California Press, Berkley, Los Angeles, London).

¹²⁶ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 5.

new form of land use, producing and often violently imposing entirely new human Nature relationships in their wake.¹²⁷

The normative dimension of *Fortress Conservation* becomes particularly fungible in the colonial encounter where the conceptual shadow of the larger family of dualisms – that interlocking system – exerts its ghostly presence. The conception of *Anthropos* as separate from and inherently destructive of *Nature* was originally modelled on modern (white) upper class *Man* (henceforth *Anthropos*). In the *technocentrist common sense* underpinning much of *conservation* thought to this day, the category of *Anthropos* as separate from and destructive of *Nature* has been extended to indigenous, and local populations. In some narratives it is humans per se irrespective of their ecological or environmental impact, political or economic position within the modern *world-system*, who are destructive of *Nature*. In these narratives the fact of rising population numbers and their growing resource consumption is presented as the root cause of the ecological crisis.¹²⁸¹²⁹

Against this backdrop the concept of *wilderness* offers a powerful imagery for *conservation*. Natural by virtue of being untouched by humans, *wilderness* is presented as pure and ahistorical. A consequence of this discursive extraction of humans from *Nature*, has been the material, often violently enforced *purification* of *conservation nature*. Thus, a key feature of *Fortress Conservation* as it emerged in the 19th century, particularly in the form of national parks, has been the displacement and dispossession of local peoples. As they upset the *ontological hygiene* required and enforced by *conservation nature*.¹³⁰¹³¹¹³² The normative dimension inherent to the key concepts in *Fortress Conservation*, particularly in the colonial encounter, have often led to the escalation of violence between park management and local and indigenous groups. Jacoby even argues that *conservation*, despite its dispassionate and scientific approach, through its insistence on technocratic top-down decision-making was part

¹²⁷ Adams, William M. (2004): *Against Extinction. The story of Conservation* (London, New York, Earthscan).

¹²⁸ Terborgh, John (1999): *Requiem for Nature* (Island Press, Washington D.C.).

¹²⁹ Hardin, Garrett (1947): 'Lifeboat Ethics': The Case Against helping the poor. In: *Psychology Today* Vol. 8, 38-43.

¹³⁰ Jacoby Karl (2001): *Crimes against Nature, Squatters, Poachers, Thieves, and the Hidden History of American Conservation* (University of California Press, Berkley, Los Angeles, London).

¹³¹ Nustad, Knut (2015): *Creating Africas, Struggles Over Nature Conservation and Land* (Hurst & Company, London).

¹³² Adams, Jonathan S.; McShane, Thomas. O. (1992): *The Myth of Wild Africa: Conservation Without Illusion*. (2nd edition). (University of California press, Berkeley).

of and facilitated '*the rise of the modern administrative state*'.¹³³ In the colonial encounter, *conservation nature* thus emerged as a new form of land use, producing and often violently imposing entirely new *discursive practices* which structured the ways in which humans related and were able to relate to the nonhuman world.¹³⁴ In a famous essay '*The problem with wilderness*' the environmental historian William Cronon points out the impossibility of *wilderness*, just as Adams and McShane have done in their book '*The Myth of Wild Africa*'. In both works, the authors discuss the deliberate strategies of erasing indigenous peoples from landscapes known by conservation as *wilderness*; and point out the political and ecological problems of *wilderness* as a conservation strategy.^{135 136}

In Europe, the situation has been different. *Wilderness* has been spatially exteriorized into the Global South and to a lesser degree North America. This created a topology of *Culture* in Europe and *Nature* in the Global South. As a result *conservation* in Europe seeks to preserve *Nature* in the form of a *premodern countryside*. This *countryside* and its Germanic and Romance cognates (*Kulturlandschaft* (German), *campo* (Spanish), *champagne* (French);) is figured as a locus of pre-modern harmony between peasants and *Nature*; upset by the industrial city.¹³⁷

In practice *conservation* remains mostly reactive, aiming to preserve '*fixed Nature*' from modern, urban and industrial society in national parks or similar conservation areas. Yet, premodern landscape ecologies preserved in this context are often the result of historic injustices and violent forms of dispossession producing unequal structures of land ownership and accumulation. Further, this approach to *conservation* is conservative in the sense that it does not provide a vision for the future. Consequently Lorimer speaks of *conservation* as managing the slow decline of biodiversity.¹³⁸

¹³³ Jacoby Karl (2001): Crimes against Nature, Squatters, Poachers, Thieves, and the Hidden History of American Conservation (University of California Press, Berkley, Los Angeles, London), 5.

¹³⁴ Williams, Adams M (2004): Against Extinction. The story of Conservation (London, New York, Earthscan).

¹³⁵ Cronon, William (1996): The Trouble with Wilderness; or, Getting Back to the Wrong Nature. In: Cronon, William (ed.): Uncommon Ground. Rethinking the Human Place in Nature (W.W. Norton, New York).

¹³⁶ Adams, Jonathan S.; McShane, Thomas. O. (1992): The Myth of Wild Africa: Conservation Without Illusion. (2nd edition). (University of California press, Berkeley).

¹³⁷ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 5.

¹³⁸ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 96.

Cronon analyses the case of Chicago and its hinterland, the Great American West. In deconstructing the city-countryside dichotomy, Cronon highlights the key issue at the heart of Fortress Conservation:

'And therein lies our dilemma: however, we may feel about the urban world which is the most visible symbol of our human power – whether we celebrate the city or revile it, whether we wish to “control” nature or “preserve” it – we unconsciously affirm our belief that we ourselves are unnatural. Nature is the place where we are not. The oddity of this belief becomes most evident when we try to apply it to an actual place and time in history. At what moment, exactly, did the city of Chicago cease to be part of nature?’¹³⁹

Against the *common sense* operation of the city-countryside *dualism*, Cronon writes the history of Chicago as one of the *city-with-its-countryside*. Far from being isolated and radically different, not despite but precisely because of its role, as the central terminus of rail lines, with its canals, lake and ocean traffic, its stock exchange, grain, lumber and meat trades, industries and industrial manufacture; Chicago was the *central place* of the American West that tied it together. People and materials flowed in and out of the city, which in turn sent finished goods and capital back into the countryside and influenced the work and land use patterns of farmers and thus remade the prairies and forests, humans and nonhumans throughout the American West.¹⁴⁰

With Cronon we have come full circle, back to the initial question of this chapter: *What is Nature?* And when does an entity cease to be natural? In keeping with the preceding deconstruction of *Nature*, we can no longer speak of a *Nature* that *is*. Rather *Nature*, in the sense of *conservation nature* is an *emergent process*. An area then becomes *conservation nature*, and can be perceived as *wilderness*, via the enactment of *conservation nature* through by the legal and bureaucratic apparatus of a nation state or colonial empire. The knowledge practices of scientists convey authority, university textbooks and courses inscribe *conservation nature*, while ‘*romantic nature writing*’ in tourist guidebooks, or public conservation documents produce powerful imaginaries. Conservationists and activists reproduce these imaginaries by relying on the authority of science and the emotional appeal of a romanticized

¹³⁹ Cronon, William (1991): *Nature's Metropolis, Chicago and the Great West* (W.W.Norton and Company, New York, London), 17.

¹⁴⁰ Cronon, William (1991): *Nature's Metropolis, Chicago and the Great West* (W.W.Norton and Company, New York, London), 17.

wilderness in societal struggles. Once an area has been designated as *conservation nature*, the presence of humans is erased or assimilated into *Nature* and frozen in a time before modernity on a discursive level. At the same time material transgressions against *conservation nature* are met with violence.¹⁴¹ In summary an area becomes conservation nature through the simple formula of: *people out, nature in*.

Conservation as ecological modernization

By the 1980s the first wave of the environmental movement had abated. Conservation despite great efforts had not been able to stem the tide of overhunting, habitat loss and extinction. Demands for changes to the conservation approach became louder and more urgent.¹⁴² International development was undergoing a similar crisis. Heralded as a great effort to end poverty and inequality in the late 1940s, forty years and millions of dollars later, no relevant results had been delivered.¹⁴³ Faced with this dual crisis practitioners attempted to kill two birds with one stone and solve both crises with the introduction of *sustainable development*. From now on development should further both human livelihood as well as environmental well-being.

The global environmental governance framework in place today is based on the United Nations Earth Summit in Rio de Janeiro 1992/93. This conference saw the signing of the Convention on Biodiversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD) as well as the publication of Agenda 21.¹⁴⁴ These changes heralded the period of *sustainable development* which aims to reconcile economic growth and human well-being with the environment. A new key term in the context of this form of environmental governance was biodiversity, with the intent to galvanize and rationalize existing conservation.

Adams distinguishes three strands of *mainstream sustainable development*: *market environmentalism*, *ecological modernization* and *environmental populism*. Only the first two

¹⁴¹ Nustad, Knut (2015): Creating Africa's, Struggles Over Nature Conservation and Land (Hurst & Company, London).

¹⁴² Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York).

¹⁴³ Escobar, Arturo (2012): Encountering Development. The Making and Unmaking of the Third World. Paperback issue with a new foreword by the author (Princeton University Press, Princeton).

¹⁴⁴ Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York), 86, 91, 92.

will concern us here. *Market environmentalism* is essentially a business-as-usual agenda that presents the *market* as the most important mechanism mediating between people and the environment. Environmental issues are the result of a misallocation of resources, particularly in the form of open-access resources. Privatization and market penetration are the central solutions presented. '*Natural*' capital is not presented as necessary to sustain '*human-made*' capital, rather the two are thought of as unrelated. This approach further does not admit to the existence of a fundamental environmental crisis.¹⁴⁵

Ecological modernization on the other hand, presents environmental issues as a failure in rational management. Procedural changes and technological improvements are the basis of a partnership between the state, private enterprise, market-based incentives, cooperative voluntary and self-regulatory approaches. At the core of this approach lies a utilitarian view of science and its potential in application to '*solve*' human problems, through rationalizing the interactions between humans and non-human nature, to suit human ends.¹⁴⁶ Merchant traces the historical genealogy of this managerial approach to *Nature* to western Europe in the 17th century. The *technocentrist* framework with its emphasis of power and control over society and *Nature* gave rise to a utilitarian ethic of responsible management for long-term human benefit and sustained yields.¹⁴⁷ Instead of reacting to environmental problems, integrated, predictive and holistic frameworks avoiding environmental problems in the first place are envisioned.¹⁴⁸ In the 20th century this approach materializes through '*green capitalism*' or '*green consumerism*'. *Ecological modernization* allows for a lot of room to continue business-as-usual, while at the same time presenting rhetoric to co-opt and manage ecological dissent. This approach became enshrined in the Rio conference and today forms the mainstream for transnational institutions such as the United Nations or the EU, particularly since the publication of the EU Commissions' *Green Deal*.¹⁴⁹¹⁵⁰

¹⁴⁵ Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York), 104, 105, 110.

¹⁴⁶ Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York), 111.

¹⁴⁷ Merchant, Carolyn (1980): The Death of Nature: Women, Ecology, and the Scientific Revolution. 40th anniversary Edition (Harper Collins Books, New York), 234, 235, 239.

¹⁴⁸ Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York), 112.

¹⁴⁹ Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York), 110, 111, 112.

¹⁵⁰ https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

On a methodological level, the goal of environmental economics is to value environmental resources, thereby making them economically legible and making it possible to include environmental resources in conventional economic decisions.¹⁵¹ From this follows a distinction between ‘*human-made capital*’ and ‘*natural capital*’. While the former is capital in the traditional sense, the other is seen as created by bio-geophysical processes. It furthermore represents the environment’s crucial role in providing for human needs, i.e. the range of ecosystem services.¹⁵²

The concept of *ecosystem services* first appeared in the Millenium Ecosystem Assessment in 2006.¹⁵³ This concept builds on the *common sense* understanding that humans, as biological organisms are dependent on various earth systems and processes, such as: the atmosphere, soils, nutrient cycling etc;. The millennium ecosystem assessment defines *ecosystem services* as ‘(...) *the benefits people obtain from ecosystems*’.¹⁵⁴ The services that these systems provide are called *ecosystem services* and are divided into three categories: 1. *Provisioning* (food, timber, water, fiber, genetic resources) 2. *Regulating* (air quality, water purification, waste regulation, flood protection disease regulation, pest regulation, pollination, natural hazard regulation) 3. *Cultural* (spiritual enrichment, recreation, ecotourism, and cultural heritage). The benefit of *ecosystem services* as a concept, as far as its proponents argue, is that it can be used to better illustrate to economists, policy makers or anyone not particularly familiar with the science of ecology, the trade-offs involved in land use change and to put a price tag on the trade-offs involved.

A Marxist perspective on Ecosystem Services

Alleging that the status quo of capitalism, colonialism, patriarchy and empire goes largely unchallenged in mainstream sustainable development. Büscher, along with a plethora of other authors suggests that the embrace of *sustainable development*, and *conservation* more specifically by the capitalist system, is a sign that environmental issues are increasingly being

¹⁵¹ Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York), 117.

¹⁵² Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York), 117, 118.

¹⁵³ *Millenium Ecosystem Assessment* (2005): Ecosystems and Human Well-Being: Synthesis. (Island Press, Washington DC).

¹⁵⁴ *Millenium Ecosystem Assessment* (2005): Ecosystems and Human Well-Being: Synthesis. (Island Press, Washington DC), 26.

accepted as a reality. At the same sustainable development is understood as an attempt to make *Nature* a part of the capitalist system by giving 'value' to *conservation*. Contrary to widely held belief, these authors argue that the co-optation of conservation serves as a new opportunity of capitalist expansion and ultimately does little to alleviate the situation conservation was meant to address. This takes place through the commodification of parts of *Nature* thereby facilitating its uptake in capital circulation, i.e. '*nature on the move*', or '*liquid nature*'.¹⁵⁵ This wider process as it applies to conservation has been called '*neoliberal conservation*'.¹⁵⁶¹⁵⁷¹⁵⁸¹⁵⁹¹⁶⁰¹⁶¹ A project famously summarized by McAfee as: '*selling nature to save it*'.¹⁶² Neoliberalism, is defined as '*(...) a political ideology that aims to subject political, social and ecological affairs to capitalist market dynamics*'.¹⁶³

To account for *Nature* and its services, *Nature* is brought into capitalism through neoclassical economic tactics. As fixed capital, *Nature* is assigned value through its services. The complex underlying bio-geophysical processes are assigned monetary value through a valuation model. This process is not only complicated – arguably it involves more speculation than '*measuring*' and '*valuing*' –crucially the evaluation of *ecosystem services* seeks to '*assign quantitatively comparable values to qualitatively incommensurable conditions and relationships*'.¹⁶⁴

¹⁵⁵ *Büscher, Bram* (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: *Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.)* (2014): *Nature™ Inc. Environmental Conservation in the Neoliberal Age*. (University of Arizona Press, Tucson Arizona), 184.

¹⁵⁶ *McAfee, Kathleen* (1999): Selling nature to save it? Biodiversity and green developmentalism. In: *Environment and Planning D: Society and Space*, Vol. 17 (2), 133-154.

¹⁵⁷ *Sullivan, Sian* (2013): Banking Nature? The Spectacular Financialisation of Environmental Conservation. In: *Antipode*, Vol.45 (1), 198-217.

¹⁵⁸ *Brockington, Dan; Igoe, James; Neves, Katja* (2010): A Spectacular Eco-Tour Around the Historic Bloc: Theorising the Convergence of Biodiversity Conservation and Capitalist Expansion. In: *Antipode*, 42, (3), 486-512.

¹⁵⁹ *Büscher, Bram et al.* (2012): Towards a Synthesized Critique of Neoliberal Biodiversity Conservation. In: *Capitalism Nature Socialism*, Vol. 23 (2), 4-30.

¹⁶⁰ *Castree, Noel* (2010): Neoliberalism and the Biophysical Environment: A Synthesis and Evaluation of the Research. In: *Environment and Society*, Vol. 1, 5-45.

¹⁶¹ *Büscher, Bram; Dressler, Wolfgang; Fletcher, Robert* (2014): *Nature™ Inc. Environmental Conservation in the Neoliberal Age*. (University of Arizona Press, Tucson Arizona).

¹⁶² *McAfee, Kathleen* (1999): Selling nature to save it? Biodiversity and green developmentalism. In: *Environment and Planning D: Society and Space*, Vol. 17 (2), 133-154.

¹⁶³ *Büscher, Bram et al.* (2012): Towards a Synthesized Critique of Neoliberal Biodiversity Conservation. In: *Capitalism Nature Socialism*, Vol. 23 (2), 5.

¹⁶⁴ *Bram, Büscher* (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: *Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.)* (2014): *Nature™ Inc. Environmental Conservation in the Neoliberal Age*. (University of Arizona Press, Tucson Arizona), 193.

The valuation of ecosystems consequently encounters a number of problems. First and foremost, as Burkett argues, *Nature* cannot be disaggregated into ‘discrete and homogenous value units’. Further, the irreversibility of some processes, such as extinction, the destruction of peatlands, old-growth forests or even a stable climate cannot be reversed or replaced.¹⁶⁵ At least not at a time-scale relevant to anybody alive today. As a reminder, the peatlands fuelling the Dutch economy in the 16th century took 10.000 years to grow.¹⁶⁶¹⁶⁷ A species once extinct, will remain extinct even if attempts at resurrection are undertaken. Related to this point is the fact that many Ecosystems and their ‘services’ are not sufficiently understood.¹⁶⁸ Further, as manifold experiences show, higher prices for scarce, and prestigious plants and animals may increase degradation.¹⁶⁹¹⁷⁰ In addition, prices are formed through complex ways, not necessarily corresponding to increasing scarcity. Lastly, and possibly most importantly, monetization introduces a tension between money’s limitlessness and the limits of material wealth.¹⁷¹ Beyond the difficulties and inadequacy involved in the valuation of *ecosystem services*, further issues pile up. Most environmental goods are not subject to market relations but are held in common. Just think of the air we breathe. In addition, where market relations exist, the environment is generally treated as an externality. Most importantly, where valuations for *ecosystem services* exist, they are criticized as speculative and useless. Just consider the landmark study of Constanza et al. who estimated the global value of *ecosystem services* in 1997, at somewhere between US\$16 and US\$54 trillion.¹⁷² In comparison, the global GDP, excluding *ecosystem services*, was estimated by the IMF at US\$115.49 trillion in 2024.¹⁷³

¹⁶⁵ Burkett, Paul (2009): *Marxism and ecological economics. Toward a red and green political economy* (Haymarket Books, Chicago), 122-24.

¹⁶⁶ De Vries, Jan; Woude, Ad van der (1997): *The first modern economy: success, failure, and perseverance of the Dutch economy 1500-1815*. (Cambridge University Press, Cambridge, New York).

¹⁶⁷ Mitch, William J.; Gosselink, James G. (2015): *Wetlands*. (John Wiley & Sons, Newark), 440.

¹⁶⁸ Adams, William M. (2001): *Green Development. Environment and sustainability in the Third World*. 2nd edition (Routledge, London, New York), 118, 120.

¹⁶⁹ Dalerum, Fredrik et al. (2018): Effects of scarcity, aesthetics and ecology on wildlife auction prices of large African mammals. In: *Ambio* Vol.45, 78-85.

¹⁷⁰ Veríssimo, Diogo; Sas-Rofles, Michael; Glikman, Jenny A. (2020): Influencing consumer demand is vital for tackling the illegal wildlife trade. In: *People and Nature*, 872-876.

¹⁷¹ Burkett, Paul (2009): *Marxism and ecological economics. Toward a red and green political economy* (Haymarket Books, Chicago), 122-24.

¹⁷² Costanza et al. (1997): The value of the world’s ecosystem services and natural capital. In: *Ecological Economics*, Vol.25, 3-15.

¹⁷³ <https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD/AFQ> (last accessed: 20.04.25; 13:51).

An additional issue of *ecosystem services* is that it bases the prices of environmental assets on their potential international marketability and thus systematically underestimates the value of *Nature* to people whose purchasing power is low. McAfee calls this the environmentalist equivalent of measuring progress in development in GDP. Based on the irreducibility of social and ecological systems, the practice of pricing becomes meaningless, given existing global inequalities, especially in purchasing power. If actors in the global North price aspects of the environment in the global South, the ascribed value of any given resource will be directed from the global North. In the words of McAfee:

*"It is simply not meaningful to weigh the amount that a professional earning US\$ 60.000 a year is 'willing to pay' for the continued existence of a tropical ecosystem against the 'willingness to accept compensation' for the loss of his or her ancestral homeland of a resident of that same ecosystem who has little or no cash income, and a vastly different world view."*¹⁷⁴

While the valuation of *ecosystem services* and their monetization is problematic if not futile and false, Büscher argues that this is only the starting point for *Nature* in capital circulation.¹⁷⁵ The goal is sufficient 'liquidity'. Such a state is achieved once assets can be traded with minimal effect on price levels. In order to be able to do so commodities must be fully transferable, a fundamental problem for environmental services. '*Conservation derivatives*' are intended to solve this problem, by financializing *conservation* and subjecting it to market exchange.¹⁷⁶ The expanded commodification of *conservation* in ideal terms is expressed by Büscher in the following way: '*The platonic ideal of liquid nature is one in which monetized forms would be completely free from the material contexts and relationships that produced them.*'¹⁷⁷ The standardization and rationalization this entails amounts to a near total separation between the

¹⁷⁴ McAfee, Kathleen (1999): Selling nature to save it? Biodiversity and green developmentalism. In: Environment and Planning D: Society and Space, 17 (2), 139.

¹⁷⁵ Büscher, Bram (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.) (2014): Nature™ Inc. Environmental Conservation in the Neoliberal Age. (University of Arizona Press, Tuscon Arizona), 195.

¹⁷⁶ Büscher, Bram (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.) (2014): Nature™ Inc. Environmental Conservation in the Neoliberal Age. (University of Arizona Press, Tuscon Arizona), 196, 197.

¹⁷⁷ Büscher, Bram (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.) (2014): Nature™ Inc. Environmental Conservation in the Neoliberal Age. (University of Arizona Press, Tuscon Arizona), 197.

circulation of *liquid nature* and the actual biophysical realities that produced it in the first place. Fully realized '*fictitious conservation*'.¹⁷⁸ The danger Büscher sees here, is that '*fictitious conservation*', increasingly subsumes and is alienated from other forms of *conservation*. In addition, the more *conservation* becomes part and parcel of capitalist expansion it will increasingly be unable to counteract the '*second contradiction*' i.e. the degradation of its ecological foundations it was meant to alleviate in the first place.¹⁷⁹ Büscher surmises that neoliberal conservation as enshrined in the Rio documents, beyond not being able to alleviate biodiversity loss and environmental degradation, also reifies and increases North South inequalities.¹⁸⁰ This narrative unfortunately is credible as the history of *conservation* has been intimately linked to the expansion of capitalism and colonialism.

Through this critical analysis Büscher – and the Marxist school more broadly – situate sustainable development and its expression in *conservation* through the language of *ecosystem services* within the historic *capitalist world-system*. In doing so the Marxist school cautions against a naiveté often found amongst those working in *conservation* who, despite their scientific credentials, lack the ability for a social or historical analysis of *conservation*. As mentioned in our discussion of the *Anthropocene*, different conceptualizations of the *Anthropocene* depend on institutional, epistemic, disciplinary and anthropological commitments. However, the compartmentalization of knowledge wherein the sciences cover '*matters of fact*' while the social sciences cover '*matters of concern*' has become untenable. In consequence those working on *conservation*, be they academics, practitioners or activists; must arrive at an understanding that goes beyond the unproblematic sociobiological subject of *Anthropos* informing much of traditional '*Green thought*'.

The first step in doing so is to recognize the historical relations of capital, class and empire; in creating systemic conditions for *Capital* to be the destructive force associated with the

¹⁷⁸ Büscher, Bram (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.) (2014): Nature™ Inc. Environmental Conservation in the Neoliberal Age. (University of Arizona Press, Tuscon Arizona), 198, 199.

¹⁷⁹ Büscher, Bram (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.) (2014): Nature™ Inc. Environmental Conservation in the Neoliberal Age. (University of Arizona Press, Tuscon Arizona), 199.

¹⁸⁰ Büscher, Bram (2014): Nature on the Move I. The Value and Circulation of Liquid Nature and the Emergence of Fictitious Conservation. In: Bram, Büscher; Dressler, Wolfgang; Fletcher, Robert (Ed.) (2014): Nature™ Inc. Environmental Conservation in the Neoliberal Age. (University of Arizona Press, Tuscon Arizona), 183, 184.

Anthropocene. Once we come to a shared understanding that the current political-economic system is geared towards compelling ever greater quantities of work from humans as well as living and non-living things, in service of accumulation, then can we begin to amend the legacy of the historic entanglements of *conservation* with colonialism, the dispossession of land and the counterproductive effects of pursuing *conservation* against, rather than with people.

However, despite this important contribution of the Marxist school to the debate on *conservation*, the likes of Büscher fail to address the remaining potential for resistance to Capital and empire in the belly of *conservation*.¹⁸¹ By not addressing the urgency of action in the face of the sixth mass extinction, and by explicating the benefits to subaltern peoples via maintaining a *livable planet*, they fail to provide a practicable ways of addressing the current moment.¹⁸² Büscher, therefore appears to remain exclusively concerned with '*matters of concern*' failing to address '*matters of fact*' those he critiques are guilty of the inverse. Consequently, by pitting *conservation* against people both groups reproduce the *technocentrist* notion of people vs. *Nature*.

Feminist ethic-onto-epistemics and New Materialism

As we have discussed *technocentrist common sense* materialized in the *wilderness* or countryside discourse has formed the ontological and epistemological foundation of the hegemonic *conservation* discourse since its inception in the 19th century. Although there is significant variation both temporally as well as spatially between different approaches to *conservation*, they all share this theoretical foundation. The key to this approach is the foundational move to posit a bounded, simple subject in opposition to a bounded, simple object. In order to build an effective narrative for *conservation* in the 21st century we will re-examine the ontology of the subject from the ground up.

Building from the insights of the poststructuralists Haraway argues that Subjects are non-identical, split and always constitute themselves in partial relation to the world and other

¹⁸¹ Moore does a much better job at tying together the issue of capital accumulation and empire on the one hand and what he calls the web of life on the other. Yet the analysis of both ultimately remains at a macro level.

¹⁸² Werner; Zips-Mairitsch Manuela (Ed.) (2019): Bewildering Borders. The Economy of Conservation in Africa (Wien, Lit).

subjects.¹⁸³¹⁸⁴ This forms the point of departure to produce what Haraway has called *situated knowledges*. Knowledge production thus appears in analogy to the becoming of subjects: it is embodied, situated, transformational, conflictive and always open to new partial relations. In the words of Haraway: '*I am arguing for the view from a body, always a complex, contradictory, structuring, and structured body, versus the view from above, from nowhere, from simplicity. Only the god trick is forbidden.*'¹⁸⁵ Thus, contrary to the deficit ascribed to marked bodies of the slave in the sense of Plumwood, embodiment is a precondition for *all* knowledge production. The *god trick* merely denies this reality in self-deception. A consequence of this self-deception is less accurate knowledge, in the service of reproducing conditions of oppression and inequality.

Haraway argues, that positivist science posits an unmarked disembodied subject: *Man* and *White* who sees everything from nowhere and engages in the kind of '*innocent*' knowledge production we have described as *technocentrist*. *Innocent* here means a commitment to the self-deception of pursuing knowledge outside of a social field, while this field – in reality – is structured through power charged relations of oppression, in service of reproducing these conditions. This is what Haraway calls the *god trick*. The *god trick* is at work in the production of knowledge whenever the *situatedness of knowledge* production is denied and the knowing subject presents itself as objective by virtue of its detachment from and disinterest in the world. A gesture which Haraway unmasks as nothing but a denial of ones' own embodied situatedness, *non-innocence*, and *partial relatedness*.¹⁸⁶

In order to produce more accurate knowledge of the world, that is attuned to injustices and power asymmetries, Haraway outlines three fundamental requirements for *situated knowledges*: 1. Knowledge must be situated 2. Knowledge must be conceived of as conflictual and open – that is never complete. 3. Knowledge must be conceived of as non-innocent – that is interested in social outcomes. Ethics and politics thus attain a central place in the production of knowledge on par with epistemics as such. Haraway's' feminist epistemology of *situated*

¹⁸³ Anzaldúa Gloria (1987) *Borderlands/ La Frontera*, The New Mestiza, 25th Anniversary fourth Edition (aunt lute books, San Francisco).

¹⁸⁴ Derrida, Jacques (1972): *Marges de la Philosophie* (Éditions de Minuit, Paris).

¹⁸⁵ Haraway (1988): *The Science Question in Feminism*, 589.

¹⁸⁶ Haraway, Donna J. (1988): *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*. In: *Feminist Studies* Vol.14 (3), 575-599.

knowledges further marks a pivot away from the predominantly epistemic concerns of the post-structuralists and marks a return to a *materialist* commitment.

By challenging the neat subject-object distinction in knowledge production, Haraway also challenges the privileged subject position of *Anthropos*, vis-a-vis naturalized and objectivized others. In conversation with Bruno Latour technologies, human bodies and nonhuman biological as well as geological forms and processes who through their co-laboring blur the boundaries between each other; have emerged as hybrid ontological beings. Latour argued that the *modern constitution*, i.e. the *dualist modern ontology*, has been engaged in an active process of *purification*. Through enforcing an ontological hygiene between *Nature* and *Culture*, it has been possible to construct the subject position of *Anthropos* as exceptional and uniquely privileged with agency vis-à-vis a world filled with mute and passive objects, or dead matter. A hybrid ontology – as proposed by Latour – focuses on the entanglements of people, technologies and other nonhumans and their varying distributed agencies.¹⁸⁷

Companion Species become wildlife in multispecies landscapes

Exploring a processual and relational ontology Haraway develops this concept of companion species, as a broad and open-ended category which sets our understanding of biological life, including human life on a new footing with fundamentally different parameters of existence. A processual ontology conceives of entities, and reality at large, as process. Contrary to a substance ontology, an ontology of *Hylomorphism*¹⁸⁸ or an ontology of the bounded individual.¹⁸⁹¹⁹⁰¹⁹¹ Haraway expresses the basic assumption of a processual ontology as explained by Whitehead in the following way: '*reality is an active verb, and the nouns all seem to be gerunds*'¹⁹². To describe this mode of existence we should thus think of what *is* in the sense of existence, not with the verb '*to be*', but with the verb '*to do*'. What *is*, *does*. As *doing* is irreducible to a moment, what '*is*' '*does*' thus *becomes*. *Becoming* then replaces *being*. The

¹⁸⁷ Latour, Bruno (1994): *Nous n'avons jamais été modernes: essai d'anthropologie symétrique* (Éd. La Découverte, Paris).

¹⁸⁸ Hylomorphism is an Aristotelian ontological approach. It asserts that physical entities are composites of matter and form.

¹⁸⁹ Ayers, Michael (1991): *Substance: Prolegomena to a Realist Theory of Identity*. In: *The Journal of Philosophy*, Vol. 88 (2), 69-90.

¹⁹⁰ Heil, John (2021): *Hylomorphism: What's not to like?* In: *Synthese* Vol. 198, 2657-2670.

¹⁹¹ Jonas, Hans (1968): *Biological Foundations of Individuality*. In: *International philosophical quarterly* Vol. 8 (2), 231-251.

¹⁹² Haraway, Donna J. (2003): *The Companion Species Manifesto: Dogs, People, and Significant Otherness*. (Prickly Paradigm Press, Chicago), 6.

relational aspect of Haraway's ontology is expressed in the proposition that the Nouns which make up reality as an active verb, are all gerunds. That is nominalized verbs which create meaning through their many appendages '*more than an octopus*' which reach into each other, a process Whitehead has called '*prehension*'. This grasping into each other expresses the relational aspect akin to meaning as it is constituted in Saussurian linguistics.¹⁹³

As Haraway applies this understanding to the process of the domestication of dogs she concludes that neither dogs nor humans pre-existed the relationship between them. Such a point of view goes against a narrative of domestication wherein *Anthropos* in an event as '*masculine, single-parent, self-birthing...*' subjugates the wolf and turns him into the servile dog. This story is appreciated both by *technocentrists* as well as *deep ecologists*. For the latter it serves as a sign of wildness before the fall.¹⁹⁴ This narrative of domestication posits humans as a finished subject who domesticate and thus act upon wolves and turn them according to their own designs into dogs. In this narrative the active subject domesticates the passive object. It is a narrative of unidirectional agency of the master.

Haraway, in a more productive fashion conceives the process of domestication, as well as ecological relations at large, as '*an unending dance of distributed and heterogenous agencies*.'¹⁹⁵ In this story of a co-evolution where agencies are distributed '*flexibility and opportunism*' have been relevant for humans and canines. From such a perspective it becomes possible to begin to understand domestication, as a two-way street, wherein both partners benefit from domestication. It is precisely the relational aspect of Haraway's ontology which allows us to understand domestication as going both, or many ways. Through this operation Haraway is able to distribute agency beyond *Anthropos*:

*'Dogs are about the inescapable, contradictory story of relationships – co-constitutive relationships in which none of the partners pre-exist the relating, and the relating is never done once and for all.'*¹⁹⁶

¹⁹³ Haraway, Donna J. (2003): The Companion Species Manifesto: Dogs, People, and Significant Otherness. (Prickly Paradigm Press, Chicago), 6.

¹⁹⁴ Haraway, Donna J. (2003): The Companion Species Manifesto: Dogs, People, and Significant Otherness. (Prickly Paradigm Press, Chicago), 27f.

¹⁹⁵ Haraway, Donna J. (2003): The Companion Species Manifesto: Dogs, People, and Significant Otherness. (Prickly Paradigm Press, Chicago), 28.

¹⁹⁶ Haraway, Donna J. (2003): The Companion Species Manifesto: Dogs, People, and Significant Otherness. (Prickly Paradigm Press, Chicago), 12.

Seen through the lens of *companion species* humans and nonhumans are deeply entangled with each other and the world. Consequently, being human means *becoming* with other living being: human and non-humans, in the most intimate fashion. An ontology of the companion species then turns into a relational *becoming with*.¹⁹⁷

Haraway introduces the concept of symbiogenesis in order to furnish these ontological assertions with a scientific foundation. Symbiogenesis¹⁹⁸, as developed by Lynn Margulis foregrounds the '*extreme genetic fluidity*' of bacteria who merge transiently or permanently with larger organisms. This suggests *symbiogenesis*, itself a relational concept as ontologically primary in biological life.¹⁹⁹ One must merely think of lateral genetic exchanges between bacteria, the composition of coral or lichen and the long history of virological exchanges between animals and humans.²⁰⁰²⁰¹²⁰²

Lorimer takes the concept of companion species further and introduces the category of *wildlife*. According to his understanding, rather than being confined to *wilderness*, *wildlife* '*lives among us*'. Within *wildlife* is included the diversity of life from microbes to megafauna, feral plants and those nonhumans who have adapted to urban ecologies. Crucially, *wildlife* is: '*risky, endearing, charismatic, and unknown*,' it '*describes ecologies of becoming (...) with movements of differing intensity, duration and rhythm*'.²⁰³ *Wildlife*, in short is everywhere and the goal is to develop ways through which we can live well with *wildlife* everywhere while accepting that *wildlife* has agency, or a generative potential which drives processes of production,

¹⁹⁷ Haraway, Donna J. (2008): When Species Meet. (University of Minnesota Press, Minneapolis, London), 16.

¹⁹⁸ Lynn Margulis studied bacteria and argues that they pass genes back and forth making exact taxonomy difficult. They theorize that eukaryotic cells evolved through the mutual absorption of different bacteria. This in turn puts the origin of all higher life on a symbiogenetic footing. Complex life then becomes the result of intricate and multidirectional forms of association.

¹⁹⁹ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 24.

²⁰⁰ Haraway, Donna J. (2016): Staying with the Trouble. Making Kin in the Chthulucene (Duke University Press, Durham, London).

²⁰¹ Crosby, Alfred W. (1973): The Columbian exchange: biological and cultural consequences of 1492. (Greenwood Press, Westport Connecticut).

²⁰² Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London).

²⁰³ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 7.

decomposition, sequestration and aesthetics; making *wildlife* a source of value that shapes the cultural, economic and political practices of humans.²⁰⁴

In order to account for the interaction of *wildlife* on a landscape level, Anna Tsing introduces the concept of *world-making*. According to her, every living thing remakes the world through its seasonal pulses, reproductive patterns and '*geographies of expansion*.' Even within species there are varying '*time-making projects as organisms enlist each other and coordinate in making landscapes*.'²⁰⁵ Through becoming attentive to these unruly edges, and the curiosity that goes with it we can follow multiple temporalities. As we do so, we become aware that we are surrounded by many *world-making projects*, human and nonhuman: '*World-making projects emerge from practical activities of making lives; in the process these projects alter our planet*.'²⁰⁶ With Tsing it becomes clear that humans have always been making *multispecies worlds* – with other species: '*Humans shape multispecies worlds when our living arrangements make room for other species*.'²⁰⁷ In consequence landscapes are the product of the symbiogenetic or relational becoming of *wildlife*, where both humans and *wildlife* are imbued with agency. *World-making*, in Tsing's understanding is central to all organisms: '*all organisms make ecological living places altering earth, air and water. (...) in the process, each organism changes everyone's world*.'²⁰⁸ Such *world-making projects* overlap often in conflictual ways. From this angle it becomes possible to understand that human *disturbance*, and by extension human life albeit necessarily causing *disturbance*, is not the root cause of the *Anthropocene*. Rather, as we have argued before it is the specific relations of capital and empire forcing humans, *wildlife* and nonliving things to yield ever greater quantities of energy and materials in service of endless accumulation.

²⁰⁴ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 180f.

²⁰⁵ Tsing, Anna L. (2015): *The mushroom at the end of the world: on the possibility of life in capitalist ruins*. (Princeton University Press, Princeton), 21.

²⁰⁶ Tsing, Anna L. (2015): *The mushroom at the end of the world: on the possibility of life in capitalist ruins*. (Princeton University Press, Princeton), 22.

²⁰⁷ Tsing, Anna L. (2015): *The mushroom at the end of the world: on the possibility of life in capitalist ruins*. (Princeton University Press, Princeton), 22.

²⁰⁸ Tsing, Anna L. (2015): *The mushroom at the end of the world: on the possibility of life in capitalist ruins*. (Princeton University Press, Princeton), 22.

Respons-able killing

Becoming-with consequently does not imply holistic harmony, such as some ecofeminists, and deep ecologists have suggested. On the contrary, ecological life is a messy affair within the matrix of dying, vulnerability and precarity. In this light – Haraway reminds us – living, dying and killing go hand in hand. In a world where eating, dying and killing are part and parcel of what constitutes the *becoming with wildlife*, the question of how to live, die and kill responsibly arises:

‘The problem is to learn to live responsibly within the multiplicitous necessity and labor of killing, so as to be in the open, in quest of the capacity to respond in relentless historical, nonteleological, multispecies contingency. Perhaps the commandment should read, “Thou shalt not make killable.”’²⁰⁹

For Haraway the issue does not lie with killing per se, it lies with self-assured, one-sided relations of instrumentality wherein hierarchy and calculation dominate. Rather than passivizing the other, a *respons-able* practice requires an engagement with the other as another. The notion of *respons-able* killing is based on the realization that *wildlife* is in constant relational becoming that necessarily entails living and dying as well as eating and killing. Responsible killing in the sense of *respons-able*, engages with the question of how a praxis of permanently negotiating mutual living, killing and eating; in a way that remains complex and cannot be dissolved in one-sided instrumentality might look like. Important in this is the realization that none of this makes life unproblematic, it remains ‘*wicked*’. As killing is inevitable we are required to kill responsibly in the sense of appreciating that others can respond to us, meet our gaze and look back at us.

Others thus being ethical subjects, and subjects requiring ethical consideration it therefore becomes impossible to relegate an entire category such as a species to being made *killable* i.e. to kill without necessary deliberation or consequence. In the words of Haraway: ‘*Caring means becoming subject to the unsettling obligation of curiosity, which requires knowing more at the end of the day than at the beginning.*’²¹⁰ To care for another, then is to remain curious and to

²⁰⁹ Haraway, Donna J. (2008): When Species Meet. (University of Minnesota Press, Minneapolis, London), 80.

²¹⁰ Haraway, Donna J. (2008): When Species Meet. (University of Minnesota Press, Minneapolis, London), 36.

seek answers through being attentive to what the other needs, what constitutes self and other. According to Hoppe, what Haraway asks of us, is to take seriously the *respons-able* entities of the world, to take human and more-than-human alterity seriously.²¹¹ The kinds of ethical considerations pursued here are not concerned, as traditional ethics tend to be, with a transcendental good, or a final settling of the scores. Rather, such multispecies ethics seek to take seriously that human life takes places within fundamental and constitutive relationships with *wildlife*. Tom van Dooren expresses the aim of a multispecies ethics in the following way:

*“As such, the partiality of perspectives is also an invitation into an ethics grounded in uncertainty, in humility, in open ended questioning. (...) they must— but instead that there will be no final or singular ethical outcome: the good must be carefully crafted, in the multiple, again and again. A restless ethics for a wakeful world.”*²¹²

The multispecies ethics developed by Haraway requires continued historical situating which must constantly be negotiated. The continuous search for what a *good answer* can be creates a state of *indigestion*. To *nourish indigestion* becomes a practice of remaining curious. *Indigestion* becomes the point of departure for a curious and inquisitive praxis of response wherein heterogenous actors participate and which is always incomplete.²¹³ Knowing *wildlife* well requires ‘*curiosity and the open-ended care for difference it engenders.*’²¹⁴ The knowledges of *wildlife* thus produced are not equal, sufficient or definitive; some are more robust than others, particularly in their ability to anticipate ecological change.

Affective logics

As we have now established a multispecies ontology that informs both our epistemic and ethical approach to *wildlife* management, we will now delve into what Lorimer has called *affective logics* in order to provide an epistemic guide which makes the different knowledges of *wildlife* we will encounter in the course of this thesis commensurable.

²¹¹ Hoppe, Katharina (2022): Donna Haraway zur Einführung (Junius Verlag, Hamburg), 142.

²¹² Dooren, Thom Van (2019): The Wake of Crows. Living and Dying in Shared Worlds. (Columbia University Press, New York), 13.

²¹³ Hoppe, Katharina (2022): Donna Haraway zur Einführung (Junius Verlag, Hamburg), 137.

²¹⁴ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 182.

In traditional fieldwork accounts and textbooks, actors, skill and affective energies – as the modalities of *conservation* and science – are downplayed. This is due to the fear that an admittance of these modalities would undermine the public authority of scientists, who in their public facing discourse are dominated by a positivist, i.e. *technocentrist* epistemology.²¹⁵ We have described such attempts to disembody scientists causing them to seemingly speak from nowhere as the *god trick*. Consequently, we argue that such a move produces inaccurate knowledges. Particularly so through the denial of its own limitations and a foreclosure of fruitful political discussions.²¹⁶ The critical – particularly Marxist – scholarship on *conservation* asserts that this approach in *conservation* and the knowledge it creates pits people against *Nature*. It deepens already existing North South inequalities, and it has had detrimental ecological consequences. Furthermore, such accounts inaccurately reflect the motives of conservationists and reduce their motivations to the instrumental logics of *ecosystem services* and resource management.²¹⁷

Reason and rationality, as Lorimer sees it, are not the absence of affect but a specific form of affect.²¹⁸ However, science in practice depends on the affective attachments to species and places by conservationists and scientists. As habits and passion shape *affective logics* in *conservation*, they influence what knowledge gets produced and accepted as legitimate.²¹⁹ Contrary to the *technocentrist logic*, *conservation* is not merely a rational practice enacted by disembodied scientists, geared towards maximizing *ecosystem services*. Rather, *conservation* is a process of *learning to be affected* by nonhumans. Built on an epistemology committed to embodied and incomplete knowledge, historical situatedness, *conservationists* committed to

²¹⁵ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 38.

²¹⁶ The best example of the god trick at work in conservation thought is the wilderness discourse. Through the operation of temporalizing and spatializing Nature undifferentiated humanity is extracted from a multispecies world now separate and in need of protection from humans. The seemingly disinterested and objective approach to conservation, as we have seen consequently gave rise to the imperial entanglements of conservation wherein conservation acted as an agent of colonization, land dispossession and the erasure of indigenous communities.

²¹⁷ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 38.

²¹⁸ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 45f.

²¹⁹ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London), 54.

non-innocent knowledge production must learn to be affected by *wildlife* as a precondition to craft better knowledge about *wildlife*.²²⁰

A key feature in shaping what knowledge gets produced by *conservationists* are different forms of charisma: *ecological*, *aesthetic* and *corporeal*. Ecological charisma describes *the '(...) the anatomical, geographical, and temporal properties of an organism that configure the ease with which it is perceived by a human subject in possession of all their senses and with limited technological assistance.'*²²¹ Ecological charisma is based on a phenomenological account of human perception. Those organisms that can be more easily perceived by humans have more ecological charisma. Aesthetic and corporeal charisma on the other hand describe the properties that generate emotional responses among people encountering them. Aesthetic charisma designates an encounter through media, while corporeal charisma designates the experience in the field. Particularly charismatic species may become flagship species. Consequently volunteers and underpaid conservationists are drawn to the field not via an instrumental rationality, but rather through a desire of *affective encounters*. Charismatic species through their popular appeal have economic and political power in the global assemblages of *conservation* by evoking *affect* and thus being able to mobilize resources. *Affective logics* then shape the cultures, practices and political economy, of *conservation*. They contribute to forming a *conservation gaze*.²²²

By making use of the concept of *affective logics* we can more fruitfully describe *conservation* as a technological practice that takes place in an '*assemblage of skilled bodies, instruments and recording devices*' wherein conservationists learn to be affected. *Conservation* then is underpinned by a multitude of '*embodied and affective encounters between skilled humans, other species and landscapes*'.²²³ It is these skilled encounters mediated through technology and motivated by *affective logics* which are the basis for the knowledge produced by conservationists which traditionally allows them to invoke *Nature* in the context of environmental management. In the words of Lorimer:

²²⁰ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 9.

²²¹ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 40f.

²²² Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 45f.

²²³ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 35-37.

*'(...) knowledge about the nonhuman world emerges out of situated, embodied, and technological encounters with the nonhumans that are the subject of research. The bodies of scientists are vital for this endeavour. It is only through training and experience that a scientist can learn to be affected by their target organism, ecology, or process. Technologies enhance and extend the possibilities of perception and recording. Science is propelled and guided by scientists' affective attachments to particular species and places. Habits and passions matter here and should be acknowledged, cultivated, and celebrated. There are multiple affective logics at work in conservation that shape what knowledge gets produced and what is accepted as a legitimate account. (...) This embodied epistemology helps account for some important patterns and processes in the scope and operation of the biopolitics of contemporary conservation.'*²²⁴

Field research understood as a situated, embodied and technological encounter, the bodies of scientists become vital sites of knowledge production with learning to become affected occupying a central place of importance with technologies enhancing and extending the ability to perceive and record. This *learning to be affected by wildlife* can be compared to how some anthropologists and philosophers have described the process of field research, or the hunting practices of indigenous communities in the arctic or amazon as *'becoming-predator'*.²²⁵ Lorimer described fieldwork in *conservation* as involving the striving for sensory affinity in order to tune into the bird's ecology.²²⁶

Knowledge of *wildlife* can take many forms, as different people and organisms learn to be differently affected by *wildlife* through varying entanglements and temporalities. These knowledges can conflict in the context of different relations.²²⁷ *Affective logics* therefore allow us to account for different knowledges about *wildlife*, without the technocentrist gesture of devaluing or erasing other knowledge formers through the god trick. At the same time, however, our commitment to *non-innocent situated knowledge* and the *care* for *wildlife*, places us in a position to discern one-sided instrumental and self-serving knowledge on *wildlife*. In

²²⁴ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 54.

²²⁵ Anthropology as affect, hunting as becoming predator

²²⁶ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 43.

²²⁷ Lorimer, Jamie (2015): *Wildlife in the Anthropocene. Conservation after Nature* (University of Minnesota Press, Minneapolis, London), 181.

our quest to better understand the practices, discourses and desires of *conservation* we will look at the relationship between beaver and beaver managers through the lens of an *affective logics of care*. With this tool we will be able to navigate the contradictory knowledges of beavers we will encounter in this thesis.

A first summary

In this chapter we have engaged with the question of: What is *Nature*? We have come to the conclusion that *Nature* as a keyword is a building block of the modern ontology which works to enforce an ontological hygiene through purification. The modern ontology has emerged as a way of engaging with the world in the context of the rise of capitalism, and the *scientific revolutions* of the early modern period. An organic model of the world was replaced by an understanding of the world as a machine. Through a series of interlocking mechanisms predicated on the cartesian Subject Object divide the modern ontology creates an identity of the master, which we have termed *technocentrism*.

We have defined *technocentrism* as constructing the natural and social world in parallel wherein both consist of atomized, distinct, countable individuals made of dead matter with objective and knowable qualities, preceding their relations. These atomized individuals form part of larger systems which function according to mechanical laws wherein individual parts can be replaced without destroying the larger entity. These laws can be known through objective science. Which in turn provides the ability to control these entities. Through an increase in knowledge and control of the world, human society advances in time conceived of as linear. As the knowledge produced by scientists is objective, it is presented as free of personal or subjective interest, per default.

We have discussed in the context of *conservation nature* and its respective iteration as *wilderness* or countryside, have served to create a specific *political ecology* with a temporalized and spatialized *Nature* imagined in opposition to a temporalized and spatialized realm for humans consequently creating an 'us' (Anthropos) and 'them' (*Nature*). The two positions, *dream of mastery* and *dream of naturalism* are both technocentrist and reproduce the modern ontology. In practice this has led to *conservation* systematically displacing and dispossessing local and indigenous communities, often through violent means. *Conservation nature* must therefore be understood as a distinct form of land use intimately tied to the administrative state and empire. We have demonstrated the ontological impossibility of

conservations core concept: *wilderness*. Consequently we have concluded that (*conservation*) *nature*, far from being an ontological category, emerges from the discursive practices of the state, empire, *technocentrist conservation* and science.

In our discussion of *conservation* since Rio, in the form of ecological modernization and in particular the concept of *ecosystem services*, we have argued that these concepts albeit intended to resolve the late twentieth century crisis of *conservation* and development, ultimately are rooted in the same technocentrist assumptions flowing from the master identity. Beyond methodological concerns involved in assigning monetary value to complex and qualitatively incommensurable bio-physical processes, critics fear a decoupling of financialized or *liquid nature* of the account book from the actual biophysical realities that produced it in the first place. Beyond being unable to alleviate the ecological crisis *conservation* was meant to address, critics fear that this approach to *conservation* will also serve to increase the North South inequalities.

We agree with the Marxist school, that biodiversity *conservation* post Rio does little to address the historical relations of capital, class and empire as the root of the *Anthropocene*. However, the Marxist school fails to address the urgency of the sixth mass extinction for humans and nonhumans, by limiting their work to a study of *conservation* at the macro level, while simultaneously not addressing the sincerity of those working in *conservation*. Therefore, they are – like traditional conservationists – guilty of looking at only one side of the coin by reproducing the technocentrist notion of people vs. *Nature*.

From this critical reflection on the *modern ontology*, *technocentrism*, *Nature* and the *conservation* apparatus, emerges the need to elaborate an ontology more suitable for *conservation* in the *Anthropocene*. To do so we have relied on the *New Materialist ethico-onto-epistemics* of Donna Haraway. We have argued that knowledge must always be embodied, historically situated, conflictive, non-innocent, incomplete and open to partial relations. Such knowledges we have called *situated knowledges*. While technocentrism presents embodiment as a deficit, for Haraway it is the precondition of all knowledge. The god trick of *technocentrism* merely denies this reality. The disembodied subject man or Anthropos pretends to engage in knowledge production from outside the social field, disinterested in social and political outcomes; all while reproducing conditions of oppression and inequality. A self-deception which results in less accurate knowledge.

From the epistemic challenge to a neat division between subject and object followed an exploration of processual and relational ontology, equally challenging a neat division between subject and object. Not only have we thus replaced being with becoming, but we have also replaced the relata with the relation as ontologically primary, through our engagement with the concept of companion species. In turning towards the concept of companion species, biological life is figured as inherently ecological and relational. This redistributes agency away from the master category of Man or Anthropos towards the plethora of human and nonhuman entities. Consequently, being human means becoming with other living things – humans and non-humans – in the most intimate fashion. This, however, does not imply holistic harmony. Rather it reflects on biological life as a messy affair where living, dying and killing go hand in hand.

Fleshing out the relational quality of the companion species, Lorimer introduces the concept of *wildlife* defined as risky, endearing, charismatic and unknown, agential and imbued with immanence and difference. *Wildlife* then subsumes all nonhuman life from beavers in their ponds to the microbes living inside of us; enacting ecologies of becoming with differing rhythms. The goal now is to develop ways to live well with *wildlife*, while accepting the agency or generative potential shaping cultural, economic and political worlds. We have defined this agency as *world-making*. In making worlds every living thing, through the fact of being alive and its attendant chemical, biological and ecological consequences, shapes the world around it. As different world-making projects overlap, *multispecies landscapes* emerge. In consequence landscapes are the product of the symbiogenetic or relational becoming of *wildlife*, where both humans and *wildlife* are imbued with agency.

Such an ontology carries direct and deep ethical implications. As world-making entails *disturbance*, it does not imply holistic harmony. If our own life is ontologically tied to the life of the other, an ethics built on bounded, disembodied human individualities engaged in technocentrist practices of domination becomes an ontological impossibility with destructive material effects. Consequently the question of how to live, kill and die responsibly remains. This problem, as we understand it, remains unresolvable – it creates *indigestion*. As others are ethical subjects who are able to respond to us, who are *respons-able* and thus require ethical consideration, killing must always include deliberation and consequence, rather than relegating an entire category of beings to being made *killable* – in self-assured, one-sided

relations of instrumentality. The task of living well then becomes to permanently negotiate this wicked world in a way that remains complex without falling into the technocentrist pit of one-sided instrumentality. Ethical living in a multispecies world, then means to consider the nonhuman other as an ethical subject who requires *care* and deliberation, without the possibility of making entire categories of *wildlife* killable. Caring in this context means becoming curious to know what the other needs. A multispecies ethic seeks to take seriously that human life takes places within fundamental and constitutive relationships with *wildlife*.

Care involves embodiment, it involves *affect*. Traditional accounts of scientific fieldwork attempt to erase both to strengthen their authority. To surpass such technocentrist accounts of fieldwork in *conservation* we have introduced the concept of *affective logics* with the intent to make commensurable different knowledges about *wildlife*. We argue that *conservation* is not merely a rational practice. *Conservation* depends on the process of learning to be affected by *wildlife*. This process is underpinned by the desire of conservationists for *affective encounters* with *wildlife*. Species with higher ecological, aesthetic or corporeal charisma have higher economic and political power in the global assemblage of *conservation*. By invoking affect they can mobilize resources. Charismatic species then through their charismatic appeal and the *affective logics of care* they invoke, contribute to forming the *conservation gaze*. Through the concept of *affective logics* we can describe *conservation* as a technological practice that takes place in an assemblage of skilled bodies, artefacts and technologies. These skilled, embodied encounters underpin the scientific authority of conservationists, particularly their invocation of *Nature*.

Beyond *conservation*, knowledge of *wildlife* can take many forms. Different people learn to be affected by *wildlife* through varying entanglements and temporalities. Knowledges which emerge from different encounters can be conflictive. *Affective logics* therefore allow us to account for different knowledges about *wildlife* in a way that makes them commensurable yet allows us to discern non-innocent *situated knowledge* interested in *care* for *wildlife* from one-sided, instrumental and self-serving knowledge of *wildlife*.

3. The Beaverocene

'Amazing isn't it? No other animal on Earth could do this.

*Maybe Beavers... but not like this.'*²²⁸

With this memorable line Dwight K. Schrute a character from the US TV series *The Office* hints at the great *world-making* capabilities of the genus *Castor*. Unnoticed by many, and certainly unintended by the writers of the show, Dwight also points to an essential issue of posthumanism. The main concern of this school of thought is no longer Anthropos as its exceptionally privileged subject of concern. Rather humans are understood and theorized as intimately related to *wildlife*, technology and the wider world they inhabit.²²⁹

As we argued in the previous chapter, to *care* for someone, one must learn about them. In order to learn about *wildlife*, one must become skilled like a hunter, or an anthropologist; in the ecology of a target species before one can produce *situated knowledges*. Before we engage with the issues of beaver management, we must therefore learn to take beavers seriously. This means that we must take those who have engaged in the technologically mediated, passionate practice of *conservation* and *wildlife* management seriously. While we have argued that a desire for *affective encounters* guides the practice of conservationists, the literature we consult in this chapter mostly works to erase these passions. Yet what the act of knowledge production already reflects is part of the necessary form of deliberation required in living and dying well with beavers who are *respons-able*. That much of this literature takes place within ontology and epistemics of *technocentrism* and therefore within a paradigm of self-assured, one-sided relations of instrumentality; is a concern we will seek to address in the second part of this chapter.

Elaborating on Dwight's remark I would like to make a deep dive into the *Eocene*.²³⁰ It is possible to trace the lineage of beavers back to some 40 Million years ago, when the ancestor of all beavers the *Agnotocastor* lived. From this ancestor more than 19 different genera of beaver developed, the largest of which, *Castoroides ohioensis* was the size of a black bear and

²²⁸ Dwight K. Schrute, in the US TV-series 'The Office' Season 6, Episode 20, 18:45.

²²⁹ Wolfe, Cary (2010): *What is Posthumanism?* (Minneapolis, London, University of Minnesota Press), XIVff.

²³⁰ Burke et al. (2018): Pliocene and Eocene provide best analogs for near-future climates. In: PNAS Vol. 115/ No.52, 13288-13293.

weighed up to 200kg. The characteristics we associate most with beavers today, swimming, and woodcutting are believed to date back some 24 million years ago.²³¹ The genus *Castor*, appears sometime around 15 million years ago in southern Europe. *Castor fiber* then spread throughout the Northern hemisphere and into North America by seven million years ago. From then on two beaver lineages emerged, eventually creating *Castor fiber*, the European beaver and *Castor canadensis*, the American beaver.²³²

As rodents, beavers are members of the largest mammalian order with 35 families and some 2600 species in total, almost 50 percent of all mammals. The great evolutionary success of rodents generally, and beavers in particular has been put down to the morphology of their dentition. Two incisors with iron enriched enamel on the outside equip them with durable, resistant to wear and very powerful tools to engage in world-making. The success of rodents has allowed them not only to evolve into many different forms, but has certainly aided them in their global spread, some islands excluded.²³³ Before we dive into the ecology of beavers, their world-making as well as their various historical encounters with humans, let us first learn more about their live history as a biological species. This knowledge is not only relevant to get to know beavers on a more intimate level, but it also serves as an important basis upon which we will have to rely going forward. In short, in the following paragraphs I will be discussing the fundamentals of the life history of beavers.²³⁴

Beavers are large rodents, adults weigh up to 20 kg with a body length of 80-100 cm plus a tail of some 30 cm. While both sexes show few physical differences, females are on average slightly heavier. Distinction is possible only during the late phase of pregnancy, or upon examination of secondary sexual organs. Their fur is usually brown, but can range from pale golden to black. Their flattened tails are generally their most distinctive feature, especially vis-à-vis other rodents. Given their size and bulk, beavers generally walk on all fours, except for when carrying mud, small rocks, or vegetation. While their eyesight is poor, they have good hearing and an

²³¹ Rybczynski, Natalia (2006): Castorid Phylogenetics: Implications for the Evolution of Swimming and Tree-Exploitation in Beavers. In: Journal of Mammal Evolution 14 (1), 1-35.

²³² Zahner, Volker; Schmidbauer, Markus; Schwab, Gerhard; Angst, Christof (2020): Der Biber. Baumeister mit Biss (Südost Verlag, Regenstein), 11ff.

²³³ Rose, Kenneth D. (2006): The Beginning of the Age of Mammals. (The Johns Hopkins University Press, Baltimore), 316ff.

²³⁴ In this account of beaver life history I mostly rely on the Eurasian Beaver Handbook.

excellent sense of smell. Moving in water, their webbed hind feet propel them while, their tail serves as a steering rudder.²³⁵

The kin groups of beavers are usually core family units comprising a heterosexual breeding couple with the offspring of the current and previous year. Mating takes place from December to February. After a gestation period of 105-107 days one to four kits are born in late spring or early summer. The first two months of their lives will generally be spent in the lodge, making kits vulnerable to flood events. Offspring does not reach adult size until three years of age, though they reach sexual maturity after two years. While beavers sometimes remain with their parents as non-breeding individuals, they usually disperse in order to find their own territory.²³⁶

Beavers spend the majority of their time feeding, foraging and marking their territory with secretions from their anal glands. Territories will be defended by the family unit. While beavers do not hibernate, their activities are reduced significantly during the winter months. Often, beavers will construct a food cache to store food for the winter. Beavers are strong and capable diggers allowing them to excavate burrows, chambers and canals of impressive size. Where the banks of a stream allow the digging of a large burrow, lodge-building is uncommon. The former can be supplemented by sticks and mud, especially if a section collapses. The most characteristic behavior of beavers is dam-building. The primary objective of constructing a dam is to raise the water table above 70cm and thereby ensure that the entrance to a burrow or lodge is below water. Further reasons for damming are safety, accessibility, and foraging potential. In consequence dam building is restricted to smaller water courses. In addition, the *technology* available to beavers restricts the construction of dams to rivers below 10 meters in width, with the majority occurring on rivers less than 6 meters wide. Where dams are constructed, they can amount to extensive systems with several cascades. The length of time over which dams are maintained varies from relatively short, to extended multi-decade periods.²³⁷

²³⁵ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 11, 12.

²³⁶ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 12.

²³⁷ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 15, 16.

Tail-slapping is a common behavior of beavers. This serves to warn others as well as to let potential predators know that they have been spotted. Interaction between individuals of a family serve to strengthen social bonds and are most common in younger animals but decline with age. A range of vocalizations like mews, short soft squeaking calls or crying noises, can be made to communicate. Grooming is a behavior that maintains the fur condition and removes parasites. Beavers can submerge for up to 15 minutes.²³⁸ Given the close relationship between beavers and watercourses their movements and migrations are easily predictable. Due to their dependence on suitable wetland habitat, their distribution can appear discontinuous on the landscape scale.²³⁹ Beavers can travel long distances to find a new territory, their preference is to travel along bodies of water. The migration period in spring is also a period of high mortality as beavers traverse roads, as well as the territories of others. Given the strong territoriality of beavers, a territory will be jealously guarded and intruders violently chased off. These fights can leave deep wounds on shoulders, flanks and tail. Infection and death are common consequences.²⁴⁰

While growth rates in newly established beaver populations are initially slow, this initial 'lag phase' of 15 to 20 years on larger rivers produces a patchwork of territories, as solitary beavers disperse into a catchment area and search out the most favorable habitat. The more beavers are released into an area the sooner mating couples are established and begin to produce offspring. This initial phase is followed by rapid expansion. Annual growth rates of 15-20 percent can occur. Population increase entails a reduction of territorial sizes. The availability of habitat then becomes the dominant limiting factor, with increasing territorial disputes and mortality due to fighting, food stress and pathogens. This can be observed by a decrease in breeding rates, delayed dispersal and lower body weight. The combination of density dependent factors eventually leads to population growth leveling off.²⁴¹ This dynamic has been widely observed and has faithfully played out over a period of some twenty years following recolonization.

²³⁸ *Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 18, 19.*

²³⁹ *Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 20.*

²⁴⁰ *Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 12, 13.*

²⁴¹ *Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 20, 21.*

This is a point of particular importance as a common argument against beavers is that they are accused of spreading uncontrollably as they face no natural predators or other limitations. However, the mortality rates of beavers and thus their total population are checked by a number of factors. Chief amongst which is the availability of habitat. Beavers are tied to watercourses, where there is no water, there cannot be any beavers. Secondly, as mentioned above, the territoriality of beavers creates competition between beavers that can lead, in a context of high population numbers and densities, to reduced fitness, lower birth rates, the spread of disease and increased predation. Third, predation. Contrary to commonly held beliefs predation is a factor in beaver population dynamics even in the contemporary European landscape, although arguably not the most important one. Predators of adult beavers include: European Wolf (*Canis lupus*), European lynx (*Lynx lynx*), brown bear (*Ursus arctos*). Red fox (*Vulpes vulpes*), domestic dogs (*Canis lupus familiaris*), pine marten (*Martes martes*), birds of prey and large pikes (*Esox Lucius*) prey on young beavers and kits. Some anecdotal evidence exists suggesting that otters (*Lutra lutra*), American mink (*Neovison vison*) and badgers (*Meles meles*) may prey on kits and adolescents occasionally.²⁴² Fourth, weather extremes and springs floods in particular have an impact on mortality rates. Fifth humans impact beaver mortality through road kills which are a significant factor in densely populated areas, as well as hunting and trapping.²⁴³

The life history of beavers, their population dynamics and colonization patterns have a direct and important implications on beaver management practices which, again, will become important in later chapters. In the words of Campbell-Palmer et al.:

„In management terms, after reintroduction, slow establishment may therefore be expected, followed by a period of rapid growth and dispersal, before becoming more stable at a lower population size and density. Culling both during the period of rapid growth or rough stability is likely to be followed by rapid recolonisation by surplus animals. Once beaver territories become fully occupied, non-lethal management, which permits beaver presence within tolerable limits,

²⁴² Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 20.

²⁴³ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 20.

should slow or prevent further colonisation and significant increase in density due to the territoriality of this species.” ²⁴⁴

This foray into management practices and contemporary debates about beavers, their populations and management thereof shall only serve to foreshadow later discussions. Let us now return to the history of beavers, humans and Holocene landscapes. I would now like to engage with beavers in their character not as a biological species, but as the quintessential ecosystem engineer and the ways that beavers have shaped and continue to shape our planet in ways comparable to *Anthropos*.

The history of humans has been intimately tied to beavers, as is the case with many other rodents. Given the greater age of beavers on an evolutionary scale, there was a long period in the natural history of beavers when humans did not play any part. In fact, beavers and humans have only encountered each other towards the end of the Pleistocene when modern humans began to radiate out of Africa and into the temperate parts of the Northern hemisphere. Historic population estimates are always difficult to make. This is no different with the historic beaver populations in North America and Eurasia-Africa. Estimates for a Holocene population of beaver before the fur trade, range from 100-500 million individuals. In North America alone, the range is given from 60 to 400 million. However, an estimate of a global beaver population of 200 million in the first century BCE is a moderately conservative yet credible estimate.²⁴⁵²⁴⁶ Today, Halley et al. estimate a population of at least 1.5 million in Eurasia alone.²⁴⁷ Some one hundred years ago beavers were on the brink of extinction with some 1200 beavers remaining in Eurasia.²⁴⁸²⁴⁹

²⁴⁴ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of *Castor fiber*. Conservation Handbook Series (Pelagic Publishing, Exeter), 21.

²⁴⁵ Zahner, Volker; Schmidbauer, Markus; Schwab, Gerhard; Angst, Christof (2020): Der Biber. Baumeister mit Biss (Südost Verlag, Regensburg), ?

²⁴⁶ Müller-Schwarze, Dietland (2003): The Beaver. Its Life and Impact Second Edition (Comstock Publishing Associates, Ithaca, London), 107.

²⁴⁷ Halley, Duncan J.; Saveljev, Alexander; Rosell, Frank (2021): Population and distribution of beavers *Castor fiber* and *Castor canadensis* in Eurasia. In: Mammal Review Vol.51, 1-24.

²⁴⁸ Halley, Duncan J.; Saveljev, Alexander; Rosell, Frank (2021): Population and distribution of beavers *Castor fiber* and *Castor canadensis* in Eurasia. In: Mammal Review Vol.51, 1-24.

²⁴⁹ Duncan Haley told me at the 10th international Beaver Symposium in September 2025, that these estimates are speculative and not backed up by very robust data. He did however argue that a more accurate population estimate could be arrived at through modelling historic habitat, historic and present population densities and historic distribution ranges of beavers in North America and Eurasia. Given the historic range of beaver populations, numbers in the hundreds of millions are not impossible.

If we compare these population numbers to estimates of the human population, we conclude that beavers, for a long time, were likely more numerous and abundant than humans. Frier gives a population estimate of 61.4 million humans for the Roman Empire in 164 CE. Sadao gives a population estimate of 59 million for the Han Empire in 2 CE.²⁵⁰ If we allow for an additional generous estimate of 80 million humans throughout the rest of the world, we arrive at some 200 million humans alive at the turn of the first millennium. Especially if we adjust for the smaller size of humans in the pre-industrial Holocene, this comparison suggests that beaver and human populations, abundance and biomass approached each other sometime around the common era.²⁵¹

Ecologists have classified beavers as ecosystem engineers. The textbook definition of an ecosystem engineer is: *'Organisms that cause changes in the physical environment sufficient to influence the structure of landscapes, ecosystems, or communities...'*²⁵² Beavers, as well as other ecosystem engineers such as humans, elephants, alligators, kangaroo rats or termites; thus have such a powerful ecological impact that they *make landscapes*. But how do beavers change landscapes and engage in *world-making*?

The one thing that makes beavers so special is their ability to build dams, dig canals, fell trees and construct lodges. Let us for a moment return to the ecological literature on beavers. When ecologists or beaver-managers speak of beavers as ecosystem engineers, what they really mean is the impact that beavers have on lower order streams, on a relatively broad floodplain at lower elevations. Only here beavers build dams and lodges, dig canals and forage for food on a large scale. Dam building also occurs in narrower floodplains at higher elevations, though the ecological impact also is narrower. When thinking of beavers as the fully unfolded quintessential ecosystem-engineer we thus think of the beaver district described by Henry Lewis Morgan in the late 1860s, rather than a small alpine stream in the 2020s.²⁵³ Yet, beavers also have an important ecological impact on large and powerful streams such as the Danube

²⁵⁰ Sadao, Nashijima (1986): The economic and social history of Former Han. In: Twitchett, Denis; Loewe Michael (Ed.): The Cambridge History of China. Volume 1 The Ch'in and Han Empires (Cambridge University Press, Cambridge New York, Melbourne), 592.

²⁵¹ Frier, Bruce W. (2008): Demography. In: Bowman, Alan K.; Garnsey, Peter; Rathbone, Dominic (2008): The Cambridge Ancient History. The High Empire, A.D. 70-192 Volume XI Second Edition (Cambridge University Press, Cambridge, New York, Melbourne), 814.

²⁵² Molles, Manuel C.; Sher, Anna A (2019): Ecology: Concepts and Applications. 8th edition (Mc Graw Hill Education, New York), 457.

²⁵³ Morgan, Lewis H. (1868): The American Beaver and his works. (J. B. Lippincott & Co., Philadelphia).

and its larger tributaries where they dig burrows into the banks and contribute sediment to the stream, forage for food and coppice riparian trees.²⁵⁴

To briefly summarize, beavers under ideal conditions, that is on lower order streams on broad floodplains significantly impact the hydrology and geomorphology of streams. Their ponds retain nutrients, store carbon and introduce habitat diversity into an otherwise monotonous landscape. Ponds further contribute to stabilizing surface water as well as ground water and flow peaks and lows.²⁵⁵ Regarding organic life beavers cause changes on all trophic levels: microbial, plankton, macrophytes, aquatic invertebrates, fish, insect, birds as well as small and large mammals. The overall impact of beavers on biodiversity is decidedly positive.²⁵⁶²⁵⁷ In the following I will discuss the impacts of beavers on hydrology, geomorphology, plant community structure, fish and birds; in more detail.

On lower order streams, where beavers construct dams, the total water surface area expands which allows an increase in riparian and macrophyte vegetation. The inundation caused by beavers pushes out upland vegetation intolerant of standing water or high ground water tables. Dead and dying trees are one of the most common characteristics of the recent arrival of beavers in an area. The foraging habits of beavers, with their preference for some vegetation over others depletes their food supply. At the same time the expansion of the water surface area in consequence of dam construction, as well as the digging of canals increases their foraging range. Canals come into existence where beavers continually cross in and out of the water or where beavers actively dig them in order to transport building materials or food for storage. As the food supply in one area is further depleted more dams, lodges and canals are constructed. Thus, riparian ecosystems are transformed over many years, decades, centuries and millennia. Sites will be abandoned after a few years or decades as food is depleted but will be reoccupied eventually. This succession of occupation, expansion and abandonment introduces a cycle central to the ecology and environmental impact of beavers. An important

²⁵⁴ *Larsen, Annegret; Larsen, Joshua R.; Lane, Stuart N.* (2021): Dam builders and their works: Beaver influences on the structure and function of river corridor hydrology, geomorphology, biogeochemistry and ecosystems. In: *Earth Science Reviews* Vol., 218, 35.

²⁵⁵ *Brazier, Richard E.; Puttock, Alan; Graham, Hugh A.* (2020): Beaver: Nature's ecosystem engineers. In *Wiley interdisciplinary reviews. Water* Vol. 8; 3, 9.

²⁵⁶ *Stringer Andrew P, Gaywood Martin J.* (2016): The impact of beavers *Castor* spp. On biodiversity and the ecological basis for their reintroduction to Scotland, UK. *Mammal Review*.

²⁵⁷ *Rossell, Frank; Bozsér, Orsolya; Collen, Peter* (2005): Ecological impact of beavers *Castor fiber* and *Castor canadensis* and their ability to modify ecosystems. *Mammal Review*, Vol.35, Issue3&4, 248-276.

aspect in beaver occupation is that an established beaver population never occupies 100% of available habitat. One study has found that in Quebec beavers only influence 30 to 50% of 2nd to 4th order streams at one time. The areas 'free' of beaver still form part of a territory, which will be guarded and defended, but, so to speak, lies fallow.²⁵⁸ The result is a patchy riparian wetland landscape with space for lentic and lotic habitats, mud flats, wet (beaver) meadows, dry meadows, an abundance of deadwood and upland forest of various ages and in various stages of ecological succession.²⁵⁹ The consensus amongst ecologists is that beavers and their works increase both habitat and species diversity.

The influence of beavers on the hydrology of rivers, however, is no less impressive. Once a network of canals develops, they significantly alter the hydrology of a floodplain and introduce complexity into an otherwise relatively monotonous landscape.²⁶⁰ Again, the most conspicuous factor influencing hydrology are dams. The barrier that a dam presents, reduces downstream connectivity, while increasing lateral connectivity, forcing water outside of the canal and into the adjacent floodplain. Through this process, a wetland environment characterized by a multi-thread channel network is created. Ponds create open water surfaces, store significant amounts of water, reduce peak flow and increase minimum flow as well as raising and charging groundwater. As water is stored in ponds it slowly leaks over the pond's crest, through its minute cavities and simply overflows on the side.²⁶¹ Studies indicate that this water retention can help alleviate flow peaks at precipitation events and thereby contribute to flood delay and reduction. However, no systematic study at the catchment scale has been done to date.²⁶²

Changing the behavior of water causes a subsequent change in the geomorphology of a flood plain. Beaver dams consequently have a significant impact on sediment. At the low end of the spectrum, where beavers dig bank burrows, the excavation material contributes significant amounts of sediment to a stream, and their excavation provides a weak point in the flood

²⁵⁸ Rossell, Frank; Bozsér, Orsolya; Collen, Peter (2005): Ecological impact of beavers *Castor fiber* and *Castor canadensis* and their ability to modify ecosystems. *Mammal Rev.* 2005 Vol.3 No3&4, 258, 259.

²⁵⁹ Rossell, Frank; Bozsér, Orsolya; Collen, Peter (2005): Ecological impact of beavers *Castor fiber* and *Castor canadensis* and their ability to modify ecosystems. *Mammal Rev.* 2005 Vol.3 No3&4, 256, 257.

²⁶⁰ Brazier, Richard E.; Puttock, Alan; Graham, Hugh A. (2020): Beaver: Nature's ecosystem engineers. In *Wiley interdisciplinary reviews. Water* Vol. 8; 3.

²⁶¹ Brazier, Richard E.; Puttock, Alan; Graham, Hugh A. (2020): Beaver: Nature's ecosystem engineers. In *Wiley interdisciplinary reviews. Water* Vol. 8; 3, 4.

²⁶² Brazier, Richard E.; Puttock, Alan; Graham, Hugh A. (2020): Beaver: Nature's ecosystem engineers. In *Wiley interdisciplinary reviews. Water* Vol. 8; 9.

embankment for increased erosion and collapse. At the high end, the extensive network of canals and dams introduces a complexity into an otherwise monotonous landscape. Dams in particular both enhance and reduce erosion as well as deposition of sediment. The edges of a dam are generally eroded away, so is the area directly downstream. The ponds store sediment, carbon, nitrogen and phosphate.²⁶³ On the landscape level, several beaver colonies in combination, cascade and introduce a stepped profile.²⁶⁴ One study on the Devon Beaver Project found one pond to have stored 100t of sediment, 16t of carbon and 1t of nitrogen. Amounting to 70kg per m² over an area of 1.8ha.²⁶⁵ While this clearly shows the potential influence of beaver dams, more research is needed as to the long-term and landscape-scale impacts. The sediment trapped in beaver ponds, however, carries large volumes of nutrients and thereby enhances both instream as well as riparian primary productivity. Anoxic conditions and microbial activity further have a denitrifying effect. Beaver ponds increase dissolved organic carbon (DOC).²⁶⁶

Whether a particular beaver pond acts as a sink or a source of sediment and nutrients depends on the stage of the cycle. But continued occupation, expansion and abandonment of the same area over extended periods of time (one million years or longer) leads to the elevation of entire valley floors.²⁶⁷ One study on beaver sediment in the Rocky Mountains National Park has found that, in some areas, up to half of the post-glacial sediment, is associated with beaver dams. Approximating total carbon storage of the area, the author concluded that the volume of organic carbon stored in beaver meadows represents 8% for the older abandoned strata and 23% for active beaver sites. This highlights the potential of beaver dams to serve as carbon sinks on the landscape-scale.²⁶⁸

Let us now move on to the ecological impacts of beavers. First, plants. The herbivory of beavers has a major impact on plant succession as well as community composition. They consume a

²⁶³ Brazier, Richard E.; Puttock, Alan; Graham, Hugh A. (2020): Beaver: Nature's ecosystem engineers. In Wiley interdisciplinary reviews. Water Vol. 8; 3, 4.

²⁶⁴ Brazier, Richard E.; Puttock, Alan; Graham, Hugh A. (2020): Beaver: Nature's ecosystem engineers. In Wiley interdisciplinary reviews. Water Vol. 8; 6, 7.

²⁶⁵ Puttock, Alan; Graham, Hugh A.; Carless, Donna (2018): Sediment and nutrient storage in a beaver engineered wetland. In: Earth Surfaces and Landforms. Vol. 43. 2358 – 2370.

²⁶⁶ Brazier, Richard E.; Puttock, Alan; Graham, Hugh A. (2020): Beaver: Nature's ecosystem engineers. In Wiley interdisciplinary reviews. Water Vol. 8; 10, 11.

²⁶⁷ Rossell, Frank; Bozsér, Orsolya; Collen, Peter (2005): Ecological impact of beavers *Castor fiber* and *Castor canadensis* and their ability to modify ecosystems. Mammal Rev. 2005 Vol.3 No3&4, 252, 253, 254.

²⁶⁸ Wohl, E. (2013): Landscape-scale carbon storage associated with beaver dams. Geophysical Research Letters 40: 3631, 3635.

wide range of bark, shoots and leaves of woody vegetation, in addition to herbaceous and aquatic vegetation.²⁶⁹ One study in Minnesota has found that a beaver colony can be responsible for 1.300 kg/ha of woody plant per year. Over the course of six years, this led to a decrease of above ground biomass of 40%, less than one-third of which was consumed. Though this might vary depending on circumstance we gain an idea of potential impacts.²⁷⁰ While their powerful jaws and sharp teeth allow them to cut mature trees, their preference lies with smaller saplings (<5cm diameter). They do so to gain access to the softer more nutritious bark, side branches and leafy stems. One study conducted in Norway has found that beavers show a strong preference for willows (*Salix spp.*) which are, besides alder (*Alnus spp.*), the most common tree species in the riparian zone.²⁷¹ This is backed up by another study from the Loire valley in France.²⁷²

The same study also found that home range size, and hence habitat quality, was directly related to willow cover.²⁷³ One study has found that beavers attain 95% of their forage within 50 meters of water's edge, strengthening the theory that beavers are central place foragers. Hence, while beavers may occasionally venture further than 50 meters from the water's edge, their foraging intensity decreases rapidly at that distance. This is another point that will become central in later chapters.²⁷⁴ In congruence with optimal foraging theory, beavers will generally select small food items that require little labor but will journey overland for larger preferred food items occasionally.²⁷⁵

Donkor and Fryxell have found that beaver foraging does change plant community composition. The authors did observe that preferred species increased close to water, while non-preferred

²⁶⁹ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of Castor fiber. Conservation Handbook Series (Pelagic Publishing, Exeter), 15.

²⁷⁰ Johnston, C.A.; Naiman R.J. (1990): Browse selection by beaver: effects on riparian forest composition. Canadian Journal of Forest Restoration, Vol. 20, 1063-1043.

²⁷¹ Haarberg, Orsolya; Rosell Frank (2006): Selective foraging on woody plant species by the Eurasian beaver (Castor fiber) in Telemark, Norway. In: Journal of Zoology Vol. 27, 206.

²⁷² Fustec, Joelle; Lodé, Thierry, Le Jacque, Dominique; Cornier, Jean-Paul (2001): Colonization, riparian habitat selection and home range size in a reintroduced population of European beavers in the Loire. In: Freshwater Biology Vol. 46.

²⁷³ Fustec, Joelle; Lodé, Thierry, Le Jacque, Dominique; Cornier, Jean-Paul (2001): Colonization, riparian habitat selection and home range size in a reintroduced population of European beavers in the Loire. In: Freshwater Biology Vol. 46, 1368,

²⁷⁴ Stoffyn-Egli, Patricia; Willison Martin J.H. (2011): Including wildlife habitat in the definition of riparian areas: The beaver (Castor canadensis) as an umbrella species for riparian obligate animals. In: Environmental Review, Vol. 19, 479-493.

²⁷⁵ Haarberg, Orsolya; Rosell Frank (2006): Selective foraging on woody plant species by the Eurasian beaver (Castor fiber) in Telemark, Norway. In: Journal of Zoology Vol. 27, 206.

species increased further away from water. In addition, plant succession did change, through the creation of light gaps and increased nutrient availability due to reduced competition, which led to an increase in shrubs.²⁷⁶ As much of the woody biomass cut by beavers is not consumed (up to two-thirds), but used as building material or left lying around becomes important deadwood habitat.²⁷⁷²⁷⁸

Moving on to fish, the general increase of wetland surface leads to a replacement of terrestrial by aquatic habitat. As with invertebrates we find that the changes from lotic to lentic, similarly shift to favor different species accordingly. It has been recognized since the 1960s that beaver impoundments and the attendant increase in the overall volume of water, deep pools and variety of habitat. This in turn has been understood to increase both the variety and standing crop of fish.²⁷⁹ This effect seems to be strongest, in low-order streams where dams are aged 9-17 years. In these conditions assemblage structure is dependent on in-migration and therefore closely tied to the cycle of occupation and abandonment of dams and impoundments.²⁸⁰ Both decreasing and increasing water velocity at different points of a stream leads to an overall increase in habitat complexity and has overall positive impacts on fish biodiversity.²⁸¹ Dams however pose an additional point of studied interest as under certain conditions they can impede stream connectivity and therefore impede the upstream migration of fish. This posits one point where case by case assessment is important from the perspective of management.²⁸²

²⁷⁶ Donkor, Noble T.; Fryxell, John M. (2000): Lowland boreal forests characterization in Impacto of beaver foraging on structure of lowland boreal forests of Algonquin Provincial Park, Ontario. In: Forest Ecology and Management, Vol. 118, 83-92.

²⁷⁷ Fustec, Joelle; Cormier Jean-Paul (2007): Utilisation of woody plants for lodge construction by European beaver (*Castor fiber*) in the Loire valley, France. In: Mammalia, 11-15.

²⁷⁸ Thompson, Stella; Vehkaoja, Mia; Nummi, Petri (2016): Beaver-created deadwood dynamics in the boreal forest. In: Forest Ecology and Management Vol. 360, 1-8.

²⁷⁹ Hanson, Willis D.; Campbell, Robert S. (1963): The Effects of Pool Size and Beaver Activity on Distribution and Abundance of Warm-water Fishes in a North Missouri Stream. In: The American Midland Naturalist. Vol. 69, No.1, 136-149.

²⁸⁰ Snodgrass, Joel W.; Meffe, Gary K. (1998): Influence of Beavers on Stream Fish Assemblages: Effects of Pond Age and Watershed Position. In: Ecology Vol. 79 (3), 928-942.

²⁸¹ Smith Joseph M.; Mather, Martha E. (2013): Beaver dams maintain fish biodiversity by increasing habitat heterogeneity throughout a low-gradient stream network. In: Freshwater Biology, Vol. 58, 1523-1538.

²⁸² Stringer, Andrew P.; Gaywood, Martin J. (2016): The impacts of beavers *Castor* spp. on biodiversity and the ecological basis for their reintroduction to Scotland, UK. In: Mammal Review, Vol. 46, 275.

From the water to the air. It has been found that the increase in wetland area caused by beavers can serve as an indicator of avian biodiversity, waterfowl in particular.²⁸³ In addition the increase of nutrients and abundance of macrophyte vegetation in beaver ponds increases macroinvertebrate densities and hence the food base for various bird species.²⁸⁴ As beavers increase the structural complexity of wetlands, they contribute to higher-quality breeding habitats and increase overall productivity. This makes beaver ponds an important landscape element.²⁸⁵ Not only the ponds, but also the meadows accompanying beaver activity form an important habitat for diverse vegetation essential to grassland birds.²⁸⁶ One study has found that the diversity of songbirds was highest in beaver meadows compared to other habitat types.²⁸⁷

Developing the *Castorian Perspective*

Now that we have become familiar with beavers as seen through the eyes of ecologists and the discourse of *conservation* biology, it is necessary to further consider what all of this means for the multispecies relations between beavers and humans, the role that either has played in the Holocene and might play in the *Anthropocene*. To do so we will rely on the old and tried anthropological technique of making the familiar unfamiliar and familiarizing oneself with the unfamiliar. The pedagogical goal of this exercise is to shift perspectives in order to critically examine one's own familiar world through understanding the world of others. This exercise is intended to foster empathy, humility and a deeper understanding of complexity.^{288,289} For these purposes I would like to attempt to develop a narrative account of the Holocene and *Anthropocene* which considers what I would like to call the '*castorian perspective*'. Through this exercise we will (hopefully) be able to see the world and our role in it in a new light.

²⁸³ Brown, Duffy J.; Hubert, Wayne A.; Anderson Stanley H. (1996): Beaver Ponds Create Wetland Habitat for Birds in Mountains of Southeastern Wyoming. In: Wetlands, Vol. 16 No.2, 127-133.

²⁸⁴ Longcore, Jerry R.; McAuley, Daniel G.; Pendelton, Grey W. (2006): Macroinvertebrate abundance, water chemistry, and wetland characteristics affect use of wetlands by avian species in Maine. In: Hydrobiologia, Vol. 567, 143-167.

²⁸⁵ Bulluck, Jason F.; Rowe, Matthew P. (2006): The use of Southern Appalachian Wetlands by Breeding Birds, with a Focus on Neotropical Migratory Species. In: The Wilson Journal of Ornithology. Vol. 118 (3), 399-410.

²⁸⁶ Chandler, Richard B.; King, David I.; DeStefano, Stephen (2009): Scrub-Shrub Bird Habitat Associations at Multiple Spatial Scales in Beaver Meadows in Massachusetts. In: The Auk Vol. 126 (1), 186-197.

²⁸⁷ Aznar, Jean-Cristophe; Desrochers, André (2008): Building for the future: Abandoned beaver ponds promote bird diversity. In: Ecoscience Vol. 15 (2), 250-257.

²⁸⁸ Malinowski, Bronislaw (1984): Argonauts of the Western Pacific ().

²⁸⁹ Eriksen, Thomas Hylland (2010): Small Places, Large Issues. An Introduction to Social and Cultural Anthropology 3rd ed. revised and updated (Pluto Press, London).

In seeking a non-dualist understanding of humans and *wildlife* we draw some of our inspiration from the school of New Animism. We do so, as Animism provides us with an ontology that allows us to focus on the continuities between humans and *wildlife*, rather than their assumed discontinuities. In 'Par-delà Nature et Culture' Descola draws out four different 'modes of identification': *Naturalism*, *Totemism*, *Animism* and *Analogism*²⁹⁰ The first, *Naturalism* has been discussed and deconstructed in the previous chapter. For the following discussion, it is important to remember that in *Naturalism*, 'Nature' exists, and things exist and develop due to an external principle (be that God, or 'the laws of nature'). *Naturalism* – *technocentrism* more specifically – has been defined as '*environmental common sense*' it importantly structures our understanding of other '*modes of identification*.' Yet, as we have argued, the existence of what we call *Nature* is contingent upon the *Modern Ontology*.²⁹¹ Animism on the other hand is defined by Descola as: '*(endowing) natural beings with human dispositions and social attributes.*' or '*(...) a continuity between humans and non-humans.*'²⁹²

Viveiros de Castro goes a step further in developing the concept of *Perspectivism*. He argues for a '*stronger*' animism. Building on his work with Amazonian peoples he writes:

*'I use 'perspectivism' as a label for a set of ideas and practices found throughout indigenous America and to which I shall refer, for simplicity's sake, as though it were a cosmology. This cosmology imagines a universe peopled by different types of subjective agencies, human as well as nonhuman, each endowed with the same generic type of soul, that is, the same set of cognitive and volitional capacities. The possession of a similar soul implies the possession of similar concepts, which determine that all subjects see things in the same way. In particular, individuals of the same species see each other (and each other only) as humans see themselves, that is, as beings endowed with human figure and habits, seeing their bodily and behavioral aspects in the form of human culture.'*²⁹³

Briefly summarized, he argues that Amazonian people understand themselves as in possession of souls of the same quality as other animals. Moreover, from the perspective of these animals,

²⁹⁰ Descola, Philippe (2005): Par-delà nature et culture. (Éditions Gallimard, Paris).

²⁹¹ Descola, Philippe (1996): Constructing natures. In: Descola, Philippe; Pálsson, Gísli (Ed.): Nature and Society. Anthropological perspectives (Routledge, London, New York), 82-102.(87f).

²⁹² Descola, Philippe (1996): Constructing natures. In: Descola, Philippe; Pálsson, Gísli (Ed.): Nature and Society. Anthropological perspectives (Routledge, London, New York), 87, 89.

²⁹³ Viveiros de Castro, Eduardo (2015): The Relative Native. Essays on Indigenous Conceptual Worlds. Afterword by Roy Wagner (Hau Books, Chicago), 58.

they themselves appear to themselves as humans. Just like humans wear ornaments, paint themselves and wear clothes as markers of their social identity and belonging to a specific human group; these animals wear their bodies as markers of their social identity and belonging to a specific human group. As do humans, these animals live within kinship networks, engage in rituals and warfare, consume crops and drink. Such a cosmology:

*'Such difference of perspective – not a plurality of views of a single world, but a single view of different worlds – cannot derive from the soul (...) Rather, such difference is located in the bodily differences between species, for the body and its affections (...) is the site and instrument of ontological differentiation and referential disjunction.'*²⁹⁴

This perspective inverts the modern ontology. With the body as the source of ontological differentiation, human and non-human souls exhibit continuity in the quality of their souls and thus share the same *culture*. Different embodied perspectives, however, create varying objective positions from the application of a universally available point of view.²⁹⁵ To further tease out the meaning of this hard-to-digest mental contortion I would like to present an often-cited passage further elaborating that crucial point:

*'(...) humans see humans as humans, animals as animals and spirits (if they see them) as spirits; however animals (predators) and spirits see humans as animals (as prey) to the same extent that animals (as prey) see humans as spirits or as animals (predators). By the same token, animals and spirits see themselves as humans: they perceive themselves as (or become) anthropomorphic beings when they are in their own houses or villages and they experience their own habits and characteristics in the form of culture.'*²⁹⁶

In Amazonian cosmologies, there are then not different points of view onto things. Rather, one sees a different world, depending on one's body. Different points of view, in consequence, are accessible through changing '*manifest forms*' i.e. bodies. The body is mere '*envelope*' or '*clothing*' that conceals an internal human form. Shamans, or the dead can assume animal form, animals can turn into other animals, or humans can be turned into animals inadvertently.

²⁹⁴ Viveiros de Castro, Eduardo (2015): The Relative Native. Essays on Indigenous Conceptual Worlds. Afterword by Roy Wagner (Hau Books, Chicago), 58f.

²⁹⁵ Holbraad, Martin; Pedersen, Morten A. (2017): The Ontological Turn. An Anthropological Exposition (Cambridge University Press, Cambridge, New York), 163.

²⁹⁶ Viveiros de Castro, Eduardo (2015): The Relative Native. Essays on Indigenous Conceptual Worlds. Afterword by Roy Wagner (Hau Books, Chicago), 197.

In a methodological exercise to increase our understanding of beavers let us put on the clothing of a beaver body, not the felted hats popular in the 17th century, but let us put on the fur, the teeth, the claws, the paws, the anal gland and beaver tail just as a diver puts on all their gear, before we take a deep dive into the beaver pond.

To the disappointment of *new Animists*, I do not intend to carry Viveiros de Castro's perspectivism to its limits by burdening beavers with it. Neither do I intend to take de Castro literally. Rather, I would like to use his Perspectivism as an ontological foundation which anchors our thinking about beavers in an ontological condition which requires us to look for ourselves in beavers in the sense that we afford them subjective agencies akin to our own, and simultaneously raise our ethical considerations regarding beavers to a level far above that which we commonly accord nonhuman mammals. Thus, I do not attempt to develop a *castorian perspectivism*, but rather a *castorian perspective*. Doing so forces us to speculate about a *castorian* epistemology grounded in their material and embodied being that guides their *world-making*. In consequence beavers must have a sense of the *good*, of the *desirable* of the *beautiful*. In other words, what to us is a beavered landscape, to Castor *is* utopia. As we accept these things as real enough to concern us, we will – I hope – eventually arrive at the conclusion, that the *castorian* utopia has significant overlap with our own utopian designs in the *Anthropocene*. Of course the rupture of the *Anthropocene* puts the possibility of utopia into question. Therefore, we will settle for an overlap between *castorian utopia* and the *ecological class's* designs for a *livable planet*. The *ecological class*, as laid out by Latour and Schultz, includes those who share ecological concerns and values, which cut across traditional class lines.²⁹⁷

Nonhuman Zoomian anarchists

In developing the *castorian perspective*, let us now recount the biological and ecological knowledge previously discussed, through the embodied eyes of beavers. We will begin with their dwelling site. What in English is called a lodge, in German has been termed '*Burg*' cognate of the old English '*Burgh*' and the Germanic equivalent of the romance '*Castle*'. One publication on beavers bears the title: Der Biber: die Rückkehr der Burgherren (The Beaver:

²⁹⁷ Latour, Bruno; Schultz, Nikolaj (2022): On the emergence of an ecological class – a memo: subject: how to promote the emergence of an ecological class that's self-aware and proud. Translated by Julie Rose (Cambridge, Polity).

the Return of the Castelans).²⁹⁸ Let us, then fabulate beavers as Castellans, as lords over a castle. A beaver dam may figure as the castle wall, the pond as the trench, the lodge as the keep. Yet, since beavers do not subjugate other beavers but live in close family units, nor do they subjugate other species, here the feudal metaphor already ceases to serve our purposes. As this road stops short, we are reminded that *common sense* narratives of and metaphors for beavers, albeit well intended, are loaded with ideological baggage that likely reflects and reproduces the prejudices and assumptions of those producing the names.²⁹⁹

Fabulating a different narrative of and metaphor for beavers let us take inspiration from narratives of resistance to political hierarchies and feudal rule. Practices that beavers are widely known for. Developing our narrative from an understanding that the social organization of beavers is characterized through kinship rather than patrimonial, or state relations; we may, in the terms of James Scott, narrate them as nonhuman *zoomian Anarchists*.³⁰⁰

Scott argues that states have historically established themselves in flat, relatively open, lowland valley bottoms and plains. Such environments allow for the projection of force and thus the subjugation, and taxation of sedentary populations. Such states have developed, or adopted religious ideologies and social identities, writing systems, conscripted armies, legal codes, and sedentary agriculture; in support of their claims to power. In the written records of such states non-state people are narrated as unruly, ungovernable and savage. Populations in such areas have traditionally developed ways of life, which Scott describes as the antithesis of valley-based state societies. They include but are not limited to: pastoral transhumance, *swiddening* as well as hunting and gathering. In the words of Scott:

*'The classical states of Southeast Asia were, as in the Middle East, ringed by relatively free communities: by nonstate spaces and peoples. Such autonomous peoples lived not only in the hills but also in the marshes, swamps, mangrove coasts, and labyrinthine waterways of estuarial regions. This marginal population represented, at one and the same time, an indispensable trading partner of valley kingdoms, a zone of refuge from state power, a zone of relative equality and physical mobility, a source of slaves and subjects of lowland identities.'*³⁰¹

²⁹⁸ Zahner, Volker; Schmidbauer, Markus; Schawb, Gerhard (2005): Der Biber: Die Rückkehr der Burgherren.

²⁹⁹ Animal metaphors, beavers, reflecting prejudice

³⁰⁰ Scott, James C. (2010): The Art of Not Being Governed: an anarchist aistory of upland Southeast Asia. (Yale University Press, Yale).

³⁰¹ Scott, James C. (2009): The Art Of Not Being Governed, 31.

In a situation wherein prolonged domination was ultimately impossible due to technological, logistical and ecological constraints, each side became an indispensable trading partner to the other. Both sides, however, presented a thorn on the side of the other. While *Zoomia* was a zone of refuge for rebellious or unruly state subjects, it also functioned as a region subject to slave raiding and attempted conquest by labor hungry state societies. In the case of the relationship between the Chinese Empire and the various nomadic groups to the West and North of its historical core, nomadic polities had been a serious threat. More than once did steppe nomads cause the destruction of an Imperial Chinese Dynasty.³⁰² This coexistence therefore was characterized by conflict, cooperation and arrangement. Richard White has called a similar situation in the context of the North American fur trade the *Middle Ground*.³⁰³ This stalemate has only been broken in the 20th century as the productive capabilities of industrial states and empires, their workforce and consequently force projection capabilities began to far outpace the abilities of stateless peoples to resist.³⁰⁴

Just like human *zoomian anarchists* beavers are stateless, have no writing, armies, taxes or laws. But they *flourish* in the same spaces where some zoomian anarchists have traditional *flourished* – the unruly wetlands. Just like human zoomian anarchists beavers are not fully sedentary. If their dwelling sites are destroyed, they pack up their few possessions and move to a new site. Just like human *zoomian Anarchists* they are despised by adjacent states and narrated as unruly, ungovernable and savage. Just consider the following quote by Christoph Angst beaver manager in Switzerland: *‘Am meisten ärgert die Leute, dass der Biber ein Anarchist ist, und nicht zuhört oder Konzepte liest. Er macht, was er will’*³⁰⁵³⁰⁶

This characterization comes from somebody who has a particularly favorable opinion on beavers and who has been – for decades – engaged in caring for beavers in Switzerland via the *affective logics* of a beaver manager. Historically, state-based people’s approaches to beavers have been quite different. They have ranged from commodification and extirpation in the fur trade, to toleration, protection and reintroduction under the *wilderness* paradigm, to

³⁰² Barfield, Thomas J. (1992): The perilous frontier: nomadic empires and China (221 BC to AD 1757) (Cambridge Massachusetts, Blackwell).

³⁰³ White, Richard (1991): The middle ground. Indians, empires, and republics in the Great Lakes region 1650-1815. Twentieth Anniversary Edition (Cambridge University Press, Cambridge, New York, Melbourne).

³⁰⁴ Scott, James C. (2009): The Art Of Not Being Governed.

³⁰⁵ Käch, Heidi (2020): *Naturschützer und Öko-Terrorist*.

³⁰⁶ ‘The most annoying thing about beavers, for people, is that the beaver is an anarchist. He neither listens, nor reads management plans. He does as he pleases.’ (Translated by the Author)

cooptation and assimilation in neoliberal *conservation*, to extermination, and increasingly in central Europe and elsewhere suppression.

A further central component, one that remains underexplored in Scott's account, is the attempt of valley states and empires at the transformation of ecologies and landscapes in order to expand *state space* and reduce the expanse of non-state space. The drainage of wetlands, and the clearance of forests are but the most prominent and ultimately effective processes that come to mind as we are reminded of Anna Tsing's Plantationocene.³⁰⁷ As these processes directly underlie key drivers of the *Anthropocene*, we will discuss the historic drainage of wetlands in Austria as it pertains to beavers at present in later chapters.

From the perspective of an ecological account of Zoomia it becomes clear, that the expansion of state space – to the extent it has taken place since the time of the fur trade – has done so not only at the cost of *human zoomian anarchists* but also the *wildlife* that has hitherto *flourished* in the space created by the *world-making practices* of *zoomian anarchists*. Again, we are reminded that the *Anthropocene* marks a rupture with roots in empire and capital, in short, the *Capitalocene*.

In what follows, we will explore in more detail what warrants the ontological assumption of a political-economic continuity between beavers and humans engaged in a particular mode of subsistence production, both conceptualized as zoomian anarchists. We do so by comparing the *world-making* of beavers with the *world-making* of a particular category of *zoomian anarchists: swidders*, also known as *slash-and-burn agriculturalists*.

Beavers swidden beaver-swiddens

So far we have argued for an epistemics which is grounded in the ontological continuity between *wildlife* and humans. We have done so based on the concept of *companion species*, *wildlife* and the *perspectivism* of Viveiros de Castro. This has allowed us to understand beavers as embodied, agential and unruly subjects. We have argued that from the embodied perspective of beavers, i.e. the *castorian perspective* a beavered landscape must appear as *good*, and beautiful even *utopian*. In discussing the ecological literature on beavers we have established the wide range and net positive environmental outcomes of a beavered landscape.

³⁰⁷ Haraway, Donna J. (2015): Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin. In: Environmental Humanities Vol. 6 (1), 159-165.

Consequently, from the perspective of the *ecological class*, castorian utopia significantly overlaps with our concerns for a livable planet. In addition to this continuity in political designs, we have argued for a continuity in the relationship between states and empires on the one hand, and beavers as nonhuman zoomian anarchists as well as human zoomian anarchists on the other hand. In this section we will turn to an exploration of the continuities between the world-making of beavers and the world making of swiddeners. We do so to demonstrate a continuity in the subsistence mode of beavers, and the subsistence mode of swiddening – in ecological terms.

Anthropologists, contrary to Conservationists, developers, states or empires; have been intrigued by this semi-sedentary form of agriculture at least since the 1990s. Anna Tsing has dedicated great *care* and effort in describing the world-making practices of the Meratus Dayak, who in their turn practice *swiddening*, evade state control and turn *technocentrist common sense* categories of *Nature* and *Culture*, *conservation* and production, wild and domesticated on their heads.

South Kalimantan, where the Meratus Dayak live is characterized by tropical forests and people who live in bamboo houses. Their houses are surrounded by swidden fields which shade into regrowth and old forest. Intriguing about the Meratus' practices is that they recognize a wide variety of practices under the category of planting. As such it ranges from the deliberate burying of seeds to the growth on garbage heaps. In addition, their *world-making* encourages certain plants, for example self-propagating plants which sprout in light gaps created by forest clearances such as rattan and bamboo. Other plants such as honeybee trees which provide habitat for honeybees are not removed when a new patch of forest is cleared. Rather, vines and parasites are removed to maintain them and attract semi-domesticated giant honeybees (*Apis dorsata*). As they like to build their nests on the tallest forest trees, Meratus will clear them of epiphytes and thus prepare them for the bees. While the bees provide honey and beeswax, they generally do not come to trees that have not been cared for.³⁰⁸

The forests, within which the Meratus Dayak live and the diversity they contain – their patchiness – clearly is *anthropogenic*. In multi-species terms: human *world making* is evident in these forested landscapes. Ironically, *conservation* biologists have often described the

³⁰⁸ Tsing, Anna L. (2005): Friction. An Ethnography of Global Connection. (Princeton University Press, Princeton, Oxford), 178, 181.

forests inhabited by the Meratus Dayak primeval or 'natural' forests, or a degraded forest in need of protection. Many of the species making up the Biodiversity found in these forests thrive in the gaps between cultivated and wild.³⁰⁹ The confusion that emerges from Dayak practices is an effect of the technocentrist categories of *Nature* and *Culture*, of *state space* and *wilderness*. Such dualist categories produce what Tsing has called zones of 'boredom' or 'gaps'.³¹⁰

Another such zone of boredom, or gap, lies in what we attempt to fill with the *castorian perspective*. We do not commonly find agential verbs imbued with intent such as 'plant', 'sow', 'weed', 'clear', 'prepare'; in our epistemic register of *wildlife*. Therefore, we do not fathom beavers preparing their swiddening plot through the weeding out of trees and other non-desirable plants. Rather, biologists refer to such activities as: '*foraging*' which changes plant community composition.³¹¹ In the same vein we do not understand the relationship between beavers and their preferred food plant – *willow* – as one of domestication. The vocabulary that ecologists provide for the relationship between beavers and willows is one of *symbiosis* or *mutualism*. As one of several possible interactions between organisms (the others being: competition, mutualism, predation/parasitism, commensalism, amensalism, neutralism;)³¹² the textbook case for mutualism is that between a pollinator and a plant. In what way organisms interact depends on many factors and can change on an evolutionary timescale.

Regarding beavers, the most relevant example is their relationship with willows (*Salix alba*). Willows are some of the most common trees in riparian wetlands in temperate Eurasia. As a pioneer species they are adapted to open, wet and nutrient rich habitats and can survive inundation periods of up to six months.³¹³ They are also, as mentioned above, the preferred food item for beavers. One special characteristic of willows is their ability to vegetatively reproduce. Thus, when a beaver fells a willow, stems will sprout from the stump. This gives rise

³⁰⁹ Tsing, Anna L. (2005): *Friction. An Ethnography of Global Connection*. (Princeton University Press, Princeton, Oxford), 178, 181.

³¹⁰ Tsing, Anna L. (2005): *Friction. An Ethnography of Global Connection*. (Princeton University Press, Princeton, Oxford), 172.

³¹¹ Donkor, Noble T.; Fryxell, John M. (2000) Lowland boreal forests characterization in Impact of beaver foraging on structure of lowland boreal forests of Algonquin Provincial Park, Ontario. In: *Forest Ecology and Management*, Vol. 118, 83-92.

³¹² Molles, Manuel C.; Sher, Anna A (2019): *Ecology: Concepts and Applications*. 8th edition (Mc Graw Hill Education, New York), 276.

³¹³ Roloff, Andreas; Weisgerber, Horst; Lang, Ulla; Stimm, Bernd (2010): *Bäume Mitteleuropas. Von der Aspe bis Zirbel-Kiefer Mit den Porträts aller Bäume den Jahren von 1989 bis 2010* (Wiley-VCH, Weinheim), 348f.

to a stand of young willow growth highly nutritious and easily accessible to beavers. As willows thus provide a readily available and nutritious food resource to beavers, beavers in turn create and expand the nutrient rich, wet conditions preferred by willows while at the same time creating unfavorable conditions to potential competitors of willows. This special relationship is not a coincidence. But the product of the evolutionary *becoming together* of willows and beavers. This is further suggested by the absence of vegetative reproduction in riparian trees in Tierra del Fuego where beavers had been introduced in the 1940s.³¹⁴

From the perspective we have been developing in this section one may argue that beavers ‘cultivate’ willows in a way similar to some of the various forms of ‘cultivation’ the Meratus Dayak practice. As we have discussed in the previous chapter, the world-making of beavers or the Meratus Dayak – contrary to *technocentrist common sense* – is not a freak occurrence or a peculiar condition of a select few cases in the realm of biology. Based on Donna Haraway’s interpretation of Lynn Margulis and their work, it is the fundamental organizing principle of biological life:

‘Critters interpenetrate one another, loop around and through one another, eat each other, get indigestion, and partially digest and partially assimilate one another, and thereby establish sympoietic arrangements that are otherwise known as cells, organisms, and ecological assemblages.’³¹⁵

The proposition of such an understanding based on the concept of companion species and their sympoietic becomings – wherein symbiosis does not equate ‘mutually beneficial’ relationships between clearly differentiated individuals caught in zero-sum games – forms the basis of the relational process ontology proposed in this thesis.

In comparing the world-making practices of the Meratus Dayak with the world-making practices of beavers it becomes clear that the occupational cycles of beavers and swiddeners are similar in their ecological effect of creating a patchy landscape and resetting ecological succession. Henceforth we will speak of an occupied beaver site within a beaver territory as a

³¹⁴ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute).

³¹⁵ Haraway, Donna J. (2016): Staying with the Trouble. Making Kin in the Chtulucene (Duke University Press, Durham, London), 58.

beaver *swidden*. The cycle of occupation and abandonment discussed in the first section of this chapter now becomes the *swidden cycle*.

The Beaverocene

So far, we have established several important continuities between beavers and humans. Beavers and humans are subjects and require respons-able engagement. There exists a continuity between beavers and the *ecological class* in respective designs for a livable planet. There is a continuity in the relationship between states and empires for both human and nonhuman zoomian anarchists. Lastly, world-making practices of beavers and swidders insofar as their subsistence mode is concerned show a continuity in creating a patchy landscape ecology. We therefore speak of beavers as *swidders*. These continuities in ontology, epistemics, ethics and political economy constitute the core of the *castorian perspective*. In this section we apply the *castorian perspective* in order to illuminate the history of beavers and humans.

The propositions through which we have thus far assembled the *castorian perspective* – embodied subjecthood, political ally, nonhuman zoomian anarchist, swidder; certainly heavily tax our *common sense* understanding of what can be included in the category of rodent. Yet, Dicenta maintains that beavers are already socialized as almost human, almost technology in the dominant, *common sense* understanding. From there it is not exactly a leap to go a step further and argue, as does Dicenta – as do we – that beavers have: ‘*agentic, technological, and social capacities to transform natures and futures.*’³¹⁶

To further unsettle technocentrist *common sense* and support this claim let us consider one intriguing proposition related to us by Bryony Coles in her book: *Beavers in Britain’s Past*. There she tells the story of humans and beavers since the late Pleistocene. In a deposit from that period, Worthington Smith a 19th century archeologist, dug up sticks of wood which he believed to have been cut by human-made tools and thus humans. The birch stems were of interest to him due to their pointed ends. But failing to engage him or anybody else beyond this curiosity they were deposited in a box and fell into oblivion until 1981 when they were finally identified as beaver artifacts.³¹⁷ This confusion between beaver artefact and

³¹⁶ Dicenta, Maria (2020): *Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s* (Dissertation, Rensselaer Polytechnic Institute), 5.

³¹⁷ Coles, Bryony (2006): *Beavers in Britain’s Past*. (Oxbow Books, Oxford), 72, 73.

anthropogenic artefact highlights the closeness between beavers and humans in more than one sense. Beavers and humans have lived in close proximity in the temperate northern hemisphere throughout the Holocene. So close in fact, that in the archeological record beaver and human artefacts are surprisingly easy to confuse:

*'(...) just as humans use beaver-cut wood and beaver structures for their own purposes, so beavers use materials discarded by humans and structures abandoned by humans for their own purposes, resulting in a mix of beaver and human activity.'*³¹⁸

Beavers and humans *make-worlds* at the landscape level. Beavers and humans deposit sediment and are therefore geologically impactful. Beavers and humans can enhance biodiversity through their world-making. Finally, beavers and humans were and are caught up in the same planetary processes such as the multispecies expansion that followed the last Ice Age. Tsing has called this *Holocene resurgence* and *Anthropocene proliferation*. *Resurgence* is the process that follows upon *disturbance*. Both are central to ecological life.³¹⁹ In the words of Tsing:

*'Holocene farming (and beaver swiddening (my addition)) privileged the same resurgence processes and forest species assemblage as the multispecies expansion that followed the Ice Age, including both local succession and the long-distance travel of plants. (...) When the glaciers retreated and the world became warmer and wetter, living things spread out from refugia, remaking forests, wetlands, and meadows.'*³²⁰

In this respect an interesting question is that of landscape structure in the early Holocene, before sedentary agriculturalists engaged in more or less widespread forest clearances. While some believe most of Europe to have been covered in blanket deciduous forest. Coles reminds us that others believe mega herbivores, human use of fire – and most importantly to us – beavers may have contributed to more patchy landscapes. Millennia before agriculturalist humans, created the open meadows and parklands so characteristic of pre-modern Europe.³²¹

³¹⁸ Coles, Bryony (2006): Beavers in Britain's Past. (Oxbow Books, Oxford), 95.

³¹⁹ Tsing, Anna L. (2017): A Threat to Holocene Resurgence Is a Threat to Livability. In: The Anthropology of Sustainability, 53.

³²⁰ Tsing, Anna L. (2017): A Threat to Holocene Resurgence Is a Threat to Livability. In: The Anthropology of Sustainability, 54.

³²¹ Coles, Bryony (2006): Beavers in Britain's Past. (Oxbow Books, Oxford), 87, 88.

As discussed at the beginning of this chapter, the impact of beavers on the landscape, hydrology, sediment, fungal, plant and animal communities; is well established. However, the cycle of abandonment and reoccupation, the *swidden cycle*, adds a unique temporal rhythm in a beavered landscape. It may even be argued to have been one of the loudest and most perceptible rhythms, if not the loudest. At least in temperate regions of the northern hemisphere during most of the Holocene. This may appear as wild speculation to some, but not to us who have become familiar with beavers. As we remember the study from the Rocky Mountains National Park³²² and its larger implications, we are forced to accept that beavers certainly must have played a significant role in keeping landscapes open during these millennia. Particularly along low lying, lower order streams with large flood plains.

How important and impactful this *rhythm* must have been and continues to be, might be elucidated not by further elaborating the role that beavers play in landscape formation in the Northern Hemisphere, but by pointing to a freak case in a sense unusual, but in another sense a typical feral dynamic in the *Anthropocene*.³²³ Maria Dicenta relates to us the story of the Fuegian beavers. Originally introduced by the Argentinian state in 1946. The primary intended goal of their introduction was to (re-)create a fur industry, make TdF economically productive and an attractive area of settlement for white colonists. As the fur industry never took off, their introduction was eventually declared a mistake by 1981. Today they are described as ‘*apocalyptic “ecosystem engineers”*’.³²⁴ Dicenta describes the landscapes the Fuegian beavers produce as *ghostly*. In these landscapes of the Southern hemisphere beavers have become a keystone species ‘*beyond their biologies*’. In order to situate the dystopian impact the invasive Fuegian beavers have on the multispecies landscapes of Tierra del Fuego Dicenta proposes *The Beaverocene*.³²⁵

Dicenta pinpoints the beginning of the *Beaverocene* in the 1980s, just around the time when beavers had reached the Chilean mainland and designs to eradicate them began to gain

³²² Wohl, E. (2013): Landscape-scale carbon storage associated with beaver dams. *Geophysical Research Letters* 40: 3631, 3635.

³²³ Bubandt, Nils; Tsing Anna (2018): Feral Dynamics of Post-Industrial Ruin: An Introduction. In: *Journal of Ethnobiology*, Vol. 38 (1), 1-7.

³²⁴ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 1.

³²⁵ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 4.

traction.³²⁶ While the desired fur industry never took off, beavers spread into all unoccupied watersheds. Eventually biologists began to assess beavers as the main disturbers of the subarctic forests of the region.³²⁷ To Dicenta, the *Beaveroscene* is characterised by beavers as the unquestionable main transformers of sub-Antarctic forests, as well as modes of ordering environmental knowledges and practices.³²⁸ At the same time, beavers are not the only non-native species making worlds in Tierra del Fuego. She points out that both sheep and beavers are non-native to the region. Although both cause significant ecological *disturbance* it is only beavers who are classified as invasive. Dicent argues that this ordering hinges upon the distinction between optimized life vs. non-capitalized, or surplus life.³²⁹ In the words of Dicenta: *'Without producing industrialized vital surplus, beavers today are narrated through apocalyptic and dystopian environmental discourses.'*³³⁰ A similar approach to invasive species has been observed in New Zealand.³³¹ Put differently the difference between an invasive non-native species and a non-invasive non-native species its relations to capital.

Dicenta concludes that relations between humans and beavers (and by extension all *wildlife*) depend on whether beavers enter the world of ecosystem restauration, the fur trade, or invasion biology. In the words of Dicenta:

*'In the Beaveroscene, it was not humans who were responsible for too much environmental damage that they were in need of control, but rather the settler beavers who, unemployed, continued extracting leaves, water, branches, and trees for their reproduction and expansion. Beavers became invasive in their relationship with humans, not just with trees and rivers...'*³³²

In other words, had the fur industry in Tierra del Fuego contributed to national economic development, and the whitening of the landscape – as originally intended – then beavers

³²⁶ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 168.

³²⁷ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 172f.

³²⁸ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 4.

³²⁹ Dienta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 226.

³³⁰ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 173.

³³¹ Dutkiewicz, Jan (2015): Important Cows and Possum Pests. New Zealand's Biodiversity Strategy and (Bio) Political Taxonomies of Introduced Species. In: Society & Animals Vol.23, 379-399.

³³² Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 263.

would not be considered invasive today. Just as in the case with the *Anthropocene*, the beaver problem in Tierra del Fuego then cannot be reduced to the ecological aspect of castorian *world-making*. Motivated by the relations of capital and empire, global science has rendered beavers as an invasive – because unruly and unprofitable – species. In an operation of one-sided instrumentality beavers in Tierra del Fuego are known as invasive. Therefore, their entire category has been made killable. While scientists, the state and international organizations present their invasive status as scientific fact, we are starkly reminded of Haraway's god trick.

Beavers are situated differently in the Northern Hemisphere. Here beavers had been socialized through the fur trade. In this capacity they have formed a central resource in the establishment of European powers in North America. In fact, the history of Canada and the US cannot be narrated without the history of beavers. As the fur trade abated, and beavers had become extirpated from almost their entire Holocene range, beavers began to undergo the transformation from object of slaughter for profit to objects of *conservation*.³³³ The later status has recently been supplemented by an understanding that beavers are ecosystem engineers who provide *ecosystem services*. What has changed with regards to beavers is not their physical or ecological characteristics. Rather, they now relate differently to the state, empire and capital. This transformation however is not complete. As we will explore in later chapters, a significant proportion of stakeholders does not accept beavers as an object of *conservation*, or providers of *ecosystem services*. Ironically those who contest the socialized status of beavers as ecosystem engineers sometimes mobilize apocalyptic and dystopian narratives reminiscent of the southern *Beaverocene*.

As Dicenta's *Beaverocene* is tailored to the historical relations of Tierra del Fuego, I would like to expand on the concept and propose a Northern Hemisphere *Beaverocene*. I do so on the basis of the *castorian perspective* we have thus far assembled in this chapter. The two *beaverocenes* share kinship ties through the expansion of the capitalist *modern world-system* and empire, as well as through the *Anthropocene*. Yet, the *Beaverocene* of the Northern hemisphere is intended to carry a longer historical perspective, equally laden with ghostly hauntings, but with a more positive outlook and stronger elements of hope for the future, due to its stable Holocene past. The northern *Beaverocene* thus stretches from the late Pleistocene

³³³ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute), 166.

through the Holocene with a great rift from the early modern period into the present, holding the promise of a possible *resurgence* in the 21st century.

What constitutes the Northern hemisphere? We must begin with the process of *Holocene resurgence*. After the retreat of glacial ice *wildlife* began to make its way north from their Pleistocene refugia. As Plants advanced, they made worlds for herbivores who in turn allowed predators to follow. A similar process can today be observed in the Arctic.³³⁴ Based on their historical range and their colonization dynamics today beavers likely occupied the vast majority of watersheds in the temperate zone of the Northern Hemisphere. Based on their range, coupled with estimates of their pre fur trade numbers we have argued that beavers likely were more abundant in numbers as well as in biomass than humans during most of the Holocene. The scales between humans and beavers, at least in total numbers began to tip around the turn of the first millennium. Consequently, we must assume that beavers until this period were the loudest rhythm in the patchy riparian wetland landscapes they helped make.

Engaged in the swiddening cycle beavers foraged, burrowed, built lodges and dams for millennia. These activities significantly impacted the hydrology and geomorphology of rivers. Their dams retained nutrients, stored carbon and created space for *wildlife*.³³⁵ As we have discussed before, the continued occupation of a territory undergoing the different phases of the swiddening cycle would eventually lead not only to the creation of distinct beaver sediment, but to the elevation of entire valley floors.³³⁶ If we remember the key drivers of the *Anthropocene* laid out by Steffen and Crutzen beavers clearly impact several of them.³³⁷ The world-making of beavers is visible in the fossil record. They have impacted the carbon cycle and therefore must have had a measurable impact on the climate. They impacted nutrient and water cycles. They have dammed many rivers. In all this, beavers created space for *wildlife*.

Of course, the difference between the *Anthropocene* and the *Beaverocene* is that we hold the latter as something positive. The *Beaverocene* was a pillar of the stable Holocene conditions under which human civilization was able to *flourish*. Put differently, the *Beaverocene* was

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³³⁵ Brazier, Richard E.; Puttock, Alan; Graham, Hugh A. (2020): Beaver: Nature's ecosystem engineers. In Wiley interdisciplinary reviews. Water Vol. 8; 3, 9.

³³⁶ Rossell, Frank; Bozsér, Orsolya; Collen, Peter (2005): Ecological impact of beavers *Castor fiber* and *Castor canadensis* and their ability to modify ecosystems. Mammal Rev. 2005 Vol.3 No3&4, 252, 253, 254.

³³⁷ Steffen, Will; Grinevald, Jacques; Crutzen, Paul; McNeill, John (2011): The Anthropocene: conceptual and historical perspectives. In: Philosophical Transactions of the Royal Society 369, 842-867.

ruptured by the Anthropocene. Another difference is that beavers were not solely responsible for the stable Holocene conditions in which human civilization thrived. Rather the *Beaverocene* was part of a multispecies world of partial relations and mutual becomings in an endless dance of distributed agencies where *wildlife* and humans were living, eating and dying. What is crucial however, is that for a very long time, beavers had a larger impact on landscapes in the Northern hemisphere, and a more significant impact on the Earth System, than humans.

What distinguishes the northern *Beaverocene* then is its positive connotation. The historic and ongoing absence of beavers is understood as a ghostly haunting. As their past presence and present absence is reflected in the ecologies of wetland species such as willows. Their ghostly haunting is further inscribed in the decline of *wildlife* who *flourished* in beaver swiddens. Conscious of the *Beaverocene*, we must understand that many wetland species that used to be abundant are now threatened, on the brink of or already extinct. Riparian landscapes in this sense of being haunted grief for the disappearance of beavers, and yearn for their *resurgence*. A *resurgence* which must be understood as a precondition for human and nonhuman *flourishing* in the 21st century. Ultimately, we – as the *ecological class* – must learn to be attentive to this perspective and incorporate the Utopia of beavers into our own designs for a livable planet.

The Fur Trade

Historically, the decline of beaver populations and the *disturbance* of the Northern Hemisphere *Beaverocene* likely began in the time-space of the Roman Empire and from then on fluctuated in inverse correlation with state and imperial projects throughout Eurasia. Thus, the interlude of late antiquity and the early middle-ages, the bubonic plague and recurring famine may have been detrimental to empires, and peasants; but proved a respite for beavers, and other *wildlife*. Similarly, the decline of the Eastern Han empire, the ensuing period of the eighteen Kingdoms and Six Dynasties provided a comparable respite for human and nonhuman *Zoomian Anarchists*, in East Asia.³³⁸³³⁹³⁴⁰

³³⁸ Coles, Bryony (2006): Beavers in Britain's Past. (Oxbow Books, Oxford).

³³⁹ Lewis, Mark Edward (2011): China between empires. the Northern and Southern dynasties (Harvard University Press, Cambridge Massachusetts).

³⁴⁰ Elvin, Mark (2004): The retreat of the elephant. an environmental history of China (Yale University Press, New Haven).

Yet, from the late Middle-ages onward beavers began – for the first time – to disappear for good such as in England and Denmark as well as southern Europe. While these extirpations occurred on an Island, a peninsula and the marginal areas of their ecological niche, from the 16th century beaver numbers began to dwindle even in their core areas. With the spread of the money economy and mercantile capitalism, the rise of Northern Europe, and the inception of the modern world-system from the fifteenth century on, something changed. Beavers were no longer a source of subsistence, or the prerogative prey of nobles, they began to be socialized, to use Dicientas' term as a commodity.

By the sixteenth century beavers and other fur bearing animals became scarce in Europe and prices rose sharply. At the same time fashion tastes changed and for much of the early modern period beaver felt hats were a fashionable status symbol amongst higher-status men.³⁴¹ Once Europe was largely beavered out, from the perspective of profit and market exchange, North America and Eurasia East of the Ural became a fur trade *commodity frontier*.³⁴²

As Richard argues: *'Much of the early impetus for maritime travel to North America came from the profits to be made from hunting, killing, processing and shipping animal skins back to Europe.'*³⁴³ Crucially, beavers were no longer hunted for their fur, meat and castoreum. They were abstracted as a high-value commodity, i.e. fur. Yet, unlike the other crucial commodities of the 16th century: sugar and tobacco, this commodity did not have to be grown. Neither was there a scarcity of labor, nor the need to invest in capital stock, land conversion or the establishment of political control. Europeans did very little hunting or trapping themselves. Indigenous peoples in America and Eurasia provided most of the labor. The effects this had on the politics of indigenous North America are well documented.³⁴⁴³⁴⁵

Commercial hunting for a range of fur bearing animals, not just beavers, carried Europeans into Siberia and North America. Characteristic of a *commodity frontier*, the trade rapidly

³⁴¹ Richards, John F. (2003): *The Unending Frontier. An Environmental History of the Early Modern World* (University of California Press, Berkely, Los Angeles, London), 463, 465.

³⁴² Moore, Jason W. (2015): *Capitalism in the Web of Life. Ecology and the Accumulation of Capital* (Verso, London, New York).

³⁴³ Richards, John F. (2003): *The Unending Frontier. An Environmental History of the Early Modern World* (University of California Press, Berkely, Los Angeles, London), 463.

³⁴⁴ Wolf, Eric R. (2010): *Europe and the People Without History. With a New Foreword by Thomas Hylland Eriksen* (University of California Press, Berkely).

³⁴⁵ White Richard (1991): *The middle ground. Indians, empires, and republics in the Great Lakes region 1650-1815. Twentieth Anniversary Edition.* Cambridge University Press, Cambridge, New York.

moved East to West as area after area was beavered out. Historically, the North American fur trade can be divided into two distinct periods: one of imperial rivalry before 1763, and one of British and US dominance until the demise of the trade in the 1890s. The two earliest points of access were the Saint Lawrence River with Quebec and the Hudson River with Nieu Amsterdam – later New York – as their strategic points of European control and settlement. From there the trade advanced, ironically like an expanding beaver population along watersheds, and across portages linking watersheds. Geographically, the trade can be divided into three regions: the Eastern Woodlands and Great Lakes, the Subarctic and the Pacific-Northeast. Moving East to West, the trade engaged ever new indigenous groups into the circuits of global commodity exchange. In the second phase of the trade, as it moved beyond the cultivated areas of North America, a new zone of food supply was created in the Buffalo of the Great Plains.³⁴⁶ The fur trade *'emptied the landscape of humans and larger fauna in advance of the settler frontier.'*³⁴⁷ Thus the fur trade was part of the first wave of the European colonization and transformation of the North American environment.

The impact of the trade on indigenous populations was manifold. The increased contacts created new vectors for disease, further decimating populations that had already been decimated by earlier epidemics. Despite the onslaught of epidemics, low population densities and woodland livelihoods created a situation where the competing European powers were unable to impose their authority on their indigenous trade partners and vice-versa. To us this story should seem familiar. We have already encountered a similar structure in discussing Zoomian anarchists. In this context indigenous and Europeans encountered each other in what Richard White has called *'the middle ground'*.³⁴⁸ A conspicuous characteristic of the early fur trade was that Europeans attempted to *'rationalize'* exchange patterns and divorce the commodity exchange from wider social, political and symbolic contexts, while indigenous groups attempted the opposite. Consequently, despite the incorporation of indigenous groups into global commodity exchanges, the political competition between European powers and

³⁴⁶ Wolf, Eric R. (2010): Europe and the People Without History. With a New Foreword by Thomas Hylland Eriksen (University of California Press, Berkely), 191f.

³⁴⁷ White Richard (1991): The middle ground. Indians, empires, and republics in the Great Lakes region 1650-1815. Twentieth Anniversary Edition (Cambridge University Press, Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, Sao Paulo, Delhi, Dubai, Tokyo, Mexico City).

³⁴⁸ White Richard (1991): The middle ground. Indians, empires, and republics in the Great Lakes region 1650-1815. Twentieth Anniversary Edition (Cambridge University Press, Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, Sao Paulo, Delhi, Dubai, Tokyo, Mexico City), 94.

the alliance system particularly between the French and their indigenous partners, prevented the emergence of market domination.³⁴⁹

The middle ground, then grew up in a context where cooperation and consent, between people with vastly diverging world-views, had to be created without force. Despite the balance of power between Europeans, the increase in armed conflict both in the context of the imperial alliance system and between indigenous groups for access to furs and hunting groups as well as the recurring outbreak of disease, in addition to the ecological destruction wrought by the fur trade, upended indigenous lifeways.³⁵⁰

However, the increased demand on European goods and the attendant growing specialization on hunting significantly altered production and reproduction patterns, kinship and gender relations as well as the relationship of indigenous groups to *wildlife*. Epidemics, warfare, and commodity exchange led to the formation of entirely new groups specialized on the fur trade and organized along patrimonial and redistributive structures, rather than the earlier kinship and subsistence-oriented formations. Groups such as the Southern Dakota, gun-wielding buffalo hunting horse pastoralists of the plains, the quintessential 'Indian' in the European imagination, are a product of the European fur trade rather than, *People without history*.³⁵¹ Thus despite the elaborations of the *middle ground*, those engaged in the fur trade inexorably came to be tied to the market economy with its price fluctuations, demand for uniform products of a certain quality and if push comes to shove, deteriorating terms of trade, beyond the control of the indigenous peoples.³⁵²

The effects on beaver populations were catastrophic. In the words of Richards: '*The North American beaver became the most valuable furbearer of the New World and prey to one of the longest sustained hunts for a single species in world history.*'³⁵³ Until the 1840s beavers were

³⁴⁹ White Richard (1991): The middle ground. Indians, empires, and republics in the Great Lakes region 1650-1815. Twentieth Anniversary Edition (Cambridge University Press, Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, Sao Paulo, Delhi, Dubai, Tokyo, Mexico City), 95.

³⁵⁰ White Richard (1991): The middle ground. Indians, empires, and republics in the Great Lakes region 1650-1815. Twentieth Anniversary Edition (Cambridge University Press, Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, Sao Paulo, Delhi, Dubai, Tokyo, Mexico City), 50, 51, 52, 53

³⁵¹ Wolf, Eric R. (2010): Europe and the People Without History. With a New Foreword by Thomas Hylland Eriksen (University of California Press, Berkeley), 191ff.

³⁵² Richards, John F. (2003): The Unending Frontier. An Environmental History of the Early Modern World (University of California Press, Berkeley, Los Angeles, London), 506f.

³⁵³ Richards, John F. (2003): The Unending Frontier. An Environmental History of the Early Modern World (University of California Press, Berkeley, Los Angeles, London), 467.

relentlessly hunted for profit. Here it is important to remember the pronouncements of Wilson from chapter 1: '*human hunters help no species*'. We must engage with this statement. It sums up the entire anthropological theory of sociobiology, a technocentrist ideology if ever there was one. As such it underlies much *conservation* thinking. Clearly, the fact that beavers were so abundant by the time Europeans established their political and economic contacts with the indigenous populations of North America, testifies to the contrary. The ways in which indigenous peoples in various parts of the Americas related to *wildlife*, is equally well documented.³⁵⁴³⁵⁵³⁵⁶³⁵⁷ Not human hunters – as the undifferentiated Anthropos – cause environmental catastrophe and extinction, but humans organized in the form of companies like the Hudson Bay company, or the Company of New Nederland, or mercantilist states like the kingdom of France, do. This is the *Capitalocene* we have been speaking of. The history of the fur trade then is a history of ways that *Capital* forcefully overturns social, political and ecological relations.

By the 1650s the Algonkian lands were beavered out, both social and ecological relations devastated. Similarly, the Hurons had depleted their beaver supply by 1630, only having established relations with the French in 1611. This is no surprise as the French, during the 1620s shipped an average of more than twenty thousand beaver pelts annually. These numbers continued to rise throughout the 18th century, averaging 122.000 beaver furs annually until 1763. As the French and Dutch were pushed out of North America, beaver pelt exports to Europe continued to rise. They peaked in the final two decades of the 18th century at around 264.000 annually. From then numbers fluctuated below that level in the 1800s until the beaver populations crashed in the 1890s.³⁵⁸ As the onslaught of beavers began in the areas of early European colonization, the beaver frontier moved east to west. By the 1660s coastal New England and the Saint Lawrence River were beavered out. By 1825 beavers were mostly gone from southern Wisconsin. In the 1840s the frontier had arrived in coastal Oregon.³⁵⁹

³⁵⁴ Viveiros de Castro, Eduardo (2015): The Relative Native. Essays on Indigenous Conceptual Worlds. Afterword by Roy Wagner (Hau Books, Chicago).

³⁵⁵ Descola, Philippe (2005): Par-delà nature et culture. (Éditions Gallimard, Paris).

³⁵⁶ Kohn, Eduardo (2013): How forests think. toward an anthropology beyond the human (University of California Press, Berkeley).

³⁵⁷ De la Cadena, Marisol (2011): Earth beings. Ecologies of practice across Andean worlds (Duke University Press, Durham).

³⁵⁸ Richards, John F. (2003): The Unending Frontier. An Environmental History of the Early Modern World (University of California Press, Berkely, Los Angeles, London), 477, 491f, 510.

³⁵⁹ Richards, John F. (2003): The Unending Frontier. An Environmental History of the Early Modern World (University of California Press, Berkely, Los Angeles, London), 509, 510.

Despite the beaver frontier moving Westward, beavers as Richards reminds us were not necessarily gone, they had just become so scarce as to not be worth the trouble. Nevertheless, local extirpations did have profound impacts on North American landscapes.³⁶⁰

With the British triumph over France, and the end of hostilities between Britain and the US, the fur trade changed significantly. Europeans became more directly involved as the trade moved West. The annual amount of beaver pelts increased, as did European attempts at political control and domination of indigenous groups and the landscape. The period of the middle ground gave way to the genocide of indigenous groups throughout North America. As the settler frontier moved West – Cronon reminds us – Chicago came to be established as the central place of the American West, dominating the flow of timber from the northern forests, meat from the prairies and grain from the plains.³⁶¹

The *Age of Capital* had dawned, as industrial production the railway, steamships and the telegraph were tying the world together. The improved modes of transport restructured global agriculture. They allowed for increased regional specialization of crop production for the market. A process that upended the livelihood of both humans and *wildlife* around the world. As the plantation evolved into the factory and coal replaced wood, wind, peat, mammalian muscle and the sun; as the main sources of energy, beavers like other *wildlife* had been pushed to the brink of extinction, or beyond. While fur bearing animals like beavers, protein providers like the North Sea and Atlantic Cod or herring for their protein, whales for their oil; had been hunted, trapped, caught and harpooned since the early modern age, new frontiers were opened up in the nineteenth century.³⁶²³⁶³ Williams narrates the story of commercial and aristocratic hunting practices rapidly shooting out game animals throughout Africa ahead of the advance of European mining, farming and settlement frontier.³⁶⁴

The worlds forests, were equally ravished. Timber had been scarce throughout the Mediterranean in the high Middle Ages, and in Central and Western Europe from the early

³⁶⁰ Richards, John F. (2003): *The Unending Frontier. An Environmental History of the Early Modern World* (University of California Press, Berkely, Los Angeles, London), 509, 512, 514.

³⁶¹ Cronon, William (1991): *Nature's Metropolis, Chicago and the Great West* (W.W.Norton and Company, New York, London).

³⁶² de Vries, Jan; van der Woude, Ad (1997): *The First Modern Economy. Success, failure, and perseverance of the Dutch economy 1500-1815* (Cambridge University Press, Cambridge, New York, Melbourne).

³⁶³ Richards, John F. (2003): *The Unending Frontier. An Environmental History of the Early Modern World* (University of California Press, Berkely, Los Angeles, London).

³⁶⁴ Williams, Adams M (2004): *Against Extinction. The story of Conservation* (London, New York, Earthscan).

Modern Age onwards. Merchants from the Hansa to the Dutch began to tap the forests of the Baltic by the late Middle Ages.³⁶⁵ From the sixteenth century onwards the Forests of New England and by the 19th century the great North American forests became new sources of timber.³⁶⁶ However, these frontiers proved insufficient and by the late eighteenth century the scarcity of timber gave rise to the nascent science of forestry. With its focus on production and uniformity, these scientifically managed tree plantations turned lowland broadleaf forests into evergreen plantations throughout Europe and beyond.³⁶⁷ With the advance of the wheat frontier in the Neo-Europes, agricultural prices in Europe dropped. Ruined peasants migrated into these areas. The frontier advanced and reinforced colonization of the worlds' temperate zones.³⁶⁸ Tropical commodities, such as rubber, cotton, opium and tea; were added to the early modern repertoire of tobacco, sugar and spices.³⁶⁹ At the same time, as Europeans aggressively fished and hunted throughout the world, they achieved the extirpation of several unwanted species within Europe such as the brown bear, the lynx, wolf and boar; to name a few. Outside of Europe, the decline of *wildlife*, especially big game alerted elites of empire.³⁷⁰

As the *Beaverocene* unraveled, the live ways of a plethora of humans and *wildlife* came apart. Some of them had *flourished* in relation with beavers, others were far removed from the nearest beaver swidden but were equally ravaged by the forces of *Capital* and empire. In this respect the fur trade was a mere prelude to what was to come. The previously existing trends of the *Capitalocene* and *Plantationocene* escalated with industry and coal but are rooted in *Capital*, the *Columbian exchange* and the fur trade. The emergence of *conservation* is partly a reaction to the unraveling of the *Beaverocene*. Developments which gave rise to the first wave of *conservation*, and the establishment of National parks.

The fur trade of the early modern period destroyed the multispecies worlds of beavers, with beavers disappeared their companion species. Species who were once abundant are now

³⁶⁵ Moore, Jason W. (2015): *Capitalism in the Web of Life. Ecology and the Accumulation of Capital* (Verso, London, New York).

³⁶⁶ Cronon, William (1991): *Nature's Metropolis, Chicago and the Great West* (W.W.Norton and Company, New York, London), 148 – 206.

³⁶⁷ Scott, James (1999): *Seeing Like a State. How Certain Schemes to Improve the Human Condition Have Failed* (Yale university Press, New Haven), 11-52.

³⁶⁸ Crosby, Alfred W. (2004): *Ecological imperialism. The biological expansion of Europe 900-1900* (Cambridge University Press, Cambridge, New York).

³⁶⁹ Beckert, Sven (2014): *Empire of Cotton. A New History of Global Capitalism* (Penguin Books Random House UK).

³⁷⁰ Adams, William M. (2004): *Against Extinction. The story of Conservation* (London, New York, Earthscan).

scarce in an inversion of ecological conditions. In this sense riparian wetlands continue to be haunted by the absence of beavers. Maintaining a *livable planet* requires the *resurgence* of beavers. In terms of the *castorian perspective*: the *ecological class* must incorporate the utopia of beavers into their designs of a *livable planet*.

4. Beaver_Management

In the previous two chapters we have engaged in the development of conceptual tools which are intended to help us better understand beaver management as a passionate practice. We have argued that *conservation* is a technological practice in an assemblage of skilled bodies, instruments and recording devices. *Conservation* depends on the process of learning to be affected by *wildlife*. *Wildlife* through its different forms of charisma is able to mobilize resources for their *conservation*. This process is underpinned by the desire of conservationists for *affective encounters* with *wildlife*. These *skilled, embodied* encounters underpin the scientific authority of conservationists. Despite the *technocentrist* invocation of the god trick in traditional accounts of fieldwork, conservationists deeply *care* for *wildlife*.

Care involves *embodiment*, it involves *affect*. As we have discussed caring – in this context – means to become curious to learn what the other needs. Ethical living in a *multispecies* world means considering the *nonhuman* other as an ethical subject who requires *care* and *deliberation*, without the possibility of making entire categories of *wildlife* *killable*. As others are ethical subjects who are able to respond to us, who are *respons-able* and thus require ethical consideration, killing must always include *deliberation* and consequence, rather than relegating an entire category of beings to being made *killable* – in self-assured, one-sided relations of instrumentality. Rather, a *multispecies ethic* seeks to take seriously that human life takes places within fundamental and constitutive relationships with *wildlife*. The task of living well then becomes to permanently negotiate this *wicked* world in a way that remains complex without falling into the technocentrist pit of one-sided instrumentality.

We have taken these epistemic and ethical requirements to heart in our familiarization with the scientific literature on beavers. In doing so we have learned what they look like and how they live their lives, who they associate with and who depends on them. We know their abilities and limitations. We have expanded this knowledge in the composition of the *castorian perspective* from the building blocks of an embodied subjecthood, a political ally, a *nonhuman zoomian anarchist* and a practitioner of *swiddening*. From this *situated, embodied* and *partial* perspective we have been able to recognize various continuities between humans and beavers. Most importantly we have learned about the Northern Hemisphere *Beaverocene*, and the history of its rupture. Building on this knowledge we now know how important beavers have

been to the riparian landscapes of the Northern Hemisphere temperate zone during the Holocene. We now have a faint idea of what has been lost through the rupture of the *Anthropocene*. At least as far as it pertains to beavers and their swiddens the human groups and *wildlife* who stood in constitutive relationships with them. Let us not forget, that the demise of beavers in the fur trade went hand in hand with the demise of many indigenous *liveways* in North America. As members of the *ecological class* we now know that we must find ways to incorporate beavers and their utopian *world-making* into our own designs for a *livable planet*.

This chapter is an account of my fieldwork experiences with Mag. Agnes Steininger, beaver manager in Vorarlberg. The Austrian region where I was born and where I grew up until I moved to *Vienna, Beijing and Taipei* for my University studies. I present the situation of beavers as well as the practical side of beaver management in Vorarlberg as I became familiar with them in spring of 2023. This narrative is based on participant observation the expert interview and several other informal conversations I have had with Agnes. Apart from presenting an ethnographic narrative I will give the reader a good understanding of the issues surrounding beavers in Vorarlberg and discuss the ways these issues are perceived by stakeholders as well as beaver managers. From this narrative will emerge the category of *beaver-managers-as firefighters*. Briefly put this category illustrates how beaver managers, despite their *care* for beavers, are continuously forced to inhibit the *flourishing* of beavers. They have to do so as the acceptance of beavers is precarious and remains contested. Beaver managers therefore must work out compromises between beavers, local stakeholders and the state.

I first met Anges Steininger – who works as beaver-manager in *Vorarlberg* – for conducting an expert interview, in October 2022. While she originally studied biology with a focus on botany in *Vienna*, she now covers a wide range of work. She is employed as a beaver manager for the region of *Vorarlberg* but also works for the *Rheindelta conservation area* (*Naturschutzverein Rheindelta*) a Natura 2000 and Ramsar site on the shores of Lake Constance. A lot of her work involves guiding groups of schoolchildren. There she and introduces them to the local flora in the vicinity of *Rheindeltahaus*, the visitor and information center of the abovementioned conservation area. In addition, more traditional *conservation* work such as plant and animal surveys and habitat management make up another important part of her work. I met her in her capacity as beaver manager.

In 2023 beavers were found throughout much of the Rhine valley, around Lake Constance, as well as in some areas of *Bregenzerwald*. Their return to *Walgau*, *Montafon* and *Klostertal* are expected to be imminent within the next few years. The distribution of beaver territories shows their density to be highest in the broad lowland floodplain of the Alpine Rhine.³⁷¹ The population is increasing, currently standing at some three hundred individuals spread out over one hundred territories. This is a significant increase from two hundred individuals in 2022. It is clear that beavers are currently in the phase of rapid population expansion. While beaver surveys are time and labor intensive, new beaver territories generally come to the attention of beaver managers rather quickly as they will generally be contacted by local people who discover potential beaver signs.³⁷²

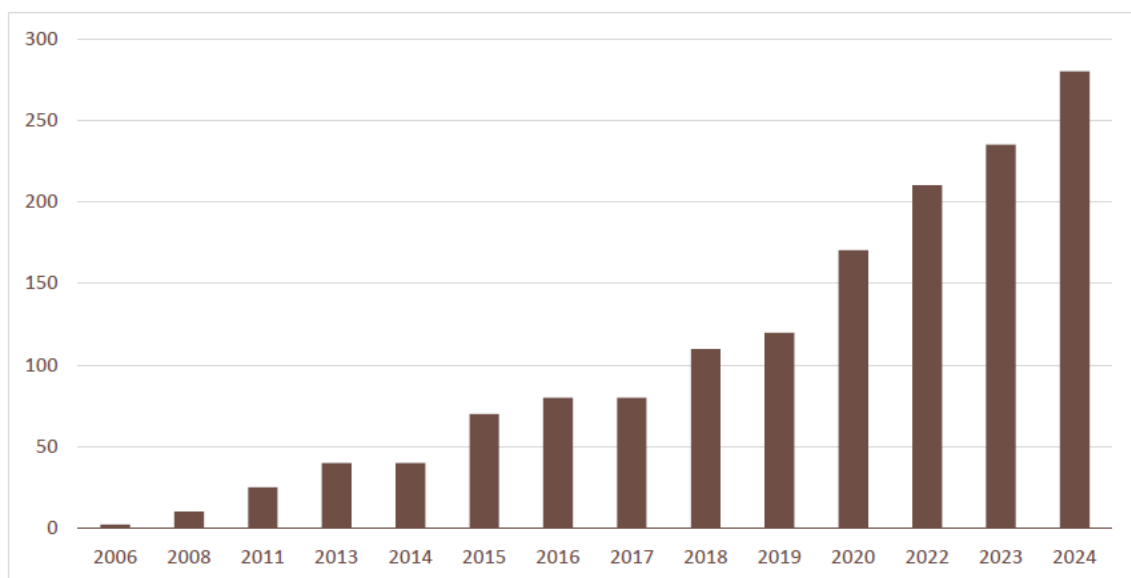


Abb. 8.: Anzahl Individuen – hochgerechnet aus der Revieranzahl – Bestandsentwicklung bis 2024

Image 8 is a graph of the beaver population from 2006 to 2024.³⁷³

³⁷¹ Steining, Agnes (2025): Biberbericht 2024 (Naturschutzverein Rheindelta), 9.

³⁷² Interview 15.10.22, 9.

³⁷³ Steining, Agnes (2025): Biberbericht 2024 (Naturschutzverein Rheindelta).

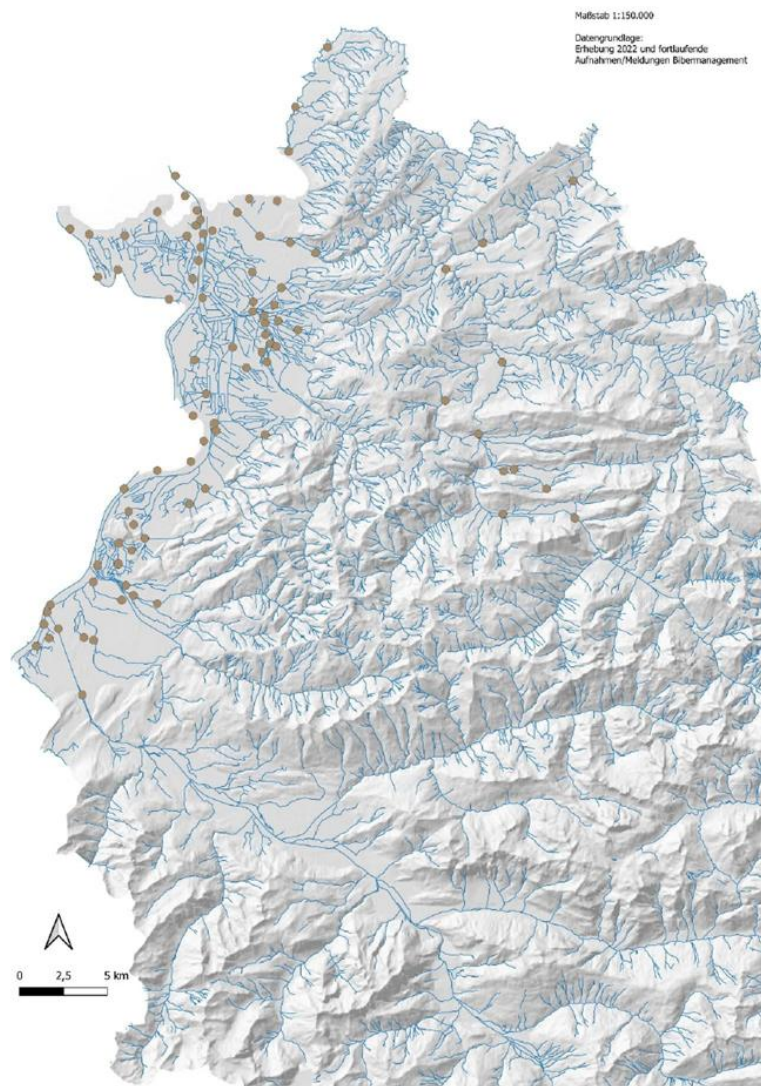


Abb. 9.: Biberreviere 2024 – inklusive Spurensichtungen im Winter 2024

Image 9 shows the current distribution of beaver territories in Vorarlberg.³⁷⁴

It quickly became clear to me that Agnes has a great deal of passion for her work. She approaches the issues of being a beaver manager through an *affective logics of care* for beavers. Telling me about the history of beavers – who returned to Vorarlberg in 2006³⁷⁵ – she highlighted the adaptability and capabilities of beavers in the following words: “*Biber können sehr viel. (...) Und was ned past machen se sich passend.*”³⁷⁶³⁷⁷ At the same time, Agnes highlighted that beavers also need space; only once beavers can spatially expand in their

³⁷⁴ Steininger, Agnes (2025): Biberbericht 2024 (Naturschutzverein Rheindelta).

³⁷⁵ Steininger, Agnes (2025): Biberbericht 2024 (Naturschutzverein Rheindelta).

³⁷⁶ Interview 15.10.22, 5.

³⁷⁷ ‘Beavers are remarkable in what they can achieve (...) Und what doesn’t suit them, they will make suitable to themselves.’

world-making, do their effects become visible: „Döt goht einiges, wobei bei üs einfach flächenmäßig schwierig isch. Die beste Wirkung hot er wenn er in die Fläche go kann, wenn ma überfluten können. Und in Vorarlberg Flächen überfluten isch a bitz schwierig.“³⁷⁸³⁷⁹

This question of space and the lack thereof significantly increases her workload. If there was more space, some 20 meters on either side along a stream reserved for the movements of a stream and all that lives along and within, her workload would be significantly decreased. Since beavers are commonly found along streams, and space for streams is scarce, water managers are important partners in her work as beaver manager. To the latter, the question of floods is of paramount concern, both in their engineering efforts as well as legally. Ensuring the adequate run-off in streams, drainage ditches, and rivers is therefore one of their primary concerns. Wherever beavers insert themselves into the situation, cooperation between beaver and water managers becomes essential. From the concern of floods, emerges the central concern of managing dam heights, one of the main occupations for Agnes as beaver manager:

„Mir müssen zum Beispiel schaua, dass die Drenagen vo den Feldern ablaufen können dass dia ned unter Wasser gsetzt werden. Es gibt eaba verschiedenste Aufgaben was Gräben und Flüsse und Bäche hond in Vorarlberg und döt müssma einfach o schoa, dass es funktioniert, dass des klappt. Und des hoast halt einfach manchmol o dass da Biberdamm a gewisse höhe ha kann und manche Höhen halt ned wo er gern hät. Und dass ma denn halt einfach o manche Dämme abboa müssen und schoa müand was er denn macht, wie er damit z reacht kummt.“³⁸⁰³⁸¹

How well this approach works in Agnes's case might be illustrated by her good relationship with the vast majority of local stakeholders. Recounting the story of my encounter at beaver bridge from the preface, Agnes remarks that this is a unique case. Generally, people address

³⁷⁸ Interview 15.10.22, 6.

³⁷⁹ 'A lot is possible in that respect, but here where it is very difficult from the perspective of space. He (the beaver) has the best effect if he is able to expand in space, if he can flood. And flooding space in Vorarlberg is a bit tricky.'

³⁸⁰ Interview 15.10.22, 8.

³⁸¹ 'We have to be careful, in ensuring the continued run-off of agricultural drainage ditches, so that these don't fall below the water line. There are differing functions of ditches, rivers and streams in Vorarlberg and there we have to make sure for it to work, for it to function. And that simply means sometimes that a beaver dam can only reach a certain height, and not the height he (the beaver) would like to have. What we do in such cases regrettably is to reduce dam heights and then wait and see how the beave responds, how he manages to deal with that.'

her with concerns regarding beavers, but are very understanding, cooperative, and friendly both to her and beavers.³⁸²

Despite this overarching concern for matters of hydrology Agnes also shows an intimate concern for the well-being of beavers, especially when management measures such as dam reductions become necessary. These reductions, as she explains, are carefully undertaken by her, always by hand, and in baby steps. This is intended to give local beavers time to adjust, react, and respond. This game of response is a common occurrence when engaging with beavers where dam removals or reductions seldom are not followed by the renewed efforts of local beavers to construct, dam, and flood:

„Aber ja er reagiert. Mir machen was, er macht was und mir schauen druf uf was mir uns einigen. Und des Spiel triebma in manchen Bereichen sehr intensiv und in anderen Bereichen isch des so das ma tatsächlich a Zit lang a Problem hond und denn verlagert sich des wo andersch ane...“³⁸³³⁸⁴

The working out of a compromise, intended to work for both beavers and people is of central concern to Agnes: *„Döt sind mir denn einfach do und müssen schoa dass mir denn a Lösung finden, die für an Biber funktioniert und aber o für d’Lüt funktioniert. Weil I kann ned ohne d’Lüt d’Akzeptanz fürn Biber ho.“³⁸⁵³⁸⁶* This approach to beavers, based on *care* and concern for their well-being, and the simultaneous adherence to legal necessities and the interests of local stake-holders with a search for compromise is common to all beaver managers I have spoken to.

The workday of a beaver manager can be quite busy. In early March 2023 Agnes and I met to manage beavers. Arriving at *Rheindeltahaus* early in the morning Agnes was already busy preparing the activities of the day. Looking up the beaver sites on GIS she explained the plan: First up, a dam removal in *Feldkirch*, second a clogged pipe in *Koblach*, third dressing trees in

³⁸² Interview 15.10.22, 15.

³⁸³ Interview 15.10.22, 8.

³⁸⁴ ‘But yes, he does react. We do something, he reacts accordingly, and we observe the situation and we’ll see to what agreement we (Agnes and the beavers) eventually come. In some areas we have been playing this game for a long time, and in other areas there has indeed been a problem for some time but then it shifts to another location.’

³⁸⁵ Interview 15.10.22, 8.

³⁸⁶ ‘That’s where we come in, where we simply have to find a solution. That works for the beaver but also works for the people. Because I cannot have people accept the presence of beavers without getting them on board as well.’

iron mesh in *Lustenau*. The first task of the day, however, was to try on a pair of waders. Agnes would not tire to remind me that I should be prepared for the cold water of the river, and that I might get both cold and wet should I fall into the river later. How exciting I thought! Arriving at the site near the confluence between the Rhine and Ill, two city employees of the city of *Feldkirch* were already waiting for us. Agnes told me she often works with them, especially when it comes to a dam removal like on that day. In fact, much of her work would be much harder without their help.

The dam, Agnes told me, must have been erected by a young beaver seeking to find a new territory and eventually a family. While this in itself is generally a lovely thing, it was quite the problem in this case as the young beaver found themselves on a fish pass. Fish passes are generally erected in order to allow for continued fish migration around large, engineered obstacles, in this case a hydro-power plant. There are several types, the one in question being a '*nature-like bypass channel*' similar to a '*natural stream*'. They are characterized by a very low gradient but take up a good amount of space.³⁸⁷ The young beaver had apparently proceeded to cut down two trees causing them to fall right across the channel. Making use of this supreme structural beam, the young beaver had continued to gather plant materials, mostly branches of various sizes to impede the flow of water. Given the relatively high discharge rate and the strength of the river, we were all quite impressed by the efficacy of this design.

Once arrived, everybody got straight to work with chainsaws, hands, and hatchets. Standing waist deep in the water, Agnes and Clemens (one of the city workers) were the main drivers of this dam removal. Branches of various sizes, and even smaller logs were pulled out from the structure; mud and even a few smaller rocks had been mixed in as well. The material was either handed to me, standing on the channel edge only ankle deep in water – but already freezing – or were given to the current. The excellent planning behind the construction of the dam made its removal relatively tricky. Clemens, standing almost chest deep in the current, was at

³⁸⁷Larinier Michel, Marmulla G. (2004): Fish passes: types, principles and geographical distribution: an overview. In: Welcomme, R.L. (ed.); Petr, T. (2004): Proceedings of the Second International Symposium on the Management of Large Rivers for Fisheries. Volume II. RAP Publication. FAO Regional Office for Asia and the Pacific, Bangkok. 183-204.

work with a chainsaw but couldn't quite get the log to do as he pleased. It would take the united strength of the four of us and some tugging, kicking and pushing to finally send it downstream.

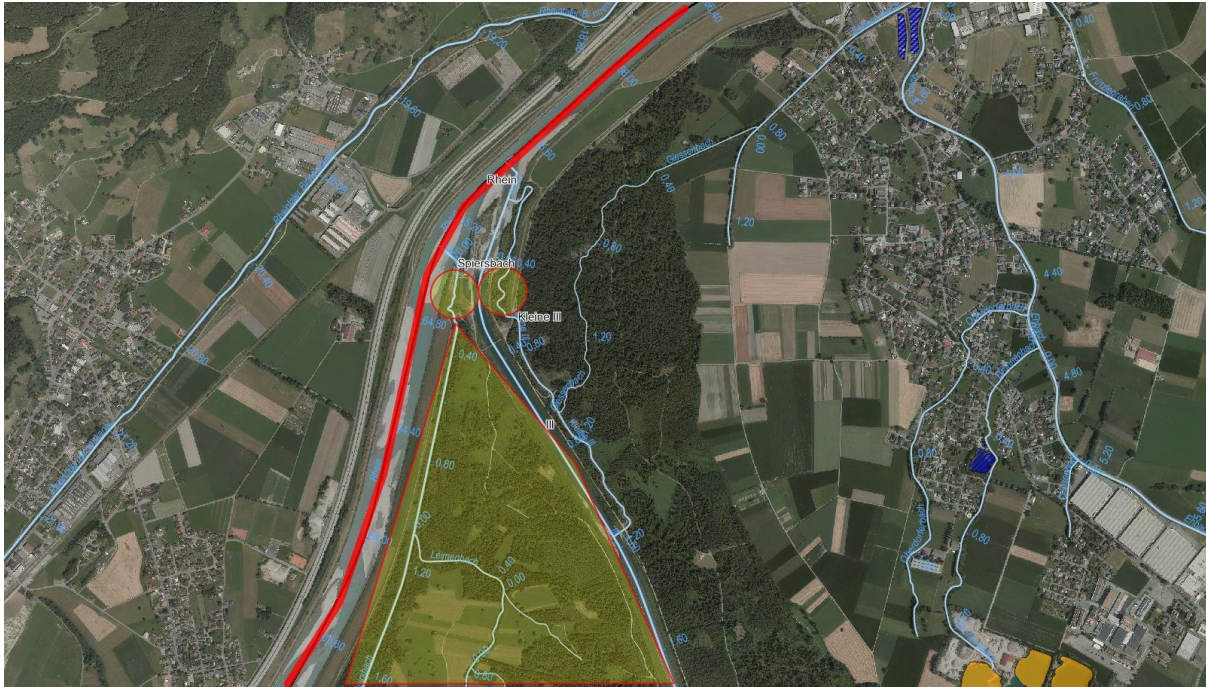


Image 10 is a screenshot from Vorarlberg Atlas. It shows the confluence of the Rhine and Ill rivers. The two circles indicate two beaver territories. The colored space to the south indicates a Natura 2000 conservation area. ³⁸⁸

After the deed was done and everybody was quite content for not having fallen into the icy waters, the four of us remained a little longer and Agnes talked to the two men about various tasks that would have to be undertaken soon and the problems with fish. Clemens was quite interested in the fish ecology of the river. He understood that some were going extinct and therefore reasoned that removing such dams was important. Agnes countered that, while what he was saying was true, for this season at least, it was still too early to tell. Aside from his interest in fish, Clemens was further curious about beavers and their interactions with fish. A thousand years ago, he mused, it must have worked somehow, without a guy and a chainsaw continuously removing dams and trees. Agnes explained that rivers would usually overflow a beaver dam on either side, especially during floods. These waters would have always allowed fish to migrate. Aside from that, dams would periodically be blown out by bigger floods. But just like in this case, after a blow-out or dam removal, beavers would often be quick to rebuild and therefore this area would have to be monitored for the time being.

³⁸⁸ Land Vorarlberg (2025): Vorarlberg Atlas.

In close proximity to this fish pass, there was another beaver site. Agnes believes it to be part of a different beaver territory as it is found along a different stream, despite the proximity. The dam on *Spiersbach* was the biggest dam I had seen to date. Wedged between Ill and Alpine Rhine, the stream, despite its small size, is channelized and tamed just like its two adjacent fellows. It's lower course, however, had recently been '*rewilded*' (*renaturiert*). These measures have allowed for a beaver family to settle in and erect a number of relatively large structures. Despite the creation of space for stream and beavers between the still very high embankments, the beaver dams now cause a concern for anglers. Their fear is that the fish they are concerned with can no longer migrate due to this beaver built impediment. Given that the stream, despite having been '*rewilded*', is still trapped between high and relatively narrow embankments, the lateral overflow as mentioned by Agnes is not quite possible. The compromise worked out between local anglers and Agnes was that the dam would be partially removed. To ensure that the local beavers would not simply rebuild the dam in its entirety an electro fence would be placed across the new, lowered crown of the dam for the period relevant to fish migration.



Image 11 shows Agnes Steininger in the process of inspecting the electrical fence at Spierßbach in March 2023.

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The second destination of the day was next to a popular free climbing spot. An agricultural drainage ditch above ground for the majority of its flow passes underneath a road bridge and a private property for a few dozen meters. A beaver recently moved into the underground section. A side effect of this new squatter is that the ditch is now clogged up. Not entirely sure how to deal with this situation, Agnes had begun to tinker with locking the beaver out of the underground section with a self-made construction of a garden fence and two poles. What she had failed to consider in the first execution of her design was that the thickness of the mesh would not withstand a beaver's powerful jaws and sharp teeth. In the second edition of her beaver guard, Agnes had therefore upgraded her construction to iron rods. Wellies on, she jumped into the drainage ditch, cleared it out, removed the old beaver guard and fitted the new one. Hard at work, the elderly couple under whose property the drainage ditch flowed came out for a chat. They clearly were very fond of Agnes and her work. They had nothing negative to say about the beaver squatting under their house, despite the inconvenience they had caused. After a few minutes and the present of a few chocolates we were on our way.

The third destination of the day were the *Lehmteiche* in *Lustenau*. On our last stop all we had to do was to place metal fences around a few birch trees in order to protect them from the local beavers.

A day like this seems rather typical for a beaver manager. In fact, dam removal, checking up on electric fences, the fencing of trees, and conversations about beavers with local stakeholders are exactly what comprises the day to day of a beaver manager. The tinkering approach of how to best handle a situation and the negotiations with stakeholders are a further central component of what beaver managers do. In fact, a beaver manager first and foremost is a manager of people and their emotions, and only secondarily has anything to do with beavers. In between talking to people and spreading the word, beaver managers spend a lot of time coming up with solutions to specific problems. While manuals and guidelines, systematizing approaches, techniques, materials, and methods exist, a lot of the actual work comes down to personal preference, available scarce resources, experimentation, and most of all, embodied experience.

It has become clear in my interactions with beaver managers that beaver management is first and foremost concerned with people. Beavers and their interests often come second. This became particularly clear during the second day I accompanied Agnes. At 9am on one of the

first warm spring days Agnes and I had to check up on a tiny little stream in *Bregenz, Weidach. Fallenbach*, the stream in question, emerges on *Fluh* some three hundred meters and a mere stream kilometer above. The steep south facing cliffs of *Fluh* force the streams waters into a plunging fall after which the stream crosses below the A14 motorway. Thence it flows through a tiny woodland nested in between the sinuous on- and off- ramps of the motorway. Along the woodland stretch, beavers have found it convenient to erect a dam as tiny as the stream. Despite its humble size, the publicly owned power company *Illwerke VKW inc.*, with their headquarters in intimate proximity, deem this damn and its architect a potential risk.



Image 12 is a screenshot from Vorarlberg Atlas. It shows a satellite view of Fallenbach, the headquarters of the state public hydropower company Vkw, a motorway and urban sprawl.³⁹⁰

Approaching the woodland, we first had to cross a feeder canal run by the aforementioned power company. Coming towards the woodland from the North, three common buzzards (*Buteo buteo*) greeted us from the trees by conspicuously departing into the air and away. Stomping on in our wellies, the wet and slimy mud of the little stream's banks had no chance of deterring us from our destination.



³⁹⁰ *Land Vorarlberg* (2025): Vorarlberg Atlas.

Images 13 and 14 show the beaver dam at Fallenbach. In the image 13 we see the spawn of European tree frog. In image 14 we see the dam.³⁹¹

After a few steps through the mud a few beaver signs became apparent. Apart from a few gnawed branches and several small, felled trees, we soon came upon the most minuscule of beaver dams. Although Agnes at first believed the dam to be unused and therefore saw fit to demolish it. At a second glance she spotted no fewer than eight clusters of frog spawn deposited in the stream. European tree frog (*Hyla arborea*) spawn to be precise.

As discussed in the previous chapter, such bodies of slow moving or standing water provide nurseries and spawning sites for amphibians and fish. Lining the upstream side of the dam, Styrofoam and plastic waste illustrated the capacity of beaver dams to trap sediments, nutrients, toxins and waste. Further downstream, Agnes and I had to check up on an electric fence stabilizing dam height. Once we had accomplished that we headed on to *Wolfurt*.

Birkengraben, our second stream of the day, could not have been more different from the first (in some respects at least). A relatively deep and broad trench draining the remains of what used to be expansive meadows in the 1950s. Since then, industrial plants, a motorway, and a massive cargo rail terminal have encroached. The management issue was simple and should be familiar by now. The dam's original height impeded the drainage of the ditch. Drainage ditches, if damned or clogged, have the unfortunate habit of turning into irrigation canals. The dam height, in order to accommodate the local beavers, was therefore gradually reduced in



³⁹¹ Images 13 and 14 courtesy of the Author.

Image 15 shows the beaver dam at Birkengraben. At the distance the headquarters of Doppelmayr and the Karen mountain are visible.³⁹²

several steps. Following the height reduction, the new level is now being safeguarded by an electric fence. Somehow the fence had fallen over and had to be re-erected. While Agnes was busy climbing into the trench and getting to work, I walked around the area, taking in the midday sun.

The scenery on this warm spring morning was stunning. Snow still covered the mountaintops surrounding the valley. A clear blue sky and the sun's warming rays highlighted the contrast between green meadows, blue sky and white mountain tops. In the distance cars buzzed along the motorway, their sounds mingling with the chirping of birds. Against this scenic backdrop the expansive industrial area stood at about one kilometer to us. A strange place, I thought; A place where beavers dwell amidst productive fields and factories. However did it come to this?

The adjacent cargo terminal was first opened in 1982 with a size of 72.000 m² after a 12-year construction period. At a price tag of €61 million an expansion of 106.000m² was added in 2018.³⁹³ The terminal processes some 3.4 million tons of cargo annually and forms an integral part of the commodity infrastructure on which much of the regional GDP relies. Doppelmayr is one of the companies with their headquarters in the area. The company is most widely known for constructing ski lifts. In recent years it also found acclaim in constructing cable cars for public transport in urban areas as far off as La Paz in Bolivia.³⁹⁴ In 2023 the company raked in revenues in the amount of €946 million.³⁹⁵ Two other large companies Haberkorn with a revenue of €760 million³⁹⁶ and Meusburger with a revenue of €349 million in 2023, also have factories in the adjacent industrial area.³⁹⁷

Today much of the valley floor of the Rhine valley is taken up by the factories, and parking lots of several large companies. They all report excellent numbers and post great annual profits. As contributors to regional GDP and providers of jobs, these companies have helped to create much of the wealth that has allowed for the high living standards enjoyed in the region. At the

³⁹² Image 15 courtesy of the Author.

³⁹³ <https://blog.railcargo.com/de/artikel/wo> (last accessed: 12.01. 2024, 19:46).

³⁹⁴ Doppelmayr Seilbahnen GmbH: Mi Teleferico: The biggest urban ropeway network in the world.

³⁹⁵ Doppelmayr Seilbahnen GmbH (2023): Doppelmayr group reports growth in revenues driven by good order book position.

³⁹⁶ Haberkorn GmbH: Über Haberkorn

³⁹⁷ Meusburger Georg GmbH & Co KG: Über uns.

same time, the consumption of space and encroachment on wet soils and wetlands has contributed to the biodiversity crisis. In addition, the emissions created in transport, production, and consumption of this profitable industry, as well as the car centric commuting habits of the workforce, have contributed to the climate crisis.³⁹⁸



Images 16 and 17 are a screenshot from Vorarlberg Atlas. Image 16 is an aerial photo from the 1950s. Image 17 is a satellite image of the same area in 2020.³⁹⁹

³⁹⁸ Amt der Vorarlberger Landesregierung (2023): Monitoringbericht zur Energieautonomie+ 2030. Ausgabe 2023 – Datenstand 2021. (Amt der Vorarlberger Landesregierung, Bregenz), 18.

³⁹⁹ Land Vorarlberg (2025): Vorarlberg Atlas.

In the area and throughout much of the Rhine valley, gley soils are common. This is a group of soils which form in the context of high ground water tables and low oxygen rates. Peat formation sometimes occurs, and such soils are generally nutrient rich.⁴⁰⁰ The soils create space for moisture loving plants. These soils are particularly abundant in the valley of the Alpine Rhine.⁴⁰¹ If used as unfertilized and undrained meadow or woodland – as has been the case historically – then there is little pressure on the soil and its ecosystem. The soils create space for moisture loving plants. Conversely, the main threat to these soils is a reduction in ground water tables. As they are being drained throughout the valley of the Alpine Rhine *wildlife* that once *flourished* on them is threatened today. Reduction in ground water tables leads to the mineralization of its topsoil, the emission of greenhouse gases and the loss of *wildlife* adapted to wet conditions.⁴⁰²



Image 18 is an image of Landgraben where it has been rewilded.⁴⁰³

From the perspective of the *ecological class*, especially from the *castorian perspective* what Agnes was doing that day seems backwards. I increasingly asked myself why drainage ditches in such an area were not only allowed to be maintained but rather, why beavers actively

⁴⁰⁰ Scheffer, Fritz; Schachtschabel, Paul (2016): Lehrbuch der Bodenkunde. 16. Neu bearbeitet von Blume, Hans-Peter; Brümmer, Gerhard W., Horn, Rainer; Kandeler, Ellen; Kögel-Knabner, Ingrid; Kretzschmar, Karl Stahr; Wilke, Berndt-Michael. (Spektrum Akademischer Verlag, Heidelberg), 333.

⁴⁰¹ Bundesforschungszentrum für Wald: Digitale Bodenkarte Österreich.

⁴⁰² Humer, Monika (2016): Gley, Boden des Jahres 2016. (Institut für Umwelt und Lebensmittelsicherheit des Landes Vorarlberg), 4.

⁴⁰³ Image 18 courtesy of the Author.

working in congruence with a sane and sensible desire to rewet the area, were kept from doing so. I further asked myself how it is possible that Agnes as a beaver manager – as somebody who relates to beavers through an *affectice logics of care* still ends up having to counteract the *utopian* designs of beavers, despite the economic prosperity and abundance experienced in *Vorarlberg*. Ironically, beaver managers spend much of their time working against the designs of beavers. They often do so due to the legal, political and economic system; shaping the contemporary landscape in a way that often does not leave much space for beavers and their companion species.

This sense of irony became more acute on our next stop on the other side of the cargo terminal. The lower course of *Landgraben* had recently been '*renaturiert*', or rewilded. To do so, the ditch had been widened and the embankment's gradient lowered. On some 100 meters of its course the stream now has space to move, flood and create a patchwork of small habitats. Precisely such changes to water courses are necessary to create space for beavers, and their *swiddens*.

The necessary precondition for such changes, however, is *space*. Specifically, the acquisition of land. In this case, as in a few other cases Agnes knows of, the acquisition of land by conservation organizations or local and regional government bodies has made such and similar transformations possible. However, Agnes explained to me that high land prices make this an unrealistic proposal for a more widespread application. Therefore, the exchange of land, or sporadic donations of land to conservation organizations by private owners are the more common route. She told me of one case where a property owner – whose parents had been farmers – did not wish to continue as a farmer himself. In exchange for a small nominal sum the person had agreed to put his land out of use and provide it to *conservation* interests. Back during our interview in October Agnes had told me the following:

„Oa, zwoa Beispiele wo die Lüt seal gset hond mir bewirtschaften des numm. Mir täten des gern fürn Schutz, Naturschutz hergia. Wobei es ned nur Biber isch, sondern einfach allna Tierle. Aber da Biber döt o profitiert, weil döt denn Flächen plötzlich frei sind wo er nutza kann und I

*ned dazua schoa muss, dass er scho ned ufbötschlat. Und ja es gibt einzelne Bereiche wo Projekte, wobei eaba do stomma erst in da Startlöcher.*⁴⁰⁴⁴⁰⁵

All good and well I thought, but is this how we will prevent the 6th mass extinction? Does this sufficiently amount to incorporating the *utopian* designs of beavers into the *ecological classes* designs for a *livable planet*? The short and obvious answer is NO.

The same issue emerged at the last stop of our day in *Hard*. Right next to the train station, a narrow ditch called *Gerberbach*, its purpose: drainage. Again, looking at aerial photographs from the 1950s, 1970s, and a satellite image from 2020 we see the explosion of concrete and steel vis-à-vis open fields. In this case private single unit housing rather than industry. The remaining field in the center, on the last image, at the time of our visit had been acquired by a real estate development company. Work was already underway to construct new housing. Pacing along the edge of the ditch, the existing properties reached right to the edge of it. With adequate foresight, planning and the care, for beavers and their friends – in short through the adoption of the *castorian perspective* – sufficient space could have easily been created to ensure a safe flood regime, a healthy environment and more pleasant scenery for the people living there. As I think these thoughts out loud, Agnes more than agrees, but sighs and shrugs repeating almost resignedly that land prices are too high and square meters lost to beavers simply aren't an acceptable proposal to real estate development companies.

⁴⁰⁴ Interview 15.10.22, 16.

⁴⁰⁵ „One or two examples where people said we aren't working the land anymore. We would like to donate this to conservation. But it isn't necessarily the beaver, but simply all little critters. But the beaver profits also there, because there then land becomes available that he can use and I don't have to make sure he doesn't get himself into trouble. And yes there are a select few areas where projects (have lead to positive outcomes for beavers) but we are only at the beginning there.’

In this chapter I have presented an account of my fieldwork with Agnes. Through accompanying her I have become familiar with the day-to-day of a beaver manager. Even though monitoring the beaver population as well as the expansion of their territories are the basis for comprehensive management. The majority of Agnes day is split between engaging with stakeholders such as water managers, hydropower companies, anglers, farmers and homeowners, industrial manufacturing, road infrastructure and real estate companies. And engaging with the activities of beavers, mostly through protecting individual trees, managing dam heights and ensuring adequate run-off in streams, canals and drainage ditches. The removal of dams as far as it concerns beavers is generally undertaken with great care.

The main function of a beaver manager consequently is to negotiate compromises between stakeholders, beavers and the state. Much of the knowledge required for this work – albeit standardized in manuals and the scientific literature – is based on the personal experiences and engagement of beaver managers with beavers. One of the most relevant skills for a beaver manager is being able to kindly interact with those stakeholders who are concerned about the recent arrival of beavers and what this might mean for their personal fortunes. Apart from that, physical fitness and the preparedness to get dirty are additional important requirements.

Even if Agnes would not use those words herself, the way she manages beavers makes evident that she engages with beavers through a *logic of affection* in what amounts to a *passionate practice*. Her knowledge of beavers certainly conforms to our requirements for *situated knowledges*. As we have seen she does not pretend to be disinterested in the outcomes of her management work either with regards to humans, beavers or other *wildlife*. Her knowledge of beavers comes not only from the scientific literature, but also from her *embodied* and *affective encounters* with beavers. Agnes knows her solutions cannot always satisfy everybody. As we have seen in the preface her knowledge on beavers clearly is contested, it is conflictual. But her humility and curiosity make clear she understands her knowledge is never complete. Indeed, as she has reminded us, beavers may always be good for a surprise. Interested in a positive outcome for beavers, stakeholders and the state, the *embodied knowledge* of Agnes is also transformational.

Despite her relating to beavers through an *affective logics of care*, or maybe as part of it, Agnes finds herself within the matrix of living, killing and dying. As we have seen in this chapter, the management of beavers is primarily concerned with an attempt to weave beavers into the

legal, political, economic and social fabric of our contemporary landscapes. Its finality is to create and grow the general acceptance of beavers, allowing for greater care in deliberation, rather than rendering them killable. Beaver management, therefore, at least in the way Agnes practices it, seeks to avoid relations of instrumentality, hierarchy and calculation. Rather, Agnes engages with beavers as *respons-able* beings. As such she is aware that no one solution can be applied wholesale. Her engagement with beavers remains *wicked*. Agnes' multispecies ethics is one of practice wherein she seeks to take seriously that human life takes place within fundamental and constitutive relationships with *wildlife*. These aspects make Agnes' knowledge of beavers – their designs and the threats they may face – some of the most robust *embodied knowledge* of anybody I have encountered in my research. Consequently, the motives of Agnes cannot be reduced to the instrumental logics of *ecosystem services* and resource management.

However, in contemporary riparian landscapes beavers can cause significant problems for the stakeholder groups mentioned above. The primary aim of beaver management as we understand it is to ensure the protection of stakeholder property in compliance with EU law.⁴⁰⁷⁴⁰⁸ Since beavers are strictly protected, engaging with them requires a minimum of *deliberation*. The legal requirement for *deliberation* – safeguarding beavers from being made killable – has been achieved thanks to the struggles of the *ecological class* – in form of the 20th century environmental movement.⁴⁰⁹⁴¹⁰ However, beaver management is primarily engaged in the prevention of damages through the protection of individual trees via metal-meshing, the management of dam heights as well as ensuring the adequate run-off and functioning of streams of all sizes. Lastly beaver management is also tasked with safeguarding stakeholder acceptance of beavers. This is aimed at preventing the shift of public opinion. A shift which could conceivably pave the way for a change in EU legislation, rendering beavers killable once again. This shows beavers are tolerated in the landscape as long as they do not come into conflict with the process of capital accumulation and GDP growth. We are reminded of the

⁴⁰⁷ EU Directorate-General for Environment: The Habitats Directive.

⁴⁰⁸ We will discuss the Habitat Directive in more detail in chapter 6.

⁴⁰⁹ Hancock, Rosemary (2018): Islamic Environmentalism: Activism in the United States and Great Britain. (Routledge Advances in Sociology, London), 23.

⁴¹⁰ Grasso, Maria; Giugni, Marco (Ed.) (2022): The Routledge Handbook of Environmental Movements (Routledge, Lond and New York), 19-31.

difference between beavers and sheep in Tierra del Fuego.⁴¹¹ As we have discussed, beavers are being tolerated by stakeholders, capital and the state. Yet, there is little interest in creating the conditions necessary for their *flourishing*. This adds to the precarity of beavers' ontological, epistemic, economic, political, legal and social status in Austrian landscapes.

Regarding beavers and their *world-making*, the central theme of this chapter has been to highlight the conflict between the *castorian perspective* of beavers and the *ecological class*. And the *technocentrist* dream of mastery of local stakeholders, capital and the state. The former want beavers to contribute to improved ecological and environmental conditions in an attempt to address the rupture of the *Anthropocene*. The latter seek to constrain the actions of beavers in a concrete desert flooded with factories, farms, single family homes, motorways, cargo and water infrastructure such as hydropower plants, flood dykes, drainage ditches and channeled streams. They do so in at least partial denial of the *Anthropocene*. This situation leads to an irony in the practice of beaver managers such as Agnes where much of their work can be described as *firefighting* above anything. Firefighting is the key category with which I seek to describe the tension beaver managers find themselves in. In a landscape structurally producing conflicts between beavers and stakeholders, beaver managers – despite their relating to beavers through an *affectice logics of care* – are forced to inhibit their *flourishing* in order to maintain the precarious status of beavers as a tolerated species under legal protection.

Consequently, the renewed presence of beavers, and the contests over their ontology, their legal, social and economic status point to issues far beyond those humble beavers. The *Anthropocene*, understood in terms of the *Capitalocene*, also has roots and drivers here in Vorarlberg. A focus on GDP as an indicator for development, coupled with the proliferation of concrete structures for industry, single family housing, car infrastructure, hydropower and water management – particularly in former wetland spaces – have contributed to the escalation of the *Anthropocene* via emitting green house gasses, and the destruction of habitat – locally as well as globally. At the same time, this unchecked consumption of space has turned much of the valley of the Alpine Rine into a *concrete desert*. With much of the land fortified in *concrete* it has become difficult to effectively address the challenges of the *Anthropocene*. The history of this process will be the subject of the next chapter.

⁴¹¹ Dicenta, Maria (2020): Beavers, Settlers, And Scientists: Entanglements of Environmental Science And (IN)Justice in Austral Patagonia, 1940s-2020s (Dissertation, Rensselaer Polytechnic Institute).

More importantly however, the absence of a concerted effort at solving these issues has become evident through a reliance on voluntary donations in money and land to improve the ecological condition for beavers, streams and wetlands, and ultimately humans. All this in a region awash in economic prosperity. The timid efforts evident in the '*rewilding*' of *Spiersbach*, and the handful of other projects based on voluntary *do-gooders* are a far cry from the urgently necessary large-scale changes so well established by climate scientists, ecologists and scholars of critical international development. Relatively simple solutions consequently have become politically and economically costly.

5. The River

In the previous chapters we have composed an understanding of beaver managers that is informed by an acceptance of the *Anthropocene* and its ontological, epistemological and political implications. To address these challenges we have thoroughly examined the theoretical underpinnings of *conservation*, one of the main social fields intended to address the *Anthropocene*. *Conservations'* core concept of *Nature/wilderness* has been identified as a keyword in a series of interlocking mechanisms predicated on *cartesian dualism* which constructs a *master identity* we have – for our purposes – called *technocentrism*. Both the *dream of mastery* and the *dream of naturalism* are *technocentrist*, as both reproduce the modern ontology and hence the *master identity of technocentrism*. *Conservation nature* must therefore be understood as a distinct form of land use intimately tied to capital accumulation, the administrative state, empire and *technocentrist conservation science*.

The interlocking of capital accumulation, the state, empire and *conservation science* has become particularly clear in our discussion of *ecological modernization* and its key concept *ecosystem services*. In its current form this approach is unlikely to adequately address the root causes of the *Anthropocene*. At the same time we have argued that an ethnography of *conservation* will reveal *conservation* to be more than a *technocentrist* attempt at environmental management in the service of capital accumulation, the state and empire. We have argued *conservation* takes place in an assemblage of skilled bodies, artefacts and technologies. These bodies are not solely or primarily motivated by one-sided instrumental relations. Rather we have argued that *conservation*, at least in the form of beaver management, is a passionate practice predicated on *affective logics* and the learning to be affected by *wildlife*.

An ontology more suitable to address the *Anthropocene* and its root causes is a multispecies ontology as well as an epistemics and ethics building on such an ontology. We have argued that *situated knowledge* embodied, historically situated, conflictive, non-innocent, incomplete and open to partial relations must replace the disembodied, innocent and disinterested knowledge of the *god trick*. In our turn towards companion species –as *wildlife* – we fulfill our ontological demands for a relational processual multispecies ontology. We have made agency commensurable through the concept of *world-making*. Through the mere fact of being alive, every living thing shapes the world around it. When *world-making* projects overlap

multispecies landscapes emerge. In a world of distributed agency humans must find ways to life, kill and die *respons-ably* with *wildlife*. Ultimately this problem remains unsolvable, it is *wicked*. Consequently, killing must involve ethical consideration, it must involve deliberation and consequence. Ethical living then means considering the other as an ethical subject who requires *care*. *Caring* in this context means to remain curious and to learn about what the other needs to *flourish*. Such *care* requires an engagement with *wildlife* through an *affective logics of care* in order to know *wildlife* well via the production of *situated knowledges*.

In the pursuit of these maxims we have composed the *castorian perspective* from an understanding of beavers as embodied subjects with an epistemics of their own, as political allies of the *ecological class*, as *nonhuman zoomian anarchists* and as *swiddeners*. Using the *castorian perspective* to re-read the ecological and scientific literature on beavers we have been able to make the case for the Northern Hemisphere *Beaverocene*. This *Beaverocene* is a reminder that the stable Holocene conditions under which human civilization thrived were in large part due to the *world-making* of beavers. The rupture of the *Beaverocene* occurred at a time when the social and ecological conditions around the world began to be overturned by the social relations of capital the state and empire. Addressing this rupture means addressing the rupture of the *Beaverocene*.

Beaver management is one way of doing so. Despite the *affective logics of care* through which beaver managers such as Agnes relate to beavers, the status of beavers remains contested in the Austrian landscape. Stakeholders, capital and the state tolerate beavers as long as they threaten neither private property nor the accumulation of capital. But as long as the proliferation of concrete structures continues, beavers will be unable to *flourish* and beaver managers will continue fighting fires. Neither will the designs of the *ecological class* for a livable planet bear fruit. In my fieldwork with beaver managers, the category of *space* in the context of riparian wetlands has emerged as the central matter of concern. It has become clear that beavers and beaver managers, water managers, hydropower companies, anglers, farmers and homeowners, industrial manufacturing, road infrastructure real estate companies, and the state all have designs for rivers.

As the two categories of space and firefighting emerged from the discussions of the previous chapter, it is the intent of this chapter to provide a historical explanation of how space became scarce in the riparian wetlands of the present. To better comprehend and appreciate this

complexity multiple timescales are relevant. As the variously timed beats of geological, climatological, biological, economic and political time interlace, a complex present of becoming unfolds. As we did with beavers, this narrative about the history of riparian wetlands begins with the last Ice Age.

In this chapter we will tell the history of the Alpine Rhine and its wetlands as a multispecies history. We will discuss the transformation of the Holocene multispecies peasant river into the concrete river of the *Anthropocene*. The first part of this chapter will deal with the geological and ecological history of the *Alpine Rhine*. As this chapter is primarily written with an audience of social scientists and scholars from the humanities, in mind I consciously chose to write distinct paragraphs with highlighted key terms in an almost indexical style akin to an encyclopedia. The goal of this strategy is to allow for selective and recursive reading. In the second part of the chapter, I will narrate the multispecies history of the early Holocene wherein a peasant landscape took shape. The third part of the chapter deals with the river regulation of the 19th century and the *concrete riparian regime* as a *hydraulic regime of consumption*. This will be examined along the lines of flood control and hydropower generation. Lastly the fourth part of the chapter will engage with current efforts of creating a *resurgent riparian regime* in the 21st century.

Geological time. (Rivers, wetlands and peasant landscapes)

Plate tectonics is the farthest back we can sensibly reach, more than 30 million years ago.⁴¹²

Climate changes towards the end of the last ice age when *Lake Constance* extended some 80km further into the contemporary *Alpine Rhine* valley (around *Sargans*).⁴¹³ For 16.000 years the river has been pilling sediment into the lake, changing lake into land. This process is ongoing with the *Alpine Rhine* delta growing at a rate of 23 square meters annually. The Holocene course of the *Alpine Rhine* thus is not a line that can be mapped out, but rather a story of becoming, a history of flood-pulse and shifting river courses. To give an idea of its expanse, in the area relevant to us, the channel in some places exceeded, but generally was

⁴¹² Hantke René (1993): Zur Entstehungsgeschichte des Alpenrheintals. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 20.

⁴¹³ Starck, Peter (1993): Restseen, Schwemmkegel und Torf im Vorarlberger Rheintal. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 36.

not broader than 500 meters. Despite this relatively humble channel size the river at one point in time impacted most parts of the 3-4km broad valley. This was, in part, due to its nivo-pluvial flow-regime, wherein snowmelt is the primary water source with peaks from April to June and a minimum in January. From March to November rainfall adds to the discharge causing expansive floods.⁴¹⁴

Rivers are not lines on a map, that we have established. A stream, as far as geologists are concerned, is any body of flowing water. A river is composed of the major branches of a large stream system. Streams have well-defined channels through which the water flows, draining entire watersheds into oceans. As streams transport large amounts of sediment, they act as conveyor belts for siliciclastic sediment and dissolved matter at a global rate of 16 billion tons annually. Streams, thus are where climate and tectonic processes meet.⁴¹⁵

When we speak of a river, we speak of a river valley, which extends from the tops of mountain slopes on either side of the river, to the valley bottom. The **channel** lies at the valley bottom, girdled on either side by the **floodplain**. The latter tend to be narrow in the high mountains and expansive in the lowlands. The shapes of a stream are highly variable and range from snaking to irregular paths, but can also split into multiple channels, **meander** or **braid**.⁴¹⁶

Meanders are of particular interest, as they migrate over the floodplain and give the characteristic shape to many known rivers. This generally snaking shape erodes the outside banks of river bends, where the current is strongest, and sees the deposition of these sediments on the insides of meander curves forming point bars. As meanders move, they leave behind point bars building up sand and silt slowly filling the floodplain with sediment. Another aspect of the migration of meanders is that they can grow closer together, until the river bypasses a loop. This often occurs during a major flood. What is left behind and cut off from the river is what geologists call an oxbow lake.⁴¹⁷

⁴¹⁴ *Trockner Klement, Robinson Christopher T., Uehlinger Urs (Ed.) (2009): Rivers of Europe (Amsterdam, London, Academic Press), 207, 208, 218.*

⁴¹⁵ *Grotzinger John, Jordan Thomas H., Press Frank, Siever Raymond (2007): Understanding Earth 5th Edition (W.H. Freeman and company, New York), 428.*

⁴¹⁶ *Grotzinger John, Jordan Thomas H., Press Frank, Siever Raymond (2007): Understanding Earth 5th Edition (W.H. Freeman and company, New York), 428, 429.*

⁴¹⁷ *Grotzinger John, Jordan Thomas H., Press Frank, Siever Raymond (2007): Understanding Earth 5th Edition (W.H. Freeman and company, New York), 429.*

As mentioned with regards to meander, a stream migrating over a valley floor creates a floodplain. Point bars, as well as sediment deposited by floodwaters build up the surface of a floodplain. As the floodwater spills out of a rivers channel, it quickly loses velocity and hence the energy to carry large sediment, which is deposited along the immediate borders of the channel. This deposition of larger sediment leads, over time, to the emergence of a levee. Such levees can reach heights of several meters eventually carrying the river above its floodplain. The fine sediments, silts and muds, are spread, sometimes over the entire floodplain. These fine-grained floodplain deposits cause the productivity (in an ecological sense) of river floodplains throughout the world.⁴¹⁸

Pulse and shift have created, over time, a complex geological mosaic of various soils ranging from fine fertile riparian soils to peat, gleys and coarse rocky sediment. A history recorded in the soil. One way of reading this history is to drill, another is to analyze peat soil depth.⁴¹⁹ As peat accumulates very slowly, its thickness is an indicator of age and thus the becoming of geological, hydrological, and climatic conditions necessary for its creation.⁴²⁰ A history also recorded in ecosystems, species composition and plant succession. Yet another way of tracing these processes is to look at historical maps. Not only do they reveal one of the many variations of possible Holocene courses, the historical extent and distribution of settlements also hints at the flood-pulse reach.⁴²¹

Peat deposits in the *Alpine Rhine* valley are extensive. Their origin is curious. They date back to the post-glacial period when *Lake Constance* extended farther South. The *Alpine Rhine* discharged sediment into the lake, pushing the lakeshore ever ahead. Given the breadth of the valley north of *Feldkirch*, despite this process of infilling, water bodies remained behind the advancing delta of the *Alpine Rhine*. These water bodies would be filled in and crisscrossed by the *Alpine Rhine's* smaller tributaries: *Ill*, *Bregenzer Ach* and *Dornbirner Ach*. This slow process

⁴¹⁸ Grotzinger John, Jordan Thomas H., Press Frank, Siever Raymond (2007): Understanding Earth 5th Edition (W.H. Freeman and company, New York), 431.

⁴¹⁹ <https://bodenkarte.at/#/center/9.6567,47.4474/zoom/12.4/l/t,true,60,kb> (last accessed 30.10.25; 14:33)

⁴²⁰ Mitch, William J.; Gosselink, James G. (2015): Wetlands. (John Wiley & Sons, Newark), 440.

⁴²¹ Hohensinner, Severin; et. Al (2021): What remains today of pre-industrial Alpine rivers? Census of historical and current channel patterns in the Alps. In: River Research & Alps, Vol.37 (2), 128-149.

of sedimentation, in its final stages was completed by wetland vegetation and subsequent peat formation in soil with high water saturation.⁴²²

Hydroperiod is the variation of discharge. Stream discharge is measured by the amount of water that passes a given point in a given time, through a given stream width and depth. Floods are defined as a short-term imbalance between input and output.⁴²³ To explain how discharge variability influences primary productivity as well as the distribution and life histories of organisms, Junk et. al have conceptualized this process as the *flood pulse*:

„We define floodplains as „areas that are periodically inundated by the lateral overflow of rivers or lakes, and/or by direct precipitation or groundwater; the resulting physiochemical environment causes the biota to respond by morphological, anatomical, physiological, phenological and/or ethological adaptations, and produce characteristic community structures.“⁴²⁴

Central about this concept, is the understanding that river and floodplain, or lake and floodplain form a system. Regular and predictable inundation of what they call the *aquatic terrestrial transition zone (ATTZ)* exert a strong selective pressure on aquatic and terrestrial organisms. The extent, intensity and duration of floods vary depending on climate, stream order and position along the stream. Lower order streams towards their mouths flood less intensely, for longer periods but over greater areas, while the reverse is true for higher order headwater streams where floods typically reset ecological succession.⁴²⁵

Junk et. al argue that this periodic flooding increases productivity but also creates finely grained small-scale habitat in narrow parallel strips along the river course. Different parts of a floodplain inundated at different speeds and for varying periods of time depending on distance and elevation from the channel. As mentioned above, floodwater quickly loses velocity and

⁴²² Starck, Peter (1993): Restseen, Schwemmkegel und Torf im Vorarlberger Rheintal. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 36.

⁴²³ Grotzinger John, Jordan Thomas H., Press Frank, Siever Raymond (2007): *Understanding Earth* 5th Edition (W.H. Freeman and company, New York), 443, 446.

⁴²⁴ Junk, W. J., P. B. Bayley, and R. E. Sparks (1989): The flood pulse concept in river-floodplain systems. In D. P. Dodge, ed., *Proceedings of the International Large River Symposium*. Special issue of the *Journal of Canadian Fisheries and Aquatic Sciences* 106, 112.

⁴²⁵ Junk, W. J., P. B. Bayley, and R. E. Sparks (1989): The flood pulse concept in river-floodplain systems. In D. P. Dodge, ed., *Proceedings of the International Large River Symposium*. Special issue of the *Journal of Canadian Fisheries and Aquatic Sciences* 106, 116.

energy, so the deposition of sediment is predicated on distance and elevation from the channel. As the hydroperiod differs over the years, discharge variability on an annual as well as decadal, centurial and millennial scale causes the great biological diversity and complexity of soil conditions of riparian ecosystems.⁴²⁶

Intermediate disturbance hypothesis is an ecological concept stating that ecological diversity is, amongst other factors, dependent on intermittent *disturbance* which impedes plant succession and reopens and maintains spaces for pioneer species, while ensuring a patchwork habitat in various states of ecological succession. Ecologically the effect of intermediate *disturbance* agents such as fire, floods, avalanches, landslides, grazing and mowing; is that within a given area several patches at different levels of succession get by, as opposed to only one large patch of climax vegetation. In terms of species diversity this increases species diversity.⁴²⁷

A multispecies peasant river gives way to a concrete river

Braudel writes about France as a peasant economy until well into the second half of the twentieth century.⁴²⁸ Anna Tsing, writing of *Satoyama woodlands* in Japan tells us of a peasant landscape that emerges in the unintentional mutual cultivation of pines, matsutake and humans; wherein these actors make each other's *world-making* projects possible.⁴²⁹ With this understanding it becomes possible to see landscapes as '*products of unintentional design, that is, the overlapping world-making activities of many agents, human and not human*'.⁴³⁰ In this respect *disturbance* is central to Tsing as '*Disturbances realigns possibilities for transformative encounter*'.⁴³¹ The inverse side of *disturbance* is *resurgence*, it is to Tsing '*the force of the life of the forest, its ability to spread its seeds and roots and runners to reclaim places that have*

⁴²⁶ Junk, W. J., P. B. Bayley, and R. E. Sparks (1989): The flood pulse concept in river-floodplain systems. In D. P. Dodge, ed., Proceedings of the International Large River Symposium. Special issue of the Journal of Canadian Fisheries and Aquatic Sciences 106, 120.

⁴²⁷ Molles, Manuel C.; Sher, Anna A (2019): Ecology: Concepts and Applications. 8th edition (Mc Graw Hill Education, New York), 354, 355.

⁴²⁸ Braudel, Fernand (1986): L'identité de la France. Les Hommes et les Choses. Tome 2. (Arthaud – Flammarion, Paris), 9.

⁴²⁹ Tsing, Anna L. (2015): The mushroom at the end of the world. On the possibility of life in capitalist ruins. (Princeton University Press, Princeton), 152.

⁴³⁰ Tsing, Anna L. (2015): The mushroom at the end of the world. On the possibility of life in capitalist ruins. (Princeton University Press, Princeton), 152.

⁴³¹ Tsing, Anna L. (2015): The mushroom at the end of the world. On the possibility of life in capitalist ruins. (Princeton University Press, Princeton), 152.

been deforested.⁴³² *Disturbance*, be it geological, human or *wildlife*; is met with *resurgence*. Ebbing and flowing, the interplay between these two creates openings in otherwise monotonous landscapes.

Bätzing, in his account of the *alpine peasant landscape* presents us with a fascinating account of how, over the course of several millennia dating back to the first arrival of neolithic humans some 6000 years ago, an intricate network of social relations has shaped a patchy, *multispecies landscape*. Given the geological relief of the Alps, a vertically structured *more than human* peasant landscape emerged. Arable agriculture was practiced at the valley bottom, the riparian wetland was used for hunting, gathering and fishing, the current was harnessed for mills, timber rafting and river travel, extensive forest use for timber and non-timber use interspersed with meadowland occupied mountain flanks and the grazing herds of mostly cattle, and sheep occupied the highest zones just below the rocky outcrops and glaciers. Dominated by the seasonal cycle, this peasant landscape – through the input of human labor – created *disturbances* in a densely forested landscape. This created space for the emergence of landscape patches. As Bätzing highlights, under a continuous labor input, this was a stable ecological regime allowing for a wide variety of humans and *wildlife* to *flourish*.⁴³³⁴³⁴

By the late Middle Ages this system reached what we may call maturity, with even the most marginal areas of the Alps having been transformed into a *multispecies peasant landscapes*. Situated at the intersection of increasingly powerful lowland polities, the Alps became a political periphery and the originator of mineral and timber resources. Particularly the industrialization of the high and late Middle Ages and the political imperative to coax surplus from the alpine peasants in order to finance ceaseless wars created *blasted landscapes* in which *peasant landscapes* resurged in ways not fully controlled by humans.⁴³⁵ However, this ebb and flow of *disturbance* and *resurgence* entered a protracted crisis as the industrial revolution began to make itself felt in the region. With increasing agricultural specialization and the wholesale diminution of the agricultural workforce as well as the migration into valley

⁴³² Tsing, Anna L. (2015): *The mushroom at the end of the world. On the possibility of life in capitalist ruins*. (Princeton University Press, Princeton), 152.

⁴³³ Bätzing, Werner (2015): *Die Alpen*. 4th completely revised edition (C. H. Beck, München).

⁴³⁴ The narrative here presented is maximally condensed and glosses over the spatial and temporal heterogeneities of the Alps.

⁴³⁵ Tsing, Anna L. (2015): *The mushroom at the end of the world. On the possibility of life in capitalist ruins*. (Princeton University Press, Princeton), 181.

and lowland urban areas the continuous labor input necessary to maintain this *multispecies peasant landscape* could no longer be provided. With the *disturbance* of humans and their companion species reduced, forest began to regrow. Since, species adapted to expansive alpine meadows no longer find the disturbed ecosystems in which they used to *flourish*.⁴³⁶ Ecologically speaking, the *multispecies peasant landscape* of the Alps can be neatly situated within the theorem of the *intermediate disturbance* hypothesis. Similarly, the double assault of industrial capitalism as both extensification of *disturbance* in agriculturally marginal areas and an intensification of *disturbance* on the valley bottoms to the point of blocking *resurgence* demonstrates a shattering of this *multispecies peasant landscape*. In the following we will return to the history of the *Alpine Rhine* in the 19th and 20th century to illustrate this claim.

Projects of industrialization and infrastructure were ripe in *Vorarlberg* during the 19th and 20th centuries. *Vorarlberg* was one of the first regions in the *Austro-Hungarian Empire* to industrialize.⁴³⁷ The textile industry was the first impetus of industrial modernity, railways the second, hydropower the third. Factories, rail, and hydropower upended earlier economies of timber rafting, subsistence production, mining and the putting out system for textile production.⁴³⁸ The tracks from *Lochau* to *Bludenz* were laid in 1872, the *Arlberg* tunnel connecting *Vorarlberg* with *Tyrol* and the rest of the *Austro-Hungarian Empire* was opened in 1882. These railway connections fundamentally changed the economic geography of *Vorarlberg*. Commodities, chief amongst which were textiles and dairy products, could now be moved in and out and over unfathomable distances for profit. Grain could be imported to feed the growing population and support the agricultural specialization on dairy. As factories were established, thrived and grew in the two valleys of *Walgau* and *Alpine Rhine* valley, the regulation of the *Ill* and *Alpine Rhine* rivers became paramount to safeguard these capital-intensive investments.⁴³⁹

⁴³⁶ Bätzing, Werner (2015): *Die Alpen*. 4th completely revised edition (C. H. Beck, München).

⁴³⁷ Pichler, Meinrad (2015): *Das Land Vorarlberg 1861 bis 2015* (Universitätsverlag Wagner, Innsbruck), 45.

⁴³⁸ Cioc, Mark (2002): *The Rhine. An Eco-Biography, 1815-2000* (University of Washington Press, Seattle, London), 62.

⁴³⁹ Pichler, Meinrad (2015): *Das Land Vorarlberg 1861 bis 2015* (Universitätsverlag Wagner, Innsbruck), 31, 32, 33, 34, 35, 37, 39.

The Concrete Riparian Regime Act I: Origins

Floods are a short-term disequilibrium between input and output. They are an agent of ecological *disturbance*. Floods can destroy capital. They are a menace to livestock, crops, dependents and property. Each of these sentences is true; from a certain point of view. In the 19th century, the latter two points were most urgently true to the inhabitants of the Rhine valley on both the Swiss and Austrian side. A series of intensifying floods caused by climate variability, flood probability and an intensification of land use in the catchment area chief among which deforestation had conspired to increase input over output, increase *disturbance*, destruction of capital, and menace to life(stock), crops and property.

Riparian floodplains have historically been a magnet for settlement. The *Alpine Rhine* was no exception. Along the Swiss and Austrian border the river was straddled by some fifty villages on either side. Another fifty villages and towns lay on either side of the valleys' edges. Despite annual and interannual flood risks, fertile soils and readily available groundwater attracted people. An extensive settlement pattern characteristic to the area had developed. Single farms surrounded by a small meadow and bounded by hedges and fruit trees, one next to the other and each in some small distance to the next. Beyond this core of loose settlement lay arable fields and hay meadows. Further still the commons of the riparian floodplain, woodland, the fen and meadows.⁴⁴⁰

Agrarian and small scale. Yet trade routes and routes of communication crisscrossed the valley of the *Alpine Rhine*. With one important route connecting southern Germany to *Milan* running straight through *Fußach*. The river was dotted with mills, was used to transport goods on rafts, gather driftwood, and fish, with yields being many orders of magnitude higher than today.⁴⁴¹⁴⁴² From the 18th century onward increases in population coupled with real division among heirs

⁴⁴⁰ Kaiser, Markus (1993): Die alten Rheindörfer. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 67.

⁴⁴¹ Hoffmann, Richard C. (2023): The Catch. An Environmental History of Medieval European Fisheries (Cambridge University Press, Cambridge), 2-14.

⁴⁴² Cioc, Mark (2002): The Rhine. An Eco-Biography, 1815-2000 (University of Washington Press, Seattle, London).

practiced in the region led to a decrease in farm size and generally widespread immiseration, driving the cutting of riparian forests for land and resources.⁴⁴³

The 19th century saw a series of major floods spurring negotiations for what eventually would become the *International Rhine regulation* (henceforth IRR). The flood of 1817 is of particular interest. In the two previous summers, the snow cover in the mountains above 1800 m. a. s. l. remained unbroken. Then in 1817 the snow finally melted and caused a devastating flood, destroying property, life and crops. Famine ensued. One fear spanning this century of floods was the loss of dry arable land to swamp, fen and bog. One hope in regulating the *Alpine Rhine* once and for all, was to reclaim lost land and more for the plough and turn the valley into a regional breadbasket.⁴⁴⁴⁴⁴⁵

Contemporaries understood the early 19th century increase in flood frequency and severity as caused by several factors. Deforestation of the upper reaches of the Rhine basin, however, was identified as the chief culprit. Lower water retention in soil and vegetation, coupled with higher sedimentation rates increased both the sedimentary load as well as the discharge rate. Increased sedimentation in turn raised the channel and its' embankments. Elevated above the surrounding floodplain created the threat of intermittent, but devastating floods. Interannual climate variability as seen above contributed more water still. Both Swiss and the Austrian townships as well as higher political bodies in the absence of coordination erected flood walls to stem the tide. However, whenever a flood wall would be erected by one party, the severity of the next flood would be increased for the other party.⁴⁴⁶⁴⁴⁷

Negotiating the bilateral treaty between Switzerland and Austria would span much of the 19th century. Several issues contributed to the prolongation of these negotiations. The *Alpine Rhine*

⁴⁴³ Kaiser, Markus (1993): Die alten Rheindörder. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 71.

⁴⁴⁴ Rohner, Hans (1993): Baragas Plan von 1792 und Korrektionsvarianten im Vorfeld des Staatsvertrages von 1802. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 144, 151, 155.

⁴⁴⁵ Bucher, Silvio (1993): Die Petitionen der st. gallischen Rheingemeinden zur Rheinkorrektion im 19. Jahrhundert In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 168.

⁴⁴⁶ Bucher, Silvio (1993): Die Petitionen der st. gallischen Rheingemeinden zur Rheinkorrektion im 19. Jahrhundert In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 158, 160.

⁴⁴⁷ Cioc, Mark (2002): The Rhine. An Eco-Biography, 1815-2000 (University of Washington Press, Seattle, London), 62.

demarcated an international border. Its regulation and the process of redrawing this border was a touchy topic fraught with distrust and accusations of maneuvering. A shifting balance of power between the two States and changing politics within, added another layer of difficulty. The river further threatened different parts of the floodplain differently at different times and thus urgency, political will and preparedness to compromise shifted.⁴⁴⁸ A particular point of contention was the fear by the Austrian side, that the sedimentary load carried by the regulated river would carry sufficient material to fill in the bay of *Fußach* within thirty years. This would deprive *Fußach* and *Bregenz* of their ports. Worse still, the rivers flowing into *Lake Constance* on the Austrian side were feared to lose their access to the lake. As we know had happened before in geological time. A process which could turn fertile soils into marsh and swamps.⁴⁴⁹

Decades of on and off negotiations would pass before the bilateral treaty was signed in 1892. Construction began in 1895 and was envisioned to last 14 years, with costs shared equally between the two parties. The treaty stipulated the regulation of the Rhine below its confluence with the Ill. Below this point the river would be shortened by 10km, and its mouth would be moved into the bay of *Fußach*. This feat was to be achieved by piercing the rivers' embankments at two points and guiding its waters into two newly constructed channels. The *New Rhine* would consist of a 110 m wide channel and a floodplain of 75 meters on either side. Flood dikes four meters in height would be erected at a distance of 260 meters. The channeling, straightening and shortening of the river was intended to increase its inclination. Planners hoped for the *New Rhine* to carry its sedimentary load well into *Lake Constance*.⁴⁵⁰

Construction of the originally envisioned project would last well into the 20th century. While the project, as envisioned in the 1890s, was finished by 1934; long after the originally envisioned date of completion, monitoring and maintaining the *New Rhine* would become a continuous project. For this purpose a permanent commission overseeing and administering

⁴⁴⁸ Koenig, Fritz (1993): Der Staatsvertrag Schweiz-Österreich von 1892. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 172.

⁴⁴⁹ Koenig, Fritz (1993): Der Staatsvertrag Schweiz-Österreich von 1892. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 172, 173.

⁴⁵⁰ Waibel, Ferdinand (1993): Die Werke der Internationalen Rheinregulierung. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 206.

the project had been created through the original treaty. Delays and unforeseen difficulties in construction, two world wars, inflation and the economic meltdown of the 1920s did their part in causing delays and producing unforeseen circumstances. But the river – it seems – also had plans of its own. In the night before the first completed section of the channel would be opened in grand ceremony, the *New Rhine* broke into its new channel with the aid of spring snowmelt.⁴⁵¹

Major problems soon arose. Not long after the *New Rhine* had come into existence gravel banks developed along a few stretches of its course. In some places they elevated the channel above the surrounding plain. This reduced the discharge capacity of the system and threatened the surrounding low-lying floodplain with inundation. In addition, the sedimentary load of the river caused a delta build up in the bay of *Fußach*. Three further bilateral treaties followed since; one in 1924 and 1954 and 2024⁴⁵²⁴⁵³ Continuing concerns for the *Alpine Rhine* and its behavior is not, however, reducible to the channel and its waterworks. Rather, once the original works had been completed new areas of concern quickly arose.

While the primary concern of the IRR was focused on the *Alpine Rhine* below the confluence of *Rhine* and *Ill*. From the beginning planners were concerned with the other smaller streams, canals and ditches of the entire watershed. Their vision did not stop at flood protection. Rather, their goal was to manage and control drainage at the watershed level.⁴⁵⁴ Accordingly, the bilateral treaty stipulated that each state was to individually ensure adequate drainage. Efforts in accordance with this stipulation gave rise to an intricate network of drainage works complementary, but largely hydrologically separated from the regulated *New Rhine*. One such effort materialized in the redesign of *Dornbirner Ach*. Hydrologically separated from the *Alpine Rhine*, several drainage canals themselves at the confluence of numerous streams now flow

⁴⁵¹ Waibel, Ferdinand (1993): Die Werke der Internationalen Rheinregulierung. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 206, 221.

⁴⁵² Waibel, Ferdinand (1993): Die Werke der Internationalen Rheinregulierung. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 220.

⁴⁵³ *Internationale Rheinregulierung*(2024): Hurra! Der Staatsvertrag ist unterzeichnet!

⁴⁵⁴ Cioc, Mark (2002): *The Rhine. An Eco-Biography, 1815-2000* (University of Washington Press, Seattle, London), 62.

into *Dornbirner Ach*. It in turn carries much of the water of the *Alpine Rhines* former flood plain into *Lake Constance*, just East of the *New Rhine*.⁴⁵⁵

Valley bottoms were not the only concern. High mountain streams were also subject to taming and control. The taming of high mountain streams was initialized by the IRR. Particularly from 1910 the effort to control these streams became a general concern not exclusive to the *New Rhine* and its tributaries. Due to the mountainous topography of the region, coupled with high precipitation, avalanches and mudslides had been a common occurrence. The effort to protect settlements and drainage projects from the effects of these events was from the beginning intimately coupled with forestry practices in a combination of engineering and forestry, rock and flora. It goes without saying that part of the reason for the exceptionally high forest cover of Vorarlberg today has to do with this technology.⁴⁵⁶⁴⁵⁷

To conceive of the *New Rhine* not only as a river, but as a river basin, is a representational frame which privileged the territoriality of nation-states. River basins were imagined as discrete geographical units amenable to water management by planners. Their development could be undertaken according to universal rules. This simplification, in the language of James Scott, whom we have already encountered in chapter 3, made rivers legible and hence amenable to manipulation by nation-states.⁴⁵⁸⁴⁵⁹

Such thinking was not unique to the Swiss and Austrian planners of the 19th century. In fact we can trace the roots of this desire to control rivers back to the Renaissance and the beginning of modern hydraulic river engineering. Thinkers like *Benedetto Castelli* and *Domenico Guglielmini* worked out the mathematical formulas necessary to calculate the amount of water flowing through a river at any given time. In addition, they conceived of stagnant water

⁴⁵⁵ *Waibel, Ferdinand* (1993): Die Binnengewässerkorrektion im Vorarlberger Rheintal. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 288, 289.

⁴⁵⁶ *Fischer, Alfons* (1993): Wildbachverbauung im österreichischen Rheineinzugsgebiet. In: *Internationale Rheinregulierung Rorschach* (1993): Der Alpenrhein und seine Regulierung. Internationale Rheinregulierung 1892-1992 (Buch Druck und Verlag, Buchs), 301, 302.

⁴⁵⁷ The technology in question is discussed by Bätzing as a central pillar of the peasant landscape, in German known as Schutzwald, or Bannwald. This describes a forest maintained above settlements in order to stabilize steep mountainsides. In the 20th century this concept became more broadly applied in order to protect settlements and infrastructure and is codified in the Austrian forestry law.

⁴⁵⁸ *Sneddon, Christopher* (2015): Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation (The University of Chicago Press, Chicago, London), 13-15.

⁴⁵⁹ *Scott, James* (1999): Seeing Like a State. How Certain Schemes to Improve the Human Condition Have Failed (Yale university Press, New Haven).

as breeding grounds for disease, and lush wetlands as inducing floods. Those who followed their teachings began to conceive of curved, free and slow flowing rivers as imperfect and defective. Consequently, the ideal river became broad and straight with a deep channel and fast flowing waters. The goal was to transfer water out and away, to improve flood protection, allow for the reclamation of land for agriculture, to create the conditions for unimpeded year-round river navigation and eventually the production of hydropower.⁴⁶⁰ By the 20th century this had become the standard approach to rivers throughout Europe and North America. Alas the *concrete riparian regime* had begun to emerge.

With floods banned, industrialization, modernization and the emergence of a new riparian regime, gave an impetus to conceive of the high precipitation rates and steep topographic profile of the Alps not as a threat, but an opportunity. Given the absence of easily accessible and large coal deposits from the Alpine landscape, hydropower came to be conceived of as the '*white coal*' of the Alps. In his dissertation Landry argues that the roughly 150 years from the 1830s to the 1970s saw the massive transformation of the Alpine landscape into a battery, or '*an energy landscape designed to generate electricity and store water power*.'⁴⁶¹ At first, alpine hydropower was harnessed in run-of-river dams only creating small reservoirs. However, the inconstant flow of water and the disparity between consumption needs and energy availability drove planners to build ever larger reservoirs in the high mountains. In the process they remade the Alps according to their needs.⁴⁶²

Particularly for Austria, the aftermath of the First World War provided the preconditions to turn Austria into a '*white coal* country' in a drive of nation-building, to improve economic malaise and to solve its energy crisis. In this process, mountains were moved, and rivers were bent. All in all, by 1970, some 131 Alpine lakes had been converted into reservoirs.⁴⁶³ Landry remarks that the *Alpine battery* is comparable, in importance, to French nuclear power, Ruhr coal and North Sea natural gas.⁴⁶⁴ Ding Xiangli, with regards to China, calls this process the

⁴⁶⁰ Cioc, Mark (2002): The Rhine. An Eco-Biography, 1815-2000 (University of Washington Press, Seattle, London), 37ff.

⁴⁶¹ Landry, Marc D. (2013): Europe's Battery: The making of the Alpine Energy Landscape, 1870-1955 (Doctoral Thesis, Washington), 216.

⁴⁶² Landry, Marc D. (2013): Europe's Battery: The making of the Alpine Energy Landscape, 1870-1955 (Doctoral Thesis, Washington), 23f, 96, 159.

⁴⁶³ Landry, Marc D. (2013): Europe's Battery: The making of the Alpine Energy Landscape, 1870-1955 (Doctoral Thesis, Washington), 130.

⁴⁶⁴ Landry, Marc D. (2013): Europe's Battery: The making of the Alpine Energy Landscape, 1870-1955 (Doctoral Thesis, Washington), 219.

formation of a *hydropower nation* a process wherein hydropower projects and political regimes mutually reinforced each other.⁴⁶⁵

Sneddon argues, that the *concrete revolution* was a hydrological and ecological experiment: *‘that has fundamentally altered human relations with water.’*⁴⁶⁶ To him large dams represent the intersection of *‘complex networks of altered hydrologies, technical expertise, financial circuits, political desires, displaced communities, and hegemonic ideologies.’*⁴⁶⁷ He concludes: *‘Dams are, as a matter of course, exceptionally “thick” with politics.’*⁴⁶⁸ This is true for concrete dams, as well as beaver dams. We see in the drive to erect large dams the profound *‘linkages between geopolitics, technologies and large-scale environmental transformations.’*⁴⁶⁹

What began as a *nation-building* exercise developed into a global *‘Concrete Revolution’* in the context of the Cold War. Like the *Green Revolution* and other development projects, it was deeply implicated in global Cold War geopolitics. Landry argues that the creation of the alpine energy landscape created national industries and expertise that states like Austria now seek to export in the context of development programs. Austria has an incentive to lend money for hydro development in the Global South while resting assured that much of the money will return to Austria through the purchase of goods and services required in dam construction.⁴⁷⁰ The *Concrete Revolution* was concrete in the material sense, but also in the sense of its physical durability. Sneddon writes of 50.000 large dams having been constructed globally during the 20th century. In the process 30 to 60 million people were displaced, and some 500 million people saw the impacts of downstream effects. Lastly, tens of thousands of rivers were remade into highly regulated water systems at a hitherto unprecedented scale.⁴⁷¹

⁴⁶⁵ Ding, Xiangli (2024): *Hydropower Nation. Dams, Energy, and Political Changes in Twentieth-Century China* (Cambridge University Press, Cambridge, New York), 6.

⁴⁶⁶ Sneddon, Christopher (2015): *Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation* (The University of Chicago Press, Chicago, London), 1.

⁴⁶⁷ Sneddon, Christopher (2015): *Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation* (The University of Chicago Press, Chicago, London), 1f.

⁴⁶⁸ Sneddon, Christopher (2015): *Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation* (The University of Chicago Press, Chicago, London), 2.

⁴⁶⁹ Sneddon, Christopher (2015): *Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation* (The University of Chicago Press, Chicago, London), 3.

⁴⁷⁰ Landry, Marc D. (2013): *Europe’s Battery: The making of the Alpine Energy Landscape, 1870-1955* (Doctoral Thesis, Washington), 223.

⁴⁷¹ Sneddon, Christopher (2015): *Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation* (The University of Chicago Press, Chicago, London), 2f.

As we have discussed in this chapter, it was the rationalities of capital, the state and empire in following the logic of accumulation, nation building and later Cold War development, that brought forth the *concrete riparian regime* and caused its global proliferation. The new riparian regime of the 19th century which replaced a *multispecies peasant river* required the addition of hydropower and the global cold war proliferation of the *concrete revolution* for the *concrete riparian regime* to fully emerge as a central rupture in the *Anthropocene*.⁴⁷² As we remember from the first chapter the spread of impervious surfaces, the disruption of water and nutrient cycles, as well as rapid species extinction; are some of the key drivers of the *Anthropocene*. The *concrete revolution* implicates Austria both in its relationship with the Global South as well as in the *Anthropocene*.

This is the story of the emergence – the first act – of the *concrete riparian regime*. In what follows we will turn to the story of its crisis. In the previous chapter we learned about the work of Agnes as beaver manager. Equipped with the *castorian perspective* we have attempted to see the landscape, not just through the situated perspective of a beaver manager – but through the embodied eyes of beavers. From this exercise it became clear that *space* for beavers is scarce. Wherever we looked, we saw signs of the *concrete riparian regime*. Moreover, it is part of the rupture of the *Beaverocene*. We now understand that *the concrete riparian regime* stands in the way of the kind of *resurgence* necessary to achieve the designs of the *ecological class* for a *livable planet*. But how did space become scarce?

The Concrete Riparian Regime Act II: Maturity

A concept that can help us put into perspective the transformation of the *multispecies peasant river* into the *concrete riparian regime* is the *organic machine*. Richard White argues that rivers are energy. The flow of their water is the release of energy. This energy makes the hydrology, geology and ecology of a stream. Hydropower dams can transform this energy into electricity. Peasants living in riparian wetlands had tapped into this energy, mediated through labor and social hierarchies. The ‘conquest’ of rivers like the *Alpine Rhine* transformed the *multispecies peasant river* through putting the river to work. Thereby planners and scientists created what

⁴⁷² Sneddon, Christopher (2015): Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation (The University of Chicago Press, Chicago, London), 2f.

White called an *organic machine*: an energy system which, although modified by human interventions, maintains its natural, its “*unmade*” qualities.⁴⁷³

The New Rhine, as it emerged from these works, is an *organic machine* harnessed for the creation of space, the production of hydropower energy and the control of water. A machine that continuously exerts energy through legal and institutional mechanisms, monetary expenditure and political will. Machine and human labor, maintains and monitors water tables, precipitation and snowfall rates, water quality, sediment load and deposition as well as the integrity of the embankments, canals ditches and other constructions of this massive basin-wide effort.

Space created by the *New Rhine* made possible a fundamental alteration of the human geography of the *Alpine Rhine* valley. With capital investment now safeguarded accumulation and reinvestment in ever larger production apparatuses was possible. This growing industry required labor. To be precise: cheap ethnic, female and child labor. In 1900 40,000 people were employed in business or industry, 55% of whom in the textile and embroidery industry, while only 25% of the total population of 129,237, were employed in agriculture.⁴⁷⁴ The textile industry, the mainstay of industry in Vorarlberg for over a century peaked in 1950 employing 72.2% of all workers.⁴⁷⁵ However, with the opening of the Peoples Republic of China and the creation of Special economic zones, regional textile production fell into a downward spiral. Within the span of two decades the regional textile industry was finished.

Instead of deindustrialization and recession a shift towards metal working and electrical appliances occurred⁴⁷⁶ While the textile industry in 1955 was responsible for 76.3% of added value this number had fallen to 24.3% in 1995 and to 15% in 2003. At the same time the metal and electric sector stood at 6.9% in 1995 and rose to 40.6% in 1995 and 48% in 2003. As metal working and electrical appliance production increased the service sector, crafts – especially

⁴⁷³ White, Richard (1995): The Organic Machine. (Hill and Wang, New York), IX.

⁴⁷⁴ Pichler, Meinrad (2015): Das Land Vorarlberg 1861 bis 2015 (Universitätsverlag Wagner, Innsbruck), 31,32, 33, 34, 35, 37, 39.

⁴⁷⁵ Pichler, Meinrad (2015): Das Land Vorarlberg 1861 bis 2015 (Universitätsverlag Wagner, Innsbruck), 296.

⁴⁷⁶ Pichler, Meinrad (2015): Das Land Vorarlberg 1861 bis 2015 (Universitätsverlag Wagner, Innsbruck), 297.

woodworking – as well as the tourism sector grew.⁴⁷⁷ Today the economy in Vorarlberg is diversified, highly productive and profitable with a GNP of € 20.716 billion in 2021.⁴⁷⁸

As the economy continued to grow, industry continued to expand and agriculture deepened its path of specialization and intensification, the population went along. The post-war era, the two decades of the 1950s and 1960s, saw the most significant changes to date. In the period from 1961 to 1971 alone we see a population increase of 22.5% (from 226.323 to 277.154). In 2023 the population was estimated at 409.593.⁴⁷⁹⁴⁸⁰ The combination of a booming economy, rising population, newly available widespread motorized personal mobility, and a conservative political hegemony unwilling to invest in social housing projects, lead to an explosion of single family suburban developments completely reshaping the settlement structure of the *New Rhine* valley.⁴⁸¹⁴⁸² The number of privately owned cars increased from a mere 10.000 in 1950 to some 200.000 at the beginning of the 1990s with slight increases since.⁴⁸³ This combination of cars and single housing, in the absence of adequate settlement development plans or other mechanisms safeguarding an economical use of space, led to unchecked growth of settlements eating away at agricultural soils and ecologically valuable spaces at an astonishing rate. This has been demonstrated in chapter 4 and 5.

The same process can be observed in a corollary project of the IRR. The annual flood pulse of *Lake Constance* materializes in a median annual amplitude of 1.6 meters. Exceptionally high floods of up to three meters would reach into *Fußach*. Dreams of banning this annual flood-pulse and draining land for agriculture had been extant since the 1820s.⁴⁸⁴ Finally in the 1950s the construction of an eight-kilometer-long polder dam along the southern shore of *Lake Constance* between the delta of the *New Rhine* in the East and the delta of the *Alpine Rhine* in the West began. The dam was finished in 1963. Pumps now regulate the ground water table

⁴⁷⁷ Pichler, Meinrad (2015): Das Land Vorarlberg 1861 bis 2015 (Universitätsverlag Wagner, Innsbruck), 355.

⁴⁷⁸ Rudnicka, J. (2025): Bruttoinlandsprodukt (BIP) von Vorarlberg bis 2024.

⁴⁷⁹ Statistik Austria (2025): Bevölkerung zu Jahres-/Quartalsanfang.

⁴⁸⁰ Pichler, Meinrad (2015): Das Land Vorarlberg 1861 bis 2015 (Universitätsverlag Wagner, Innsbruck), 353.

⁴⁸¹ Pichler, Meinrad (2015): Das Land Vorarlberg 1861 bis 2015 (Universitätsverlag Wagner, Innsbruck), 305.

⁴⁸² Fillion, Pierre (2015): Suburban inertia. The Entrenchment of Dispersed Suburbanism In: International Journal of Urban and Regional Research Vol. 39 (3), 633-640.

⁴⁸³ Statistik Austria (2024): Kfz-Bestand.

⁴⁸⁴ Aschauer, Maria; Grabher, Markus; Loacker Ingrid (2007): Geschichte des Naturschutzes in Vorarlberg. Eine Betrachtung aus ökologischer Sicht. UMG Berichte 6 (UMG Umweltbüro Grabher, Bregenz) 91.

south of the polder dam. During the summer months the area South of the polder dam lies below the water table of the lake and exclusively receives water through precipitation. This allowed, just as in the rest of the *New Rhine* valley, the expansion of settlements and intensive mechanized agriculture.⁴⁸⁵

Just as with the IRR, the hopes behind this project were a mixed bag of flood protection and productive fields. While the first hope has been managed relatively successfully, the second desire has proven to be evasive. Being cordoned off from the lakes' flood pulse and its alkaline waters, the soils have been acidifying. Agricultural intensification rather than leading to increased yields has been causing the populations of various meadow breeding birds to plummet. Lower ground water tables have been causing the nitrification of peat soils leading to the release of methane. Following the Second World War, several construction projects – some realized, some not – as well as increased pressure from leisure seekers contributed to an increasingly untenable situation.⁴⁸⁶

In 1976, after decades of lobbying by conservation groups, scientific assessments and ecological surveys, struggles with local land users and a disinterested ruling party, a protective bill was issued.⁴⁸⁷ The area became a Ramsar site in 1982 with the federal republic of Austria joining the Ramsar convention.⁴⁸⁸ In 1995 upon Austrias ascension to the EU, the *Rhinedelta* also became part of the Natura 2000 network. The *Rhinedelta conservation* area, at 2.065ha is one of the largest in Vorarlberg. The varied wetland habitat consists in mud flats, shallow waters reeds, humid and dry meadows, swamp forests, and fens. With a median depth of 90 meters, the ecologically most productive parts of the lake with a depth not exceeding two meters are strung along its edges. A significant amount of this habitat is situated in the *Rhinedelta conservation* area. The size of *Lake Constance* acts as a temperature buffer and mitigates winter temperatures. This creates ice-free conditions year-round. The annual flood-

⁴⁸⁵ Aschauer, Maria; Grabher, Markus; Loacker Ingrid (2007): Geschichte des Naturschutzes in Vorarlberg. Eine Betrachtung aus ökologischer Sicht. UMG Berichte 6 (UMG Umweltbüro Grabher, Bregenz) 93.

⁴⁸⁶ Aschauer, Maria; Grabher, Markus; Loacker Ingrid (2007): Geschichte des Naturschutzes in Vorarlberg. Eine Betrachtung aus ökologischer Sicht. UMG Berichte 6 (UMG Umweltbüro Grabher, Bregenz) 94, 95, 97.

⁴⁸⁷ Aschauer, Maria; Grabher, Markus; Loacker Ingrid (2007): Geschichte des Naturschutzes in Vorarlberg. Eine Betrachtung aus ökologischer Sicht. UMG Berichte 6 (UMG Umweltbüro Grabher, Bregenz), 101.

⁴⁸⁸ Grabher Markus, Blum Vinzenz, Farasin, Kurt, Lazowski Werner (1990): Ramsar-Bericht 1. Rheindelta / Marchauen. Bestandsaufnahme österreichischer Schutzgebiete. (Umweltbundesamt Wien, Monographien Band 18), i, 19ff.

pulse creates a condition where the retreating flood waters – from late summer until the snowmelt in spring – cause the water to gradually retreat. Thereby fresh food resources are made available to wintering birds. Consequently, the area is one of the most important wintering sites for birds in Europe.⁴⁸⁹

Through these efforts, the worst can be said to have been avoided. However, the establishment of the *Rhinedelta conservation* area must be understood as a temporary measure freezing the current state of development and land use anno 1976 in order to prevent further rapid degradation. Despite this success, the hydrological conditions continue to deteriorate. In the absence of improvement the area South of the polder dam would, in the foreseeable future, no longer satisfy the criteria of the Ramsar site.⁴⁹⁰ Here, *conservation* really has been limited to the management of extinction.⁴⁹¹ Here we are sadly reminded of beaver managers as *fire fighters*.

According to a 1999 vegetation survey commissioned by the regional government of Vorarlberg, only a quarter of the area South of the polder is still in adequate ecological condition, about the same amount is put to intensive agricultural use (ploughland, meadows, garden;). The rest, some 50% are strongly impacted by dyke and drainage.⁴⁹² The changes in land use, vegetation and species abundance are especially glaring if compared to a 1948 survey, where 70% of the area were occupied by wet meadows compared to 27% in 1989 and 13% in 1999. In contrast, the intensively used area has increased from 1%, in 1948, to 23% in 1999.⁴⁹³

While the *Rhinedelta conservation* area remains an ecologically valuable, albeit rapidly deteriorating patch in the landscape, the *New Rhine* just like the rest of the *Rhine* has fared much worse. Virtually all of the *Rhine's* lowland forests, meadows and marshes have been drained, cut and converted. While the floodplain once formed a single uninterrupted corridor from the source of the *Rhine* to its terminus in Rotterdam, varying in width from a few hundred

⁴⁸⁹ Grabher Markus, Blum Vinzenz, Farasin, Kurt, Lazowski Werner (1990): Ramsar-Bericht 1. Rheindelta / Marchauen. Bestandsaufnahme österreichischer Schutzgebiete. (Umweltbundesamt Wien, Monographien Band 18), 7, 9.

⁴⁹⁰ Steiner, G. M.; Latzin, S. (1999): EU - Life – Projekt Wasserhaushalt Naturschutzgebiet Rheindelta – Ökologische Begleitplanung. Stafpia 85, 595.

⁴⁹¹ Lorimer, Jamie (2015): Wildlife in the Anthropocene. Conservation after Nature (University of Minnesota Press, Minneapolis, London).

⁴⁹² Steiner, G. M.; Latzin, S. (1999): EU - Life – Projekt Wasserhaushalt Naturschutzgebiet Rheindelta – Ökologische Begleitplanung. Stafpia 85, 588.

⁴⁹³ Steiner, G. M.; Latzin, S. (1999): EU - Life – Projekt Wasserhaushalt Naturschutzgebiet Rheindelta – Ökologische Begleitplanung. Stafpia 85, 592.

meters to fifteen kilometers, today less than 500 of the 2300 square kilometers of floodplain remain.⁴⁹⁴ Cioc concludes: *'Straightened streams all tend to resemble one another. They lose their individuality and take on the geometric profile prescribed to them by hydraulic engineers: a canal-like look with evenly spaced banks and a trapezoid-shaped (...).'*⁴⁹⁵ And yet it is precisely the structurally rich character of riparian wetlands, in part created through the annual flood-pulse, in part created by wetland organisms, which forms the basis of the ecological wealth created by riparian wetlands. The shortening of the river, the removal of braids and arms, the amputation of the floodplain through the erection of embankments; each massively reduced the space available to *wildlife* along the river.⁴⁹⁶

The hydrology of the *New Rhine* has been strongly affected by the construction and operation of hydropower plants. The most significant effect of this is hydropeaking, with daily flow variations of 100 m³/s. In addition the storage volume of reservoirs amounts to approximately 10% of average annual discharge, leading to the dampening of annual flow pulse, and increased winter low flow.⁴⁹⁷ The two factors of channelization and hydropeaking shift the character of the river towards a torrential mountain river. Low habitat diversity, high flow variation, turbidity and poor food resources result in severely limited niches. While there are several organism groups that exhibit this state of affairs (Benthic Algae, Macrophytes, Bryophytes, Plankton, Benthic invertebrates, Fish, Amphibians, Reptiles, Avifauna or Mammals) we will focus here on a brief look at Fish. Before the regulation of the Alpine Rhine, 30 species of fish were found. Today the fish population comprises 19 species, 12 of which are considered threatened, and two are introduced. Channelization and hydropeaking have not only led to a decrease in species diversity, and populations (<50 individuals ha⁻¹ and 10 kg ha⁻¹). More suitable habitat can be found in the *Old Rhine*, an oxbow lake, connected to the Alpine Rhine before regulation. Here 28 taxa can be found. 33 fish species appear in *Lake Constance* today, roughly the same amount as at the beginning of the 20th century.⁴⁹⁸

⁴⁹⁴ Cioc, Mark (2002): The Rhine. An Eco-Biography, 1815-2000 (University of Washington Press, Seattle, London), 151.

⁴⁹⁵ Cioc, Mark (2002): The Rhine. An Eco-Biography, 1815-2000 (University of Washington Press, Seattle, London), 167.

⁴⁹⁶ Cioc, Mark (2002): The Rhine. An Eco-Biography, 1815-2000 (University of Washington Press, Seattle, London), 169f.

⁴⁹⁷ Trockner Klement, Robinson Christopher T., Uehlinger Urs (Ed.) (2009): Rivers of Europe (Amsterdam, London, Academic Press), 207, 208, 208, 217, 218, 219.

⁴⁹⁸ Trockner Klement, Robinson Christopher T., Uehlinger Urs (Ed.) (2009): Rivers of Europe (Amsterdam, London, Academic Press), 231.

Lastly, it is important to understand that, despite the -at least partial- failure of concrete projects such as the polder dam along the Southern shore of Lake Constance, we must agree with James Ferguson⁴⁹⁹ that the intentional plans 'are never important "*in quite the ways the planners imagined.*"' Rather: 'the "*unintended outcomes*" of development interventions are comprehensible within circuits of power and control that transcend those of the governments and experts that dominate the development apparatus.'⁵⁰⁰ Thus, despite the failure of many dam projects in terms of narrow project goals, they were nevertheless successful in establishing techniques for managing rivers that ultimately became hegemonic.⁵⁰¹

Let us take stock of our riparian history. In this chapter we have discussed the basic geology, hydrology and ecology of riparian wetlands. In writing the *longue durée* history of the *Alpine Rhine* we have seen how the postglacial river became a *multispecies peasant river*. From the 19th century on we have traced the emergence of the *concrete riparian regime* as an *organic machine* creating *state space* in the service of capital accumulation. During the Cold War, the *concrete riparian regime* expanded globally in what we have called the *concrete revolution*. In the last section we have discussed the unintended consequences of the *concrete riparian regime* as it entered its protracted crisis. While the original dreams of agriculture did not materialize in the case of the *New Rhine*, the space created through the channelization of the *Alpine Rhine* and the control of its watershed became significant political capital for the conservative ruling party. These projects were successful in establishing techniques for managing rivers that ultimately became *hegemonic*. This allowed politicians in Vorarlberg to neglect the construction of social housing or public transport to the benefit of single-family homes and car-centric infrastructure. However, after seven decades, *space* again is scarce. For working people, for farmers and for beavers. To *castorian politics* – indeed to the politics of the *ecological class* – it is crucial to tell this historical legacy of the *concrete riparian regime* and its crisis.

Lastly, it is important to understand that, despite the – at least partial – failure of concrete projects such as the polder dam along the Southern shore of Lake Constance, we must agree

⁴⁹⁹ Ferguson, James (1990): The Anti-Politics Machine. "Development," Depoliticization, and Bureaucratic Power in Lesotho (Cambridge University Press, Cambridge).

⁵⁰⁰ Sneddon, Christopher (2015): Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation (The University of Chicago Press, Chicago, London), 16.

⁵⁰¹ Sneddon, Christopher (2015): Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation (The University of Chicago Press, Chicago, London), 16.

with James Ferguson⁵⁰² that the intentional plans ‘are never important *“in quite the ways the planners imagined.”*’ Rather: ‘the *“unintended outcomes”* of development interventions are comprehensible within circuits of power and control that transcend those of the governments and experts that dominate the development apparatus.’⁵⁰³ Thus, despite the failure of many dam projects in terms of narrow project goals, they were nevertheless successful in establishing techniques for managing rivers that ultimately became *hegemonic*.⁵⁰⁴ These strategies presented wetlands as ontologically and epistemically and politically unruly. Or at least they potentially harbor politically unruly subjects – for example beavers. Capital, the state and empire presented their subjugation of rivers, their wetlands and populations as Progress. *Technocentrist* scientists and engineers, in their service thus remade rivers into *state space*.

⁵⁰² Ferguson, James (1990): The Anti-Politics Machine. “Development,” Depoliticization, and Bureaucratic Power in Lesotho (Cambridge University Press, Cambridge).

⁵⁰³ Sneddon, Christopher (2015): Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation (The University of Chicago Press, Chicago, London), 16.

⁵⁰⁴ Sneddon, Christopher (2015): Concrete Revolution. Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation (The University of Chicago Press, Chicago, London), 16.

6. Beaver managers Water managers

In the previous chapter we learned about rivers as the interface between the earth's crust and climate. We learned about hydrological, geological and ecological processes associated with rivers and their floodplains. In our multispecies history of the *Alpine Rhine* we described this river as a multispecies peasant river. We discussed how the transformations of the 19th and 20th centuries brought about the *concrete riparian regime*.

Through regulating rivers into virtual canals for river navigation, flood control, hydropower production and land reclamation for industrial agriculture, industry, the generation of hydropower and car-centric suburbanization; rivers have been harnessed into *organic machines*. In the emergence of Austria as a *hydropower nation* we were able to observe the convergence of state building, economic development and large-scale environmental transformation. The *Concrete Revolution* demonstrated the imperial effect of the *concrete riparian regime*, implicating Austria in a central aspect of the rupture known as the *Anthropocene*. This process established techniques for managing rivers which today remain *hegemonic*.

Since the post war boom, the *concrete riparian regime* has been maintained through an expenditure of capital, labour, and the political will of conservative parties. At the core of this approach lie the *technocentrist* assumptions of the ontological separation between humans and *Nature*, the innocent claim of scientific knowledge as objective and its equation with progress in a world conceived of as a machine. *Technocentrism* as master identity systematically constructs the other as inferior through the mechanisms of *incorporation*, *hyperseparation*, *instrumentalization*, *homogenization* and *backgrounding*. These processes coupled with the *god trick*, make *technocentrism* suitable to enact the *dream of mastery* in a world configured as machine. In other words, *technocentrism* provides an ideological corollary to the activities of capital, the state and empire. Ultimately the strength of *technocentrism* lies in justifying power over *Nature* and *Society*.

As the *concrete riparian regime* evolved, conservative politicians continued to engage engineers and scientists in service of capital accumulation. They did so through harnessing cheap land, made available by the *concrete riparian regime*, to expand industrial zones and

the creation of car centric suburban housing system. This led to the proliferation of concrete structures especially in former wetlands.

The car centric single-family suburban housing, industrial plants and industrial agriculture ate away at the land made cheaply available through the reclamations of the *concrete riparian regime*. After seven decades, once abundant land has become scarce. This scarcity of cheaply available land manifests in the scarcity of space for *wildlife* as well as in scarcity of *space* for housing. Both find a common denominator in high land prices. As we have seen in the case of the *New Rhine* the transformations the *concrete riparian regime* introduced severely restricted the proper hydrological and ecological functioning of riparian wetlands.⁵⁰⁵ Signs of the looming ecological crisis began to be noticed by the fledgling ecological movement from the 1960s on. In an effort to conserve the most valuable landscape patches where *wildlife flourished* conservationists mobilized against the proliferation of concrete structures.

The rise of the ecological movement and its concern, especially for wetlands, reflects the first organized push-back against the *concrete riparian regime*. Their efforts have been instrumental in demonstrating the costs of the *concrete riparian regime* and the unequal distribution thereof. In the *Anthropocene* these costs have reverted the function of the *concrete riparian regime* from a *hydraulic mode of production* to a *hydraulic mode of consumption*. Consequently, the unequal distribution of the costs and benefits of the *concrete riparian regime*, continue to be derided by the ecological movement. Continued efforts by conservative politicians to expand and further cement the *concrete riparian regime* highlight the political and conflictual character of its crisis.

In their official documents inter- and transnational organizations like the United Nations, or the European Union and even nation states like Austria have acknowledged the crisis of the *concrete riparian regime*.⁵⁰⁶⁵⁰⁷⁵⁰⁸ Although the *Anthropocene* and its consequences are

⁵⁰⁵ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 23.

⁵⁰⁶ Rounsevell, Mark; Fischer, Markus; Amor, Torre-Marín Rando; Mader, André (eds.) (2018): The IPBES regional assessment report on biodiversity and ecosystem services for Europe and Central Asia (Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn.).

⁵⁰⁷ Bundesministerium für Landwirtschaft, Regionen und Tourismus (2022): Nationaler Gewässerbewirtschaftungsplan 2021. (Bundesministerium für Landwirtschaft, Regionen und Tourismus).

⁵⁰⁸ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien).

understood by scientists and acknowledged by nation states, the techniques for managing rivers established in the 19th and 20th centuries despite their shortcomings remain *hegemonic*. In blocking the *resurgence of wildlife*, the *concrete riparian regime* in terms of the language of *ecosystem services* – creates costs hitherto unaccounted for. To illustrate this point, we introduce the notion of a *hydraulic mode of consumption*.

The official discourse at these levels – as we shall see – is dominated by the language of *ecosystem services*. The managerial approach of *ecological modernization*, as discussed in chapter 2, presents the *Anthropocene* and its corollary crises as issues of (ir-)rational resource management. What this approach denies is the inherently political and conflictual character of the *concrete riparian regime*, and the *Anthropocene*, more broadly. The attempt at reforming the *concrete riparian regime*, through *ecological modernization*, in its framing of environmental issues as failures of rational management engages in an effort of *depoliticization*.⁵⁰⁹ While it is tempting to understand the designs of engineers and scientists vis-à-vis rivers like the *Alpine Rhine* merely as ignorant of ecological knowledge, the rationality of their work undeniably subscribed to the goal of capital accumulation, the creation of space and enhancing control of humans and *wildlife*. For this end the displacement of the multispecies relations of the *peasant river* was accepted.

Officially, many environmental organizations as well as scientists have adopted the language of *ecosystem services*. This forms part of a long process wherein the radical environmental movement of the 20th century has been able to channel some of its contentious politics into official channels. Examples of this are the formation of green parties and their subsequent election to regional and national parliaments. The founding of NGOs and the creation of the comprehensive EU *conservation* legislation of the 1980s and 1990s.⁵¹⁰ At the same time this process has been criticized as *cooptation*. Consequently, *ecological modernization* facilitates the continuation of *business as usual* with reforms designed to co-opt ecological dissent.⁵¹¹⁵¹²

⁵⁰⁹ Ferguson, James (1990): The Anti-Politics Machine. “Development,” Depoliticization, and Bureaucratic Power in Lesotho (Cambridge University Press, Cambridge).

⁵¹⁰ Jackson, Andrew L.R. (2018): Conserving Europe’s Wildlife. Law and Policy of the Natura 2000 Network of Protected Areas (Earthscan, New York).

⁵¹¹ Adams, William M. (2001): Green Development. Environment and sustainability in the Third World. 2nd edition (Routledge, London, New York).

⁵¹² Adams, William M. (2004): Against Extinction. The story of Conservation (London, New York, Earthscan).

In chapter 3 we have assembled the *castorian perspective* as an explicit alternative to the *technocentrist common sense* of the *dream of mastery*, the *dream of naturalism* or *ecological modernization*. The *castorian perspective* is composed of the building blocks of an *embodied subjecthood*, a *nonhuman zoomian anarchist*, the economics of *swiddening* and a political ally. This approach has allowed us to historically situate the crisis of the *concrete riparian regime* in the context of the *Beaverocene*. The former is a central part of the rupture of the stable *Holocene* conditions – known as the *Anthropocene* – which allowed human civilization to *flourish*. When beavers came to be socialized as a commodity, they became central to the first wave of European colonization in North America. The fur trade caused ecological, social, political and economic upheavals for beavers as well as indigenous peoples.

Our historical study of the history of beavers, and the *concrete riparian regime*, as well as our adoption of the *castorian perspective* have made it clear that the environmental issues of the *Anthropocene* must be understood in the terms of the *Capitalocene*. Moore argues, *Capitalism* is a project compelling ever greater quantities of work from humans as well as living and non-living things, its goal is accumulation. The *Anthropocene* thus is a crisis of accumulation. Environmental problems, consequently, are not reducible to rational management, they are a political issue.⁵¹³

Landry reminds us of the fact that the term rivalry comes from the Latin word for river: *rivus*, *rivi*. Those who occupy the same river – riparian neighbors – with competing and often mutually precluding claims on the river and its products are '*rivales*' (from *rivalis*, *rivalis*). The modern term for rival and rivalry comes from this Latin root.⁵¹⁴ The Latin origin of this word seems particularly well suited for understanding the crux of the *concrete riparian regime* and its crisis. Mutually precluding claims that compete for the use of a river, and its resources cannot be solved through improved rational management. It is inevitable that some *rivales* and their claims will lose out while others succeed in making their claims.

From the beginning of this thesis we have followed Moore in understanding the *Anthropocene* as a capitalist crisis of accumulation. Environmental problems, consequently, are not reducible to rational management, rather they are a political issue. Therefore, we have argued to

⁵¹³ Moore, Jason W. (2015): *Capitalism in the Web of Life. Ecology and the Accumulation of Capital* (Verso, London, New York).

⁵¹⁴ Landry, Marc D. (2013): *Europe's Battery: The making of the Alpine Energy Landscape, 1870-1955* (Doctoral Thesis, Washington), 224.

conceive of local stakeholders, along riparian wetlands as *rivals* whose claims on the river and its products (partially) mutually preclude each other. In other words the crisis of the *concrete riparian regime* cannot be solved through rational management, but through making hard choices.

At present these hard choices create a situation where beavers are tolerated only as long as they do not disrupt the operations of the *concrete riparian regime*. The key category here is space. Beavers require *space* to forage and build dams. This forces beaver managers to inhibit the *flourishing* of beavers as they are obliged to satisfy other more powerful riparian rivals. In the scarcity of *space* produced by the *concrete riparian regime* beaver managers are confined to *firefighting*. A situation that seems to define well the eternal rearguard actions fought by the ecological movement as it has subscribed to the *dream of naturalism*. However, as I have shown the motivation of beaver managers are neither reducible to a rational calculation of *ecosystem services* or an enactment of the *dream of naturalism*. Rather, their work is guided by an *affective logics of care* for beavers. Beaver managers can be argued to work in accordance with a *common sense* form of what I have called the *castorian perspective*. Nevertheless, as *common sense*, their approach combines the rational calculation of *ecosystem services*, the *dream of naturalism* and the *castorian perspective*. At the same time, the organic intellectuals of the *concrete riparian regime* tend to employ the technocentrist dream of mastery as a narrative strategy to deny the crisis of the *concrete riparian regime*. In doing so they strategically construct beavers as nuisances. In this chapter we will have a closer look at how this operates.

In the following section we will engage with the official documents inter- and transnational organizations like the United Nations, or the European Union and even nation states like Austria in their acknowledgement of the crisis of the *concrete riparian regime*. In our discussion of the plans of the Austrian government to improve riparian management measures as presented in the document ‘*Auenstrategie 2030+*’⁵¹⁵ and ‘*Nationaler Gewässerbeirrttschaftungsplan*’ (NGP)⁵¹⁶ we will see this acknowledgement is confined to a

⁵¹⁵ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien).

⁵¹⁶ Bundesministerium für Landwirtschaft, Regionen und Tourismus (2022): Nationaler Gewässerbewirtschaftungsplan 2021. (Bundesministerium für Landwirtschaft, Regionen und Tourismus).

conception of the *concrete riparian regime* as an issue of (ir-)rational resource management. As such the *hegemonic* techniques of managing rivers established by the *concrete riparian regime* are reproduced. While reforms are enacted, ecological modernization allows for the cooptation of ecological dissent and thereby facilitates reformed business as usual.

In the next section we will discuss four of the interviews I conducted. In the process we will be able to see how exactly the status of beavers as riparian rivals is contested between the state, local stakeholders and beaver managers. The narrative strategies we will encounter in this section are: 1. *Beavers-as-nuisance* 2. *Beavers-as-object-of-conservation* 3. *Beavers-as-ecosystem-engineers* 4. *Beavers-as-allies*. As we shall see each of these narrative strategies respectively is tied to the *dream of mastery*, the *dream of naturalism*, *ecological modernization* and the *castorian perspective*, as *common sense*. I will demonstrate how the mobilization of each narrative strategy corresponds to whether the interviewee in question acknowledges the crisis of *the concrete riparian regime* or denies it.

Concrete Riparian Regime Act III: Crisis

European Wetlands

This issue is not exclusive to the *New Rhine*. The 2018 IPBES report finds that 73% of EU freshwater habitat types show an unfavorable *conservation* status. Lakes, ponds and streams are altered and are disappearing due to agricultural intensification, irrigation and urban development, as well as climate change.⁵¹⁷ Rivers in Europe are among the most heavily regulated in the world.⁵¹⁸ The extent of wetlands more generally has declined by 50% since 1970. More than 75% of catchment areas are heavily modified, with only 53% of rivers and lakes achieving good ecological status as defined under the EU Water directive.⁵¹⁹ Jakubínský et al. estimate 70-90% of floodplain area in Europe to be ecologically degraded due to human activity. The authors furthermore state that this reduces the services provided by riparian wetlands to society. This takes place at a time when the continued escalation of the climate

⁵¹⁷ Rounsevell, Mark; Fischer, Markus; Amor, Torre-Marin Rando; Mader, André (eds.) (2018): The IPBES regional assessment report on biodiversity and ecosystem services for Europe and Central Asia (Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn.), XXXIII.

⁵¹⁸ Jakubínský, Jiří; et al. (2020): Managing floodplains using nature-based solutions to support multiple ecosystem functions and services. In: Wires Water Vol.8, 8.

⁵¹⁹ Rounsevell, Mark; Fischer, Markus; Amor, Torre-Marin Rando; Mader, André (eds.) (2018): The IPBES regional assessment report on biodiversity and ecosystem services for Europe and Central Asia (Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn.), XXXIII.

crisis puts additional strains on an already strained system.⁵²⁰ A situation that is especially troubling as riparian wetlands have been widely recognized as being particularly productive both in ecological terms as well as in terms of an *organic machine*. The interactions between geography, hydrology and biology, as detailed in the previous chapter, make riparian wetlands ecosystems of particular high biodiversity.⁵²¹ Costanza et al. have found them to be the second-best ranked in terms of *ecosystem services* calculated in dollar amounts.⁵²² The IPBES report states:

*'Freshwater biodiversity trends are primarily driven by habitat destruction and modification caused by infrastructure for hydropower, navigation, flood protection, agriculture, urban development and water abstraction; pollution from agriculture and industry; the introduction of invasive alien species and their pathogens; and climate change.'*⁵²³

In a more finely grained analysis Hohensinner et al. looked at 143 rivers in the Alps and found that river straightening has cumulatively shortened these rivers by 510 kilometers. This is equivalent to 4.3% of their pre-concrete extent, with 45% being intensively channeled and only 15% of multi-channel stretches remaining. Overall, large rivers have been modified more intensely than smaller ones.⁵²⁴ In addition, hydropower development which stood at 68% of its potential in Austria, while supplying 57.9% of electricity production in Austria (2020), has put additional pressure on riparian wetland ecosystems.⁵²⁵⁵²⁶

Austrian Wetlands

In the 2023 report on riparian wetlands by the Austrian federal ministry of agriculture, forestry, regions and water management; riparian wetlands are recognized as an important form of

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⁵²¹ Jakubínský, Jiří; et al. (2020): Managing floodplains using nature-based solutions to support multiple ecosystem functions and services. In: Wires Water Vol.8, 2, 4f.

⁵²² Costanza et al. (1997): The value of the world's ecosystem services and natural capital. In: Ecological Economics, Vol.25, 3-15.

⁵²³ Rounsevell, Mark; Fischer, Markus; Amor, Torre-Marín Rando; Mader, André (eds.) (2018): The IPBES regional assessment report on biodiversity and ecosystem services for Europe and Central Asia (Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn.), XXXIII.

⁵²⁴ Hohensinner, Severin; et al. (2021): What remains today of pre-industrial Alpine rivers? Census of historical and current channel patterns in the Alps. In: River Res Applic. Vol.37, 128f, 147.

⁵²⁵ Wagner, Beatrice; Hauer, Christoph; Schoder, Angelika; Habersack, Helmut (2015): A review of hydropower in Austria: Past, present and future development. In: Renewable Sustainable Energy Reviews Vol.50, 305.

⁵²⁶ Hein, Thomas et al. (2023): Research on coupled socio-ecohydrological systems – implementing a highly integrative and interdisciplinary research agenda in the Doctoral School “Human River Systems in the 21st Century (HR21) In: River Research and Applications Vol.40 (9), 4.

'natural capital' providing a range of *ecosystem services*. The riparian wetland inventory has taken stock of a total of 101.132 hectares of riparian wetlands, 62% (63,091 ha) of which are under some form of protection. According to the report 52% of which have a large, 19% a very large and 5% an extraordinary importance to *conservation*.⁵²⁷ The report concludes that, in order to harness riparian wetlands as *natural capital* which provides a range of *ecosystem services*, these wetlands need to be restored. The report states: *'The functionality and productivity of these ecosystems serve society and people, without or little cost (...). In this context one speaks of ecosystem services.'*⁵²⁸⁵²⁹ Approaching riparian wetlands through this lens of *ecosystem services*, the ministry highlights a number of functions such as water and sediment retention, hydrology, river morphology, biodiversity and recreation; as the primary functions which have been reduced and disturbed through the modification of riparian wetlands.⁵³⁰

The explicit goal of the *Auenstrategie 2030+* is to create more riparian wetlands as habitat, increase the connectivity of streams, as well as to improve the distribution and retention of water in the landscape.⁵³¹ The strategy perceives the necessary measures as an integrated planning approach, taking account of: Climate action, Conservation, Wetland ecology, Biodiversity and flood risk management which are understood as equally important objectives:

'All activities and measures in our wetlands under an integral and intersectoral planning approach especially considered climate action (mitigation and adaption), Nature conservation,

⁵²⁷ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 28, 34, 35.

⁵²⁸ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 11.

⁵²⁹ „Diese Funktions- und Leistungsfähigkeit der Ökosysteme dient dem Menschen und der Gesellschaft, kostengünstig oder ohne Kosten zu verursachen (...). In diesem Zusammenhang spricht man auch von ökologischen Dienstleistungen.“

⁵³⁰ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 24, 25.

⁵³¹ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 79.

*aquatic ecology, biodiversity conservation and flood risk management as targets of equal importance.*⁵³²⁵³³

As we stated at the beginning of this chapter, the importance of ecologically functional riparian wetlands has been widely recognized. Considerable efforts have been made to adapt streams to the new requirements. However, this is no easy task, as the combined length of all streams in Austria stands at 32,101 kilometers. According to *Nationaler Gewässerbewirtschaftungsplan* 9,722 kilometers of stream length have been classified as '*signifikant strukturell verändert*' (significantly structurally modified). This amounts to 30.3% of the entire Austrian stream network. More than half of this is found along the larger streams. Morphological changes along streams are mostly due to flood measures, totaling at 14%; settlement, infrastructure, hydropower, shipping and agriculture.⁵³⁴ 44% of surveyed streams do not achieve '*guter ökologischer Zustand*' (good ecological condition) due to these hydromorphological impacts.⁵³⁵

From a legal perspective, improving the condition of riparian wetlands is not merely an issue of *conservation* under the *Habitat Directive*. The *Water Directive*, and the directive on the assessment and management of flood risks also require the ecological improvement of riparian wetlands. According to Jakubínský et al., the legal framework only provides indirect protection and restauration for riparian wetlands. They highlight that achieving protection and restauration of riparian floodplains will require detailed planning and various compromises.⁵³⁶

⁵³² Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 79.

⁵³³ „Bei allen Aktivitäten und Maßnahmen in unseren Auen betrachten wir im Sinne eines integralen und intersektoralen Planungsansatzes vor allem Klimaschutz, Naturschutz, Gewässerökologie, Biodiversität und Hochwasserrisikomanagement als gleichrangige Zielsetzungen.“

⁵³⁴ Bundesministerium für Landwirtschaft, Regionen und Tourismus (2022): Nationaler Gewässerbewirtschaftungsplan 2021. (Bundesministerium für Landwirtschaft, Regionen und Tourismus), 47.

⁵³⁵ Bundesministerium für Landwirtschaft, Regionen und Tourismus (2022): Nationaler Gewässerbewirtschaftungsplan 2021. (Bundesministerium für Landwirtschaft, Regionen und Tourismus), 54.

⁵³⁶ Jakubínský, Jiří; et al. (2020): Managing floodplains using nature-based solutions to support multiple ecosystem functions and services. In: Wires Water Vol.8, 8.

It is important to notice here that the requirements of these directives, as well as their overarching goals in many central respects, overlap with the utopian designs of beavers.⁵³⁷⁵³⁸

The availability of space and monetary resources is essential. In order to improve these conditions and to harness the potential of riparian wetlands, a total of €250 million has been spent in the context of *LIFE* projects from 1996 to 2023 in Austria.⁵³⁹ To put this into perspective, between €250 million and €350 million have been spent on flood management annually over the decade prior to 2022 alone.⁵⁴⁰ An estimate of the funds required in order to achieve good ecological condition along 8,5000 stream kilometers ranges from €2.7 billion to €3.7 billion.⁵⁴¹

Although sufficient funds are slow to materialize, official discourse on the inter- and transnational levels as well as the national levels shows that efforts at reforming the *concrete riparian regime* are underway. The official discourse also reflects an awareness that the *concrete riparian regime* has become a *hydraulic mode of consumption*. However, as the managerial approach of *ecological modernization* seeks to co-opt ecological dissent, the official discourse frames the shortcomings of the *concrete riparian regime* as failures of rational management. The techniques for managing rivers, established in the 19th and 20th centuries, remain hegemonic. Thereby the Austrian state, the EU and the transnational UN community hold on to the technocentrist dream of mastery.

Seen from the *castorian perspective*, it is doubtful whether this approach will be able to address the mutually precluding claims on the river and its products which we have discussed in chapter 3, 4 and 5. Not only are funds for reform slow to materialize, riparian wetlands – and wetlands in general – continue to be assaulted by *conservative politicians* and their

⁵³⁷ *European Parliament (2014)*: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. 20.11.2014.

⁵³⁸ *European Parliament(1992)*: Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

⁵³⁹ *Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023)*: Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 77.

⁵⁴⁰ *Bundesministerium für Landwirtschaft, Regionen und Tourismus (2022)*: Nationaler Gewässerbewirtschaftungsplan 2021. (Bundesministerium für Landwirtschaft, Regionen und Tourismus), 103.

⁵⁴¹ *Bundesministerium für Landwirtschaft, Regionen und Tourismus (2022)*: Nationaler Gewässerbewirtschaftungsplan 2021. (Bundesministerium für Landwirtschaft, Regionen und Tourismus), 219.

engineers as champions of the *concrete riparian regime* in their support for car-centric infrastructure and single-family suburban housing.⁵⁴²⁵⁴³ In a context where capital, the state and empire continue to compel ever greater quantities of work from humans as well as living and non-living things, intensive struggles over the future of the *concrete riparian regime* lie ahead for the *ecological class* and their opponents.

Beaver managers and water managers or, a tale of two cities.

Beaver numbers

As we have seen in the first part of this chapter. The reform of the *concrete riparian regime*, as envisioned by the corpus of official literature examined – even under ideal conditions – will unfold as a marathon rather than a sprint. However, as we have conceived of the *Anthropocene* as a crisis of accumulation it seems unlikely that this transformation will take place under ideal conditions. Our discussion of beavers so far, and in what follows, will make this abundantly clear. Beavers have occupied center stage in this thesis, and they shall continue to do so. In the context of their recent return to riparian landscapes they encounter a riparian regime largely unsuited to their utopian designs. As the capacity of concrete Rivers to perform labor has been stretched beyond its limits, the added demands of beavers on these rivers are immediately and very overtly felt by their rivaless.⁵⁴⁴ Mag. Knapp, beaver manager in Lower Austria, reflected on this point:

‘Yes, so the basic problem that we have with beavers in our human dominated landscapes (Kulturlandschaft) is simply that he had been absent from our human dominated landscape (Kulturlandschaft) for about one hundred and fifty years, and we with our land use, no matter whether agriculture, or settlements, flood management, public infrastructure like sewage pipes; have continuously encroached on the waterbody und these original (ursprünglichen) habitats, which the beaver had claimed in the past along the water, these flood zones, today they are all in use.’⁵⁴⁵⁵⁴⁶

⁵⁴² WWF Austria: 3 Gründe, warum der Lobau-Tunnel keine gute Idee ist.

⁵⁴³ TU Wien (2025): Expert*innen liefern wissenschaftliche Evidenz gegen den Lobautunnel.

⁵⁴⁴ Latin, masculine accusative plural.

⁵⁴⁵ Interview, 03.07.23, 1.

⁵⁴⁶ „Ja also das Grundproblem das wir mit dem Biber in der Kulturlandschaft haben, ist einfach dass der rund Hundertfünfzig Jahre ned in der Kulturlandschaft do war und mir mit unseren Nutzungen, ganz egal ob des jetzt Landwirtschaft oder Siedlungsbau, Hochwasserschutz, öffentliche Infrastruktur wie

Here we are directly confronted with the historic contradiction, and in part tragedy of the *concrete riparian regime*. Firstly, Mag. Knapp recognizes the rupture of the disappearance of beavers. This we have called the rupture of the *Beaverocene*. He further recognizes the effects of the *concrete riparian regime* as an *organic machine* harnessed for the creation of space via the displacement of the previously existing multispecies peasant river.

Such conflicts are particularly noticed by those working for water authorities such as Mag. Schashek⁵⁴⁷, head of the state water authority (*Gewässeraufsicht*) in Lower Austria. In our interview she highlighted what, according to her, were massive and frequent damages to water and water adjacent infrastructure, caused by beavers in Lower Austria. In her role she is responsible for overseeing the maintenance of flood control structures with the goal of preventing floods and ensuring adequate, i.e. rapid runoff of excessive flood waters. From her perspective, beavers create a risk, as their dams can obstruct the runoff of flood waters. Making matters worse, beavers burrow into dams. This in turn reduces their structural integrity.

Mag. Perschl understands the increase in such damages to be a consequence of the protected status of beaver. The strict protection the *Habitat Directive* affords beavers, in combination with an absence of predators, in her eyes has led to this increase. According to her current management approaches, in her eyes they were insufficient, ineffective, inaccessible due to red tape, or too costly. Despite her personal feelings towards beavers as a species – which were quite positive – Mag. Schashek highlighted that these issues were only being exacerbated by an incredibly complex situation where many different interests, necessities and legal matters intersect:

*‘It is a complex situation. And it is only one animal, that’s what I mean, you start turning one wheel (in this complex machine) with the best intentions regarding a complete set of native species, a wonderful idea, a wonderful thought, but this wheel at this point regrettably, because it lacks regulation, or because regulation proves very difficult (...)’*⁵⁴⁸⁵⁴⁹

Kanalwasserleitungen; immer mehr ans Gewässer herangerückt sind und diese ursprünglichen Lebensräume, die der Biber halt früher auch in Anspruch genommen hat entlang vom Gewässer, diese Überflutungsflächen, die sind halt alle de facto heute in Nutzung.“

⁵⁴⁷ The name has been changed.

⁵⁴⁸ Interview, 11.07.23, 11.

⁵⁴⁹ „Es ist komplex. Und das macht ein Tier, das meine ich, es wird ein Rädchen gedreht in der besten Absicht im Hinblick auf Artenauswahl, wundervolle Idee, wundervoller Gedanke, aber dieses Rädchen führt mittlerweile halt einfach, weil hier keine Regulation passiert oder die Regulation sehr schwierig ist (...).“

Given the high total beaver population in Lower Austria (estimates range from 7.747 to 8.920 individuals)⁵⁵⁰, such damages are becoming increasingly frequent as beavers are forced to seek out more and more marginal territories, less and less suitable to them and occupied by an ever-wider array of riparian rivals leading to more conflicts. Mag. Perschl here mobilizes a commonly held misconception about the population dynamics of beavers. The belief is that beaver population dynamics behave like rodents, they increase exponentially, until they crash.

Beaver managers such as Dr. Parz-Gollner, former beaver manager in Lower Austria untiringly stress that beavers are primarily regulated through the territoriality of beavers. In consequence, their numbers are thus intrinsically limited: *‘Well, beaver numbers do not skyrocket. Given an area of a certain size, there will always be a certain maximum population number for beavers. The territoriality of beavers takes care of this. There are no multistory lodges.’*⁵⁵¹⁵⁵² As we have discussed in chapter 3, beyond their territoriality, beavers are regulated due to predation, roadkill and density dependent factors. Finally, Lower Austria has a relatively liberal interpretation of the Habitat Directive and allows for easier and more frequent culling than other Austrian states.⁵⁵³ The official website of Lower Austria also contradicts Mag. Schashek in stating that young beavers fall prey to fish, dogs and fox.⁵⁵⁴

More importantly, Mag. Schashek here suggests an understanding of space as an absolute, rather than a relational category, the availability of which depends on the historical becoming of the landscape. She further refers to the *organic machine* of the river as a complex machine. To conceive of the world as machine is a core component of *technocentrism*. This statement furthermore marks out and makes visible the boundary of beavers being tolerated as objects of *conservation* and being managed restrictively as an increasing nuisance. Consequently this statement deploys the *technocentrist dream of mastery* in an effort to legitimize the status quo of the *concrete riparian regime*. However, this legitimization is based on a false and easily refuted assumption. What remains is the question why Mag. Schashek is unaware of such a

⁵⁵⁰ *Amt der Niederösterreichischen Landesregierung Abteilung Naturschutz* (2023): Europäischer Biber (Castor fiber) - Verbreitung und Bestand in Niederösterreich 2023. (Niederösterreichische Landesregierung, Klagenfurt), 36.

⁵⁵¹ Interview 16.06.23, 10.

⁵⁵² „Also, Biberzahlen wachsen nicht in den Himmel. Auf einer bestimmten Fläche wird es immer nur eine bestimmte Anzahl Biber geben. Das regelt das Reviersystem ab. Es gibt keine Stockbauten.“

⁵⁵³ *Bundesland Niederösterreich* (2023): Gesamte Rechtsvorschrift für NÖ Biber-Verordnung 2019.

⁵⁵⁴ *Land für Naturschutz Niederösterreich: Der Biber*

basic fact. For now we can explain this only through ascribing basic beaver ecology to a *zone of boredom*.

It is true, however, that Lower Austria is home to the largest beaver population of all nine Austrian regions. In 1976 the Konrad Lorenz Institute of Ethology of the veterinary university of Vienna, with the help of the federal Ministry of Education and Science, engaged in efforts to resettle beavers in the Danube-Auen National Park near Vienna. The original beavers were purchased from Sweden. In the following years more beavers would be released. Given that beavers spread along water courses, the Danube and its tributaries have presented beaver with an ideal highway for their reoccupation of habitat. By the mid-1980s the beaver population began to grow rapidly.⁵⁵⁵ This development has been in keeping with the understanding of (re-occupation) and population dynamics as discussed in chapter 3.

The return of beavers has been facilitated by the ecological movement. Like the numerous beaver releases in North America and Europe, the passing of the *Habitat Directive* has been one of the successes of the environmental movement.⁵⁵⁶ Both were consequences of the ecological movements tactic to direct some of its contentious politics into official channels. The EU *Habitat Directive* lists beavers under Annex II and IV affording them the status of strict protection under Article 12, while also requiring the delineation of habitat to be maintained at favorable condition under Article 3.⁵⁵⁷ The increase of the beaver population of Lower Austria as well as the increase of conflicts between beavers and their riparian rivals is a direct product of their release and legal protection. Based on our understanding of the crisis of the *concrete riparian regime*, it is no surprise that their dispersion into ever less suitable habitat leads to an increase in conflicts. Given our discussion of the *technocentrist dream of mastery* and our understanding that beavers, albeit tolerated, are increasingly perceived by capital, the state and local state holders as a costly problem which requires a radical solution. Beaver managers are acutely aware of this. They are, however, also aware that such perceptions are based on a misunderstanding of the ecology of beavers:

⁵⁵⁵ Kollar, Hans Peter; Seiter, Marianne (1990): Biber in den Donau-Auen östlich von Wien Eine erfolgreiche Wiederansiedlung. (Verein für Ökologie und Umweltforschung, Wien).

⁵⁵⁶ Jackson, Andrew L.R. (2018): Conserving Europe's Wildlife. Law and Policy of the Natura 2000 Network of Protected Areas (Earthscan, New York).

⁵⁵⁷ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

*'In Lower Austria we have several thousand beavers, more than in all other states combined. So yes, the pressure naturally is completely different, because what do politicians hear? Especially who yells the loudest, those who are (negatively) impacted. And that's ultimately the result; the beaver god be with us in agriculture and water engineering etc. and is then (perceived) primarily as a nuisance, that somewhere has to be removed.'*⁵⁵⁸⁵⁵⁹

Mag. Knapp here reflects on the position of beaver managers as firefighters. As we have learned in chapter 4, beaver managers – despite relating to beavers through an *affective logics of care* – are caught between a rock and a hard place when it comes to negotiating the interests of capital accumulation, the state and local stakeholders. Mag. Knapp is not alone in lamenting this *technocentrist* knee-jerk reaction to kill beavers.

In a lecture held in November 2019 at the University of Vienna, Bernhard Schön reported that culling often comes to mind as a first response regarding a majority of stakeholders. However, as he argued – given the population ecology of beavers – extraction can have two possible results. Either the newly emptied territory will quickly be occupied by another beaver, and beaver reproduction will be stimulated, or extraction of beavers reaches sufficient heights causing the population to crash. The latter consequence is incompatible with the habitat directive, and the former ineffective at best and counterproductive at worst.⁵⁶⁰ In this respect Bernhard strongly criticized the approach to beaver management adopted by the state of Lower Austria.

While Bernhard generally opposed the culling of beavers as nonsensical, he did participate in two such operations during his time as beaver manager in Upper Austria. What happened? Along the Marchland dam, the largest flood prevention structure in Austria, beavers had dug into the canal, threatening its integrity. A quick solution was necessary and therefore culling made sense. A total of seven beavers were culled over a period of some two months. The beavers were trapped and then executed by a hunter. The hunter in question alerted Bernhard to the presence of a very careful beaver lady, whom he lovingly called „*Big Mamma*“. He also

⁵⁵⁸ Interview, 03.07.23, 2.

⁵⁵⁹ „In Niederösterreich habenma etliche tausend Biber und mehr als alle anderen Bundesländer mitanaunder. Jo. Do is der Druck natürlich auch ganz anders, weil was hören die Politiker? Vor allem, wer schreit am lautesten, die die was davon betroffen sand. Und do kummt am Ende dann raus, der Biber is der Gott sei bei uns der Landwirtschaft und der Wasserbauer etc. und ist primär ein Problemtier, das irgendwo weg gehört.“

⁵⁶⁰ Lecture 29.11. 2022, 33.

remarked that she was impossible to trap. Two months after the cull, beavers were back in the area. According to the hunter, '*Big Mamma*' had returned.⁵⁶¹

All beaver managers I have talked to have expressed a strong discomfort regarding the culling of beavers. It is important to consider their reasons. As we have mentioned, culling can have three outcomes: no effect, a population crash, or an increase in the reproductive rate leading to continuous recruitment. The first consequence has no practical effect on the population. Yet, its lack of efficacy makes such practices difficult to justify to those who require killing to be *respons-able*, without relegating entire categories of beings to the status of being made *killable*. Consideration in this sense is required by the habitat directive. The beaver managers I worked with have a higher ethical standard for beavers. It is their goal to avoid killing beavers whenever possible. The second consequence, a population crash has happened historically because of the fur trade. The widespread disappearance of beavers from Northern Hemisphere landscapes i.e. the rupture of the *Beaverocene* is a partial origin of the *Anthropocene*. It goes without saying that such an approach to beavers is irreconcilable with the habitat directive, the ethical standards of beaver managers or the political goals of the *ecological class*. At the same time many stakeholders entertain such dreams of extermination implicitly like Mag. Perschl, or explicitly like the person from chapter 1. The third consequence finally, is an outcome nobody desires, as it means more beaver culls, no reduction riparian conflicts involving beavers and their rivaless. Rather, the constant recruitment of newly arriving beavers will make their monitoring and management more difficult and less predictable

Mag. Knapp has a slightly different approach to beaver culls than the other beaver managers I have interviewed. He argued that in some areas there was no alternative to culling. The time bought through the culling of a beaver (family) may be relevant, even if beavers would be back soon, even if an increase in the reproductive rate of beavers was the medium-term consequence:

⁵⁶¹ Lecture 29.11. 2022, 39.

*'I have areas where I do not have another choice but to cull. There I must live with it. Even if culling is only a temporary solution, and I basically only buy myself some time, until the next beaver shows up. In some areas I just don't have anything else left to do.'*⁵⁶²⁵⁶³

In this specific instance Mag. Knapp referred to *Marchfeldkanal* and its accompanying flood infrastructure. As required by the *Habitat Directive*, only once the application of less invasive measures have been tried and failed, or if an urgent overriding public interest exists, does culling become an option. To Mag. Knapp – as is the case with other beaver managers – killing beavers is only a last resort in specific cases, after careful consideration. Whenever I have discussed culls with beaver managers the category of *firefighting* has emerged. In this respect, beaver managers tend to reflect on the difficult position they are in. On the one hand their care for beavers and their *flourishing* is genuine. On the other hand the political economy of beaver management requires them to enact compromises between the state, local stakeholders and the accumulation of capital. This often means to actively inhibit the *flourishing* of beavers in their management practices. While beaver managers engage with beavers through an *affective logics of care*, producing a *common sense* form of the *castorian perspective*, the unavailability of space in the landscape remade by the *concrete riparian regime* forces beaver managers to approach beavers as if they were a *nuisance*. What strongly distinguishes the variation between the positions of beaver managers on the issue of beaver culls from the positions of local stakeholders and agents of the state like Mag. Schashek is that these do not engage with beavers through an *affective logics of care*. The result is a *zone of boredom*, or in the terms of *technocentrism*: the active process of backgrounding presented as fact through employing the *god trick*. This systematic *not-noticing*, or rather not knowing about beavers goes hand in glove with the assumption that unruly *wildlife*, just like unruly humans – (non-) *human zoomian anarchists* – are in need of subjugation, domination, control and improvement. In employing the *god trick*, the systematic *not-noticing* is presented as objective fact, requiring the seemingly only reasonable albeit regrettable solution: the legal and practical facilitation of beaver culls.

⁵⁶² Interview, 03.07.23, 12.

⁵⁶³ „Ich hob Bereiche da bleibt mir gar nix anderes über, als zu entnehmen. Da muss ich damit leben. Auch wenn die Entnahme nur eine kurzfristige Lösung ist und ich mir im Grunde Zeit erkaufe, bis halt dann der nächste Biber dasteht. Es bleibt mir eben in gewissen Bereichen einfach nix anderes über.“

Creating space for beavers

All beaver managers fundamentally agree that only the creation of space for beavers can solve the conflicts between beavers and their riparian rivals in the long-term. In the medium-term the adaptation of existing structures, particularly flood infrastructure, is necessary and in the short term continued, caring and competent beaver management is necessary. Mag. Knapp measures the timeframe of this challenge in decades:

‘(...) the ideal solution I see for all streams in Austria would actually be more space for streams left and right of the stream proper (...). All the areas where today we have flood protection structures, which are only earthen dams (flood banks) without adequate beaver safe mesh (sunken welded wire mesh), these structures if one wants to keep them there, they can’t be made beaver safe by tomorrow so these are endeavors which will concern us for the rest of the century.’⁵⁶⁴⁵⁶⁵

The endeavor envisioned here by Mag. Knapp and other beaver managers is not narrowly focused on solving problems between beavers and their riparian rivals. Crucially, a broader set of motivations contribute to this argument. As Dr. Parz-Gollner illustrates:

‘So the beaver in the meantime has become a component of the inventory of our species communities, which would bring unbelievable advantages for our ecosystems, if one would let him. (...) That means, we complain about droughts and about canals that drain too quickly, but the beaver would get just that done, what we with a lot of money, and effort try to artificially build back. The only problem with it is: the beaver needs space for it.’⁵⁶⁶⁵⁶⁷

Bernhard Schön argues:

⁵⁶⁴ Interview, 03.07.23, 2.

⁵⁶⁵ „Also der Biber ist mittlerweile ein Bestandteil des Inventars unserer Lebensgemeinschaften, der unglaublich viele Vorteile für das Ökosystem bringen würde, wenn man ihn ließe. (...) Das heißt, wir beklagen uns über Dürren und über zu schnell abschließende Wasserkanäle, aber der Biber würde genau das erledigen, was wir mit viel Geld, Einsatz, künstlich versuchen, wiederrückzubauen. Das Problem dabei ist nur, der Biber braucht Platz dafür.“

⁵⁶⁶ Interview, 16.06.23, 3.

⁵⁶⁷ „Also der Biber ist mittlerweile ein Bestandteil des Inventars unserer Lebensgemeinschaften, der unglaublich viele Vorteile für das Ökosystem bringen würde, wenn man ihn ließe. (...) Das heißt, wir beklagen uns über Dürren und über zu schnell abschließende Wasserkanäle, aber der Biber würde genau das erledigen, was wir mit viel Geld, Einsatz, künstlich versuchen, wieder rückzubauen. Das Problem dabei ist nur, der Biber braucht Platz dafür.“

*'I mean the massive reason, why, the massive reason why we need to do something for the beaver, is not so much that we have to create habitat for him, like it is the case with other species – but we have already talked about that – but rather that we let him create habitat. And with that we will gain habitat for other forms of organisms, and that in turn will be free. That relativizes the cost, which I may have to expend for a beaver management and compare that to the cost of rewilding streams, which the beaver would rewild more or less for free. Space is what we need, that is the only thing, and it is here where things as a rule do not work out.'*⁵⁶⁸⁵⁶⁹

From these three statements it becomes clear that *space* as a category is overtly present in the ways beaver managers talk about beavers in the present landscape. *Space* here is not conceived of as an absolute category. Rather its abundance, or lack thereof is conceived of as relational. Consequently, *space* is subject to political considerations. To these three beaver managers, and many others, it is clear that the current politics of *space* of the *concrete riparian regime* are not compatible with the *flourishing* of beavers, and the *wildlife* that *flourishes* in *beaver swiddens*. Here we see beaver managers conceiving of beavers as *ecosystem engineers* and even potential allies, not merely objects of *conservation*. As a consequence of their encounters with beavers mediated via the *affective logics* of *care* beaver managers conceive of beavers as potential allies. This is one of the four components (*embodied subjecthood, political ally, nonhuman zoomian anarchist, swiddening*) of the *castorian perspective* as defined in chapter 3. As we have argued, the *castorian perspective* produces an understanding of the rupture of the *Beaverocene* as a central component of the *Anthropocene*. In turn, the riparian rivalry for space makes it impossible to relegate the crisis of the *concrete riparian regime* to a *zone of boredom*, or worse yet to deny it. Consequently, beaver managers are not only very well aware of the crisis of the *concrete riparian regime*, but they are also advocates for its transformation.

⁵⁶⁸ Interview, 13.03.23, 3.

⁵⁶⁹ „I man da massive Grund, warum da massive Grund warum mir für an Biber was mochen müssen, is ned so sehr dass mir eam Lebensraum schaffen müssen wie bei anderen Oarten, was ma jo eh scho gredt hoben, sondern den Lebensraum eam schaffen lassen. Und damit Lebensraum für andere Organismenformen zu bekommen, und des wiederum gratis. Des relativiert die Kosten, die I vielleicht fürs Bibermanagement aufwende und es vergleiche mit den Kosten einer Renaturierung, die da Biber mehr oder weniger dann gratis mitmocht. Plotz brauchma, des is des anzige und an dem scheiterts halt in der Regel.“

While the language employed by beaver managers tends to be influenced by the *technocentrist dream of naturalism* – the *common sense* of traditional *conservation* – there is an implicit mobilization of the language of *ecosystem services* and the concepts of *ecological modernization*. At the same time in these statements we can also find hints of beaver managers conceiving of beavers as *agential subjects* who ultimately cannot be controlled or dominated but can contribute to the designs of the *ecological class* as *allies*. This is a crucial aspect since beaver managers do not exclusively conceive of beavers as objects of *conservation*, ecosystem engineers or allies. They do acknowledge that beavers can cause damages and create costs to capital, the state and local stakeholders. This is an important addendum, as it shows that beaver managers do not romanticize beavers.

However, not everybody sees it this way. Mag. Schashek, for example, doubts whether providing *space* to beavers to the extent of twenty meters on either side of a stream (the number most commonly given in the literature), beaver managers and brochures, would solve the issue of conflicts between beavers and their riparian rivals: *‘Well, to me, the question always is how realistic is something and what is the foundation of this claim 20 Meters?’*⁵⁷⁰⁵⁷¹ This begs the question: indeed what is the basis for this claim? Its basis lies in the systematic, methodical observation and study of beavers by generations of scientists and beaver managers who have shared their knowledge in peer-reviewed journals.⁵⁷² On the basis of which comprehensive books about beavers have been written.⁵⁷³⁵⁷⁴ More accessible mediums, such as a WWF brochure, make this knowledge widely available and easily accessible.⁵⁷⁵ The literature on beavers makes it clear, beavers are a semi-aquatic species who nimbly and swiftly move in water, but are sluggish and awkward on land. This makes them easy pickings for potential predators. Their impacts therefore rapidly decline as the distance to the closest water

⁵⁷⁰ Interview, 11.07.23, 7.

⁵⁷¹ „Also für mich ist immer die Frage, wie realistisch ist etwas und worauf begründet sich so eine Behauptung 20 Meter?“

⁵⁷² Larsen, Annegret; Larsen, Joshua; Lane, Stuart N. (2021): Dam builders and their works: Beaver influences on the structure and function of river corridor hydrology, geomorphology, biogeochemistry and ecosystems. In: Earth-Science Reviews Vol.218, 30.

⁵⁷³ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of *Castor fiber*. Conservation Handbook Series (Pelagic Publishing, Exeter), 56, 80, 88.

⁵⁷⁴ Zahner, Volker; Schmidbauer, Markus; Schwab, Gerhard; Angst, Christof (2020): Der Biber. Baumeister mit Biss (Südost Verlag, Regensburg).

⁵⁷⁵ WWF (2025): Der Biber. Unser Verbündeter in der Klima- und Biodiversitätskrise (WWF), 27.

body increases. This behavior is also in accordance with the optimal foraging theory.⁵⁷⁶ In consequence, although the distance stated in the literature varies from ten to thirty meters – depending on context – it is a robustly established fact beyond reasonable doubt, that the activity of beavers and therefore the potential for conflict decreases to an irrelevant factor within this range.

Beyond doubting the factual veracity of the above ‘claim’, Mag. Schashek assessed proposals envisioning the creation of space for beavers as unrealistic due to legal, financial, political and moral obstacles. Contrary to the sentiment expressed in *Auenstrategie 2030+* as well as *Nationaler Gewässerbewirtschaftungsplan*, the EU water directive; or the positions of beaver managers, the beavers need for space in riparian wetlands does not converge with the interests and goals of water management.⁵⁷⁷⁵⁷⁸⁵⁷⁹ According to her perspective, the interests of beaver managers, beavers and water managers converge only in the case of ‘rewilding’⁵⁸⁰ but not when it comes to managing water more broadly:

*‘Interests converge, if we say, we commit to rewilding (of a stretch of river). But rewilding (Renaturierung) means we seek out areas, which have not yet been built up (or modified), or rather land (in the sense of private property) is necessary for it. And land (in the sense of private property) which is necessary for it, is agricultural land as a rule. Now, (imagine) you have one hundred hectares of agricultural land. Would you give it up? That is the question.’*⁵⁸¹⁵⁸²

Rewilding here is a translation of the word ‘Renaturierung’ and bears little to no resemblance to the concept of rewilding as practiced in the US or by European organizations like Rewilding

⁵⁷⁶ Larsen, Annegret; Larsen, Joshua; Lane, Stuart N. (2021): Dam builders and their works: Beaver influences on the structure and function of river corridor hydrology, geomorphology, biogeochemistry and ecosystems. In: *Earth-Science Reviews* Vol.218, 30.

⁵⁷⁷ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): *Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie*. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien).

⁵⁷⁸ Bundesministerium für Landwirtschaft, Regionen und Tourismus (2022): *Nationaler Gewässerbewirtschaftungsplan 2021*. (Bundesministerium für Landwirtschaft, Regionen und Tourismus).

⁵⁷⁹ European Parliament (2014): Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

⁵⁸⁰ Rewilding here is used as a translation of the word Renaturierung. As such there is no direct relationship with the concept of rewilding as understood in the US and parts of Europe.

⁵⁸¹ Interview, 11.07.23, 7.

⁵⁸² „Die Interessenslage deckt sich, wenn wir sagen, wir gehen in eine Renaturierung. Aber Renaturierung heißt, wir suchen uns Plätze, die halt noch nicht so verbaut sind, beziehungsweise es braucht der Grundbesitz dafür. Und der Grundbesitz, den man dafür braucht, ist Landwirtschaft im Regelfall. Jetzt haben Sie 100 Hektar Landwirtschaft. Geben Sie es her, oder? Das ist die Frage.”

Europe.⁵⁸³ Rather, rewilding (Renaturierung) in the sense used in the context of rivers tends to focus on the amelioration of ecological conditions while maintaining the *concrete riparian regime*. As stated in *Auenstrategie 2030+*, rivers are beginning to be perceived as multi-functional spaces, accordingly, their management is approached through ‘*an integral and intersectoral planning approach*’ (*integralen und intersektoralen Planungsansatzes*) with the interest of taking account of the various rivaling interests along the river.⁵⁸⁴

As has been iterated above, the amount of space that would be required for a beaver friendly riparian transformation is generally given at ten to thirty meters on either side of a stream. To put this into perspective, at a length of 10,000 river kilometers this would amount to an area of 400,000m², a sizeable chunk for sure. The financial, political and legal difficulties involved in such an undertaking are evident in the context of the foregone chapters. As a reminder, at the current pace the adaptation of Austrian streams ensuring conformity with the water directive will take some 260 years until completion. Granted that this transformation of creating space for riparian wetlands would not eliminate all conflicts between beavers and their riparian rivals, the creation of space riparian wetlands has been found to be the most viable solution to the crisis of the *concrete riparian regime*, regardless of whether beavers are present or not.⁵⁸⁵⁵⁸⁶

Furthermore, such measures would create riparian conditions in keeping with the EU *Water Framework Directive*, the *Floods Directive*, the *Habitat and Birds Directive* as well as the EU *Biodiversity Strategy*; in short, the environmental EU legal architecture.⁵⁸⁷⁵⁸⁸ Beyond the existing legal requirement for such riparian adaptations these adaptations would both drastically reduce damages caused by beavers as well as the resources necessary for their management. At the same time such adaptations would drastically increase what the official

⁵⁸³ Hawkins Sally; Convery Ian; Carver, Steve; Beyers, Rene (Ed.) (2023): Routledge handbook of rewilding. (Routledge, New York).

⁵⁸⁴ Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft (2023): Auenland. Das Aueninventar als Grundlage einer österreichweiten Auenstrategie. (Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft, Wien), 79.

⁵⁸⁵ Schindler, Stefan; et al. (2014): Multifunctionality of floodplain landscapes: relating management options to ecosystem services. In: Landscape Ecology Vol.29, 229.

⁵⁸⁶ Muhar, S.; et al. (2016): Evaluating good-practice cases for river restoration across Europe: context, methodological framework, selected results and recommendations. In: Hydrobiologia Vol.769, 5.

⁵⁸⁷ Jakubínský, Jiří; et al. (2020): Managing floodplains using nature-based solutions to support multiple ecosystem functions and services. In: Wires Water Vol.8, 8.

⁵⁸⁸ Hein, Thomas et al. (2023): Research on coupled socio-ecohydrological systems – implementing a highly integrative and interdisciplinary research agenda in the Doctoral School “Human River Systems in the 21st Century (HR21) In: River Research and Applications Vol.40 (9), 2.

language of the state – some scientists, beaver managers and NGOs – calls *ecosystem services* provided by beavers.⁵⁸⁹ How real the monetary effect of beavers can be, has recently been proven by an industrious beaver family in *Czechia*. As stakeholders argued for years about how to ecologically restore a stretch of the *Klabava* river near *Prague*, beavers practically overnight built a damn and created a beaver *swidden*. This saved time, labor and money (some €1.2 Mio), while at the same time circumventing bureaucratic red tape and creating a solution acceptable to all stakeholders. nonhuman zoomian anarchists indeed.⁵⁹⁰ Consequently, rewilding (*Renaturierung*) in this sense is congruent with the goals of *ecological modernization*.

Nevertheless, in her statement Mag. Schashek focuses on extant structures of the *concrete riparian regime* both in a material as well as in a legal sense. The understanding expressed by beaver managers and the official documents cited above, that the *concrete riparian regime* may be in crisis is absent from this perspective. This is a form of denial in support of *business as usual*. In addition, a false dichotomy is created between maintaining the status quo as it is and the complete *rewilding* of riparian wetlands. This statement furthermore *depoliticizes* the crisis of the *concrete riparian regime* in denying the history of land ownership in Austria and its attendant class dimension. I have afforded considerable space to engaging critically with the arguments of Mag. Schashek because her views are emblematic of many riparian rivals in Austria sometimes even beaver managers themselves:

*‘And if the land is my property, the land and the soil, and I have to feed my family, then I will have to work the land so as to be able to do so. And if the beaver enters the equation and floods half my field, I won’t be happy with that, but I will say: the animal has to go, here I have to cultivate my crops.’*⁵⁹¹⁵⁹²

This *hegemonic common sense* narrative strategy invokes an ego. Typically a small-scale family farmer trying to make a living on a small plot of land. This reduces a structural issue to an individualized and moralizing level where a strawman ego is created and pitted against another

⁵⁸⁹ Campbell-Palmer, Róisín et al. (2016): The Eurasian Beaver Handbook: Ecology and Management of *Castor fiber*. Conservation Handbook Series (Pelagic Publishing, Exeter), 20.

⁵⁹⁰ *Der Standard* (2025): Biberdamm spart tschechischen Naturschützern mehr als eine Million Euro.

⁵⁹¹ Interview, 16.06.23,4.

⁵⁹² „Und wenn mir der Grund gehört, der Grund und Boden, und ich eine Familie ernähren muss, dann werde ich dort wirtschaften müssen, sodass ich das erledigen kann. Und wenn mir jetzt der Biber in den Weg kommt und mir die Hälfte des Feldes unter Wasser setzt, werde ich damit nicht zufrieden sein, sondern ich sage, das Tier muss weg, hier muss ich meine Kulturen anbauen.“

strawman, a disinterested often maleficent bureaucratic machine. Erased is the *Anthropocene* as a fundamental rupture.

Erased are also the long-term trends in agriculture where small scale farming operations are disappearing, while a few large-scale operations are growing in size, mechanical, chemical and energy input.⁵⁹³ According to Statistik Austria, there had existed a total of 154,953 agricultural and forestry operations in 2020 at a median size of 44.9hectares.⁵⁹⁴ This is a 50% reduction from 1990, when numbers stood at 281,910 at a median farm size of 31.5hectares.⁵⁹⁵ In addition, the vast majority of the population does not own any land at all. Moreover, the largest landowners are the federal forestry service and the forestry service of the city of Vienna. As this is public land, the question of how it is to be used undeniably is a political question. The vast majority of privately owned land is concentrated into a few formerly aristocratic hands, the catholic church and other wealthy landowners.⁵⁹⁶

Erased are also the already existing mechanisms to acquire land for purposes of overriding public interest, as is the case for the construction of infrastructure projects such as rail, roads or flood management structures.⁵⁹⁷ It is particularly ironic to be confronted with this narrative device whenever measures are considered when the designs of the *ecological class* for a livable planet are at stake, while actually existing small scale farmers face a disinterested often maleficent bureaucratic machine hell bent on disappropriating their land in order to construct expensive car infrastructure despite massive resistance from civil society and well-founded concerns as to their costs and benefits.⁵⁹⁸⁵⁹⁹

Erased are the various measures possible to balance out the private interest of a landowner, with the public interest. These include the purchase of land, the exchange of land, or the payment of an annual subsidy in the context of treaty-based *conservation*

⁵⁹³ Weiss, Hans (2010): Schwarzbuch Landwirtschaft. Die Machenschaften der Agrarpolitik (Deutcke, Wien).

⁵⁹⁴ Statistik Austria (2020): Agrarstrukturhebung. Land- und forstwirtschaftliche Betriebe und deren Strukturdaten. Endgültige Ergebnisse. (Statistik Austria, Wien), 14.

⁵⁹⁵ Statistik Austria (2013): Agrarstrukturhebung. Land- und forstwirtschaftliche Betriebe und deren Strukturdaten. Endgültige Ergebnisse. (Statistik Austria, Wien).

⁵⁹⁶ trend. (2023): Österreichs größte Grund- und Waldbesitzer.

⁵⁹⁷ Bundeskanzleramt der Republik Österreich (2025): Gesamte Rechtsvorschrift für Eisenbahn-Enteignungsentschädigungsgesetz

⁵⁹⁸ WWF Austria: 3 Gründe, warum der Lobau-Tunnel keine gute Idee ist.

⁵⁹⁹ ASFINAG: S1 Wiener Außenring Schnellstraße: Schwechat bis Süßenbrunn

(*Vertragsnaturschutz*).⁶⁰⁰⁶⁰¹ Last but not least erased is also the fact that agricultural land is melting away, as it continues to be rezoned for housing purposes. With land for housing being scarce, land prices are rising. Zoning powers are held by township mayors. Their close proximity to landowners, and their interest in re-election are powerful tools incentivizing the conversion of agricultural land into housing. Rezoning agricultural land can turn an indebted farmer into a multi-millionaire overnight.⁶⁰²

Beyond this operation of the *god trick* we again observe the operations underlying the construction of the *master identity technocentrism*. We can observe how the similarities between farmers and beavers in their relation to a multispecies world and a *livable planet* as well as the state and capital accumulation are minimized while their differences are exaggerated in *hyperseparation*. The land – as underside – is the *instrument* of the master while beavers are *homogenized* into *Nature* and therefore must submit to control. As part of the rest, beavers require little to no moral consideration once they become unruly. The context of the *Anthropocene* is systematically *not-noticed* through the operation of *backgrounding*. This narrative device consequently upholds the *dream of mastery* while simultaneously *depoliticizing* the crisis of the *concrete riparian regime* and presenting itself as objective fact by making use of the *god trick*.

Through the mobilization of this narrative strategy several crucial aspects are erased which can only be made visible through thorough historical situating practices as we have practiced in the course of this chapter. Hence, from the *castorian perspective* – which we have composed in an encounter between the ecological literature on beavers and anthropological work on ecology, indigenous people and beavers – we can confidently argue that this move erases the rivalry for space in riparian wetlands and the history of the *concrete riparian regime*. Thus we can situate the scarcity of space mobilized in such statements as a consequence of *hegemonic* conservative politics which support the production and consumption of space of the *concrete riparian regime*, in an alliance with the accumulation of capital. This global process has produced the *Anthropocene* as a rupture which today endangers the designs of the *ecological class* for a *livable planet*. Briefly put this narrative device employs denial as a strategy as it seeks to uphold the status quo in support of business as usual. The mobilization of this strategy

⁶⁰⁰ *Naturschutzbund Österreich*: Naturfreikauf-Aktion rettet Lebensräume.

⁶⁰¹ *Bundesland Niederösterreich (2015)*: NÖ Naturschutzgesetz 2000.

⁶⁰² *Weiss, Hans (2010)*: Schwarzbuch Landwirtschaft. Die Machenschaften der Agrarpolitik (Deutcke, Wien).

by Mag. Schashek and Dr. Parz-Golnner, two riparian rivals who have few agreements when it comes to their relationship with beavers – suggests that this narrative device is an important pillar of the environmental *common sense*. It shows that the ecological movement continues to operate on a *common sense* which inhibits their political goals.

Another strategy commonly employed to delegitimize beavers is to reduce beavers to a species of aesthetic importance in a more or less complete assemblage of native species, as quintessential objects of *conservation*. This view, while denying the relevance of their *world-making* to *wildlife*, humans and rivers makes it possible to narrowly focus on their absolute population numbers and the costs they create through damages and management efforts:

‘I mean the population is at least twice as high as necessary to achieve a good status of conservation. The beaver has no enemies (Feinde) and as a consequence we have encounter massive damages in water management (Wasserwirtschaft). (...) So due to the Beaver, as wonderful as he is, I myself am a biologist, (...), as fascinating as that animal is, as large are the conflicts when it comes to water and its management (Wasserrechtliche Nutzungen).’⁶⁰³⁶⁰⁴

I believe this statement to be unmasking as to the true motivations of Mag. Schashek. Here it becomes clear that what we have believed to be a *zone of boredom* is revealed to be more of an intentional form of denial. If Mag. Schashek had a different professional background than being a biologist she might be excused for not knowing basic facts about the biology and ecology of beavers, or to not being familiar with the basic ecological theories contextualizing the conflicts between beavers and their rivals. Against this background however, it becomes clear that Mag. Schashek, in the interview I conducted with her has acted as an *organic intellectual* of the *concrete riparian regime* whose purpose is to give it a semblance of legitimacy.

Denying a relational world

I am sure it has become clear to the reader that beavers not only face the material obstacles of the *concrete riparian regime*, but they are also opposed in the realm of discourse. The

⁶⁰³ Interview, 11.07.23, 2, 3.

⁶⁰⁴ „Also wir sind ja Minimum über das Doppelte vom Erhaltungszustand. Der Biber hat keine Feinde und damit haben wir massive Schäden in der Wasserwirtschaft. (...) Also durch den Biber, so großartig es ist, ich bin selber Biologin, (...) , so faszinierend dieses Tier ist, so groß ist der Konflikt bei wasserrechtlichen Nutzungen.“

disagreements about beavers are rooted in the contested status of beavers in terms of ontology, epistemology, ecology, political economy, and society. The positions on beavers we have encountered in this context are: *beavers-as-nuisance*, *beavers-as-objects-of-conservation*, *beavers-as-ecosystem-engineers* and *beavers-as-political-allies*.

As we have discussed presenting beavers as nuisance corresponds to the *technocentrist dream of mastery* operating as a legitimizing force for the *concrete riparian regime*. Presenting beavers in this way serves to deny the crisis of the *concrete riparian regime* in support of the status quo. Preexisting conflicts between riparian rivals can thereby be displaced onto beavers who come to be categorized as unruly, requiring domination and control. The *god trick* relegates ecological knowledge about beavers to a *zone of boredom*.

Framing beavers as objects of *conservation* reduces beavers to inventory in a more or less complete species list in the *dream of naturalism* which is itself an inversion of the *technocentrist common sense*. This approach makes it possible to reduce beavers to their population numbers and costs to capital, the state and local stakeholders. This makes it possible to sidestep the riparian conflicts of the crisis of the *concrete riparian regime*. It consigns the relational *world-making* abilities of beavers, and the rupture of the *Beaverocene* to a *zone of boredom*.

Organic intellectuals of the *concrete riparian regime* ontologically present beavers-as-nuisance whose population increase is out of control, causing massive economic damages. They narrate beavers as an object of aesthetic quality, whose economic cost far outweighs the potential ecological or economic benefits along a concrete river. The ontological status as nuisance precludes serious ethical considerations of beavers as a *respons-able companion species* that This makes it permissible to manage their population through extraction, i.e. to make them *killable*.

The previous two paragraphs directly feed into the question of creating space for beavers in the face of the crisis of the *concrete riparian regime*. If the beaver population is too high, if the damages incurred through their activities are too costly, and if their value merely lies in the aesthetic quality of a complete native species assemblage. Indeed, it becomes difficult to legitimize the re-engineering of entire riparian landscapes. If this perspective on beavers is coupled with the denial of the crisis of the *concrete riparian regime* as well as the climate crisis altogether, it becomes possible to represent the *concrete riparian regime* as stable and

desirable, a *hydraulic mode of production*, rather than a *hydraulic mode of consumption*. Faced with such rivals, beavers as well as beaver managers will find it difficult to enact their designs for a livable planet.

An understanding of beavers as *ecosystem engineers* aligns well with a reformist ethos of *ecological modernization* and the language of *ecosystem services*. While such an understanding of beavers allows for a partial acknowledgement of the crisis of the *concrete riparian regime*, it maintains the core *technocentrist* assumptions that beavers, just as *wildlife* more generally are *instrument*, *separate*, *underside* and *background*. At the same time this approach maintains the understanding that the *Anthropocene* is a consequence of irrational management of resources, in a move to *depoliticize* the crisis of the *concrete riparian regime*.

Lastly, beavers as allies aligns best with the discourse of the beaver managers I have talked to. This understanding of beavers is the most compatible with the *castorian perspective* as we outlined it in chapter 3. Out of these four ways of talking about beavers, this is the only approach which sufficiently situates the conflicts of beavers and their riparian rivals in the history of the rupture of the *Beaverocene*, the emergence and crisis of the *concrete riparian regime* and the *Anthropocene*. Understanding beavers as allies with *subjective agencies* allows for the kind of *care* for beavers and *wildlife* necessary to realize the *ecological class* designs for a *livable planet*.

Beaver managers, as we see here have a nuanced view of beavers, their abilities as well as their potential for causing nuisance and damages. The approach that beaver managers follow, in attempting to diffuse potential conflicts, to negotiate an acceptable compromise between capital, the state, local stakeholders and beavers, is however only a temporary solution. Beaver managers are aware of this, and all argue that beavers need *space*, not just for themselves.

The ontology of beavers-as-ecosystem-engineers, or beavers-as-political-allies whose population is self-regulating, with both considerable long-term economic and ecological benefits accruing to the state, stakeholders and civil society on the landscape level, necessitates serious ethical considerations of beavers as *companion species*. This arguably complicates their management and shifts the focus from *wildlife* management to the political economy of the *concrete riparian regime*. Mobilizing the narrative of *beavers-as-allies* and *beavers-as-ecosystem-engineers* highlights the need for structural changes along the rivers of Austria, for beavers, humans and other *wildlife*.

This project, however, inadvertently puts beaver managers up against powerful and well-organized interests who, in some cases, show a studied disregard for knowledge-based problem solving. In addition, beaver managers so far continue to mobilize various narrative strategies of the environmental *common sense*, particularly when it comes to the ownership of land and its availability. The political implications of conceptualizing beavers-as-allies ultimately is a logical consequence of the affective logics through which beaver managers engage with beavers. This step, however, so far exceeds not only the professional purview of beaver managers but also supersedes their training and education as scientists. This shows the limitations of the *technocentrist* dream of *naturalism* for realizing the designs of the *ecological class*

7. Conclusion

From the beginning of this thesis I have situated my motivations within the diagnosis of the *Anthropocene*. This crisis not only ruptures earth system relations, but it also ruptures the relationship humans have to the earth system – materially as well as epistemically. Part of the crisis of the *Anthropocene* is the difficulty it poses to our understanding of it. I have made the argument that the *dualist modern ontology* and the *technocentrist common sense* it produces are wholly inadequate when it comes to understanding or counteracting this crisis. Beyond this I have made the claim that both have emerged as a corollary of the emergence of *capitalism* and the *scientific revolution*. As such they have been instrumental in legitimizing the kind of power over humans, and *wildlife* identified to be at the root of the *Anthropocene*.

Consequently I have argued that the *Anthropocene* at its core is a crisis of *accumulation*. The goal of this thesis has been to contribute to the reconceptualization efforts required in the face of the *Capitalocene*. The *ecological class*, defined through a shared concern for the environmental concerns the *Anthropocene* presents, has so far not been able to enact their designs for a *livable planet*. I have identified a struggle over *hegemony* in the Gramscian sense as a key component holding back the *ecological class*. The *technocentrist common sense*, drives a wedge between the two camps of the *ecological class*.

This conflict is rooted in the concept of *wilderness* which creates a spatialization and temporalization of *conservation nature*. It turns the *dream of mastery* on its head. In the dream of naturalism human progress and control are conceived of as destructive of *Nature*. To preserve *Nature* it must be separated from humans. The formula goes: people out, *Nature* in. Just like the *dream of mastery*, the *dream of naturalism* legitimizes authoritarian top-down intervention. In the context of *Fortress Conservation* it served to legitimize the violent displacement and dispossession of indigenous peoples in the 19th century through the normative enforcement of an epistemologically necessary *ontological hygiene*, in many cases *conservation* continues to do so today.

However, as we have seen in the course of this thesis, particularly in chapters 2, 3 and 5 humans have been an integral part of a *multispecies* world for millennia. In this light the demarcation of *conservation* in space and time and the reduction of permissible roles of humans to tourism, science, and management understandably have forced people in the

global South into resistance against *conservation* perceived as another colonizing form of land use. Consequently much of the social science literature on *conservation*, particularly from the Marxist school has focused on this blind spot of *conservation*.

This reflects a core disagreement between the two camps of the *ecological class*. It stems from different institutional, epistemic, disciplinary and anthropological commitments which ultimately produce different conceptualizations of the *Anthropocene*. The modern compartmentalization of knowledge wherein the sciences cover *matters of fact*, while the social sciences cover *matters of concern*, are a central impediment to the *ecological class* and its designs for *hegemony*, and ultimately a livable planet.

The theoretical production and conceptualizations of this thesis have been intended to contribute to the reconciliation of the green and red camps of the *ecological class*. In chapter 2 of this thesis I engaged with *new materialist* ontology, epistemics and ethics. The intent was to construct an embodied perspective from where it is possible to know well a multispecies world in which humans and *wildlife* become in intimate and mutually constitutive relationships. We conceived of the subjective agencies of wildlife as *world-making* and argued that multispecies landscapes emerged when the *world-making* projects of *wildlife* and humans overlap. Landscapes are a result of a symbiogenetic and relational becoming of *wildlife* and humans wherein both are imbued with agency. *World-making* causes *disturbance* but also allows for *resurgence*. Living, killing and dying are essential to life.

I argued that to know well requires one to acknowledge one's own embodiment, one's historical situatedness and *non-innocence* in a world characterized by living, killing and dying. In such a *wicked* world, knowledge perforce remains conflictual and incomplete and always open to new partial relations. This stands in opposition to the *god trick* of *technocentrist* knowledge. Acknowledging the irreducible wickedness of the world and the integral character of living killing and dying we have explored what it means to live, kill and die well. The issue of killing becomes one of *killing responsibly*, with *care* and consideration while avoiding making entire categories of beings *killable*. *Caring for wildlife* means remaining curious and learning what they need and to know more at the end of the day than at the beginning, while remaining in a state of *indigestion*.

In an attempt to reconcile the green and red camps of the ecological class I consequently argued that conservationists engage with *wildlife* through an *affective logics of care*. What this

looks like we explored in chapter 4 and 6. At the same time I argued that it is the epistemic commitments to *technocentrism* which require conservationists to downplay these *affective logics of care* in their official accounts. They do so by engaging the *god trick*. As a consequence the affective logics of care remain *common sense* and have so far not been formed into a *buon senso*.

In chapter 3 I engaged in an effort to make a contribution to this by composing the *castorian perspective*. The ecological and management literature on beavers makes clear that scientists, and beaver managers care for beavers enough to dedicate their lives to their study and *conservation*, they are indeed curious to know more about beavers at the end of the day. However, their epistemic commitments lie with the dream of naturalism. I therefore engaged the ecological literature on beavers with anthropological work on indigenous people, ecology and the environmental history of empire. From this emerged the *castorian perspective* as an understanding of beavers as *embodied subjects*, as *nonhuman zoomian anarchists*, as political allies and as *swiddeners*.

As we harnessed the *castorian perspective* to a reexamination to the historical relations of beavers and humans it soon became clear that beavers once had a larger global impact on the earth system than humans. Consequently beavers were an important – possibly the most important as far as wildlife is concerned – part in the multispecies ecologies that contributed to the stable Holocene conditions under which human civilization flourished. To illustrate the magnitude of their impact on the earth system I coined the term Northern Hemisphere Beaverocene. At the same time this perspective also made it possible to examine the relations between humans and beavers in the context of the fur trade. I argued that the fur trade formed an integral part of the *biological Anthropocene* and was a temperate zone counterpart to the *Plantationocene* within the *Capitalocene*. The almost extinction of beavers means that their impact on the earth system virtually disappeared. Creating the conditions for a resurgence of beavers therefore must be a central component of the *ecological classes* designs for a livable planet. In other words, no beavers, no *livable planet*.

In my discussion of beaver management as practiced by Agnes Steininger – in chapter 4 – I examined how beaver managers relate to beavers through an *affective logics of care*. I argued that this *affective logics of care* produces a *common sense* understanding of beavers akin to what I have described as the *castorian perspective*. However, as the status of beavers remains

contested in the Austrian landscape beaver managers are preoccupied with attempting to maintain the precarious status of beavers as a tolerated species under legal protection. This forces beaver managers to engage in *firefighting*, where they must negotiate compromises between capital, the state, local stakeholders and beavers. Given a scarcity of *space* beaver managers are forced to inhibit the *flourishing* of beavers. This structure reinforces the necessity of beaver managers to recur to the *dream of naturalism*, while downplaying their *affective logics of care* for beavers. As a result the formation of something akin to the *castorian perspective* in the *buon senso* composed in this thesis is blocked.

In an attempt to explain this scarcity of space as relational rather than absolute, I discussed the history of the *Alpine Rhine* in chapter 5. I again combined the registers of the social and natural sciences in order to write a multispecies history. In doing so I discussed the basic geology, hydrology and ecology of riparian wetlands generally and the *Alpine Rhine* in particular. In doing so we saw how the *Alpine Rhine* became harnessed as a *multispecies peasant river* until well into the 19th century. From the 19th century onwards we observed the regulation of the *Alpine Rhine* and its transformation into the *New Rhine*. We argued that this transformation occurred in accordance with the logic of accumulation, nation building the rise of hydropower and later Cold War development. These processes brought forth the *concrete riparian regime* and its global proliferation. As it emerged the *concrete riparian regime* transformed riparian wetlands into *organic machines* harnessed for the production of space, hydropower, the control of water and people. It was conceived as a *hydraulic mode of production*. In the course of its emergence techniques of managing rivers which remain *hegemonic* today were established.

Since the post war boom, the *concrete riparian regime* has been maintained through an expenditure of capital, labour, and the political will of conservative parties. At the core of this approach lie the *technocentrist* assumptions of the ontological separation between humans and *Nature*, the innocent claim of scientific knowledge as objective and its equation with progress in a world conceived of as a machine. As the *concrete riparian regime* evolved, conservative politicians continued to engage engineers and scientists in service of capital accumulation. They did so through harnessing cheap land, made available by the *concrete riparian regime*, to expand industrial zones and the creation of car centric suburban housing system.

This led to the proliferation of concrete structures especially in former wetlands. After seven decades, once cheap and abundant land is now scarce and expensive. This scarcity of cheaply available land manifests in the scarcity of space for *wildlife* as well as in scarcity of *space* land use forms not sanctioned by the *concrete riparian regime*. As I demonstrated with regards to the *New Rhine* the *concrete riparian regime* severely impedes the proper ecological and hydrological functions of riparian wetlands. The ecological movement has been mobilizing against the *concrete riparian regime*, its consumption of space and the proliferation of concrete structures since the 1960s. Today the *concrete riparian regime* stands in the way of the designs of the *ecological class* for a *livable planet* as it is a primary contributor to the crisis of the *Anthropocene*. As such the *concrete riparian regime* has become a *hydraulic mode of consumption*.

Despite ongoing efforts by capital and conservative politicians to maintain and expand the *concrete riparian regime*. In their official documents inter- and transnational organizations like the United Nations, or the European Union, and even nation states like Austria have acknowledged the crisis of the *concrete riparian regime*. This acknowledgement however is only partial as it is limited to *ecological modernization* while maintaining the *hegemonic* techniques of managing rivers. This approach denies the inherently political and conflictual character of the *concrete riparian regime*, and the *Anthropocene*, more broadly.

However my historical study of the history of beavers, and the *concrete riparian regime*, as well as my elaboration of the *castorian perspective* have made it clear that the environmental issues of the *Anthropocene* must be understood in the terms of the *Capitalocene*. Consequently, the crisis of the *concrete riparian regime* ultimately is a crisis of *accumulation* and therefore inherently political. Beavers, the state, capital and local stakeholders therefore must be understood as riparian rivals with partially mutually preclusive claims on the river and its products. I argued that this crisis can only be resolved by making hard choices.

In my discussion of the four interviews I conducted, transcribed and analyzed for this thesis, I demonstrated how beavers are not merely opposed by the concrete structures of the *concrete riparian regime*, but also in the realm of meaning making. These disagreements are rooted in the contested status of beavers in terms of ontology, epistemology, ecology, political economy, and society. The narrative devices we encountered were *beavers-as-nuisance*, *beavers-as-objects-of-conservation*, *beavers-as-ecosystem-engineers* and *beavers-as-allies*. I

demonstrated how the different ways of narrating beavers directly relate to whether or not the narrator acknowledges or denies the crisis of the *concrete riparian regime* and more broadly the *Anthropocene*. As I made the case, the first two narratives of beavers allow for a denial of this crisis and can serve to legitimize the status quo. At the same time this strategy displaces the causes of riparian conflicts onto beavers and turns them into scapegoats. The latter two narratives require an acknowledgement of the crisis of the *concrete riparian regime* and logically require the person in question to present potential solutions to this crisis. As a result these narrative devices are intimately linked to the struggle for *hegemony* in the *Anthropocene*.

At the end of this thesis it is now time to take stock and reflect on what we have learned. At the very beginning of this thesis, at beaver bridge I introduced the *dream of mastery* and the *dream of naturalism* as the two dominant forms of relating to the environment in the global North. I argued that neither are conducive to the designs for a *livable planet* of the *ecological class*. I explained how both form part of the *technocentrist common sense* which itself serves to legitimize control over people and *wildlife*. In order to enact the *ecological class's* designs for a *livable planet* we as the *ecological class* must engage in the formation of an ecological *buon senso*.

I believe that my construction and application of the *castorian perspective* to the historic relations between humans and beavers forms an important contribution to these efforts. Based on my experiences with beaver managers I know that this way of understanding beavers resonates with those who are familiar with beavers even across the great divide between the natural and social sciences. In fact the *affective logics of care* through which beaver managers relate to and engage with beavers inspired me to develop this *common sense* into the *buon senso* of the *castorian perspective*. In this respect I have merely provided the finishing touches of this theory. It is my sincere hope that this concept will prove to be fruitful to beaver managers and scientists engaging with beavers as allies.

Struggles over meaning are a key component of the *Anthropocene*. This is a direct consequence of the epistemic shock the realization of the *Anthropocene* has caused. At the same time the deliberate effort by the opponents of the *ecological class* to hunker down into a denial of this crisis (of the *concrete riparian regime*) intensifies the complexity of these struggles over meaning. The disagreements as to what beavers are which we have

encountered in this thesis directly reflect these deeper structural issues. In dissecting what motivates the mobilization of different narrative strategies and how they are connected to historical processes of oppression, I hope to have provided some clarity. At the same time I'm cognizant of the fact that the project of pulling the wedge separating the green and red camps of the *ecological class* will continue to pose a difficult task. However, I hope that some members of the *ecological class* from both camps will find my work helpful in stimulating their thoughts and future conversations.

While I believe this thesis to be an important contribution, a word of self-critique is necessary as I take stock of my work. Despite its great length this thesis remains limited in depth and detail. A further point of critique is that my study of the *concrete riparian regime* and its *organic intellectuals* remains limited. In order to achieve true saturation as envisioned by the GTM methodology I would have had to conduct more interviews. The same goes for the limited number of riparian rivals I have interviewed. In addition the theoretical insights of this thesis remain incomplete. This especially so as I would like to deepen the usefulness of the *castorian perspective* by further elaborating the alliance envisioned between beavers and the *ecological class* as a *gift exchange* along the lines of the anthropological literature on this topic.

A brief sketch of what I envision in a future projects on beavers would be the following. As beavers cannot be controlled, neither is such control desirable we must engage with them through means of diplomacy. Anthropologists have argued that the exchange of gifts establishes and strengthens social bonds between different groups, who others wise might violently engage with one another. The exchanges in the Middle Ground of the fur trade, between indigenous peoples and colonizing Europeans, were embedded in social, cultural and political worlds. In the same way we may begin to envision our relationship with wildlife such as beavers as a social relation mediated through the exchange of gift. What would be exchanged? The ecological class provides beavers with space. Beavers in turn provide the ecological class with a contribution to a livable planet. If we remember the Beaverocene this gift exchange has existed once before, but gave way to violence, and extermination. In the 21st century we may find ways of reestablishing peaceful relations with beavers. In this sense I would like to conclude this thesis with a rallying cry for the *ecological class* in our political and intellectual endeavors. As I have demonstrated in this thesis it is an imperative to create space for and with *wildlife* on this damaged planet: ***Beavers over Concrete!***

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