



MASTERARBEIT | MASTER'S THESIS

Titel | Title

The Birth of Eco-Biopolitics
Bringing Biodiversity into Governance

verfasst von | submitted by
Sara Aref Zahed BSc BA

angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of
Master of Arts (MA)

Wien | Vienna, 2026

Studienkennzahl lt. Studienblatt | Degree
programme code as it appears on the
student record sheet:

UA 066 824

Studienrichtung lt. Studienblatt | Degree
programme as it appears on the student
record sheet:

Masterstudium Politikwissenschaft

Betreut von | Supervisor:

Mag. Dr. Sergej Seitz BA MA

Zusammenfassung

Zeitgenössische Umweltgovernance erstreckt sich zunehmend über den Menschen hinaus und umfasst mehr-als-menschliches Leben sowie ökologische Systeme. Dennoch bleiben klassische biopolitische Ansätze weitgehend anthropozentrisch und unzureichend, um zu analysieren, wie Biodiversität, Ökosysteme und ökologische Prozesse zu Gegenständen der Governance werden. Aufbauend auf Foucaults Konzept der Biopolitik und unter Einbeziehung von Erkenntnissen der Actor-Network-Theory und der politischen Ökologie entwickle ich das Konzept der Öko-Biopolitik als analytischen Rahmen, um zu verstehen, wie ökologisches Leben unter Bedingungen ökologischer Krisen regierbar wird. Meine zentrale These lautet, dass Governance nicht direkt auf 'Leben' einwirkt, sondern es durch Prozesse der Quantifizierung, Kategorisierung und Institutionalisierung in Biodiversität als regierbaren Stellvertreter übersetzt. Mein Konzept ist entlang zweier Dimensionen strukturiert – Ontologien und Rationalitäten – und identifiziert fünf zentrale Rationalitäten: Sicherheit, Risiko, Optimierung, Nachhaltigkeit und Resilienz. Darüber hinaus führe ich den Öko-Biopolitischen Kompass als vergleichende Heuristik ein, um Umweltgovernance-Arrangements anhand ihrer zugrunde liegenden Naturontologien und Grade der Biodiversitätsinstitutionalisierung zu verorten. Als empirische Fallstudien dienen mir das Nature Restoration Law der EU und die ecuadorianische Verfassung, wodurch kontrastierende öko-biopolitische Konfigurationen sichtbar werden. Öko-Biopolitik erweist sich damit als notwendige analytische Perspektive zum Verständnis von Umweltgovernance unter Bedingungen ökologischer Krisen, in denen Macht zunehmend durch das Management ökologischer Gegebenheiten ausgeübt wird.

Abstract

Contemporary environmental governance increasingly extends beyond humans to include more-than-human life and ecological systems. Yet classical biopolitical approaches remain largely anthropocentric and insufficient for analyzing how biodiversity, ecosystems, and ecological processes become objects of governance. Building on Foucault's concept of biopolitics and integrating insights from Actor-Network Theory and political ecology, I develop the concept of eco-biopolitics as an analytical framework for understanding how ecological life becomes governable under conditions of environmental crisis. My argument is that governance does not act on 'life' directly but translates it into biodiversity as a governable proxy through processes of quantification, categorization, and institutionalization. The framework is structured along two dimensions – ontologies and rationalities – and identifies five key rationalities: security, risk, optimization, sustainability, and resilience. In addition, I introduce the Eco-Biopolitical Compass as a comparative heuristic for situating environmental governance arrangements according to their underlying ontologies of nature and degrees of biodiversity institutionalization. Empirically, the framework is applied to the EU Nature Restoration Law and the Ecuadorian Constitution, revealing contrasting eco-biopolitical configurations. Eco-biopolitics thereby emerges as a necessary analytical lens for understanding environmental governance under ecological crises, in which power increasingly operates through the management of ecological conditions.

Table of Contents

Acknowledgements.....	V
1. Introduction: Toward an Eco-Biopolitical Framework.....	1
1.1 From Ecological Crisis to Governance of Life	1
1.2 Biopolitics and its Extensions, Critiques, and More-Than-Human Approaches.....	2
1.3 Research Gap, Questions, and Objectives.....	6
1.4 Case Selection and Comparative Design	7
1.5 Methodology and Materials	8
1.6 Structure of the Thesis	9
2. From Sovereign to Biopower: The Historical Development of Foucault's Concept of Biopolitics.....	11
2.1 The Spectacle of Sovereign Power	11
2.2 Disciplinary Power and the Production of Docile Bodies.....	12
2.3 Biopower and the Regulation of the Masses.....	13
3. Latour's Actor-Network Theory.....	16
3.1 First Source of Uncertainty: Groups	16
3.2 Second Source of Uncertainty: Actions	18
3.3 Third Source of Uncertainty: Objects	19
3.4 Fourth Source of Uncertainty: Facts	20
3.5 Fifth Source of Uncertainty: Writing Risky Accounts.....	22
4. Eco-Biopolitics: Theoretical Conceptualization	23
4.1 Concept Map of Eco-Biopolitics: Dimensions and Key Points	23
4.1.1 Ontological Dimension – What counts as life?	24
4.1.2 Rationalities of Governance – Why and how is life governed?	28
4.2 Scope Conditions of Eco-Biopolitics	38
4.2.1 Eco-Biopolitics as Counter-Institutional Practice	38
4.2.2 Types of Eco-Biopolitics.....	40
5. Eco-Biopolitics in Practice.....	44
5.1 European Union – Nature Restoration Law	44
5.1.1 Multi-Level Governance and Political Contestation	44
5.1.2 The Nature Restoration Law as Technocratic Environmental Governance	47
5.2 Ecuador's Constitution, <i>Sumak Kawsay</i> and the Rights of Nature	54
5.2.1 <i>Sumak Kawsay</i> and the Reconfiguration of Knowledge and Nature.....	55
5.2.2 The Ecuadorian Constitution and its Rights of Nature.....	57
5.2.3 The Aftermath: Rights of Nature under Extractive Pressure.....	61
6. How Can Eco-Biopolitics Be Applied to Environmental Policies?	65
6.1 The Five Interlocking Rationalities as Analytical Categories.....	65
6.2 The Eco-Biopolitical Compass and Hybrid Governance Configurations	66

6.3 Limitations and Future Research	67
7. Conclusion.....	70
Reference List	LXXIII

List of Figures

Figure 1: Governance logics of biopolitics and eco-biopolitics in relation to the spheres of life	6
Figure 2: Eco-biopolitical compass.	40
Figure 3: Actant mapping of the EU Nature Restoration Law with focus on Article 12.	52
Figure 4: Actant mapping of Ecuador's rights of nature framework.	57

List of Tables

Table 1: Key elements of sovereign power and biopower in relation to human life	15
Table 2: Analytical Questions for Applying the Eco-Biopolitical Framework	65

List of Abbreviations

ANT	Actor-Network Theory
ES	Ecosystem Services
EU	European Union
RoN	Rights of Nature
SDM	Species Distribution Modeling

Acknowledgements

First and foremost, I would like to thank my supervisor, Sergej Seitz, for his generous guidance, thoughtful feedback, and steady encouragement throughout this project. His suggestions shaped this thesis in decisive ways, and his teaching sparked my curiosity for philosophical and theoretical questions long before I began writing. Many of the ideas developed in this thesis are directly indebted to his influence and mentorship.

I am also grateful to Anna Zeillinger (formerly Peter Zeillinger), who first introduced me to biopolitics, and to Alice Vadrot, whose insistence on taking environmental texts seriously pushed me to read more widely, more carefully, and more critically. Further, I want to thank all the scholars in the field of more-than-humanism with whom I am in dialogue with throughout this thesis for their tips and support, particularly Christopher Bear, Eben Kirksey, Audra Mitchell, Austin Read, Jonathon Turnbull, and Dinesh Wadiwel.

My deepest thanks go to my family for raising me with Iranian and Gilaki culture and the perspectives they carry, which have shaped how I think about science and politics and how I relate to animals and nature. These influences have profoundly shaped the person and researcher I am today. So, I would like to thank my mother, Manijeh Tondro; my father, Hamid Aref Zahed; my stepmother, Yasmin Darwisch; my beloved aunts, uncles, and cousins – too many to name. As many of them do not speak English, I would also like to include a Farsi version:

عمیق‌ترین سپاس‌های من نثار خانواده‌ام است که مرا با فرهنگ ایرانی و گیلکی و دیدگاه‌هایی که این فرهنگ‌ها به همراه دارند، پرورش دادند. دیدگاه‌هایی که شکل‌دهنده‌ی نگرش من به علم و سیاست، و همچنین رابطه‌ام با حیوانات و طبیعت بوده‌اند. این تأثیرات عمیقاً در شکل‌گیری شخصیتی و پژوهشگری امروز من نقش داشته‌اند.

بنابراین، مایلم از مادرم، منیژه تندرو؛ پدرم، حمید عارف زاهد؛ نامادری‌ام، یاسمین درویش؛ خاله‌ها، عمه‌ها، دایی‌ها و عموهای عزیزم؛ و همچنین پسر عموها، دختر عموها، پسر خاله‌ها، دختر خاله‌ها، پسر عمه‌ها، دختر عمه‌ها، پسر دایی‌ها و دختر دایی‌هایم — که آن‌قدر زیاد هستند که نام بردن از همه‌شان ممکن نیست — صمیمانه تشکر کنم.

Further, I want to acknowledge my friends who have accompanied me on my journey, making it not only full of fun and ‘deep conversations’, but also full of care and support. In particular, I thank Irem Arslan, Nina Bäuerle, Magdalena Brändle, Sabrina Marder, Matteo Mattersberger (despite his commitment to analytical philosophy), Ivan Mirkovic, Jakob Poschner, and Elisabeth Pusitz. I also want to thank my partner, Michael Manfred Geier, who has been my steadfast support and my loudest cheerleader. He not only took on care work and everyday responsibilities when it mattered most, allowing me to fully commit to this thesis, but also patiently listened to every inch of this work – its ideas, doubts, detours, and breakthroughs – often long before they made it onto the page and carefully proofread it.

Finally, I thank my *Canis lupus familiaris* companion, Sammie, who has been by my side at every step, quite literally, for thirteen years. He not only accompanied me as an emotional anchor but also reminded me to truly experience nature rather than merely pass through it. By insisting on our daily walks, he brought me outside, into forests, parks, and changing seasons, and in doing so, gave me the time and attentiveness necessary for thinking. Some ideas and connections that shaped this thesis emerged along those paths. In that spirit, I also want to thank the many animals, plants, algae, and other natural assemblages I have encountered, whose presence continues to inspire me and grounds my commitment to protecting the more-than-human world.

1. Introduction: Toward an Eco-Biopolitical Framework

1.1 From Ecological Crisis to Governance of Life

In the face of the ecological crises of the 21st century – such as climate change, species extinction, and degradation of nature – political institutions around the world are increasingly responding to ecological challenges. As a result, environmental regulation is evolving, expanding, and becoming more influential (F. Biermann, 2021; Hughes & Vadrot, 2023; Latour, 2023). These forms of environmental governance not only regulate economic processes and human action but also affect ecosystems, including their inhabitants, whose conditions of survival, persistence, or extinction are increasingly politically shaped. Ecological management therefore intervenes directly in conditions of existence. In this sense, environmental governance can also be understood as governance of human and more-than-human¹ life.

Biopolitics, as conceptualized by Michel Foucault (1978, 2003a, 2024), provides a highly valuable analytical framework for understanding how politics regulates and optimizes life. Foucault (2007) demonstrates in his analysis of governmentality that modern power no longer consists solely of the exercise of law and submission but has shifted toward the control of biological phenomena such as birth rates, longevity, and public health. The field of biopolitics is centered on the management of populations as “masses of living beings” that have to be optimized, safeguarded, and controlled effectively (Foucault, 2007). In this context, Foucault speaks of biopower as a new form of power that makes biological existence itself the object of political rationality. This development is evident in the emergence of welfare states, public health programs, and policies directed at populations, where life is not only governed but systematically regulated and managed (Foucault, 2003a).

However, while Foucault conceptualizes biopolitics as the governance of life, his analysis remains confined largely to human populations. Therefore, I develop the concept of eco-biopolitics, understood as an extension of biopolitics to the governance of life across more-than-human domains, including the conditions under which life can be counted, valued, and made governable.

¹ As Susan Leigh Star stated in *The Emergence of Multispecies Ethnography*, saying “non-human” is comparable to saying “non-white” and implies something lacking (Kirksey & Helmreich, 2010). Therefore, I will use the term “more-than-human” in my thesis.

1.2 Biopolitics and its Extensions, Critiques, and More-Than-Human Approaches

Building on this Foucauldian understanding of biopolitics as the governance of human life, an increasingly rich body of academic work has started to rethink and expand the theory in new directions. Such research emanates from various directions. *First*, critical studies of classical biopolitics reveal its human-centered approach. *Second*, philosophical and ontological problems begin to cast doubt on the category of life itself. *Third*, the fields of human geography, political ecology, and Science and Technology Studies (STS) stress relations with the more-than-human world and material processes. *Fourth*, anthropological research highlights multi-species interactions. *Fifth*, an increasing number of studies that explicitly or implicitly demand an eco-biopolitical analysis. These different research streams collectively offer the intellectual resources to articulate a concept of biopolitics beyond human life.

A *first* strand of critique addresses precisely this limitation by questioning the anthropocentric focus of biopolitics. While Foucault conceptualizes modern power as the governance of life, his analysis remains focused on human populations. Although he refers to life in general terms, his empirical analyses and historical reconstructions point almost exclusively to the regulation of human populations (1978, 2003a, 2024). More-than-human life – whether animal, vegetal, or microbial – appears only marginally, typically as an indirect factor in relation to human health, productivity, or social order. As a result, biopolitics effectively reduces life to human life, leaving largely unexplored how political rationalities extend beyond human populations and operate across more-than-human beings and ecological processes (C. Biermann & Mansfield, 2014). This limitation has been extensively criticized within political ecology and other fields of inquiry that examine the growing propensity for contemporary forms of governance to be concerned with more-than-human beings. For example, in conservation practices, biosecurity regimes, and environmental legislation (Cavanagh, 2018; Hinchliffe et al., 2013; Srinivasan, 2013; Youatt, 2015). This points to the importance of power not only as it is exercised over human populations but also through the differential valuation, protection, and endangerment of more-than-human life.

The *second* strand of literature takes the critical examination of the ontology behind the concept of biopolitics even further. It makes the field of study accessible not only to a larger set of objects, but also to questions about the notion of life and the differentiations made in it. One scholar to develop such an approach is Elizabeth Povinelli (2016), whose term *geontopower* refers to the exercise of control via the distinction between life and nonlife. *Geontopower* raises

critical questions of what a living being is, who determines the conditions of this separation, and with that, who has power (Povinelli, 2016).

The alternative reading of biopolitics is presented in *Homo Sacer* through the lens of “bare life” (Agamben, 2021). While Foucault’s perspective on biopolitics is related to the management and enhancement of the population, Giorgio Agamben’s emphasis is on the role of sovereign exceptionalism and the capacity of producing “killable life” in the defining features of contemporary politics (Agamben, 2021). Achille Mbembe’s *Necropolitics* (2019), building on Foucault’s biopolitics and Agamben’s analysis of sovereign exclusion, demonstrates how the governance of death operates in colonial and postcolonial contexts where sovereignty manifests itself in the form of constructing “death-worlds” that intentionally expose particular populations to death (Mbembe, 2019). Both Agamben and Mbembe ground their analyses in the lethal dimensions of political power, thus challenging Foucault’s original life-oriented focus. Together with Povinelli, they contribute to a growing recognition that the politics of life cannot be understood without also addressing the politics of death, nonlife, and ontological categorization.

Extending these debates beyond the human, Dinesh Wadiwel (2015) demonstrates that systematic violence against animals is not an exception but a constitutive feature of modern political orders. Similarly, Rafi Youatt (2015) demonstrates how modern political orders increasingly govern animal life through practices such as classification, conservation, and population management, while simultaneously excluding animals from conventional understandings of political subjecthood. Both authors illustrate how biopolitical and sovereign forms of power increasingly operate across more-than-human domains, thereby extending questions of governance, exclusion, and killability beyond human populations. Likewise, Audra Mitchell (2024) notes that present ecological crises are not solely about the annihilation of individual lives but also about the erasure of specific life forms, relations, and worlds. Her work therefore further expands political analysis toward questions of extinction, multispecies coexistence, and ecological loss beyond the human. While these approaches primarily focus on animals, multispecies relations, and extinction, the concept of eco-biopolitics developed in this thesis extends the analysis toward broader environmental governance structures, including the rationalities, institutions, and ecological conditions through which more-than-human life becomes governable.

A *third* strand is derived from more-than-human geography, political/decolonial ecology, and STS, where scholars stress that life is embedded in socio-ecological relations between humans, more-than-humans, technologies, and environments. This literature, which emphasizes aspects

such as relationality, interdependence, colonial history, and more-than-human agency in contrast with literature that is highly dependent on the ideas of bounded populations, shows us how the management of our environment is done through socio-ecological assemblages and not just through a strictly human form of politics (Lorimer, 2015; Lorimer & Hodgetts, 2024; Read, 2024; Searle et al., 2024). These works suggest that there is a necessity for transcending the separation between society and nature and focusing instead on socio-material relations.

Similar approaches increasingly focus on the metabolic and material conditions necessary for sustaining and governing life. In this literature, metabolism is understood not merely as a biological process but also as a site of intervention, regulation, and industrial transformation (Landecker, 2011, 2024). Building on these insights, Maan Barua (2025a, 2025b) develops the concepts of metabolic work, metabolic shifts, and metabolic politics to analyze the organization, intensification, and governance of the transformative capacities of living bodies and material circulations. While Barua's framework primarily focuses on metabolic transformations and material circulations, the concept of eco-biopolitics developed in this thesis extends beyond metabolic governance toward the broader rationalities, institutional arrangements, and ontological distinctions through which ecological life becomes governable. Along similar lines, Adam Searle et al. (2024) demonstrate how climate governance increasingly operates through metabolic interventions in livestock, particularly cattle, where political strategies aim to influence biological processes such as digestion and emission cycles.

Simultaneously, research on environmental governance has pointed out the dispersed and scalar character of modern-day ecological governance. For example, Harriet Bulkeley (2019) shows how climate governance occurs through dispersed networks, sites, and socio-ecological practices rather than the more traditional political approach rooted in the state. In sum, both sets of ideas have shown that environmental governance has become a means of intervention not only within societies but also within ecology, metabolism, and infrastructure and through which life is sustained.

A *fourth* strand of research, from anthropology, in particular multispecies ethnography, is interested in human-other interactions, entanglements, and encounters at the level of practice as opposed to macro-level systems and flows. This literature considers multispecies relations not only in terms of how multispecies life is governed but also in terms of how it is co-produced in everyday practices, knowledge, and care (Haraway, 2016; Hartigan, 2021; Kirksey, 2015; Kirksey & Helmreich, 2010; Tsing, 2015).

For instance, Eben Kirksey (2015) asks how these relationships are generated through contingent interactions and shifting ecological assemblages, noting that multispecies worlds are fluid and continuously produced and configured. The core concern of this body of work is how life is regulated but also lived, negotiated, and performed across species divides, bringing to the fore the everyday actions through which socio-ecological relations are constituted. Thus, multispecies theories emphasize relational ontologies and the interdependencies that shape both human and more-than-human life. In this way, they bring to light the concrete contexts and lifeworlds within which political and ecological relationships are inscribed, adding a different angle to the structural and material emphases of political ecology and human geography.

A *fifth* strand of literature engages directly with eco-biopolitical dynamics. The term eco-biopolitics itself appears in earlier works. For instance, Valerie Olson (2010) analyzes space biomedicine to show how scientific and technological infrastructures govern human and more-than-human bodies in extraterrestrial environments, thereby extending biopolitical analysis beyond Earth-bound ecologies. Ashley Carse's (2021) research on environmental mitigation within the Savannah Harbor Expansion Project analyzes the processes and mechanisms of ecological restoration, emphasizing that the 'remaking' of environments involves institutional and material complexity. Both examples clearly show how eco-biopolitics may help to understand socio-ecological governance practices in situ. However, these approaches largely remain focused on specific empirical and micro-level case studies rather than developing eco-biopolitics as a broader analytical framework for understanding environmental governance across different socio-ecological contexts.

Taken together, these strands of literature demonstrate the growing need for analytical approaches capable of connecting situated socio-ecological processes with broader structures of governance and political rationality. Connor J. Cavanagh's (2018) work offers an especially important contribution in this regard through its discussion of the relationship between political ecology and biopolitics, including their possible integration. Benjamin Bühler (2018), in turn, adds a historical perspective by demonstrating how environmental governance has been intertwined with population management and economic rationality since the 18th century. Building on these insights, the concept of eco-biopolitics developed in this thesis seeks to integrate questions of governance, ecology, power, and more-than-human life within a broader analytical framework.

Despite these important contributions, existing approaches often remain focused on specific dimensions of socio-ecological governance, such as metabolism, multispecies relations, extinction, or ecological restoration. While they provide important empirical and theoretical insights, no broader analytical framework currently exists that systematically integrates these dimensions into a unified analysis of how human and more-than-human life become governed across different socio-ecological contexts. This is the gap addressed in my thesis through the theoretical conceptualization of eco-biopolitics.

1.3 Research Gap, Questions, and Objectives

As outlined above, there is a theoretical need to systematically extend the biopolitical approach to more-than-human life. What is missing is a framework that captures the political technologies of power directed toward more-than-human life and investigates their integration into political administrative logics. The expansion of biopolitics into eco-biopolitics seeks to bridge this gap through the question of how political rationalities can be systematically integrated with more-than-human actors. Eco-biopolitics is understood in my thesis as an analytical framework for examining how political rationalities, institutions, and technologies govern human and more-than-human life across socio-ecological systems.

Figure 1 provides a simplified illustration of the relationship between biopolitics and eco-biopolitics. On the left side, forms of governance are represented, while the right side illustrates the scope of life governed. Eco-biopolitics expands the analytical scope of biopolitics beyond an exclusive focus on human life.

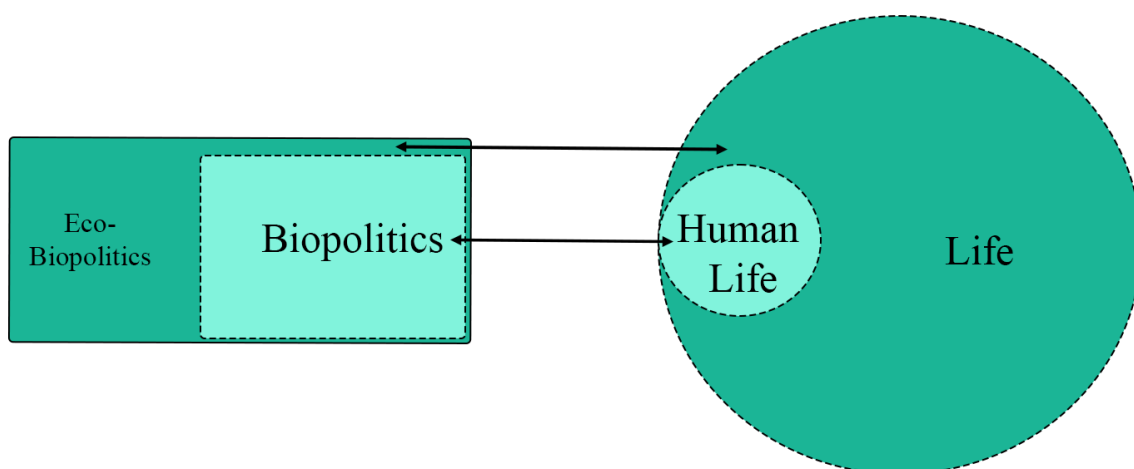


Figure 1: Governance logics of biopolitics and eco-biopolitics in relation to the spheres of life.

My thesis seeks to develop an approach that reconfigures the concept of biopolitics in order to more comprehensively and precisely capture ecological assemblages. I aim to theoretically elaborate the notion of eco-biopolitics and to demonstrate how biopolitical perspectives can be analytically extended to include more-than-human life. I will follow an analytical approach to study *how* power operates and *who* is governed in contemporary environmental governance.

My thesis addresses the following research questions:

1. Theoretical Dimension: How can the concept of biopolitics be extended to systematically analyze the governance of more-than-human life?
2. Analytical Dimension: To what extent can selected environmental policies be considered expressions of eco-biopolitics?

The underlying assumption here is that, in light of ecological emergencies, eco-biopolitics is indeed already present in current modes of environmental governance, shaping political institutions, decision-making processes, and concrete interventions.

1.4 Case Selection and Comparative Design

I analyze the eco-biopolitical logics by using two case studies that reflect distinctive forms of environmental governance, such as the European Union's (EU) Nature Restoration Law (European Commission, 2024) and the constitutional recognition of Rights of Nature (RoN) in Ecuador (Ecuador's Constitution, 2008). Instead of looking at these cases from the perspective of individual policy models, I will treat them as locations where the governmentality of life, both human and more-than-human, is constituted, institutionalized, and contested.

The Nature Restoration Law exemplifies an instance of technocratic and highly institutionalized hegemonic environmental governance. The law operates through targets, indicators, and measurement tools for ecosystem restoration in EU member countries (Aragão & van de Braak, 2026; Cliquet et al., 2024). This example is particularly useful for studying the emergence of eco-biopolitics in data-rich environments managed by experts on a macro scale.

In contrast, the Ecuadorian Constitution, which recognizes the RoN, represents a fundamentally different approach. Nature here is no longer conceptualized merely as an object to be managed but as a legal subject that has its own rights (Akchurin, 2015; Kauffman & Martin, 2017). This case provides an opportunity to study the intersection between eco-biopolitical rationalities and other ontological perspectives that subvert hegemonic discourses.

By comparing these divergent case studies, I examine how eco-biopolitical rationalities emerge across different institutional, epistemological, and cultural contexts. Instead of presupposing a coherent and unified eco-biopolitics, the examination reveals the multiple and contested nature of these rationalities, indicating that different governance practices of life coexist alongside one another.

1.5 Methodology and Materials

My selection of sources is guided by the research aim to develop eco-biopolitics as an extension of biopolitical theory applicable to environmental governance. Sources used are both theoretical and empirical, thus helping to bridge the gap between theoretical considerations and practical politics.

From a theoretical perspective, key primary works by Foucault include *The History of Sexuality* (1978), *Security, Territory, Population* (2007), and *Discipline and Punish: The Birth of the Prison* (2024). These books serve as the basis for the reconstruction of biopolitics and governmentality concepts. At the same time, these works should not be viewed as a closed framework; rather, their content will be expanded, taking into account ecological dimensions.

Bruno Latour's work is central to this theoretical extension because it fundamentally challenges the modern separation between nature and society that underlies many conventional approaches to politics and governance. In particular, *Reassembling the Social* (2022) develops Actor-Network Theory (ANT), which reconceptualizes the social not as a pre-existing domain but as the effect of relations among heterogeneous actors, including humans, technologies, infrastructures, animals, and environments. Rather than treating more-than-human entities as passive objects, ANT emphasizes their role within socio-material networks and processes of association. This perspective is particularly relevant for eco-biopolitics because it allows more-than-human actors to be analyzed as participants in socio-ecological relations and governance processes.

Moreover, Latour's other work, such as *Politics of Nature* (2004a) and *Facing Gaia* (2023), reveals that the dichotomy between nature and society is artificial within the context of modern politics since collective action involves both human and more-than-human actors. The above works, therefore, suggest moving beyond the conventional study of the governance of human populations and considering the assemblages of socio-ecological relations and the stabilizing mechanisms at their core. Povinelli's (2016) concept of *geontopower* also informs the analysis by emphasizing how political power operates through distinctions between life and nonlife.

For the empirical case studies, two key texts will be analyzed in depth: Ecuador's Constitution and the Nature Restoration Law (Ecuador's Constitution, 2008; European Commission, 2024). These texts constitute the primary empirical materials of the thesis.

In terms of methods, I use a Foucauldian-influenced discourse analysis, specifically interpretivist perspectives on governance (Dean, 2010; Hajer, 1995). The approach is concerned with problem definitions, the dominance of certain epistemologies, and the legitimization of political actions. This method is suitable because it enables an investigation of the ways through which environmental governance structures relations between humans and more-than-humans.

This discourse-analytical approach is complemented by insights from ANT, which sensitizes the analysis to the socio-material relations through which actors, knowledges, and materialities become connected. As a result, policy documents are not treated as neutral texts but as practices through which socio-ecological relations are produced, stabilized, and governed.

1.6 Structure of the Thesis

The thesis is structured as a gradual conceptual extension of biopolitics toward the analysis of environmental governance and more-than-human life. It moves from the reconstruction of Foucauldian theories of power through the development of eco-biopolitics as a theoretical framework to its empirical application in contemporary socio-ecological governance contexts.

Chapter two (*From Sovereign to Biopower: The Historical Development of Foucault's Concept of Biopolitics*) outlines Foucault's theories of power. It discusses the evolution of power relations from sovereign power to disciplinary power and then to biopolitics. This chapter also explains the ideas of biopower and governmentality and their interrelations in contemporary societies. Further, it elaborates on the theoretical foundation for the later extension toward eco-biopolitics.

Chapter three (*Latour's Actor-Network Theory*) is the second major theoretical pillar of the thesis. Building on *Reassembling the Social* (2005), it outlines a relational conception of the social as a network of relations among humans and more-than-human actants. Through the systematic presentation of the five sources of uncertainty, which Latour highlights, this chapter develops an analytical lens through which more-than-human entities can be regarded as actors in political and social processes. I argue that such an approach is needed to address the anthropocentric bias in classical biopolitics.

Chapter four (*Eco-Biopolitics: Theoretical Conceptualization*) represents the conceptual core of the thesis. It begins by defining eco-biopolitics and then develops a concept map of eco-

biopolitics, organized around questions of ontology and rationalities of governance. Building on this foundation, it outlines the scope conditions of eco-biopolitics, discusses eco-biopolitics as a counter-institutional practice, and finally develops a typology of eco-biopolitical modes of governance.

Chapter five (*Eco-Biopolitics in Practice*) employs this approach to analyze two very distinct case studies: the Nature Restoration Law of the EU and the Constitution of Ecuador. Both case studies are selected because of their contrasting eco-biopolitical configurations. The first case highlights a very institutionalized, technocratic model of governance that relies heavily on quantification and indicators as well as institutional coordination. The second case study emphasizes a more relational and normative approach to eco-biopolitics.

Chapter six (*How Can Eco-Biopolitics Be Applied to Environmental Policies?*) explains how eco-biopolitics can be applied beyond the selected case studies and how it becomes a tool for different forms of environmental governance, including anthropocentric, technocratic, and relational approaches. Furthermore, it raises some issues and opens questions for further research.

Chapter seven (*Conclusion*) presents the findings of the thesis as well as theoretical and empirical implications.

2 From Sovereign to Biopower: The Historical Development of Foucault's Concept of Biopolitics

This chapter provides a concise overview of the historical development of biopolitics and introduces the key concepts that inform the theory of eco-biopolitics. It starts with an introduction to sovereign power and then moves to the shift from sovereign power to disciplinary power. Finally, it discusses biopolitics. The final part of the chapter examines biopower and the concept of governmentality and how they connect to each other.²

2.1 The Spectacle of Sovereign Power

According to Foucault, sovereign power dominated from the Middle Ages to the early modern period. Personified by the monarch, it represented the ultimate authority over life and death (Foucault, 2024, pp. 44–45). This concept can be traced back to the ancient Roman law of *patria potestas*, which granted the male head of the family (*pater familias*) the right to reclaim the life he had created. This right applied primarily to his children and slaves, illustrating the vast authority vested in the *pater familias* (Foucault, 2023, p. 131).

This absolute authority was not merely theoretical but was made tangible through public displays of power. It was most visibly embodied in the practice of brutal public torture, a punishment staged before the eyes of the people to demonstrate the sovereign's dominance through the violent enactment of justice. At the center of this spectacle stood the offender's body, dominated, mutilated, and disfigured in cruel and diverse ways to reaffirm the ruler's supremacy (Foucault, 2024, pp. 44–48).

Sovereign power also encompassed the right to self-defense: when attacked by external forces, the sovereign could lawfully send his subjects to war, exercising an indirect right over life and death. Internal violations, however, struck at the very core of sovereign authority. As the ultimate source of legislation, any breach of the sovereign's order was perceived as a direct assault on his power and was answered with violent retribution. Through the spectacle of public torture, the sovereign exercised power over life and death, restoring his authority in the eyes of his

² It is important to note that Foucault's observations were primarily derived from French and European contexts. His analyses reflect the historical and cultural conditions of these societies at that time (70ties) and must be interpreted with this background in mind. Despite this regional focus, his theoretical framework provides valuable insights for understanding the dynamics of power more broadly, particularly when extended to contemporary debates on governance and the management of life.

people (Foucault, 1995, pp. 64–65). As Foucault notes, “[t]he right which was formulated as the ‘power of life and death’ was in reality the right to *take* life or *let* live” (Foucault, 1978, p. 136). During the 18th and 19th centuries, an increasing number of critical voices were raised against this form of sovereign violence. Solidarity grew with the petty offenders who were subjected to the arbitrariness of the sovereign. Protests against torture took place throughout the country.

It was as if the sovereign power did not see, in this emulation of atrocity, a challenge that it itself threw down and which might one day be taken up: accustomed as it was to 'seeing blood flow', the people soon learnt that 'it could be revenged only with blood'. [...] In this same dangerous and ritual violence, the eighteenth-century reformers denounced, on the contrary, that which exceeded, on both sides, the legitimate exercise of power: in this violence, according to them, tyranny confronts rebellion; each calls forth the other. It is a double danger. Instead of taking revenge, criminal justice should simply punish. (Foucault, 1995, pp. 73–74)

According to Foucault, to counter this spiral of violence, penal justice began to move away from vengeance and toward systematic punishment. Also, the economic sphere changed, which was another driver for the profound changes that were taking place in criminal justice. Crime increasingly shifted toward property crimes and replaced violent crimes, gangs of robbers became smaller, laws became stricter, and the police apparatus expanded. Wealth was accumulating in societies as a result of capital accumulation, and with it, the need for security increased (Foucault, 2024, pp. 96–97).

Therefore, the purpose of punishment evolved: no longer the sovereign's revenge, it now served to defend society by counteracting the social consequences of crime (Foucault, 2024, pp. 115–118). The justice system shifted its focus from physical punishment of the body to control of the modern soul. The modern soul is defined by the current reference point of a particular technology of power over the body. The soul is constantly produced through the exercise of power. It is the element in which the effects of power and the object reference of knowledge intersect (Foucault, 2024, pp. 41–42).

2.2 Disciplinary Power and the Production of Docile Bodies

These developments prepared the ground for a new form of power, disciplinary power (Foucault, 1995). Foucault describes how disciplinary power emerged as a form of power that took hold of individual bodies, disciplining and aligning them in order to increase their economic usefulness and profit from their efficiency. At the same time, however, it also weakens the body

to make it politically obedient. The power of the body is thus divided into utility and submission. Disciplinary institutions (like schools, prisons, and armies) define an explicit political and detailed occupation of the body, representing a new microphysics of power (Foucault, 2024, p. 177).

Power now organizes bodies in detailed ways through spatial division, activity coding, time management, and force coordination (Foucault, 2024, p. 216). Disciplinary power is not only imposed from above but also reinforced from below and across social relations, forming a network of mutual surveillance and self-regulation (Foucault, 2024, p. 228). Subjugated individuals internalize the power relationship, thereby subjugating themselves. As disciplinary mechanisms became internalized, punishment increasingly shifted away from spectacular bodily violence toward continuous surveillance and normalization (Foucault, 2024, p. 260).

Building on these transformations, this intricate network of disciplinary mechanisms forms the micro-level foundation for a broader transformation in power relations. The same logic that individualized and normalized bodies expands to the collective, paving the way for the emergence of biopower.

2.3 Biopower and the Regulation of the Masses

Foucault introduces biopower as a new political rationality encompassing two interconnected poles: the disciplinary control of individual bodies and the regulation of populations through biopolitics (Foucault, 2023, p. 134). This dual structure marks a fundamental change in how modern societies govern life itself:

$$\textit{Biopower} = \textit{Disciplinary Power} \cup \textit{Biopolitics}^3$$

As Foucault notes, the effects of this shift are far-reaching. Since the 19th century, wars have no longer been waged in the name of the sovereign but in the name of life itself. Entire populations are mobilized and sacrificed not for the glory of a ruler but for the survival of the nation, illustrating the biological stakes at the heart of modern warfare. Foucault summarizes, “[o]ne might say that the ancient right to *take* life or *let* live was replaced by a power to *foster* life or *disallow* it to the point of death” (Foucault, 1978, p. 138).

³ Set-theoretical union: for two sets A and B, $A \cup B = \{x \mid x \in A \vee x \in B\}$. In this context: Modern power encompasses all elements of sovereign power and of biopower, including those that belong to both, while acknowledging that in reality these forms of power overlap, interact, and transform one another.

For the first time in history, no doubt, biological existence was reflected in political existence; the fact of living was no longer an inaccessible substrate that only emerged from time to time, amid the randomness of death and its fatality; part of it passed into knowledge's field of control and power's sphere of intervention. Power would no longer be dealing simply with legal subjects over whom the ultimate dominion was death, but with living beings, and the mastery it would be able to exercise over them would have to be applied at the level of life itself; it was the taking charge of life, more than the threat of death, that gave power its access even to the body. (Foucault, 1978, p. 142)

According to Foucault, reproduction, birth rates, mortality rates, health standards, life expectancy, and longevity, along with all their variations, became the target of regulatory controls and interventions. He states that the disciplines of the body and the regulations of the population form the two poles around which the power over life is organized. The establishment of this dual technology – both anatomical and biological, individualizing and specifying, directed at bodily performance and life processes – characterizes a form of power whose highest function is no longer to kill but to enforce life in its entirety (Foucault, 2023, p. 135).

However, as Foucault notes, the emergence of biopower did not mean the replacement of sovereign power; rather, it involved the formation of a new mode of regulation, while previous ones remained intact. Even though biopower creates its own new methods for governing individuals' lives and entire populations, sovereign power remains effective by relying on the law, violence, and sovereignty of life and death (Foucault, 2023, pp. 134–135). Modern states, therefore, combine the two: they retain sovereign mechanisms while simultaneously employing biopolitical techniques to optimize and manage life. This coexistence can be expressed as a conceptual formula:

$$\textit{Modern Power} = \textit{Sovereign Power} \cup \textit{Biopower}$$

The persistence of sovereign power is particularly evident in the continued use of legal frameworks, state violence, and war, where the state still exercises the capacity to decide who may live and who must die. At the same time, biopower operates through the regulation of bodies and populations, aiming to foster life and prevent its decline. In this way, modern power is not a replacement of sovereignty but a hybrid form in which sovereignty and biopower are interwoven. To make these differences visible,

Table 1 contrasts the characteristics of sovereign power and the two poles of biopower – disciplinary power and biopolitics.

Table 1: Key elements of sovereign power and biopower in relation to human life.

	Sovereign power	Biopower	
		Disciplinary power	Biopolitics
Historical Context	Middle Ages, Early Modern Era	From 17 th /18 th century, rise of modern institutions	From 18 th /19 th century, welfare state
Focus	To kill or let live	Disciplining, normalization	Management and optimization of human life
Object	Individuals/subjects	Bodies of individuals	Population as biological mass
Instruments	Law, command, prohibition, violence	Surveillance, training, regulation, norm-setting	Statistics, public health, hygiene, urban planning
Goal / Function	Maintain sovereignty, obedience	Usefulness, obedience, efficiency	Promotion and regulation of life
Relation to Other Forms	Preceded and coexists with biopower	Forms the micro-level basis for biopower	Forms the macro-level basis for biopower
Examples	Public executions	Prisons, schools, military drills	Vaccination programs, environmental regulation

Building on this conceptual clarification, Foucault relates the coexistence of these forms of power to the rationality that unifies them all – governmentality, which is neither an institution nor a technique but the broader rationality through which modern power operates. Governmentality utilizes knowledge, security apparatuses, and administration to direct the behaviors of individuals and populations. Instead of supplanting old power relations, governmentality integrates them into broader strategies of governance (Foucault, 2007).

This relationship can be captured as follows:

$$\text{Modern Governance} = \text{Governmentality}[\text{Modern Power}]$$

The above equation captures the idea that governmentality is the general rationality within which modern power works. Sovereign power, discipline, and biopower are organized and coordinated within this rationality to work as part of the processes of governance in modern times. Through governmentality, the modern state does not just govern through laws and coercive power but also through managing life itself.

3 Latour's Actor-Network Theory

The aim of my thesis is to transform Foucault's concept of biopolitics in a way that allows more-than-human actors and ecological systems to be systematically captured as well. For moving toward this turn, I first introduce Latour's ANT, which provides the methodological tools to overcome the classical separation between nature and society and to include more-than-human entities as effective actors in political orders.

ANT is a school of thought in the social sciences that began to take shape in the 1980s, particularly within the field of science and technology studies, through the work of Michel Callon, John Law, and Latour. One of Latour's (2022) most influential contributions to ANT is *Reassembling the Social: An Introduction to Actor-Network-Theory*. In this book, Latour develops and defends ANT as a methodological and definitional reorientation of sociology (Latour, 2022, pp. 10–12).

Latour distinguishes his perspective from a classical sociology of the social, by which he does not mean an already existing substance or a fixed sphere that floats above things. Rather, the social refers to relationships, associations, and connections. Society is not a given but arises in the moment when actors connect and thereby produce a form of order. Therefore, Latour advocates a sociology of associations that traces these processes of assembling and linking instead of assuming society as a pre-given background (Latour, 2022, pp. 19–23).

To elaborate this methodological shift, Latour points to five sources of uncertainty that sociology has to face: the nature of groups, the nature of actions, the role of objects, the status of facts, and finally, the character of sociological investigations themselves. These five uncertainties serve as the framework for ANT and will structure the following discussion. Furthermore, they also serve as a lens through which I will analyze the conception of eco-biopolitics.

3.1 First Source of Uncertainty: Groups

In the first source of uncertainty, Latour postulates that there are no such things as groups, only group formations (Latour, 2022, p. 53). Latour (2005, p. 29) describes the relational and contingent nature of groups as follows:

The word 'group' is so empty that it sets neither the size nor the content. It could be applied to a planet as well as to an individual; to Microsoft as well as to my family; to plants as well as to baboons.

What we call a 'group' – such as 'working class', 'scientific community', or even 'morons' – does not exist independently, but only because it is created and stabilized through constant practices. Groups are the result of ongoing work: they are formed, redefined, defended, or questioned (Latour, 2022, pp. 54–55).

According to Latour (2022, pp. 55–60), sociology should therefore not pretend that groups exist as fixed entities but rather make the dynamics of grouping visible. This methodological injunction directly challenges one of the strongest habits of classical sociology: the tendency to presuppose collective entities as explanatory resources. Latour (2022, pp. 30–32) notes that Émile Durkheim regarded society as a *sui generis* reality that exerted causal force on individuals, while for Marx, class structured political conflict as an objective social position. But Latour argues that treating collectives as given hides the processes that create them. Rather than asking what holds a group together, sociology must trace how particular alliances, rhetorical strategies, institutional devices, and material infrastructures continuously make and remake the contours of a group.

Latour continues that groups depend on spokespersons who claim to speak in their name, on statistical devices that count and measure them, and on symbolic practices that render them visible. Thus, for example, a working class is not simply an economic position but a political one, constituted through trade unions, party organizations, and discourses that demarcate who is in and who is out; the scientific community must continually reproduce itself through journals, conferences, peer review, funding agencies, and laboratories that stabilize its boundaries; a group of climate change deniers, likewise, is not just a matter of individual skepticism, but also of media outlets, lobbying networks, and rhetorical strategies that reinforce their collective identity as morons. The very existence of a group is therefore an achievement. It is the outcome of the ceaseless work of group formation and reformation (Latour, 2022, pp. 66–69).

One must note that especially the spokesperson's argument has been severely criticized. Although Gayatri Chakravorty Spivak (2004) did not address Latour directly, her work in *Can the Subaltern speak?* clearly dismisses the European thought of speaking for someone. The subaltern is a term originally developed by Antonio Gramsci (2020) that describes those who are marginalized because they lack access to hegemonic discourses and have little or no power. Spivak accuses Foucault of claiming that the oppressed can speak for themselves, while he continues to speak on their behalf. A similar critique can be directed at Latour's concept of spokespersons. Scholars such as Kirksey (2015) have pointed out that these spokesperson relations are never politically neutral. The question is not only whether more-than-humans can be

represented, but also who gains the authority to speak for them, and which forms of life become politically visible through these processes.

While these critiques raise important questions regarding representation and political authority within ANT, they will be discussed in greater detail in Chapter 6. For now, it is sufficient to note that Latour's methodological intervention shifts the focus of sociology away from fixed entities and toward processes of association and group formation.

For Latour, this has decisive methodological consequences: sociology must not begin with groups as stable building blocks of the social but with the practices of grouping as events in themselves. What matters is not the ontological status of the working class, but the empirical tracing of how these collectives are invoked, assembled, and maintained in specific situations. Latour lays the groundwork for a sociology that views collectivity as a process, not a substance, an ongoing accomplishment rather than a pre-given structure through the claim that there are no groups, only group formations (Latour, 2022, p. 70).

3.2 Second Source of Uncertainty: Actions

Closely connected to this is the second principle: no action without mediation. Latour makes it clear that actions are never exclusively human. Rather, every action arises from a network of mediators – both humans and other-than-humans. A person who writes a letter does not act alone: paper, pen, language, computer programs, and institutional rules all contribute as constitutive factors (Latour, 2022, pp. 63–70, 105–110). Action is thus always distributed agency, which is only realized in the chaining of different elements.

Latour (2022, pp. 76–78) differentiates sharply between intermediaries and mediators. An intermediary merely transports an action without altering it; a mediator, by contrast, transforms, translates, and modifies the input it receives. Since most entities encountered in empirical investigation are mediators rather than intermediaries, action is never linear but constantly redirected through networks of translation. For this reason, Latour defines actors not as originators of action but as “anything that modifies a state of affairs by making a difference” (Latour, 2022, p. 75). From this perspective, an actor is not simply an intentional subject but any entity that changes, extends, or redirects a chain of actions, whether human, animal, technical artifact, microorganism, or document.

This understanding of agency is closely related to the concept of material agency, which emphasizes that material objects, technologies, infrastructures, and more-than-human entities actively shape social and political processes rather than merely serving as passive backgrounds for human action (Knappett & Malafouris, 2008).

Latour deliberately prefers the term “actant,” since “actor” in social science is usually associated with conscious, intentional human behavior. Actant, on the other hand, places humans and more-than-humans on the same ontological plane, allowing both to be analyzed as contributors to collective action (Latour, 2022, pp. 79–82). The methodological consequence is far-reaching: sociology can no longer assume that agency is located in individuals or groups alone. Instead, it must empirically trace the chains of mediation through which action is distributed and transformed. To follow the actors is therefore to follow the mediators that make action possible, visible, and effective (Latour, 2022, p. 110).

3.3 Third Source of Uncertainty: Objects

The third source of uncertainty concerns the role of objects. Latour (2022, p. 109) emphasizes that one must never decide *a priori* which entities are relevant to an action. Classical sociology, with its anthropocentric bias, tends to underestimate the role of things, artifacts, or more-than-human entities and to treat only humans as actors.

In the case of ANT, it is precisely uncertain which objects, devices, or materials enter into a given course of action (Latour, 2022, pp. 126–132). A traffic accident, for instance, cannot be explained by examining only the drivers. Road conditions, brakes, traffic signs, weather patterns, and even insurance protocols are just as much a part of the chain of action as the human participants. Latour insists that this principle must not be misunderstood as a simple abolition of the subject/object dichotomy. ANT does not claim that humans and things are ontologically identical, nor that a perfect symmetry exists between them. What it problematizes is the asymmetrical attribution inherited from modern social thought: humans are granted intentionality, reflexivity, and meaning, while the material world is relegated to the sphere of mute causality and passive background conditions. The so-called principle of symmetry in ANT does not entail an ontological equation between humans and objects, but rather an analytical decision not to accept a predetermined separation into intentional and non-intentional entities (Latour, 2022, pp. 130–131).

In this way, Latour reframes the object as an actant: an entity that, through mediation, can re-direct, enable, or constrain action. Empirical research must therefore be open to the possibility

that heterogeneous actants – both human and more-than-human – jointly produce agency in networks of mediation and translation. Instead of presupposing that only subjects act and objects merely react, ANT demands that we follow the associations to see how action is generated and distributed, and through which material arrangements it becomes effective (Latour, 2022, p. 132).

3.4 Fourth Source of Uncertainty: Facts

In the fourth source of uncertainty, Latour examines *matters of fact* vs. *matters of concern*. He states that the conventional way of thinking about sociology (and science in general) involves a belief that objective facts can be separated from social processes and that any controversy arises only at the social construction level. Latour challenges this distinction by arguing that facts do not exist as isolated entities but emerge through networks of human and more-than-human actors and become stabilized through practices, instruments, and institutions (Latour, 2022, pp. 154–173).

From Latour's perspective, facts are not simply discovered, nor are they arbitrarily constructed. Rather, they are assembled through heterogeneous networks that include scientists, laboratories, measuring devices, models, funding structures, and institutional arrangements. An indisputable fact is therefore undisputed not because it exists beyond all social processes but because it has been successfully stabilized within such networks. Conversely, controversial facts are those whose networks are not yet sufficiently stabilized or widely accepted. Latour thus shifts the analytical focus: sociology should not begin with a distinction between 'natural' facts and 'social constructions', but instead empirically trace how facts are assembled, stabilized, and sometimes destabilized through networks of humans and more-than-humans (Latour, 2022, pp. 154–173).

In *On the Partial Existence of Existing and Nonexisting Objects*, he writes:

How could he [Ramses II] have died of a bacillus discovered in 1882 and of a disease whose etiology, in its modern form, dates only from 1819 in Laennec's ward? Is it not anachronistic? The attribution of tuberculosis and Koch's bacillus to Ramses II should strike us as an anachronism of the same caliber as if we had diagnosed his death as having been caused by a Marxist upheaval, or a machine gun, or a Wall Street crash. (Latour, 2022, p. 248)

In *Pandora's Hope*, Latour formulates a similar point:

'Did the ferments (or the microbes) exist before Pasteur?' [...] The subject-object dichotomy distributed activity and passivity in such a way that whatever was taken by one was

lost to the other. If Pasteur makes up the microbes, that is, invents them, then the microbes are passive. If the microbes lead Pasteur in his thinking then it is he who is the passive observer of their activity. We have begun to understand, however, that the human-nonhuman does not involve a tug-of-war between two opposite forces. On the contrary, the more activity there is from one, the more activity there is from the other. The more Pasteur works in his laboratory, the more autonomous his ferment becomes. (Latour, 2000, p. 147)

These provocative formulations capture the essence of Latour's position, but they also raise significant interpretive challenges. Literally understood, the statements imply, for instance, that certain things, such as microbes, never existed before they were discovered scientifically. However, this is not Latour's claim. Rather than denying the existence of microbes before Pasteur or Laennec, his argument is that they did not yet exist as stabilized scientific objects within networks of knowledge, instrumentation, and practice. In other words, Latour distinguishes between the ontological existence of entities and their epistemic and material stabilization as objects of scientific knowledge.

This ambiguity led to significant controversy during the so-called Science Wars, where Latour's work was frequently interpreted as a form of epistemic relativism. Critics argued that his approach reduced scientific facts to mere social constructions (Sokal & Bricmont, 1998). Latour later acknowledged that interpretations in which scientific results were disclaimed, like climate change deniers do, were politically problematic. In his essay *Why Has Critique Run out of Steam?*, he reflects on how arguments about social construction had been appropriated by "dangerous extremists [...] using the very same argument of social construction to destroy hard-won evidence that could save our lives" (Latour, 2004b).

To address this problem, Latour (2004b) clarifies that construction does not imply arbitrariness. The moronic use of construction treats the claim that something is constructed as evidence that it is false or manipulable. On the contrary, Latour notes that since it is through a series of networks of experiments, instrumental devices, institutions, and actions that facts are constructed, they are therefore sturdy and worthy of our attention. Construction, in this sense, is the condition of durability, not its negation.

This change in perspective results in the call for Latour to shift from *matters of fact* to *matters of concern*. Unlike *matters of fact*, whose nature is supposed to be isolated and indisputable, *matters of concern* draw attention to the complex and fragile arrangements that make facts durable and meaningful. It follows from the above that critique should consist of caring for and illuminating those networks that make facts possible (Latour, 2004b).

3.5 Fifth Source of Uncertainty: Writing Risky Accounts

The fifth source of uncertainty, namely writing risky accounts, focuses on the responsibility of sociologists themselves. Those who follow the actors and empirically reconstruct controversies, mediations, and translations must do so in the form of descriptions and reports. But such reports are never neutral. Every sociological representation intervenes in the constellations it claims to describe. According to Latour, the role of the sociologist lies in the formation of new ties and the transformation of networks through the writing process. The report may empower some actors while weakening others; it may increase conflicts or reduce them. The activity of writing a report is therefore an act of intervention that cannot be viewed as something outside the network (Latour, 2022, pp. 211–212).

This is precisely why Latour (2022, pp. 212–223) says writing is risky: risky because it influences the stabilization of facts; risky because it – consciously or unconsciously – takes sides in ongoing negotiations; and risky because the report itself becomes an actor in the network it discusses. At this point, it is crucial to understand what Latour means by network. He explains that a network is not a technical structure or spatial map. Rather, it refers to the trail of associations through which actors are connected to one another. An element does not gain stability and reality from within itself, but through the multitude and density of its connections.

Networks are therefore dynamic systems, which appear, transform, dissolve, and reform (Latour, 2022, pp. 223–226). This implies that sociology should not assume abstract structures like societies but instead trace the real links actors engage in. Latour's point is thus that sociology cannot deny its own performativity. It is not a detached observer of events external to it but itself an active part of the networks it describes. As reports generate new associations, they themselves become nodes in the network. This is precisely where the fifth source of indeterminacy lies (Latour, 2022, pp. 211–230).

ANT, as developed by Latour, constitutes a paradigm shift that undermines classical dichotomies such as that between humans and other-than-humans, between subjects and objects, and between facts and concerns. ANT makes it possible to think about ecology in such a way that living beings and entities – whether these are animals and plants, technologies, or even entire ecosystems – can become political actants through their process of association, mediation, and stabilization. Such a paradigmatic move is necessary to lay the conceptual groundwork for broadening the idea of biopolitics proposed by Foucault in order to transcend its anthropocentrism. The following section will address the problem of articulating eco-biopolitics as a concept.

4 Eco-Biopolitics: Theoretical Conceptualization

This chapter develops the theoretical conceptualization of eco-biopolitics and prepares its analytical application. My aim is to systematically extend Foucault's concept of biopolitics to include more-than-human life and ecological systems as integral objects of political rationality. For this purpose, I bring together Foucauldian power analysis with Latour's ANT as described in the previous chapter. Chapter 4.1 introduces a concept map that organizes the framework around two dimensions: ontology and rationalities of governance. Chapter 4.2 then specifies the scope conditions of eco-biopolitics, discusses eco-biopolitical counter-institutions, and develops a typology that clarifies the different forms of eco-biopolitics.

Based on these considerations, I propose the following **working definition of eco-biopolitics**:

Eco-biopolitics is an analytical framework for studying how political power governs, differentiates, and values life beyond the human, including more-than-human beings and ecological systems. It examines how different ontological understandings of nature shape *who* counts as life, *why* it is governed, and *how* governance operates. Eco-biopolitics further analyzes how life is rendered actionable through specific rationalities, institutions, and techniques, and how these practices distribute protection, optimization, and exposure to harm across multispecies and ecological configurations.

In this sense, eco-biopolitics does not name a separate, additional form of power, but a way of analyzing how life is translated into governable forms within contemporary regimes of eco-biopower, and how the politics of this translation is contested. The following section outlines the internal architecture of this framework.

4.1 Concept Map of Eco-Biopolitics: Dimensions and Key Points

The concept map serves as a schematic overview of eco-biopolitics. It identifies two analytical dimensions that together explain how life becomes a political and administrative object:

1. Ontology – what counts as life
2. Rationalities – why and how life is governed

Building on each other, ontology establishes the conceptual foundations and rationalities articulate the guiding logics of intervention.

4.1.1 Ontological Dimension – What counts as life?

[T]he Anthropocene contrasts the human actor to other biological, meteorological, and geological actors. The Human emerges as an abstraction on the one side with the Nonhuman world on the other. (Povinelli, 2016, p. 11)

Povinelli's observation encapsulates the ontological tension that underlies this thesis: if the project proceeds from more-than-human life, it must first ask what counts as life at all and who or what is thereby excluded.

A conventional working definition in biology typically identifies living beings as cellularly organized systems that maintain homeostasis, metabolize energy, grow, reproduce, respond to stimuli, and evolve (Knipe & Howley, 2013). The biological definition may appear reasonable and clear, but in the following cases, I will elaborate its complexity. In botany, inactive seeds are considered to be in a state of dormancy (McAninch, 1999). The origin of dormancy is the Latin word *dormire*, which means *to sleep*. Therefore, those seeds are considered to be 'sleeping' life, in some cases with no measurable metabolism. Once the conditions for the seed are right and it has not been damaged, it can flourish (El-Maarouf-Bouteau, 2022).

Similarly, tardigrades are micro-animals that humans cryptobiosed, a death-like mode with no measurable metabolism at all, and were exposed in low Earth orbit to the vacuum and radiation of space (in some samples also to solar UV) before being returned, rehydrated, and revived (Jönsson et al., 2008). In light of these two cases, I claim that metabolism should not be understood as a permanent, observable activity, but as a capacity: to be alive is to be able to sustain metabolism and to resume it when conditions allow, not to display it uninterruptedly.

Another considerable case, which can shatter the definition of life, is the virus. It has no cellular structure, nor independent metabolism, yet it replicates, mutates, evolves, and causes pandemics on a global scale. The virus, therefore, problematizes the assumption that life is a discrete natural kind (Forterre, 2010; Machery, 2012); instead, livingness appears contextually attributed to the criteria and settings within which it is observed.

Therefore, what counts as life is neither self-evident nor stable. As Edouard Machery (2012) claims in his paper *Why I stopped worrying about the definition of life... And why you should as well*, the recurring failure to provide a single definition of life is not merely a temporary lack of knowledge, but a conceptual signal: Life does not straightforwardly pick out one unified natural kind with necessary and sufficient conditions. Rather, it functions as a cluster concept whose application shifts with explanatory aims and research settings. The borderline cases above show why a fixed checklist definition breaks down. What appears as life is, in practice,

attributed through criteria that are selected, weighted, and stabilized within particular epistemic and institutional contexts. In that sense, searching for a single ‘true’ definition resembles searching for Nathan’s ring⁴: Depending on the epistemological premises, one can always privilege a candidate, yet the privilege itself requires justification.

Povinelli (2016) situates this ontological uncertainty within relations of power. Her concept of *geontopower* names a mode of late-liberal governance that operates *on and through the dividing line between Life and Nonlife* – a line that is not merely descriptive, but politically productive, because it organizes what can be extracted, exhausted, protected, or granted standing. *Geontopower* exposes how biopolitical governance has always depended on the management of this distinction, even when it presented life as its primary object.

Povinelli illustrates this dynamic through heuristic figures such as the Desert, the Animist, and the Virus. The Desert represents forms of existence understood as nonliving, hence open to extraction and exploitation. The Animist ontology shows where the difference between Life and Nonlife evaporates, granting agency to things like rivers, rocks, or ancestral beings. The Virus, on the other hand, disrupts the distinction altogether, manifesting both as nonliving matter and living agents with the capacity for reproduction and transformation. Together, these figures demonstrate that the boundary between Life and Nonlife is neither fixed nor universal, but historically contingent and politically constituted.

Latour’s ANT, however, does something quite different. ANT shifts the focus away from pre-conceived categories like that of life to how things act in relation to others within a network of associations. ANT does not define in advance what qualifies as life; instead, it looks into how agency is generated through the process of mediation and association. To Latour, an actor or actant is simply something that makes a difference within a given state of affairs, regardless of whether they are human or more-than-human (Latour, 2022, p. 129).

In this regard, humans, animals, microorganisms, technologies, as well as atmospheric processes, can also serve as actants, provided that they play a role in determining the results of socio-material assemblages (Latour, 2022). As such, the analysis of life is redirected from its definition as a biological phenomenon to the ways in which various things become significant

⁴ “Nathan’s ring” refers to the “Ring Parable” in Gotthold Ephraim Lessing’s play *Nathan the Wise* (Lessing, 1976). In the parable, a father owns a ring said to make its wearer pleasing to God; unable to choose among his three equally beloved sons, he has made two indistinguishable copies. After his death, the sons fight over which ring is the ‘true’ one (the rings stand symbolically for the three dominating monotheistic religions: Judaism, Christianity and Islam). A judge concludes that the genuine ring cannot be demonstrated by proof and urges each son to live as if his ring were authentic, by practicing love, tolerance, and moral conduct, thereby shifting the question of ‘true’ religion from demonstrable doctrine to ethical life (Lessing, 1976).

in the network of activities. From this perspective, the distinction between life and nonlife is not taken as a given ontological boundary, but as something that is enacted and stabilized within scientific, political, and social practices.

These ontological instabilities make a purely biological starting point untenable and prepare the shift toward an eco-biopolitical perspective. I argue that, within technocratic forms of environmental governance, eco-biopolitics operates through the translation of a contested notion of life into a governable proxy – *biodiversity* – through constitutive cuts that render ecological complexity decidable and administrable. Mechanisms behind this can be bioindicators, monitoring, baselines, and many more. However, this logic is not uncontested. Relational approaches, such as those informed by Indigenous epistemologies, problematize precisely these reductions (Malo Larrea et al., 2024). Rather than translating life into simplified proxies, they emphasize the ongoing negotiation and relational Constitution of what counts as life, thereby resisting or destabilizing such constitutive cuts.

In the technocratic approach, for instance, “[n]aturally occurring Bioindicators are used to assess the health of the environment and are also an important tool for detecting changes in the environment, either positive or negative, and their subsequent effects on human society” (Parmar et al., 2016). To illustrate this, *Chara vulgaris* is an algae that is relatively tolerant to pollution and is commonly described as eutrophication-tolerant, meaning that it can persist under conditions of high nutrient enrichment (eutrophication). It is therefore often found in shallow and nutrient-rich water bodies. In contrast, *Chara braunii* shows pronounced stress responses under copper (Cu) contamination and has been proposed as a bioindicator for copper-related water quality (Marković et al., 2023; Ranawakage et al., 2021).

In waters in which both are inhabitants, a rise in *Chara vulgaris* and a fall of *Chara braunii* can indicate that the limnological system is polluted. Bioindicators operationalize biodiversity by reducing life to a small set of indicator taxa, abundance thresholds, and reference baselines. In doing so, governance does not act on life as such, but on a quantified biodiversity signal that stands in for ecosystem integrity and legitimizes intervention. In addition, Austin Read (2024) links eutrophication to colonial histories of phosphate control and extraction, thereby demonstrating how seemingly local limnological conditions are entangled with global infrastructures of resource circulation, agricultural intensification, and socio-ecological metabolism, whose effects may ultimately boomerang back across the very infrastructures that produced them.

Beyond these operationalizations, the rather vague definition of biodiversity, according to the Convention on Biological Diversity, is “the variability among living organisms from all sources

including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (Secretariat for the Convention on Biological Diversity, 1992, p. 4). This conceptual ambiguity is also emphasized by Youatt (2015, p. 1), who notes that:

‘Biodiversity’ is difficult to define precisely. As an ecological concept, it refers to the diversity of species that make up life on earth. But as it circulates in the world, biodiversity is at once a natural fact, a species-extinction event, a scientific field of inquiry, a political referent, a moral discourse, an abstract pattern, and a tool of governance.

Despite its vagueness, or perhaps precisely because of it, the term is found in all kinds of environmental texts and has mutated into a buzzword that can be used to describe everything and nothing at the same time. In this sense, biodiversity can be read as a strategically flexible signifier, whose vagueness allows it to operate simultaneously as a scientific concept, a political objective, and a moral imperative (Laclau, 2007). I argue that this is the case because biodiversity is not merely an ecological descriptor; rather, it is the technopolitical operationalization of life under late modern hegemonic conditions. Whereas life remains a philosophically unstable term, biodiversity is the category through which governance in the Global North seeks to stabilize, quantify, and protect the living world. The conceptual shift from life to biodiversity thus mirrors one central logic of eco-biopolitics itself: the transformation of ontological uncertainty into a field of administrative and technopolitical control.

Throughout my thesis, more-than-human life serves as the theoretical lens through which the limits of the category of life are examined. In contrast, biodiversity refers to the empirical form in which life is rendered visible, calculable, and governable within environmental policy and governance in the Global North. Parallely, asking what counts as life is also accompanied by the question of whom to cut: any system that seeks to count life must draw distinctions that include some forms and exclude others.

Following Markus Schroer’s (2022) reading of *geosociology*, even Latour’s supposed radical inclusion – a parliament in which humans and more-than-humans alike must be counted as actors (Latour, 2024) – inevitably rests on such procedures of exclusion. Schroer emphasizes Foucault’s question: “Through what system of exclusion, by eliminating whom, by creating what division, through what game of negation and rejection can society begin to function?” (Foucault, 1974). Read in this way, exclusion in a Foucauldian sense is not a normative failure but a constitutive operation that produces subjects, spaces, and regimes of ‘truth’.

To conclude, this subchapter reveals that life as an ontological category is neither fixed nor value-neutral but is generated through scientific, political, and social activities. Instead of taking for granted a pre-defined concept of life, eco-biopolitics takes its ontological ambiguity as a starting point and considers how it can be governed. Life in modern environmental management tends to be translated into biodiversity, a concept that reveals, measures, and operationalizes ecological complexity, although it needs to draw boundaries at the same time. Thus, eco-biopolitics does not just manage life but manages how life can be known, quantified, and intervened upon. The next section elaborates further on this point by exploring rationalities behind these processes.

4.1.2 Rationalities of Governance – Why and how is life governed?

If the previous subchapter argued that counting requires cutting, this subchapter asks how those cuts become necessary, legitimate, and actionable. Modern governance operates as governmentality, described by Foucault as “the ensemble formed by institutions, procedures, analyses and reflections, calculations, and tactics” that organize the conduct and management of life (Foucault, 2007, p. 144). Yet it is undeniable that a big portion of the management of life consists of taking life, no matter whether human life (e.g. through wars), or more-than-human life (e.g. through intense animal husbandry⁵). However, the latter is conducted on a much larger scale.

How can a power such as this kill, if it is true that its basic function is to improve life, to prolong its duration, to improve its chances, to avoid accidents, and to compensate for failings? How, under these conditions, is it possible for a political power to kill, to call for deaths, to demand deaths, to give the order to kill, and to expose not only its enemies but its own citizens to the risk of death? Given that this power's objective is essentially to make live, how can it let die? How can the power of death, the function of death, be exercised in a political system centered upon biopower? It is, I think, at this point that racism intervenes. (Foucault, 2003b, p. 254)

Although racism existed much longer, Foucault claims that its function changed during the 19th century. Two biopolitical functions entered the room. *First*, to legitimize that some lives are valuable and some are not, a break with the continuum of the human species is needed (Lemke et al., 2020). Therefore, Foucault introduces the term *caesuras* to represent those breaks. “That

⁵ Recent work demonstrates how environmental governance increasingly intervenes directly in metabolic processes. Adam Searle et al. (2024), for instance, analyze how climate governance targets livestock metabolism, particularly methane emissions from cattle digestion, thereby illustrating how ecological governance increasingly operates through biological and metabolic optimization.

is the first function of racism: to fragment, to create caesuras within the biological continuum addressed by biopower” (Foucault, 2003b, p. 255).

The *second* function goes even further by trying to establish a positive relationship of “[t]he very fact that you let more die will allow you to live more” (Foucault, 2003b, p. 255). According to Foucault, this relationship follows the logic of war, but in a biological sense. The more the ‘bad’ races die, the ‘healthier’ and ‘purer’ life will be in general.

And the reason this mechanism can come into play is that the enemies who have to be done away with are not adversaries in the political sense of the term; they are threats, either external or internal, to the population and for the population. In the biopower system, in other words, killing or the imperative to kill is acceptable only if it results not in a victory over political adversaries, but in the elimination of the biological threat to and the improvement of the species or race. [...] Once the State functions in the biopower mode, racism alone can justify the murderous function of the State. (Foucault, 2003b, p. 256)

In tandem with Mbembe (2019), there is an equally uneven distribution of exposure to death in contemporary power arrangements, leading to the formation of death-worlds or zones of abandonment, in which selected groups of people are forced to endure their lives by making sacrifices in their everyday lives. For instance, this occurs when industries are set up near poor communities, with risk calculations allowing for tolerable levels of pollution. Where sustainability measures any losses as costs that can be managed within the boundaries of threshold limits, and resilience calls upon the marginalized to be resilient.

Most of these processes align with the concept of slow violence, in which harm occurs gradually and does not have to be visible as its violence unfolds across time (Nixon, 2011). In the context of extractivism, if a company of the Global North decides to exploit a mine next to someone’s village, it may not look like a form of violence. But across time, due to the environmental degradation that is caused by the mine diggings, health problems accumulate for the villagers, leading to severe issues or even death.

Within eco-biopolitics, the logic identified by Foucault does not disappear, but expands. While racism introduces *caesuras* in human populations, contemporary forms of governance operate through additional distinctions that extend beyond the human.

Importantly, these *caesuras* are not entirely new. Historically, processes of dehumanization have often relied on the symbolic reduction of certain human groups to the status of animals. In racist and antisemitic discourses, those constructed as ‘inferior’ are frequently compared to or portrayed as animals, thereby legitimizing their exclusion, exploitation, or even death. This

reveals that the boundary between human and animal has long functioned as a political tool: to be placed closer to ‘animality’ is to be placed outside the sphere of protection.

Building on this, eco-biopolitics introduces an expanded *caesura* within the continuum of life that structures how life is governed: The distinction between the human and the more-than-human. This division encompasses both animals and broader ecological systems and legitimizes their differential valuation, instrumentalization, and destruction. In this sense, eco-biopolitical governance extends Foucauldian biopolitics beyond the human, while reproducing similar mechanisms of differentiation and hierarchization across species and environments.

On the one hand, animals are systematically exploited and killed, even though they remain indispensable to the functioning of ecosystems. For instance, approximately 80% of angiosperms depend on biotic pollinators (Ackerman, 2000), which are essential not only for ecological stability but also for global food production (OECD & Nations, 2022; Ray et al., 2013). Humans thus simultaneously depend on animals and destroy them, revealing a constitutive tension within eco-biopolitical governance: life is both protected and sacrificed, depending on its position within this *caesura*.

On the other hand, this *caesura* extends to nature more broadly and is institutionalized within concepts such as Ecosystem Services (ES). This framework translates ecological processes into economic value and thereby renders nature governable within existing political-economic rationalities (Büscher, 2012; Díaz et al., 2018). Within this logic, nature is reduced to opportunity costs: for example, the potential loss of pollinators is evaluated against the costs of artificial pollination or conservation measures. In the context of the Capitalocene (Moore, 2016), scientific knowledge increasingly adopts this economic language in order to communicate with political and economic actors. As a result, this mode of valuation has become not only normalized but hegemonic.

This distinction can be elaborated with help from Judith Butler's (2009) complementary idea of *grievability*. According to Butler, not all lives are considered equally in terms of the political and media representations, because recognition is allocated to people differently. While certain lives are constructed in ways that allow them to be seen as important, making them ‘grievable’, other lives may be underrepresented politically. She notes that deaths in places like Iraq, Afghanistan, or Palestine are depersonalized, whereas Western lives, particularly those of U.S. soldiers, are individualized and publicly mourned. *Grievability* thus functions as a political mechanism through which hierarchies of life are stabilized and reproduced (Butler, 2009).

Within eco-biopolitical governance, this logic can also be applied beyond the human. Certain forms of more-than-human life become highly visible, emotionally protected, and politically mobilized, while others remain largely invisible despite their ecological importance or systematic destruction. The question is therefore not only which forms of life are protected or sacrificed, but also which forms of life become publicly grievable in the first place.

The uneven distribution of *grievability* becomes particularly visible in contemporary environmental controversies surrounding charismatic animal species, like Timmy. Occasionally, he is also called Hope or Fridolin and is a humpback whale that stranded three times on German coasts in the Baltic Sea in 2026. The media broadly and extensively covered Timmy and his status. Most marine biologists and whale experts who analyzed the situation concluded that Timmy is in dire condition and will eventually die regardless of any intervention. Therefore, they argued that the most humane course of action would be to allow him to die naturally, without any further rescue efforts (Schmidt, 2026). A very heated discussion occurred among German citizens and beyond over whether and how to save him.⁶ The situation got so intense that people not only started to pray for him but also to hold saving ceremonies and send whale-like sounds to him. Hope died soon after (Gessner, 2026), leaving a nation in devastation.

However, at the very same time in the very same Baltic Sea, critically endangered harbor porpoises continue to die as bycatch in fishing nets, which remains one of the primary causes of human-related mortality for the species (HELCOM, 2023). Timmy himself had reportedly already been caught in a fishing net and released before his first stranding (von Schaper, 2026). Marine biologist and whale researcher Fabian Ritter further noted that net fragments were found in Timmy's mouth and that he may also have ingested parts of the net, which could have contributed to his death (*Toter Buckelwal „Timmy“*, 2026).

Timmy's case is therefore not an isolated tragedy, but part of a broader regime of extraction and collateral destruction. Bycatch kills not only harbor porpoises, but also fish (including sharks), seabirds, turtles, and numerous other marine species. Further, such practices disrupt marine trophic webs and intensify pressures on already vulnerable ecosystems (Dietz et al., 2021).

⁶ Two wealthy individuals decided to privately finance a 1.5-million-euro operation designed by radical right influencer Jens Schulz (Ivits, 2026), who also recruited a 'whale whisperer'. Additionally, another radical right individual was brought on board because 'his voice matched the frequency of the whale', and they aimed to create an 'aura' that would contribute to 'saving' the whale (Kroll & Heinemann, 2026). Almost 1.5 months passed from the time of the first stranding until he was released in the North Sea, in an area with very heavy ship traffic. According to the only person with whale experience, the crew of the barge did not want to wait for the whale team to arrive, so they released Timmy with pure violence, which may have caused serious injuries.

What is currently taking place in our seas is an exodus that, in terms of the sheer number of killed and dying animals, can easily rival the whaling era. In fact, the number of victims exceeds even the peak periods of brutal industrial whaling. Reflecting on this, considering what causes it, primarily industrial fishing, and determining how to respond to it, is the task of our time.⁷ (Fabian, 2026, author's translation)

These developments are especially severe in the Baltic Sea, which is widely regarded as one of the world's most polluted and ecologically stressed marine regions due to eutrophication, overfishing, hazardous substances, oxygen depletion, and biodiversity loss (Dietz et al., 2021; European Parliamentary Research Service, 2025; HELCOM, 2021). As Dinesh Wadiwel (2016) argues in *Do Fish Resist?*, industrial fishing systems normalize large-scale violence against marine life while rendering much of this destruction socially and politically invisible. Within this logic, only selected charismatic animals become objects of public empathy and rescue, whereas the systematic killing of countless other sea creatures remains largely ungrieved.

Eco-biopolitical *caesuras* therefore function not only as mechanisms of classification, but also as mechanisms for distributing *grievability* across multispecies life. They determine which forms of life appear as valuable, protectable, and publicly mournable, and which remain politically invisible despite their systematic destruction. Yet these distinctions are not natural or self-evident. They are actively produced, stabilized, and reproduced through institutions, discourses, infrastructures, scientific practices, and material arrangements that shape how life becomes politically visible in the first place.

This dynamic resonates with Latour's argument that nature and society do not constitute separate ontological domains, but are continuously co-produced through networks of relations between humans and more-than-human actants (Latour, 2012). At the same time, Latour emphasizes that power is not a pre-existing resource but must be actively assembled:

Power, like society, is the final result of a process and not a reservoir, a stock, or a capital that will automatically provide an explanation. Power and domination have to be produced, made up, composed. Asymmetries exist, yes, but where do they come from and what are they made out of? (Latour, 2005, p. 72)

⁷ Original German quote: "Was da stattfindet in unseren Meeren, ist ein Exodus, der es von den getöteten Tieren oder sterbenden Tieren gesehen von der Anzahl her ganz locker mit der Walfang-Ära aufnehmen kann. Also das sind größere Opferzahlen als zu den höchsten Zeiten des brutalen Walfangs. Das zu durchdenken, zu überlegen, was ist da ursächlich dafür, nämlich in erster Linie die Fischerei, und wie damit umzugehen ist, das ist das Gebot der Zeit."

From this perspective, eco-biopolitical *caesuras* are not given, but are continuously produced and stabilized through socio-material practices. At the same time, seemingly marginal struggles over nature have become central to collective survival. As Latour and Schultz (2022, p. 69) argue:

Struggles that seemed marginal, on the sidelines, have become central to the survival of all. A surprising reversal that turns every former marginal into the bearer of a struggle that must now be waged on a large scale and together with many others.

This significant shift highlights how ecological conflicts, once considered peripheral, now re-organize the terrain of politics itself.

These dynamics become apparent in cases of the extraction of resources under green capitalism. There is a certain nature that is highly sought after and valued, while other aspects of nature are simply discarded. Rare metals play an important role in renewable energy sources because even small amounts of rare metals have very powerful magnetic forces, thus allowing energy generation with minimal carbon dioxide emission (Pitron, 2024). However, from the perspective of their whole life cycle, the extraction of such metals poses great ecological and societal problems. The mining sites suffer from pollution, poisonous waste, contamination of soil and water, acid rain, and the destruction of entire ecosystems. Such extractivism is evident in many beyond-Western countries, including China, the Democratic Republic of Congo, Kazakhstan, and Bolivia (Pitron, 2024).

In the context of global extractivism, these patterns reveal a continuation of imperial relations between the Global North and the Global South. As Ulrich Brand and Markus Wissen (2017) argue, the ecological and social costs of resource extraction are unevenly distributed, allowing the Global North to pursue ‘sustainable’ development at the expense of human and more-than-human life elsewhere. This dynamic aligns with the logics of racism, *grievability*, and *slow violence* described above: the more life is exposed to harm in one part of the world, the more it can be protected, grieved, and optimized in another.

Extending this argument through the lens of ANT, these *caesuras* can be understood as effects of mediating practices that stabilize distinctions between valuable and disposable forms of life. In this sense, racism is not only a historical phenomenon but also a mediator through which such divisions are materialized and maintained. The same caesural logic that fragments the human species in classical biopolitics is thus rearticulated at a broader scale, sorting and sacrificing more-than-human life as well.

However, identifying these *caesuras* alone does not yet explain *how* they become governable. If eco-biopolitics operates by differentiating, valuing, and exposing life to harm, it must do so through specific logics of intervention that render these distinctions actionable within governance. In other words, the question is not only *what* is cut, but *how* these cuts are translated into concrete strategies of regulation, management, and control. It is at this point that the notion of rationalities becomes crucial.

Five Interlocking Rationalities

On this basis, I identify five interlocking rationalities – security, risk, optimization, sustainability, and resilience – through which environmental governance pushes biopolitics toward eco-biopolitics and discloses where protection yields to abandonment. Those rationalities are not exhaustive and are oriented toward Global North approaches, which I chose, as the Global North is hegemonic in contemporary environmental governance. Nevertheless, these rationalities are key channels through which caesural distinctions are operationalized: they specify which forms of life are problematized, which exposures are rendered acceptable, and which sacrifices are normalized. Taken together, they form the analytical grid for the following sections, where I reconstruct how each rationality configures multispecies populations, redistributes vulnerability, and stabilizes particular patterns of multispecies injustice.

First, security reframes ecological conditions as vulnerabilities to be safeguarded. Security primarily works on uncertainty by organizing uncertainty into a series of probable events (Foucault, 2007). This involves creating boundaries and placing constraints, such as emission limits, habitat reserves, and fire breaks, to prevent risks from spreading through the system (Dalby, 2020; European Commission, 2020).

Through the ANT perspective, the process of creating these zones and setting boundaries becomes one of constructing socio-technical arrangements through which particular places, species, and forms of exposure become legible as ecological risks. Even seemingly objective ecological monitoring practices rely on situated forms of interpretation and negotiation. During a long-term ecological monitoring exercise I participated in as part of the University of Vienna's Master's program in Conservation Biology and Biodiversity Management, vegetation plots were repeatedly relocated through GPS coordinates and historical photographs before being delineated and assessed in the field. Although GPS devices significantly facilitated the relocation of monitoring sites, they did not always indicate precisely the same position, leaving a margin of spatial uncertainty regarding the supposedly identical plots. Working in groups, plant species were identified directly on-site, while species composition and vegetation cover were

visually estimated and documented in the form of species lists, for example, *Festuca pseudovina* with an estimated cover of 5–10%. In practice, disagreements emerged particularly regarding the estimated degree of vegetation cover, but occasionally also concerning species identification itself. Smaller or less visible plants could easily remain unnoticed, while repeated movement around the monitoring plots visibly affected the surrounding vegetation.

At the same time, such monitoring practices remain crucial for the management of the Seewinkel region and the Neusiedler See–Seewinkel National Park. Long-term ecological monitoring enables researchers and conservation authorities to detect gradual environmental transformations such as declining groundwater levels, increasing drought stress, salinization changes, biodiversity loss, eutrophication, invasive species expansion, and the drying of characteristic soda lakes, all of which are intensified by climate change and water extraction. Monitoring therefore not only produces ecological knowledge but also forms an essential basis for environmental governance, conservation planning, and political decision-making under conditions of ecological uncertainty (Euller et al., 2014; Korner et al., 2008).

In Foucauldian terms, security operates alongside sovereignty and discipline: modern power not only *makes live* and *lets die* but also targets the *conditions of existence*, including ecological infrastructures (Foucault, 1978). Importantly, the security rationality can generate significant protective effects. Conservation measures, early warning systems, and ecological monitoring can stabilize ecosystems, prevent species loss, and reduce the likelihood of large-scale environmental breakdowns (Hansson, 2012). In this sense, security is not merely restrictive but also productive: it enables the preservation and continuation of certain forms of life.

However, these benefits are not uniformly distributed. Security logic is not neutral but political and historical, especially within post-colonial states. In some regions in Kenya, for instance, conservation is couched in ecological security rhetoric but carried out using surveillance measures, militarization of anti-poaching patrols, and exclusionary wildlife reserves (C. Biermann & Anderson, 2017; Lunstrum, 2014; Mbaria & Ogada, 2016). Such measures tend to marginalize local communities and limit their access to natural resources, thereby replicating the colonial tradition of territorial dispossession.

In such instances, the preservation of biodiversity also implies the regulation of the human population, specifically that which had been marginalized historically. In this context, security measures do not merely preserve life but redistribute vulnerability by defining who gets to have their lives and livelihoods protected and who does not. Conservation becomes a process of simultaneous ecologizing and exclusion of human communities.

Second, risk converts uncertainty into a calculable object. Extinction probabilities, scenario modeling – from climate projections to species distribution modeling (SDM) – and ES valuation translate contingency into thresholds and priorities (Díaz et al., 2018; Escobar, 1998; Foucault, 2007; IPBES, 2019).

According to Latour (2023, 2024), risk is performative: models and indicators help compose the very networks in which nature appears as governable. This is not a flaw but the condition of practical decision-making. The same tools that enable clarity, comparability, and transparent trade-offs also shape what becomes actionable.

A common critique of modeling is that it relies on imagination rather than ‘real’ knowledge. Yet this misunderstands its epistemic role. Much like complex numbers combine a real and an imaginary component – and are indispensable for describing electrical circuits, waves, or quantum phenomena – ecological models integrate empirical observations with projected scenarios. While the imaginary component is not directly observable, it is essential for calculation, prediction, and intervention. In this sense, models do not fabricate reality but extend it by rendering uncertain futures actionable.

From my applied SDM work in my biology master’s thesis *Climatic Niche Dynamics During the Recovery of Lost Anurans in Costa Rica* (Aref-Zahed, 2026), I have observed how seemingly reasonable modeling decisions – such as the selection of predictor variables, spatial resolution, or threshold criteria – can lead to different yet equally defensible distribution maps. These variations are not arbitrary but reflect underlying assumptions about ecological relationships, data quality, and future developments. This illustrates the double character of modeling: it produces operational knowledge that enables decision-making, while simultaneously framing what counts as a relevant risk, a vulnerable species, or a priority area for intervention.

Third, optimization pursues improvement by normalizing reference values and measuring deviations (Foucault, 2007). Biodiversity policies steer populations toward favorable conservation status, engineer ecosystems for functions such as carbon sequestration or pollination, and maintain genetic diversity to secure adaptive potential – shifting from preservation to performance (C. Biermann & Mansfield, 2014).

ES metrics frequently become targets aligning living systems with productivity benchmarks. Once you quantify a service, that number becomes a target. Management then orients living systems toward hitting that number – shifting from preservation (keep it as it is) to performance (make W do X at level Y by temporality Z). As an example, farmland hedgerows are increasingly treated as low-cost biodiversity infrastructure and, therefore, should be planted more often

(Cocco et al., 2025). Once services such as pollination per hectare, habitat connectivity, or carbon storage are quantified, these metrics become benchmarks that guide management.

Fourth, sustainability turns optimization into a permanent balancing act between ecological integrity and economic development, and locks it in through indicators, budgets, and accounts (Bühler, 2018). This is where Natural Capital Accounting comes in: ecosystems are entered on balance sheets as assets and flows (United Nations et al., 2021), merging ecological with fiscal rationalities, ultimately resulting in a modern paradigm like green growth.

Read with Karl Marx and John B. Foster, this move is ambivalent. For Marx, nature provides capital with free ‘gifts’, such as soil fertility, energy, and raw materials that production takes without paying for, while modern industry opens a *metabolic rift* between human societies and ecological reproduction (Foster, 1999; Marx, 1956). The mode of production destroys its own natural foundations instead of regenerating them. This argument has been extended, showing that today’s natural-capital accounting makes such ‘gifts’ visible and measurable, but at the same time objectifies them through monetization and trade (Foster & Burkett, 2016).

In this light, the smooth balance promised by sustainability ledgers can hide what Mbembe (2019) calls a necropolitical logic: the uneven distribution of vulnerability, in which some landscapes and communities are protected and grieved while others are sacrificed in the name of sustainable growth. This logic closely resonates with Nixon’s (2011) concept of *slow violence* and Butler’s (2009) notion of *grievability*, both of which highlight how harm, suffering, and exposure to death are unevenly distributed and differentially recognized.

Fifth, resilience assumes that disturbance is normal⁸ and focuses on how systems can adapt and reorganize rather than prevent shocks altogether. It works in a cybernetic way through continuous feedback, monitoring, and adjustment, so that power moves from direct control (stop disruption) to indirect calibration (keep the system functioning) (Walker et al., 2010).

In practice, climate adaptation, disaster management, and nature-based solutions follow this logic: they operate through trial and correction, using models, sensors, and dashboards to link human and more-than-human actors into networks that can track and react to change (Grove, 2014; Latour, 2004a). This flexibility has clear advantages by making societies and ecosystems more responsive, but it also has a political side. Resilience often shifts the costs of adaptation

⁸ This understanding partly resonates with ecological theories such as the Intermediate Disturbance Hypothesis, which suggests that moderate levels of disturbance can stabilize or even enhance biodiversity and ecosystem resilience (Dial & Roughgarden, 1998).

onto those already at risk, turning temporary crises into permanent routines of coping and survival.

To conclude, these five rationalities – security, risk, optimization, sustainability, and resilience – indicate how governance nowadays renders the undetermined idea of life calculable, governable, and administrative. They provide means to manage uncertainty, optimize ecological relations, and adapt to disturbance. However, they also manifest themselves through a politics of differentiation – of who and of what to protect, optimize, or allow to adapt.

By extending biopolitics beyond the human to ecological relations, this notion of eco-biopolitics highlights the fact that governing life entails governing the conditions of life itself. What appears as protection or balance often entails selective exposure, delayed harm, or the quiet normalization of sacrifice. In this sense, environmental governance not only manages the living world – it decides, quite literally, which forms of life are allowed to thrive and which must endure. In short, eco-biopolitics names how contemporary power manages life by governing the conditions of life across human and more-than-human worlds.

4.2 Scope Conditions of Eco-Biopolitics

Eco-biopolitics does not take a singular or uniform form. Rather, it manifests in different configurations depending on how nature is conceptualized and how biodiversity is institutionalized within governance structures. These variations are shaped by historical conditions, political-economic contexts, and the specific ways in which ecological crises are addressed. The following section first conceptualizes eco-biopolitics as a counter-institutional formation, before developing a typology that captures its different modes in practice.

4.2.1 Eco-Biopolitics as Counter-Institutional Practice

Eco-biopolitics, on the other hand, is not only a practice of governing more-than-human life but can also be seen as a counter-response to prevailing modes of modern governance. Whereas classical biopolitical practices involve institutionalizing, classifying, and managing forms of life, eco-biopolitics arises as a result of its limits and inadequacies. It is important to note that counter-responses are contextual.

In the Ecuadorian case, for instance, the long tradition of *sumak kawsay* (an indigenous ontology and epistemology) and the rights of nature became prominent as they can be read against a history of colonial exploitation, extractivist development, and the marginalization of indigenous epistemologies (Coral-Guerrero et al., 2021; Hidalgo, 2011; Houtart, 2011; Malo Larrea et al.,

2024). In contrast, within the EU, eco-biopolitical developments are embedded in highly institutionalized governance systems and the emergence of technocratic environmental regulation that tries to cope with the ecological crises.

Indeed, in both instances, eco-biopolitical formations can be said to be reactions not only to ecological problems but also to the inability of mainstream institutions to adequately address them. In this way, the notion of eco-biopolitics is never created in isolation from power and context.

Such responses often take institutional form in what Sergej Seitz (2024) conceptualizes as counter-institutions. These emerge in response to the perceived failures or blind spots of existing institutional arrangements. Rather than operating entirely outside the institutional order, they intervene in its gaps, addressing problems that are insufficiently captured by established governance frameworks. A prominent example is the Embassy of the North Sea, which symbolically represents the interests of a more-than-human entity within political processes. Such initiatives do not merely critique existing institutions but actively experiment with alternative forms of representation, responsibility, and governance (Seitz, 2024).

From this perspective, eco-biopolitics can be interpreted as a form of heterotopia within biopolitical regimes. Drawing on Foucault (1999), heterotopias can be understood as real, situated spaces that operate according to alternative logics while remaining embedded within the dominant order. Eco-biopolitics, in this sense, does not exist fully outside systems of governance but constitutes a parallel space in which alternative ontologies and practices are articulated. These heterotopic spaces make visible that the boundaries of governance are neither fixed nor complete, but continuously contested and reconfigured.

Central to these developments are prefigurative practices. Rather than waiting for institutional change, prefigurative approaches seek to enact alternative forms of governance in the present (Sørensen, 2023). By doing so, they expand political imagination (Castoriadis, 1997) and make different configurations of human–nature relations thinkable and, to some extent, practicable. In the context of eco-biopolitics, such practices play a crucial role, as they allow relational and more-than-human perspectives to be articulated even in the absence of full institutional recognition.

At the same time, these counter-institutional and prefigurative forms remain marked by tensions. While they open up new possibilities, their impact often depends on their translation into more formalized governance structures. This process of translation may lead to partial implementation, institutional friction, or even the transformation of the original relational principles.

Eco-biopolitics thus unfolds across a spectrum ranging from weakly institutionalized, relational practices to highly formalized and technocratic governance forms. It is precisely these variations – shaped by different degrees of biodiversity institutionalization and differing conceptualizations of nature – that the following typology of eco-biopolitics seeks to capture.

4.2.2 Types of Eco-Biopolitics

Since there exist different modes of governing more-than-human life, one cannot speak of a unified form of eco-biopolitics applicable to all contexts. Building on the theoretical considerations above and in order to lay the groundwork for the empirical analysis of the EU and Ecuador (see Chapter 5), this section proposes a typology of eco-biopolitics, as illustrated in Figure 2.

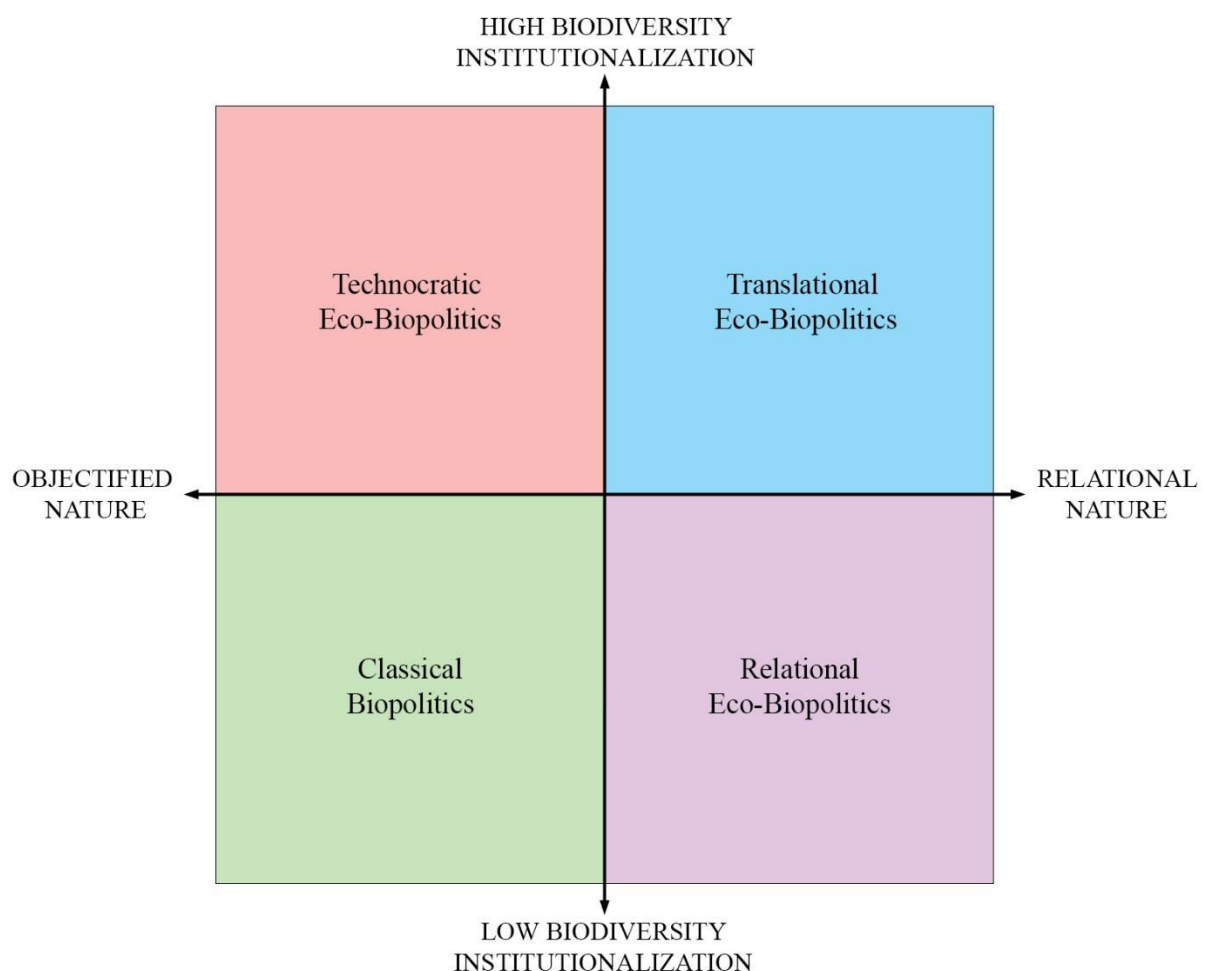


Figure 2: Eco-biopolitical compass.

The framework distinguishes eco-biopolitical modes along two dimensions: the ontological status of nature (objectified vs. relational) and the degree of biodiversity governance institutionalization. The latter does not refer to institutionalization in general, but to the extent to which ecological relations are formalized, translated into legal norms, and embedded in policy instruments. The four quadrants – biopolitical, technocratic, relational, and translational – represent ideal-typical configurations, while empirical cases may occupy hybrid positions across them. Although the framework is designed as a non-normative analytical heuristic, the terminology used – especially distinctions such as *objectified* versus *relational* nature – is itself not free from normative implications. Despite these tensions, the eco-biopolitical compass can nevertheless serve as a heuristic device for distinguishing different modes of governing human and more-than-human life.

To start with, the lower-left quadrant captures forms of governance that can be understood as classical biopolitics. Even though humans are not discrete entities but rather assemblages composed of microorganisms, ecological dependencies, and more-than-human relations, the rationality of classical biopolitics remains firmly oriented toward the human as its primary object of protection and optimization. Nature is thereby primarily treated as an external factor that affects human populations.

At the same time, biodiversity remains poorly institutionalized, whereby environmental issues are regulated to the extent that they influence human life, health, efficiency, or risk. An example is the regulation of air pollution through air quality directives in the EU, which determine the level of pollutants like particulate matter or nitrogen dioxide (European Parliament & Council, 2008). Though these policies have become well institutionalized, their principal purpose lies in safeguarding the human population and not in preserving ecosystems. Here, nature functions as a risk medium or exposure medium, thus providing an example of a form of governance which remains firmly entrenched in biopolitics and not yet in eco-biopolitics.

This corresponds to the bottom right-hand corner, which reflects relational eco-biopolitics, where nature is not an object, but something more relational and co-constitutive, located in relation to society, ecology, and spirituality. As biodiversity does not have much governance infrastructure at all, ecological relationships are not highly institutionalized as rules and indicators. This means that the relationships are embedded in community processes and organizational practice.

As this approach ensures a holistic and non-objectivistic comprehension of human-nature interactions, however, it is important to realize that it may create problems in terms of its realization at the level of governance practices. Specifically, the absence of formalization makes it difficult for relational principles to be applied and coordinated. In other words, relational eco-biopolitics may have a solid grounding, yet the implementation of those measures often fails, leaving them as rather utopian ideas.

One prominent example is the principle of *sumak kawsay*, within the Ecuadorian framework, that views humans as an integral part of a larger network of life based on the principles of living together, mutual exchange, and interdependence. Nevertheless, it faced limitations based on institutional barriers, knowledge deficiencies, and economic pressure.

The upper-left quadrant represents technocratic eco-biopolitics. Here, nature remains largely objectified, while biodiversity is highly institutionalized through legal norms, indicators, targets, monitoring systems, and policy instruments. This mode is characteristic of contemporary environmental governance in the EU, where biodiversity becomes governable through quantified objectives, restoration targets, reporting duties, and expert-led administrative procedures. Unlike classical biopolitics, the object of governance is no longer only the human population but ecological life itself; however, this life is still primarily rendered visible through technocratic and managerial categories.

In the upper right quadrant, one finds translational eco-biopolitical governance characterized by the formalization of relational concepts of nature but their translation into the concrete realm of politics and governance. For such an approach, biodiversity will be highly institutionalized, while nature will have a relational ontology. Translational eco-biopolitics made the jump possible from not only being a utopian idea with a relational understanding but also being realized in governance as a heterotopia.⁹

⁹ To illustrate this distinction heuristically, I draw a highly simplified analogy to the historical tension between anarchist and marxist traditions. Anarchist approaches have often emphasized prefigurative politics, meaning that the methods of political transformation should already embody the emancipatory goals they seek to achieve (Graeber, 2008). This orientation tends to privilege horizontality, anti-authoritarianism, and ethical consistency, but has historically struggled with questions of large-scale institutionalization and durable political coordination (Bakunin, 1990). Marxist traditions, by contrast, have generally been more successful in building centralized institutions and scaling political organization, yet have frequently been criticized for reproducing hierarchical and authoritarian forms of governance in the process (Arendt, 2021). In this simplified analogy, relational eco-biopolitics resembles the anarchist pole insofar as it emphasizes relationality, decentralization, and co-agency, while technocratic eco-biopolitics resembles the marxist pole through its reliance on centralized coordination, expertise, and institutional capacity. Translational eco-biopolitics can then be understood as an attempt to mediate between these poles by combining institutional effectiveness with relational sensitivity toward human and more-than-human actors.

One could argue that the case of Ecuador clearly started within the field of relational eco-biopolitics but over the years it is slowly moving toward translational eco-biopolitics as the level of knowledge and institutionalization is increasing.

Taken together, the proposed typology makes it clear that eco-biopolitics is not an exclusive form of governance but rather a series of configurations depending on differing understandings of nature and levels of institutionalization of biodiversity. As highlighted in the section above, eco-biopolitics is a response to environmental crises and shortcomings in existing governance frameworks that lead to the creation of alternative forms and practices which aim to redefine the connection between humans and nature. Eco-biopolitics thus operates both within and against prevailing biopolitical frameworks through technocratic, relational, and hybrid approaches.

They do not signify established categories but rather serve as analytical instruments for understanding the articulation, institutionalization, and contestation of particular forms of governing beyond human life. The applicability of the categories can only be seen in their use in specific cases, where theoretical differences are translated into situated forms of action within particular socio-historical conditions. With this analytical framework established, the next chapter examines how these ideal-typical modes materialize in concrete governance arrangements.

5 Eco-Biopolitics in Practice

This chapter applies the eco-biopolitics framework to two empirical case studies: the European Union's Nature Restoration Law and the Ecuadorian Constitution. Both cases represent forms of legally binding (hard law) governance, yet they differ significantly in their underlying ontologies, governance logics, and modes of institutionalization. While the EU regulation constitutes a highly technocratic and indicator-based governance instrument, the Ecuadorian Constitution can be understood as a meta-policy that establishes a broader normative and ontological framework, particularly through the recognition of the rights of nature and the concept of *sumak kawsay*, which will be elaborated later (see Chapter 5.2.1).

The selection of these cases is deliberate. They allow for a comparative analysis of contrasting eco-biopolitical configurations: on the one hand, a highly institutionalized, technocratic, and objectifying mode of environmental governance from a supranational scale to a national scale of the member states; on the other hand, a relational and normative framework that seeks to reconfigure the relationship between humans and nature at a national level. By analyzing these cases side by side, the chapter explores how different eco-biopolitical modes are articulated, institutionalized, and contested in practice. I will first start with the European Union and then move on to Ecuador.

5.1 European Union – Nature Restoration Law

The first case examines the European Union's Nature Restoration Law as an example of technocratic and highly institutionalized environmental governance. The analysis proceeds in two steps. *First*, it outlines the EU's multi-level governance structure and the political contestation surrounding the Nature Restoration Law. *Second*, it analyzes the regulation itself as a technocratic governance framework that renders ecosystems measurable and governable through quantified targets.

5.1.1 Multi-Level Governance and Political Contestation

The EU constitutes a system of multi-level governance in which competences are distributed across supranational, national, and subnational levels (Hooghe & Marks, 2003). The current 27 member states remain central political units, yet they are embedded within a broader institutional framework that shapes and constrains their policy-making (Hix & Høyland, 2022). Within the EU system, governance operates through the interaction of key EU institutions – such as the European Commission, the European Parliament, and the Council of the European

Union – as well as national administrations responsible for implementation (Hix & Høyland, 2022). This institutional configuration enables the coordination and standardization of ecological governance across territories, rendering biodiversity measurable and governable at a supranational scale. This reflects the rationalities of optimization and security identified in Chapter 4, through which ecological complexity becomes standardized, measurable, and governable across political scales.

In the field of environmental governance, multi-level polity provides the institutional structure through which strategic objectives can be translated into binding legal instruments (Jordan & Gravey, 2021). While member states retain responsibility for implementation, policy goals and regulatory frameworks are largely defined at the EU level, reflecting a polity in which authority is distributed yet hierarchically structured, allowing supranational institutions to define regulations while delegating implementation to member states. This structure is particularly evident in biodiversity governance, where supranational strategies are operationalized through regulations that require national adaptation and enforcement (European Commission, 2020, 2024; Jordan et al., 2021a; Jordan & Gravey, 2021). Therefore, I would argue that the EU governance operates on a macro scale and is highly institutionalized.

Furthermore, environmental politics within the EU is characterized by complex negotiations between supranational institutions, member states, and competing interest groups. Biodiversity-related governance is shaped by tensions between ecological objectives and economic interests (Jordan et al., 2021b). These conflicts are typically mediated through institutionalized procedures and expert-driven processes, which facilitate compromise while simultaneously obscuring underlying power asymmetries (Vadrot, 2014). As a result, environmental outcomes often reflect negotiated trade-offs rather than purely ecological considerations.

This can be exemplified by the Nature Restoration Law, whose development was shaped by intense political contestation. While the proposal initially received strong support from scientists, environmental organizations, and parts of the private sector, opposition quickly emerged from actors in primary sectors such as agriculture, forestry, and fisheries, who raised concerns about economic impacts and regulatory burdens (Cliquet et al., 2024). Much of this opposition was accompanied by the circulation of claims, for instance, that restoration measures would threaten food security or undermine climate mitigation efforts. These claims were contested by scientific actors and assessments, which emphasized the ecological and long-term socio-economic benefits of restoration, yet the claims nevertheless gained traction in public and political debates and contributed to the politicization of the proposal. As a result, the final compromise

reflects not only ecological objectives but also political bargaining, lobbying pressures, and competing economic interests, ultimately producing a less ambitious policy outcome than initially envisioned (Cliquet et al., 2024; Pe'er et al., 2023). Importantly, these antagonisms did not end with the formal adoption of the law. Political contestation persisted throughout the final approval stages and is likely to continue during implementation, particularly as member states respond to domestic pressures, including protests from agricultural actors (Cliquet et al., 2024).

The underlying critique behind many protests is that the EU works as a top-down institution with very centralized power structures (Jordan 2000; Peters & Pierre 2004). To answer these critiques, some of the governance principles that operate within the EU have tried to counteract this phenomenon and partially decentralize the process of decision-making. One such key principle is that of subsidiarity, which postulates that political decisions should be made as close to the people as possible. There have been various efforts to incorporate the idea of bottom-up multi-level governance into the environmental policy sphere, including regional and local stakeholders (Jordan 2000; Hooghe & Marks 2003).

To exemplify this in greater detail, in my work at the Austrian Institute of Economic Research, I have contributed to the EU project *Land Management for Sustainability* (LAMASUS). “LAMASUS develops an innovative governance model based on collaborative work by policy makers, land users, and researchers.” (*LAMASUS - Land Management for Sustainability*, 2022). Although not directly part of the Nature Restoration Law, it still is highly related and gave me valuable insight into EU processes.

Next to the scientific aspect of the project, LAMASUS also involved people from different member states in the form of stakeholder workshops in Spain, Germany, Greece, Belgium, France, Austria, the Netherlands, and Norway. Four regional workshops were held. Additionally, scientists and stakeholders were also flown in for four international workshops. During those workshops, the results of the scientists were presented and intensively discussed with and among the stakeholders. I documented the stakeholder statements in reports, which influenced ongoing research within the project and created feedback loops between science and the people affected by policies.

Although this approach gave us extremely valuable insights into realities that scientists could not easily access from ivory towers, it also faced issues. *First*, who decides which stakeholder is invited? Why are some groups of stakeholders more prominent than other groups? For instance, if one invites many more people working for the executive than people from NGOs, it is highly probable that executive actors will dominate, which was indeed the case. *Second*, why

are countries from Western and Northern Europe more represented than countries from Eastern and Southern Europe? Attempts to increase participation from Eastern European countries revealed that differing cultural understandings of environmental governance and EU projects also shaped levels of participation. *Third*, which may also contribute to the previous point, structural problems hindered the stakeholder recruitment process. For example, because women still carry the largest share of care responsibilities, many of the already small number of women in the agricultural sector often were unable to participate in the workshops in other countries.

Nevertheless – despite the epistemic, cultural, and structural problems – this approach is an important step toward decentralizing knowledge and power and should therefore continue, while at the same time being continuously improved. The tensions observed within projects such as LAMASUS demonstrate that contemporary ecological governance oscillates between decentralization and technocratic centralization. While participatory mechanisms seek to include local actors and situated forms of knowledge, supranational institutions continue to shape the overall regulatory frameworks, indicators, and objectives through which biodiversity becomes governable. The Nature Restoration Law provides a particularly revealing example of how these eco-biopolitical rationalities are translated into binding environmental governance.

5.1.2 The Nature Restoration Law as Technocratic Environmental Governance

In 2024, the EU enacted the Nature Restoration Law. However, the regulation is not a spontaneous or isolated development. Rather, it builds on decades of environmental governance and treaties at both EU and international levels, including directives, strategies, and global biodiversity commitments that have shaped and catalyzed its emergence (Convention on Biological Diversity, 2022; European Commission, 2020; Secretariat for the Convention on Biological Diversity, 1992, 2020). In this sense, the Nature Restoration Law can be understood as a conglomerate of multiple policy trajectories and governance instruments.

Its main objective is the “restoration of ecosystems to ensure the recovery of biodiverse and resilient nature across the Union territory” (European Commission, 2024, p. 1). Article 1 further specifies its scope, including the long-term recovery of degraded ecosystems across both land and sea areas, while simultaneously contributing to climate change mitigation and adaptation, land degradation neutrality, food security, and the fulfilment of international commitments (European Commission, 2024, p. 18).

A central element of the regulation is the requirement for member states to implement restoration measures covering “at least 20 % of land areas and at least 20 % of sea areas by 2030, and

all ecosystems in need of restoration by 2050“ (European Commission, 2024, p. 18). Notably, the regulation repeatedly follows a formulaic logic: *Y % of W should reach X by year Z*. For instance, “Member States shall put in place measures which shall aim to restore organic soils in agricultural use constituting drained peatlands. Those measures shall be in place on at least: (a) 30% of such areas by 2030, of which at least a quarter shall be rewetted; [...]” (European Commission, 2024, pp. 27–28). This illustrates how ecosystems are rendered governable through optimization rationalities that translate ecological processes into measurable performance targets. At the same time, the temporal structure of these targets reflects resilience-oriented governance, in which ecosystems are continuously monitored and recalibrated over time.

Other named targets include the renaturation of rivers, reforestation and the removal of invasive species, as well as the reintroduction of ecological structures such as hedgerows and fallow areas in agricultural landscapes to increase biodiversity. In addition, restoration measures extend to urban environments, including greening and the reduction of sealed surfaces (European Commission, 2024).

Central to this approach is the regulation’s definition of ecosystem as a “dynamic complex of plant, animal, fungi and microorganism communities and their non-living environment, interacting as a functional unit” (European Commission, 2024, p. 18). While this definition explicitly includes both living and non-living components, it nevertheless maintains a distinction between them and organizes their interaction within a functional framework. In this sense, the regulation exemplifies Povinelli’s (2016) argument that the categories of life and nonlife are politically stabilized through governance practices.

However, I claim that this stabilization should not be understood merely as a reduction, but as a precondition for environmental governance in a European context. Governing complex ecological processes requires their translation into analytically distinguishable and operationalizable entities. Without defining ecosystems as functional units, it would be difficult to establish measurable targets, compare ecological conditions across member states, or implement restoration measures in a systematic way across the EU. In terms of the Eco-Biopolitical Compass, this reflects a technocratic mode of eco-biopolitics, in which nature is primarily approached through objectified and functional categories that enable large-scale governance interventions.

The ecosystem concept employed in the regulation therefore treats living and non-living components as distinguishable yet functionally integrated, rendering ecological processes measurable and governable. In this sense, the regulation does not simply reflect a particular ontology of nature, but actively produces the conditions under which ecosystems can be governed and

transformed. Rather than contradicting relational or process-oriented understandings of nature, this functional definition constitutes a strategic simplification that enables coordinated intervention across large spatial and political scales. However, this does not imply that such stabilization constitutes the only possible mode of large-scale environmental governance. Rather, it highlights the specific epistemic and operational conditions under which this particular regulatory framework becomes actionable.

Furthermore, the EU Nature Restoration Law does not primarily refer to the designation of protected areas, but to the implementation of active restoration measures across ecosystems. These measures can also take place outside existing conservation zones, including in agricultural landscapes, forests, and urban areas. This does not imply the absence of protection-based approaches in EU environmental governance. On the contrary, earlier legal frameworks – most notably the EU Habitats Directive and the EU Birds Directive – established a system of territorial conservation through the Natura 2000 network (European Commission, 2009, 2019, 2025).¹⁰

These conservation infrastructures also reflect security rationalities, insofar as ecological governance seeks to stabilize vulnerable ecosystems through territorial protection, ecological boundaries, and preventive intervention. Rather than replacing these approaches, the regulation complements and extends them. At the same time, it reinforces obligations within already protected areas by requiring the improvement of ecological conditions and the prevention of further degradation. This shift illustrates how eco-biopolitical governance increasingly operates through optimization and resilience rationalities, moving beyond the passive protection of ecosystems toward their active restoration and adaptive management.

This shift toward more interventionist forms of environmental governance is closely linked to the increasing role of indicators and monitoring requirements within the regulation. In order to render restoration processes measurable and comparable across member states, the law relies on a set of quantified indicators that translate ecological complexity into standardized metrics. These indicators form a key component of the governance framework, enabling the coordination of restoration efforts across different spatial and political contexts.

We should admit rather that power produces knowledge, that power and knowledge directly imply one another; that there is no power relation without the correlative Constitution of a

¹⁰ The Natura 2000 network constitutes the core of EU conservation policy, based on the designation of protected areas aimed at maintaining or restoring a favorable conservation status of species and habitats (European Commission, 2019).

field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations. (Foucault, 1995, p. 27)

Techniques and instruments are thus not neutral tools, but sites where specific power relations and specific fields of environmental knowledge are co-constituted.

In eco-biopolitics, this takes the form of an institutionalization of environmental knowledge, in which scientific expertise, environmental agencies, and global assessment bodies define what counts as relevant data, thresholds, and indicators. These arrangements underpin technocratic environmental interventions that present decisions about multispecies life as matters of technical optimization rather than political contestation. From an actor-network perspective, such interventions can be seen as networks of heterogeneous actants: quantification devices, maps, models, and indicators operate as mediators that transform, translate, and reorder relations between humans, more-than-humans, and institutions.

Quantification is central here, especially in biodiversity conservation. Biodiversity indicators, population models, habitat suitability indices, and ES valuations do not simply describe ecological realities; they enact a particular political anatomy of life. Originally coined to analyze the disciplining of individual bodies, Foucault's (1995) notion of a political anatomy can be extended to the ways in which species, habitats, and ecological processes are decomposed into units that can be counted, ranked, targeted, and optimized. This corresponds closely to the optimization rationality outlined in Chapter 4, where multispecies life becomes governable through quantification, benchmarking, and performance-based intervention.

In this sense, quantification operates as a microphysical technique: it organizes more-than-human bodies and relations through minute classifications, thresholds, and performance indicators. These inscription devices translate messy ecological relations into comparable numbers, graphs, and maps, stabilizing certain versions of reality while excluding others. At the same time, they contribute to a political economy of the body, in which living beings and ecosystems are assessed in terms of productivity, resilience, and their contribution to growth, 'natural capital' or offset markets. This corresponds to sustainability rationalities in which ecological systems are increasingly integrated into logics of economic management, long-term resource stability, and green growth. As discussed in the previous section, such calculative practices help draw ecological *caesuras*, sorting species and territories into those that merit investment and those that can be exposed to degradation or loss.

Spatial instruments such as zoning plans, protected area designations, land-use regulations, and restoration programs further materialize these distinctions. They draw lines between spaces of

protection, spaces of optimization, and spaces of sacrifice, translating ecological *caesuras* into cartographic form. Furthermore, monitoring technologies and predictive models add a temporal dimension. Remote sensing devices, sensors, databases, and climate or population models enable anticipatory interventions that seek to prevent threshold crossings or manage future risks. This reflects the risk rationality outlined in Chapter 4, in which ecological uncertainty is translated into calculable scenarios, thresholds, and anticipatory governance interventions.

Just as disciplinary microphysics organizes individual bodies through spatial division, activity coding, and time management (Foucault, 1995), eco-biopolitical microphysics organizes multispecies collectives through sampling grids, monitoring intervals, reporting cycles, and modelled futures. Here, eco-biopolitics operates through distributed, capillary mechanisms – data standards, field protocols, software interfaces, indicators, and reporting formats – that quietly shape how multispecies life is governed.

For instance, Article 12 on forest ecosystems requires member states to achieve an increasing trend at national level in the common forest bird index, as well as in at least six out of seven additional indicators, including standing and lying deadwood, forest connectivity, stock of organic carbon, the share of forests dominated by native tree species, and tree species diversity (European Commission, 2024, pp. 28–29). Such indicators not only measure ecological conditions but also define what counts as restoration success, thereby shaping both the objectives and the implementation of policy.

To illustrate a case more deeply, I will take a closer look at deadwood. For context, deadwood has long been assumed to be waste and the presence of it even a form of mismanagement and a potential infection risk for healthy trees (Radu, 2006). Therefore, it has been removed extensively for decades. At the end of the 20th century, a growing number of scholars studied deadwood and came to different conclusions. In particular, deadwood has been identified as a key component for maintaining biodiversity and ecosystem functioning (Albrecht, 1991; Blanco & Lo, 2012; Hansson, 2012; Kirby & Drake, 1993; Radu, 2006). As Stelian Radu (2006, p. 137) argues, deadwood is “maintaining biodiversity because they provide food and shelter for mammals (particularly bats), birds, and less visible forest-dwelling biota such as invertebrates (especially beetles), fungi and lichens. Deadwood is a constant and critical subsystem component in natural forests, playing a key role in sustaining forest productivity and environmental functions such as carbon storage”. This knowledge was strengthened in the science networks, taken up by the EU, and became an objective in the Nature Restoration Law.

Deadwood is now considered an indicator of ecological quality and biodiversity. From a Foucauldian perspective, this shift reflects a process of objectification, in which deadwood is rendered visible, measurable, and governable through its incorporation into indicator frameworks. As such, it becomes an object of governance that can be monitored, compared, and regulated. At the same time, a Latourian perspective allows us to move beyond this objectification by analyzing how deadwood participates in governance processes. Through its stabilization as a measurable variable, it can be understood as an actant within a network of environmental governance, as it contributes to shaping monitoring, reporting, and intervention. Rather than presupposing a distinction between passive objects and active subjects, this dual perspective highlights how ecological elements are both constituted as objects of governance and, through their integration into socio-technical networks, participate in the distribution of material agency.

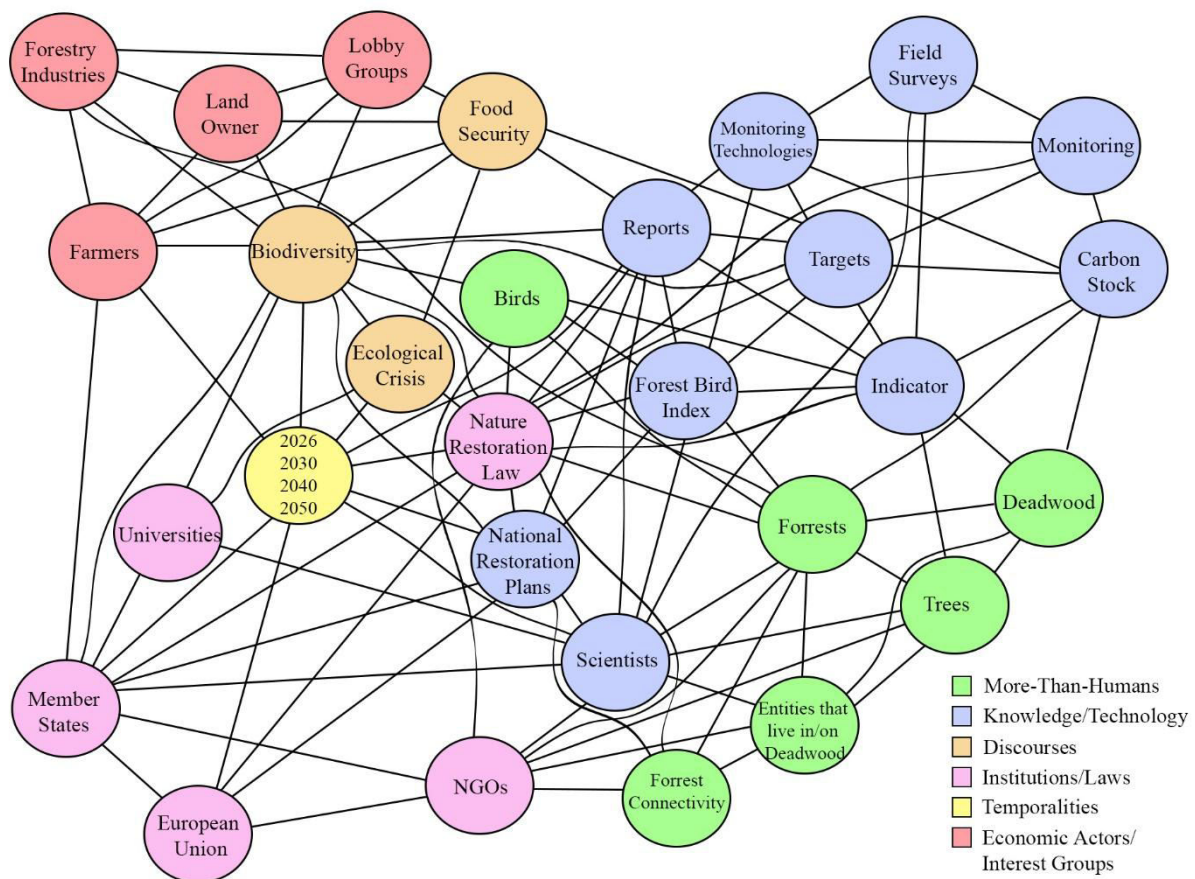


Figure 3: Actant mapping of the EU Nature Restoration Law with focus on Article 12.

To further illustrate the complexity of environmental governance, Figure 3 constitutes a simplified and partial representation, focusing on a specific empirical example, namely the governance of forest ecosystems as outlined in Article 12 of the Nature Restoration Law. Rather than

aiming to capture the full complexity of the policy framework, it highlights central relations that are particularly relevant for this case.

The mapping includes a wide range of human and more-than-human entities that jointly shape governance processes. This approach follows ANT, which emphasizes that agency emerges through networks of heterogeneous actants. Notable is the central role of knowledge and scientific expertise, which is also explicitly reflected in the regulation itself, as it requires member states to “taking into account the latest scientific evidence” (European Commission, 2024, p. 29). From a Foucauldian perspective, this illustrates how governance operates through knowledge, as scientific expertise becomes a key basis for defining, measuring, and managing ecological processes.

Furthermore, Figure 3 makes visible how ecological elements such as deadwood are not only objects of governance, but also participate as actants within socio-technical networks that produce and stabilize environmental knowledge and intervention. In this sense, environmental governance appears as materially and technocratically mediated, relying on infrastructures of measurement, monitoring, and expertise that render ecological processes visible and actionable.

Building on this mapping, the role of indicators and monitoring practices becomes particularly central for understanding how environmental governance is operationalized in practice. While the actant map illustrates the heterogeneous network of actors and entities involved, it is through indicators and monitoring systems that these relations are stabilized and translated into concrete governance outcomes. Monitoring thus functions as a key mechanism through which ecological processes are continuously assessed and aligned with the targets set out in the regulation. Therefore, monitoring can be understood as a central technique of governance that ensures visibility, comparability, and control. Here, resilience rationalities become particularly visible, as governance operates through continuous monitoring, feedback loops, and adaptive recalibration rather than through static conservation alone. At the same time, a Latourian perspective highlights how monitoring infrastructures themselves become part of the network of actants that sustain and reproduce governance processes over time.

This process also transforms the meaning and value of ecological entities themselves. For example, deadwood, which was long regarded primarily as waste, disorder, or a sign of mismanagement in forestry practices, increasingly becomes redefined as an ecological indicator and conservation resource associated with biodiversity, habitat provision, nutrient cycling, and ecosystem resilience. Through monitoring and indicator systems, ecological elements are thus not

merely observed but resignified and integrated into new governance rationalities and regimes of value.

In addition, the regulation requires member states to prepare and submit national restoration plans by September 2026 (European Commission, 2024, p. 34). These plans are subject to periodic review and revision, with EU countries being obliged to update them and include supplementary measures by 2032 and again in 2042. This introduces a temporal structure to environmental governance, in which planning, implementation, and evaluation are organized in iterative cycles. Rather than constituting a one-time intervention, restoration is thus framed as an ongoing and adaptive process, continuously reassessed in light of monitoring data and policy objectives. From this perspective, temporality becomes a key dimension of governance, structuring not only when action takes place, but how it is continuously recalibrated through cycles of knowledge production and review.

While these timelines structure governance as an iterative and forward-looking process, the Nature Restoration Law has only recently entered into force, and its effectiveness therefore remains difficult to evaluate. However, analyses of related EU policy frameworks, such as National Energy and Climate Plans and Common Agricultural Policy Strategic Plans, point to inconsistencies and challenges in their practical implementation (Perissi, 2025). In particular, limited coordination across policy domains and the lack of detailed, actionable measures may complicate their alignment with the objectives of the Nature Restoration Law. In some cases, these coordination gaps may even result in competing priorities, for instance between renewable energy expansion on the one hand and biodiversity or land-use objectives on the other. (Perissi, 2025).

5.2 Ecuador's Constitution, *Sumak Kawsay* and the Rights of Nature

This subchapter examines the Ecuadorian case as an alternative configuration of environmental governance, focusing on the relationship between *sumak kawsay*, the constitution, and the institutionalization of the RoN. It proceeds in three steps. *First*, it outlines *sumak kawsay* as a distinct epistemological framework that reconfigures knowledge, nature, and human–environment relations. *Second*, it analyzes how these principles are translated into the legal and institutional framework of the Ecuadorian Constitution, particularly through the recognition of the RoN. *Third*, it investigates the practical implementation of these principles and the tensions that arise in the context of extractive development and global economic structures.

5.2.1 *Sumak Kawsay* and the Reconfiguration of Knowledge and Nature

Sumak kawsay is an alternative epistemology, in comparison to those dominant in the Global North, of the Indigenous Kichwa people on which the Ecuadorian Constitution is based (Acosta & Martínez, 2009; Coral-Guerrero et al., 2021; Gudynas, 2011). It is often translated in Spanish as *buen vivir* (good living), which has been contested as the true meaning cannot be translated without reducing its philosophical and cultural notions of the Andean cosmovision (Coral-Guerrero et al., 2021; Hidalgo, 2011). Therefore, I will continue with the original term *sumak kawsay*.

This worldview flourished through the Kichwa community in the Global South and predates capitalism as well as communism or socialism. Therefore, even if it is diametrically opposed to Western capitalist thought, *sumak kawsay* should not be understood as a derivative of hegemonic development paradigms (Hidalgo, 2011). Rather than prioritizing economic growth or individual accumulation, it emphasizes relational coexistence, collective well-being, and ecological balance (Acosta & Abarca, 2018; Acosta & Martínez, 2009; Gudynas, 2011). Although there are clearly some similarities between *sumak kawsay* and eco-socialist imaginaries, it is nevertheless distinct in its temporality. While classical socialist thoughts follow a trajectory of a European understanding of linear time, *sumak kawsay* is grounded in cyclical and relational temporalities. (Coral-Guerrero et al., 2021). In this sense, *sumak kawsay* not only challenges dominant development paradigms but also reorients how life and continuity are understood across time.

Building on this, Coral-Guerrero et al. (2021) identify four theoretical foundations of *sumak kawsay*. *First*, it is grounded in an Indigenous worldview that rejects linear conceptions of development and instead emphasizes non-linear and relational processes. This perspective avoids rigid dichotomies and adopts a holistic understanding in which social, ecological, and spiritual dimensions are inseparably intertwined (Acosta, 2011; Houtart, 2011).

Second, nature plays an ontologically important role, being described as *Pachamama* (Mother Earth). It is seen as a living being that embraces the lives of human beings. In this regard, the distinction between humans and nature is erased, since they both belong to the same undifferentiated whole (Gudynas, 2009). This biocentric perspective assigns intrinsic value to nature, independent of its instrumental use (Gudynas, 2016). Within the eco-biopolitical compass, this reflects a relational mode of eco-biopolitics in which nature is not approached as an object of governance external to society, but as part of a co-constitutive network of human and more-than-human relations.

Third, community forms an important organizing principle. Social interactions are marked by mutual interdependency, interrelation, and strong ties of belonging, both materially and affectively in nature. As highlighted by Choquencagua (2010, as cited in Coral-Guerrero et al., 2021, p. 37), “[w]e are part of the community, as the leaf is part of the plant”. This metaphor illustrates the idea that people are part of collectives and their environments rather than being independent individuals.

Fourth, the economic element of *sumak kawsay* is governed by principles of solidarity and reciprocity. The economy is less concerned with accumulation and expansion, and more focused on redistribution and exchange for collective benefit. In this view, poverty is not a condition of material deprivation, but one of societal and ecological imbalance (Acosta, 2011).

Eco-biopolitical theories would see *sumak kawsay* as an alternative epistemological paradigm that allows the articulation of life and nature into knowable concepts. Instead of generating knowledge based on abstraction, categorization, and quantification, it provides an epistemology wherein the production of knowledge arises from a relational perspective that sees humans, nature, and community as intertwined with each other. Unlike scientific methods that generate knowledge external to the subjects under consideration, *sumak kawsay* generates knowledge that is inseparable from its subject. The latter creates tensions with technocratic eco-biopolitical systems because of its inherent relationality that foregrounds knowledge as non-objective and situational.

Another element of this perspective that is consonant with ANT is the rejection of *a priori* distinctions between subject and object. Instead, it emphasizes relationality and the co-production of agency. Through the lens of ANT, *sumak kawsay* expands the range of actants involved in knowledge formation beyond humans and organizations to include more-than-human entities such as ecosystems, spiritualities, and communities. Knowledge thus emerges through engagement within networks rather than through detached observation. *Sumak kawsay* can therefore be understood as a relational ontology rooted in Indigenous epistemologies. Building on this perspective, the following mapping visualizes the heterogeneous network of actants involved in the Ecuadorian case.

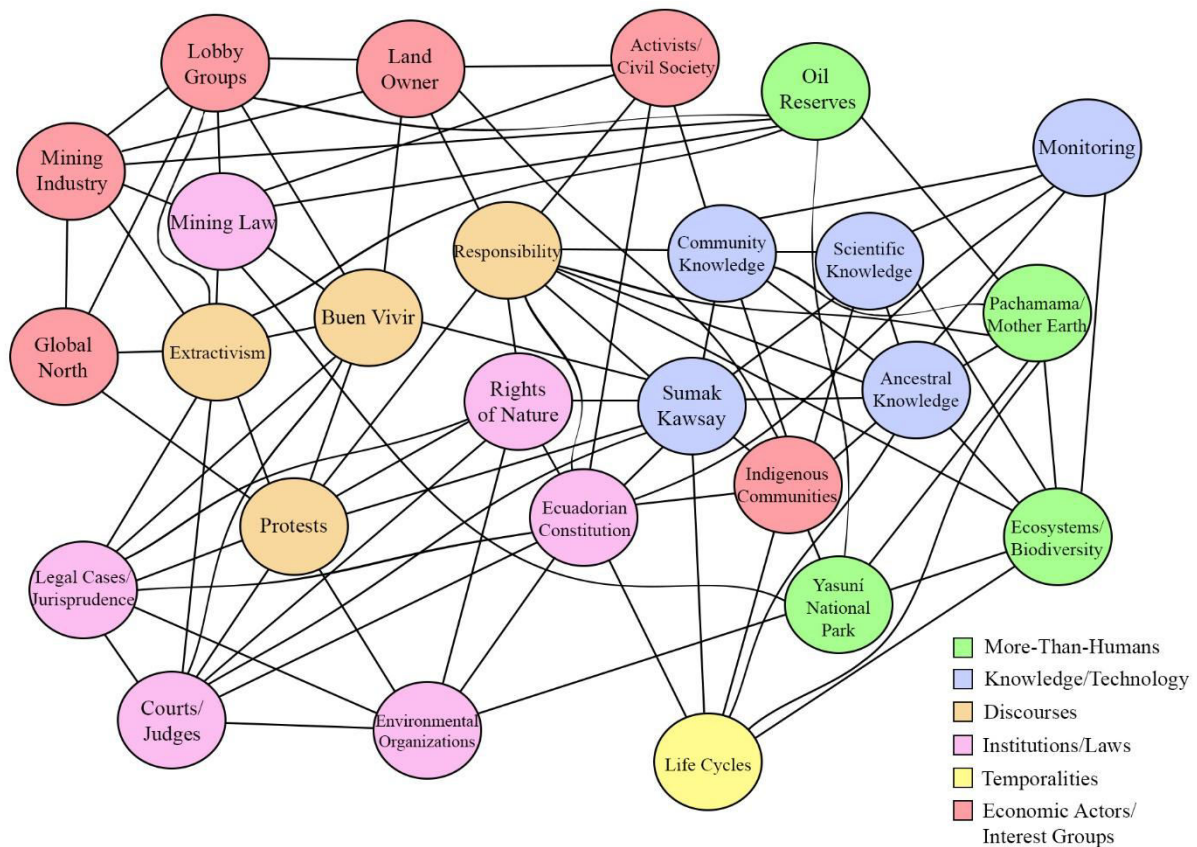


Figure 4: Actant mapping of Ecuador's rights of nature framework.

Figure 4 illustrates key human and more-than-human actants shaping the Ecuadorian case, including Indigenous epistemologies, legal institutions, extractive industries, and ecological entities. It highlights how these elements are relationally configured and anticipates the tensions between relational ontologies and extractive political-economic structures that will be examined in Chapter 5.2.3. While this mapping provides an overview of the relational configuration of the Ecuadorian case, the following subchapter examines how these epistemological principles are translated into the legal and institutional framework of the Ecuadorian Constitution, particularly through the recognition of the RoN.

5.2.2 The Ecuadorian Constitution and its Rights of Nature

“Nature shall be the subject of those rights that the Constitution recognizes for it” (Ecuador's Constitution, 2008, p. 11). The Ecuadorian Constitution, adopted in 2008, marks a profound shift in environmental governance by recognizing nature not merely as an object of protection, but as a subject of rights. It was the first country to include the RoN (Kauffman & Martin, 2017). Notably, this meta-policy precedes the EU Nature Restoration Law by sixteen years, a temporal difference that is significant when considering the evolution of environmental dis-

courses and governance frameworks. While ecological crises were already widely acknowledged at the global level in 2008, the corresponding governance networks, policy instruments, and scientific infrastructures have expanded considerably in the years leading up to 2024.

Despite an earlier stage of the recognition of the crises, the Ecuadorian Constitution already recognizes the importance of “[a] new form of public coexistence, in diversity and in harmony with nature, to achieve the good way of living, the *sumak kawsay*” (Ecuador’s Constitution, 2008, p. 8).

This vision is further articulated in the preamble of the Constitution, which provides an explicit account of its human–nature relationship.

CELEBRATING nature, the Pacha Mama (Mother Earth), of which we are a part and which is vital to our existence. (Ecuador’s Constitution, 2008, p. 8)

The use of the term “celebrating” is of utmost importance, as it conveys not merely recognition, but an explicit normative and affective valuation of nature. What is striking here is the decentring of a classical human–nature dichotomy. Rather than positioning humans as separate from or external to nature, the Constitution explicitly situates them as part of it, while simultaneously emphasizing their dependence on ecological systems.

This relational and value-laden understanding of humans and nature also has important implications for how responsibility for environmental harm is conceptualized. The Ecuadorian Constitution establishes a precautionary approach, requiring the state to adopt timely policies and measures to avoid environmental harm where there is a risk of damage. Importantly, it extends this obligation to situations of uncertainty, mandating protective action even in the absence of full scientific evidence (Ecuador’s Constitution, 2008, p. 136). This reflects security rationalities insofar as environmental governance seeks to prevent ecological harm through anticipatory and precautionary intervention.

Beyond prevention, the Constitution states that “[r]esponsibility for environmental damage is objective. All damage to the environment, in addition to the respective penalties, shall also entail the obligation of integrally restoring the ecosystems and compensating the affected persons and communities” (Ecuador’s Constitution, 2008, p. 136). In recent debates on criminal justice, similar logics have been discussed under the concept of *restorative justice*, which emphasizes repairing harm and restoring relationships rather than focusing solely on punishment (Zehr, 2010). While the Ecuadorian framework is not directly derived from this concept, it reflects a comparable orientation, in which environmental harm entails not only sanctions but also obligations of prevention, restoration, and compensation.

Responsibility for environmental protection is further decentralized and embedded within community-based structures. It is, for instance, assigned in part to local governance bodies such as rural parish governments (Ecuador's Constitution, 2008, p. 98). In addition, the constitution requires that "[a]ll state decision or authorization that could affect the environment shall be consulted with the community, which shall be informed fully and in a timely manner" (Ecuador's Constitution, 2008, p. 137). Even the process of creating the Constitution itself was participatory. Civil society contributed to the drafting of the Ecuadorian Constitution by submitting over 3,000 proposals, which were acknowledged by the governmental body, and the final draft of the Constitution was approved by Ecuadorian voters (Kauffman & Martin, 2017).

This participatory dimension is reinforced by the establishment of a decentralized national environmental management system, which is tasked with safeguarding the environment and nature, while articulating the shared responsibility between the state and the citizenry (Ecuador's Constitution, 2008, p. 137). Environmental governance is thus not only a matter of state regulation, but is distributed across multiple levels and actors, integrating local communities into decision-making and responsibility structures.

The central role of knowledge in environmental governance is also conceptualized differently in the Ecuadorian Constitution. It explicitly recognizes not only scientific knowledge, but also "collective knowledge," including ancestral wisdom, traditional practices, and knowledge about biodiversity and ecosystems (Ecuador's Constitution, 2008, p. 27).

The national system of science, technology, innovation and ancestral wisdom, in the framework of respect for the environment, nature, life, cultures and sovereignty, shall have as its end purpose the following:

1. To generate, adapt, and disseminate scientific and technological knowledge.
2. To restore, strengthen and upgrade ancestral wisdom.
3. To develop technologies and innovations that promote national production, raise efficiency and productivity, improve the quality of life and contribution to the achievement of the good way of living. (Ecuador's Constitution, 2008, p. 132)

These provisions indicate that knowledge in the Ecuadorian Constitution is not treated as a singular, technocratic resource, but as a plural and relational domain that integrates scientific expertise with ancestral and collective forms of knowing. This connection becomes particularly visible in the Constitution's reference to environmental monitoring, which is framed not merely as a technical practice, but as part of broader structures of accountability. Responsibility for environmental protection extends to public officials tasked with carrying out environmental

monitoring (Ecuador's Constitution, 2008, p. 136), thereby embedding knowledge practices within institutional arrangements of oversight and responsibility. While monitoring does not occupy as central or technically elaborate a role as in the EU case, its inclusion nevertheless points to emerging resilience rationalities oriented toward adaptive governance, environmental responsiveness, and institutional accountability.

At the same time, the Constitution situates environmental governance within a distinct temporal framework. Rather than relying on linear notions of progress, it refers to the "life cycles of the planet and biosphere" (Ecuador's Constitution, 2008, p. 141) and emphasizes intergenerational responsibility, stating that biodiversity shall be managed "on the basis of responsibility between generations" (Ecuador's Constitution, 2008, p. 137).

This relational and intergenerational understanding of governance also extends to the economic sphere. The Ecuadorian Constitution recognizes "the right to develop economic activities individually or collectively, in line with the principles of solidarity, social and environmental responsibility" (Ecuador's Constitution, 2008, p. 32). Economic activity is thus not framed as an autonomous domain driven solely by growth or efficiency, but is explicitly embedded within social and ecological relations.

Rather than positioning the economy in opposition to environmental protection, the Constitution integrates economic practices into a broader normative framework that emphasizes responsibility, solidarity, and sustainability. Unlike technocratic sustainability rationalities centered on optimization and green growth, the Ecuadorian framework embeds economic activity within broader ethical and ecological relations. This reflects a departure from conventional models that treat economic development and environmental protection as competing objectives, instead conceptualizing them as mutually constitutive.

The Ecuadorian Constitution also addresses the question of extractivism, revealing inherent tensions within its environmental governance framework. On the one hand, it establishes strong protective measures, prohibiting the extraction of non-renewable natural resources in protected and intangible areas, including a ban on metal mining in such zones (Ecuador's Constitution, 2008, p. 138). On the other hand, it affirms state ownership over non-renewable natural resources and allows their exploitation under strict environmental conditions, while ensuring that the State captures a significant share of the resulting profits (Ecuador's Constitution, 2008, p. 139).

This dual approach reflects the broader structural position of Ecuador within the global economy, where dependence on resource extraction persists despite constitutional commitments to

environmental protection and *sumak kawsay*. Extractive activities are thus not simply prohibited, but re-regulated and embedded within a framework that seeks to reconcile economic necessity with ecological limits. This tension illustrates how sustainability and risk rationalities remain deeply entangled with global economic dependencies, even within relational eco-biopolitical frameworks.

This tension cannot be understood in isolation from global dynamics. Resource extraction in countries such as Ecuador is closely linked to international demand, including demand originating from industrialized economies in the Global North, such as the EU. In this sense, environmental governance is shaped not only by national constitutional frameworks, but also by transnational economic relations that generate pressures for extraction. This places countries like Ecuador in a structurally constrained position, where commitments to ecological protection coexist with the economic imperatives of participating in global markets.

The Ecuadorian case therefore does not represent a complete departure from dominant forms of environmental governance, but rather illustrates a hybrid model in which alternative ontologies and governance logics are institutionalized, while remaining entangled with global economic structures. Rather than replacing technocratic governance rationalities entirely, the Ecuadorian case demonstrates how different eco-biopolitical rationalities coexist and overlap within historically and economically constrained governance arrangements. As such, it provides a critical lens through which to rethink the possibilities and limitations of eco-biopolitical governance beyond technocratic and objectifying approaches.

5.2.3 The Aftermath: Rights of Nature under Extractive Pressure

What appears on paper as a utopian dream in which humans and more-than-humans finally live in harmony again turned out to be a nightmare for those who understood *sumak kawsay* from an environmental and Indigenous perspective.

Shortly after the Constitution was adopted, a mining law was passed, which stated that it would ensure social development as well as improve the energy sector through its profits, while simultaneously ensuring socially and environmentally responsible mining. Paradoxically, according to the Ecuadorian politicians who created the mining law, its legitimization followed the principles of *sumak kawsay*, as its profits would allow a better life for the people. This displays the discursive element of *sumak kawsay*, especially when it is read as *buen vivir*. Through this

translation, the concept could be mobilized not only to justify ecological protection and Indigenous relational ontologies, but also developmental and extractivist state projects aimed at improving social welfare through resource revenues.

An incredible number of environmental and community-rights activists and Indigenous communities started protesting as they saw the law as a direct violation of their own Constitution and accused the state of twisting the concept of *sumak kawsay* (Coral-Guerrero et al., 2021). These violations can also be understood as attacks on Ecuadorian identity itself. If Ecuadorians see themselves as entangled with nature, then destroying nature also means destroying Ecuadorians.

In a Derridean sense, constitutional declarations do not merely describe an already existing political reality, but also actively participate in producing the political subjects and collective identities they invoke (Derrida & Kittler, 2000). Such dynamics also resonate with Latour's (2005) notion of the uncertainty of groups, insofar as Ecuadorians, through the perceived violation of their Constitution and environment, are compelled to continuously reaffirm and defend both – and thereby themselves and their collective identity.

This led to increasing tensions when a water law was proposed in 2009 with similar conditions as the mining law. Craig M. Kauffman and Pamela L. Martin (2017) report that by 2011, 189 Indigenous leaders were arrested and charged with terrorism for sabotaging mining activities. Furthermore, the government closed many protest-led environmental organizations.

Consequently, efforts to apply RoN in Ecuador occurred in a highly politicized context, with relatively little institutional structure beyond general constitutional principles. Yet, while some efforts failed, others succeeded in developing RoN jurisprudence. (Kauffman & Martin, 2017)

Kauffman and Martin (2017) analyzed thirteen Ecuadorian cases from 2008 to 2016 in which legal tools were contested to protect the RoN. Ten out of the thirteen cases succeeded in court, and two main obstacles were identified. *First*, these cases had to navigate politicized contexts, and *second*, judges often lacked knowledge not only of *sumak kawsay*, but also of environmental issues and the RoN. This knowledge gap became particularly significant, as secondary laws and institutions intended to support the Constitution were never fully established. As Kauffman and Martin (2017, p. 139) note, “the government ignored this process as it focused on expanding mining”.

Nevertheless, the discourse on the RoN has become a fundamental part of national debates, and extractive activities increasingly require justification. The growing number of precedent-setting

cases has strengthened RoN norms, and their discursive dimension has contributed to increasing judicial awareness over time.

As judges become aware of RoN laws, they become agents in the development of RoN norms and jurisprudence, not because they are norm entrepreneurs, but because of their professional requirements to interpret and apply RoN according to the law. The fact that Ecuadorian judges are beginning to apply RoN to cases that were not initially about RoN is evidence that RoN norms are strengthening in the judicial system. This is another way that Ecuador's allegedly 'weak' (i.e., not fully implemented) RoN laws matter. (Kauffman & Martin, 2017, p. 139)

Furthermore, as Tilo Wesche (2023) argues, although Ecuador's RoN are embedded in a specific context of Indigenous cultures and the concept of *Pachamama*, they cannot be universalized or simply transferred to other governance frameworks in the Global North, which follow different logics of validity (Geltungslogiken). As a consequence, RoN can only be established if they emerge on their own normative basis (Wesche, 2023, pp. 15–16). Nevertheless, through Ecuador's Constitution, RoN have also become part of an international discourse, and an increasing number of countries have adopted similar notions, including Romania, India, Bolivia, the United States, Brazil, and New Zealand (Kauffman & Martin, 2017).

Such contradictions of constitutional principles versus extractive actions are also expressed in political initiatives. According to Gudynas (2011) and Kauffman and Martin (2017), an example of such a political initiative is the Yasuní-ITT Initiative, introduced in 2007, with the goal of leaving huge amounts of oil underground and receiving international financial compensation. There were three main reasons behind this initiative. *Firstly*, the idea of not extracting resources would contribute to avoiding greenhouse gas emissions and helping to mitigate climate change effects. *Secondly*, such an initiative was expected to protect one of the most biodiverse territories of the Earth, as well as the areas where indigenous communities live. *Finally*, the most important point from the political standpoint is that this initiative is based on the idea of global environmental justice. Namely, the Yasuní-ITT Initiative contests the idea that the countries of the Global South must suffer economically because of their conservation actions, while developed countries benefit from extractivism. This idea of global environmental justice implies that the countries that benefit from the exploitation of natural resources must provide some form of compensation for it.

Yet, the project turned out to be unsuccessful in 2013 as a result of a lack of international backing, and oil extraction went on (Kauffman & Martin, 2017). The case reveals that environmental

politics in Ecuador is characterized by both internal disagreements and broader global power relations. Namely, ongoing consumption of fossil fuels in the Global North stimulates the continuation of extractive development models, preventing alternative solutions from being implemented politically (Gudynas, 2011).

Such issues can be contextualized through a larger discussion of extractivism, an ongoing process that impacts Ecuador's political economy. In spite of constitutional recognition of RoN and *sumak kawsay*, state-directed development continues to be characterized by extensive resource extraction. As such, the tension between ecology and economics is further highlighted within the context of efforts to re-envision environmental governance under a system still dependent upon resource extraction.

To sum up, the Ecuadorian case can be considered an example of relational eco-biopolitics within the proposed eco-biopolitics framework. The principles of *sumak kawsay* and the concept of the Rights of Nature lay the groundwork for an ontologically relational understanding of the environment, while their institutionalization initially remained limited. Nevertheless, this level of institutionalization increased over time through legal development and jurisprudence, moving the Ecuadorian case more toward translational eco-biopolitics. At the same time, it should be noted that the developments described above indicate that eco-biopolitics does not exist as an isolated phenomenon, but rather in interaction with other eco-biopolitical modes. For instance, the tensions surrounding extractivism demonstrate how technocratic eco-biopolitics continues to shape and constrain relational eco-biopolitical projects.

6 How Can Eco-Biopolitics Be Applied to Environmental Policies?

The preceding case studies demonstrate that environmental governance cannot be reduced to a singular logic of conservation, sustainability, or ecological management. Instead, environmental policies operate through multiple and often competing rationalities that shape how nature, risk, responsibility, and ecological futures are governed.

The concept of eco-biopolitics developed in this thesis provides an analytical perspective for examining these dynamics. Rather than focusing solely on institutions or policy outcomes, it draws attention to how environmental governance renders ecosystems knowable, measurable, and governable through specific forms of knowledge, infrastructures, and intervention. The following sections therefore outline how the proposed framework can be applied analytically through the five interlocking rationalities and the Eco-Biopolitical Compass developed in Chapter 4.

6.1 The Five Interlocking Rationalities as Analytical Categories

The five interlocking rationalities developed in Chapter 4 – security, risk, optimization, sustainability, and resilience – provide a heuristic framework for analyzing how environmental policies govern ecological life. Rather than functioning as isolated categories, these rationalities frequently overlap and reinforce one another within concrete governance arrangements. Environmental governance therefore does not operate through a singular logic, but through multiple rationalities that interact, compete, and stabilize one another.

As set out in Table 2, the framework can be applied analytically by applying different analytical questions to environmental policies and governance arrangements.

Table 2: Analytical Questions for Applying the Eco-Biopolitical Framework.

Rationality	Analytical questions
Security	Which forms of life are to be protected? Which ecological boundaries are drawn? Which threats are to be prevented? Which lives are publicly grieved when lost?
Risk	Which ecological futures are anticipated? Which uncertainties are calculated, modeled, or monitored? Which risks justify intervention?
Optimization	What becomes measurable, quantifiable, and improvable? Which indicators, targets, and benchmarks define ecological success?

Sustainability	How are ecological protection and economic activity reconciled? Which forms of development are considered sustainable? Which ecological and social trade-offs are normalized?
Resilience	How are adaptation, recovery, and flexibility organized? Which monitoring, feedback, and recalibration mechanisms sustain system functionality under disturbance?

The case studies demonstrated that these rationalities rarely appear independently. The EU Nature Restoration Law, for instance, combines security rationalities through conservation infrastructures, optimization rationalities through quantified restoration targets, sustainability rationalities through the integration of ecological and economic objectives, and resilience rationalities through adaptive monitoring systems. Similarly, the Ecuadorian case illustrates how relational and decentralized forms of governance nevertheless remain entangled with security, sustainability, and risk rationalities, particularly in relation to extractivism and global economic dependencies.

The framework therefore enables environmental policies to be analyzed not simply according to their stated objectives, but according to the underlying rationalities through which ecological life becomes governable. In this sense, eco-biopolitics shifts analytical attention from environmental policy as a purely institutional or legal phenomenon toward the epistemic, material, and political conditions through which environmental governance is organized in practice.

6.2 The Eco-Biopolitical Compass and Hybrid Governance Configurations

The Eco-Biopolitical Compass developed in Chapter 4 provides a comparative heuristic for situating environmental governance arrangements according to their underlying ontology of nature and their degree of biodiversity institutionalization. Rather than functioning as fixed categories, the compass allows governance configurations to be analyzed as dynamic and hybrid formations in which different rationalities and governance modes overlap.

The comparison between the EU Nature Restoration Law and Ecuador's constitutional framework illustrates these differences particularly clearly. The EU case primarily reflects a technocratic configuration of eco-biopolitics characterized by highly institutionalized governance structures, standardized indicators, monitoring systems, and an objectified-functional understanding of nature. Ecuador, by contrast, moves closer to relational eco-biopolitics through the principles of *sumak kawsay*, the recognition of the rights of nature, and the integration of plural and situated forms of knowledge.

At the same time, neither case exists in a pure form. The EU framework incorporates certain participatory elements through multi-level governance arrangements, while the Ecuadorian framework remains entangled with extractivist economic structures, environmental monitoring practices, and institutional governance mechanisms. The compass therefore highlights that environmental governance rarely operates through fully isolated modes, but instead through hybrid and contested configurations shaped by historical, political, and economic conditions.

Importantly, governance configurations may also shift over time. Increasing institutionalization, legal codification, and the expansion of environmental governance infrastructures can gradually transform relational forms of eco-biopolitics into more translational configurations. In the Ecuadorian case, for example, the growing institutionalization of the rights of nature through courts, legal procedures, environmental monitoring, and administrative structures increasingly translates relational ontologies into formal governance arrangements. The compass therefore not only enables comparison between governance configurations, but also helps to analyze their historical transformation and internal tensions.

6.3 Limitations and Future Research

Although my developed concept of eco-biopolitics offers a heuristic for examining current policies and shaping future ones, there are also limitations. Since this is a theoretical work and a practical component would go beyond the scope of this thesis, a practical exploration would be useful for future projects. The insights gained from practical work could then feed back into the theory, refining, improving, and expanding it where necessary.

In particular, the question of the exact mechanisms and techniques behind eco-biopolitics remains open. Future research could explore more systematically the relationship between eco-biopolitics and eco-biopower. Although this thesis has mainly worked with eco-biopolitics as a conceptual frame for understanding how environmental governance produces and organizes more-than-human life, future studies could draw on empirical work to explore the material and institutional mechanisms through which these arrangements are made effective. Adapting Foucauldian notions of biopower (Foucault, 1978, 2020), this would allow for a detailed analysis of how environmental governance operates through protocols, databases, indicators, modeling practices, thresholds, monitoring infrastructures, and institutional categories that make ecological life governable and intervention-ready.

In this context, future research could also more directly engage with STS notions such as Calton's (1986) notion of *interessement* (*inter-esse*, to be in between) in order to analyze how

environmental governance attempts to bring actors, species, technologies, environments, metrics, and responsibilities into relatively stable intervention arrangements. More precisely, conservation interventions might seek to enroll species, sites, monitoring practices, and ecological indicators into workable governance assemblages, while organisms, pathogens, ecological dynamics, and local environmental conditions might simultaneously redirect, resist, or exceed these enrollments (Kirksey, 2015; Wadiwel, 2016).

From this perspective, representation is not treated as a fixed act of speaking for passive entities, but as a contingent and ongoing process of negotiation, mediation, and stabilization across multispecies relations. *Interessement* therefore offers one possible way of rethinking the spokesperson problem discussed in Chapter 3.1 by shifting analytical attention from the legitimacy of individual spokespersons toward the socio-material practices through which representation itself becomes assembled, contested, and maintained (Kirksey, 2015). Such approaches would enable us to move beyond broad governance rationalities to a more fine-grained analysis of the evidentiary, infrastructural, and material-semiotic mechanisms through which environmental governance stabilizes, validates, and operationalizes claims about ecological life.

Future research could also engage more systematically with emerging work in political ecology, decolonial ecology, metabolic politics, more-than-human geography, democratic environmental governance, and pluralist political theory that examines how ecological governance operates through infrastructures, material flows, colonial inheritances, multispecies relations, competing worlds, and contested forms of participation and representation (Callon, 1986; Kirksey & Helmreich, 2010; Mitchell, 2016). Of particular relevance are approaches that analyze how environments become measurable, governable, and intervention-ready through documentary infrastructures, environmental metrics, natural capital accounting, and monitoring systems. From this point of view, eco-biopolitics could increasingly be understood not only as the governance of life, but also as the governance of socio-ecological metabolism through the regulation, circulation, optimization, and monitoring of ecological matter, species, nutrients, energy, and environmental information across socio-technical infrastructures.

Beyond these theoretical limitations, the empirical scope of this thesis also remains limited. The analysis was mainly based on document analysis, policy frameworks, and discourse analysis, which was appropriate for the development of the conceptual framework, but future research should aim to include more extensive empirical and ethnographic engagement with environmental governance practices. In particular, multispecies ethnography and fieldwork could give further insights into the concrete mechanisms of enactment of eco-biopolitical governance in

everyday practices, how ecological knowledge is negotiated between different actors and how more-than-human entities themselves shape governance processes.

Such approaches would allow for the analysis of the translation, contestation, and material enactment of environmental policies across local contexts, institutions, and ecological relations. Future research could thus combine policy analysis with participant observation, interviews, multispecies ethnography, and the study of monitoring and modeling practices in order to examine environmental governance beyond formal policy frameworks alone. Finally, the framework itself should be considered open and provisional rather than definitive. Environmental governance configurations are historically contingent, internally contradictory, and subject to constant transformation. The Eco-Biopolitical Compass and the five interlocking rationalities thus do not seek to provide a stable typology of environmental governance, but rather a flexible analytical vocabulary for exploring how ecological life becomes governable under alternative political, epistemic, and institutional conditions.

7 Conclusion

My thesis argues that classical biopolitical theory no longer sufficiently captures governance under conditions of ecological crisis. The main aim was thus to develop a theoretical framework to enable a systematic extension of biopolitical analysis to more-than-human life. More specifically, I addressed two interrelated research questions: first, how the concept of biopolitics can be extended to capture the governance of more-than-human life forms and ecological systems, and second, to what extent current environmental governance can be understood as expressions of eco-biopolitical rationalities.

To address these questions, my thesis engaged Foucault's analytics of biopower and governmentality in dialogue with Latour's ANT, political ecology, and Povinelli's concept of *geon-topower*. This theoretical synthesis enabled a conceptual shift from the anthropocentric assumptions of classical biopolitics. Rather than viewing nature as a passive background condition for human politics, the framework conceptualized humans, more-than-humans, technologies, infrastructures, and ecological processes as relationally entangled in networks of governance.

Building on this, I developed eco-biopolitics as an analytical framework that examines how political rationalities govern, regulate, optimize, and make calculable life across human and more-than-human domains. Eco-biopolitics was not conceptualized as a replacement for classical biopolitics, but rather as its ecological expansion. The framework showed that contemporary hegemonic environmental governance increasingly operates through forms of power that focus on ecosystems as functional units, species relations, ecological resilience, biodiversity infrastructures, and environmental futures as objects of intervention.

To make this framework operational in an analytical sense, I developed a number of conceptual tools. *First*, I identified five interlocking rationalities – security, risk, optimization, sustainability, and resilience – through which hegemonic environmental governance renders ecological life governable. Rather than functioning independently, these rationalities overlap and stabilize one another through environmental policies, ecological indicators, restoration targets, monitoring systems, and adaptive governance mechanisms. The framework therefore shifted analytical attention away from environmental policy as merely a legal or institutional phenomenon toward the epistemic and material conditions through which ecological governance becomes operational.

Second, the thesis developed the Eco-Biopolitical Compass as a comparative heuristic to analyze different governance configurations according to their ontology of nature and degree of biodiversity institutionalization. The compass showed that eco-biopolitics does not exist as a

singular governance form, but through hybrid and contested arrangements combining technocratic, relational, translational, and classical biopolitical elements. Environmental governance thus does not appear as a coherent regime, but as a constantly shifting field where different ontologies, rationalities, and infrastructures compete and overlap.

The empirical analysis revealed these dynamics through the comparison of the EU Nature Restoration Law and Ecuador's constitutional recognition of the Rights of Nature. The EU case demonstrated a predominantly technocratic form of eco-biopolitics, characterized by highly institutionalized environmental governance through quantified restoration targets, ecological indicators, monitoring infrastructures, and adaptive management systems that render ecosystems measurable and intervention-ready. Ecuador, by contrast, exemplified a more relational form of eco-biopolitics grounded in an ontology that conceptualizes ecosystems not only as objects of governance but also as legal and political subjects.

Nonetheless, both cases also revealed significant tensions and contradictions. In the EU case, conflicts emerged around the perceived top-down character of environmental governance and fears that restoration measures could undermine food security and agricultural production. In Ecuador, by contrast, tensions emerged through the translation of the Indigenous concept of *sumak kawsay* into the more anthropocentric framework of *buen vivir*, leading to severe misunderstandings and protests. At the same time, this politicization contributed to increasing institutionalization. Ecuador can therefore be understood as moving from a predominantly relational form of eco-biopolitics toward a more translational eco-biopolitical configuration.

Broadly speaking, I showed that eco-biopolitics should not be simply understood as an extension of environmental protection. Rather, eco-biopolitical governance produces new modalities of inclusion, exclusion, protection, optimization, sacrifice, and abandonment, all at once, across human and more-than-human life. The same rationalities that seek to secure ecosystems may also create new ecological *caesuras*, unevenly redistribute vulnerability, and legitimate forms of extractivism and disposability elsewhere. Eco-biopolitics is thus profoundly ambivalent: it manages ecological crises and simultaneously reproduces many of the asymmetries and inequalities inscribed within existing political-economic systems.

The contribution of my thesis is mainly in its theoretical synthesis. By connecting Foucauldian biopolitics with ANT and political ecology, I produced a conceptual vocabulary to analyze how contemporary power increasingly governs life beyond the human. In doing so, I contribute to debates on the transformation of political power under conditions of ecological crisis. At the

same time, the framework developed here should be seen as open and provisional rather than definitive.

Eco-biopolitics is not proposed as a universal theory able to explain all forms of environmental governance. Rather, it is offered as a flexible analytical heuristic that exposes how environmental governance organizes, differentiates, and governs life across socio-ecological assemblages. The framework therefore does not attempt to resolve the tensions between technocratic governance, relational ontologies, ecological protection, and political economy. Instead, it provides tools for analyzing how these tensions are continuously negotiated, stabilized, and challenged within contemporary environmental governance.

I ultimately argue that the recent ecological crises call for not only new environmental policies but also new analytical frameworks that can understand how power is exercised through ecological relations. Eco-biopolitics is proposed as one such framework: an effort to rethink the politics of life under conditions in which the boundaries between humans, more-than-humans, nature, and governance become increasingly unstable and politically consequential.

Reference List

- Ackerman, J. D. (2000). Abiotic pollen and pollination: Ecological, functional, and evolutionary perspectives. *Plant Systematics and Evolution*, 222(1), 167–185.
<https://doi.org/10.1007/BF00984101>
- Acosta, A. (2011). El buen (con)vivir, una utopía por (re)construir: Alcances de la Constitución de Montecristi. *Revista Obets*, 6(1). <https://doi.org/10.14198/OBETS2011.6.1.03>
- Acosta, A., & Abarca, M. M. (2018). Buen Vivir: An Alternative Perspective from the Peoples of the Global South to the Crisis of Capitalist Modernity. In Vishwas Satgar (Ed.), *The Climate Crisis: South African and Global Democratic Eco-Socialist Alternatives* (pp. 131–147). Wits University Press.
- Acosta, A., & Martínez, E. (2009). *El buen vivir: Una vía para el desarrollo* (1st ed.). Abya-Yala.
- Agamben, G. (2021). *Homo sacer: Die souveräne Macht und das nackte Leben* (H. Thüning, Trans.; 13th ed.). Suhrkamp.
- Akchurin, M. (2015). Constructing the Rights of Nature: Constitutional Reform, Mobilization, and Environmental Protection in Ecuador. *Law & Social Inquiry*, 40(04), 937–968. <https://doi.org/10.1111/lsi.12141>
- Albrecht, L. (1991). Die Bedeutung des toten Holzes im Wald. *Forstwissenschaftliches Centralblatt vereinigt mit Tharandter forstliches Jahrbuch*, 110(1), 106–113.
<https://doi.org/10.1007/BF02741245>
- Aragão, A., & van de Braak, K. (2026). Interpretation of the EU Nature Restoration Law: From pieces of a puzzle to a complete picture. *Restoration Ecology*, n/a(n/a), e70318.
<https://doi.org/10.1111/rec.70318>
- Aref-Zahed, S. (2026). *Climatic Niche Dynamics During the Recovery of Lost Anurans in Costa Rica* [Master's thesis]. University of Vienna.
- Arendt, H. (2021). *Elemente und Ursprünge totaler Herrschaft: Antisemitismus, Imperialismus, totale Herrschaft* (23rd ed.). Piper.
- Bakunin, M. A. (1990). *Statism and anarchy* (1st ed.). Cambridge University Press.
- Barua, M. (2025a). Metabolic geographies: Work, shifts and politics. *Progress in Human Geography*, 49(2), 145–163. <https://doi.org/10.1177/03091325241311914>

- Barua, M. (2025b). Metabolic politics: A comparative synthesis. *Transactions of the Institute of British Geographers*, 50(2), e12712. <https://doi.org/10.1111/tran.12712>
- Biermann, C., & Anderson, R. M. (2017). Conservation, biopolitics, and the governance of life and death. *Geography Compass*, 11(10), e12329. <https://doi.org/10.1111/gec3.12329>
- Biermann, C., & Mansfield, B. (2014). Biodiversity, Purity, and Death: Conservation Biology as Biopolitics. *Environment and Planning D: Society and Space*, 32(2), 257–273. <https://doi.org/10.1068/d13047p>
- Biermann, F. (2021). The future of ‘environmental’ policy in the Anthropocene: Time for a paradigm shift. *Environmental Politics*, 30(1–2), 61–80. <https://doi.org/10.1080/09644016.2020.1846958>
- Blanco, J. A., & Lo, Y.-H. (2012). *Forest Ecosystems: More than Just Trees*. BoD – Books on Demand.
- Brand, U., & Wissen, M. (2017). *Imperiale Lebensweise: Zur Ausbeutung von Mensch und Natur im Globalen Kapitalismus*. Oekom.
- Bühler, B. (2018). *Ökologische Gouvernementalität: Zur Geschichte einer Regierungsform*. Transcript.
- Bulkeley, H. (2019). Navigating climate’s human geographies: Exploring the whereabouts of climate politics. *Dialogues in Human Geography*, 9(1), 3–17. <https://doi.org/10.1177/2043820619829920>
- Büscher, B. (2012). Payments for Ecosystem Services as Neoliberal Conservation: (Re)interpreting Evidence from the Maloti-Drakensberg, South Africa. *Conservation and Society*, 10(1), 29. <https://doi.org/10.4103/0972-4923.92190>
- Butler, J. (2009). *Frames of war: When is life grievable?* (1st ed.). Verso.
- Callon, M. (1986). Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieu Bay. In J. Law (Ed.), *Power, Action, and Belief: A New Sociology of Knowledge?* (pp. 196–233). Routledge and Kegan Paul.
- Carse, A. (2021). The ecobiopolitics of environmental mitigation: Remaking fish habitat through the Savannah Harbor Expansion Project. *Social Studies of Science*, 51(4), 512–537. <https://doi.org/10.1177/0306312721992541>
- Castoriadis, C. (with Blamey, K.). (1997). *The imaginary institution of society*. Polity Press.

- Cavanagh, C. J. (2018). Political ecologies of biopower: Diversity, debates, and new frontiers of inquiry. *Journal of Political Ecology*, 25(1). <https://doi.org/10.2458/v25i1.23047>
- Cliquet, A., Aragão, A., Meertens, M., Schoukens, H., & Decler, K. (2024). The negotiation process of the EU Nature Restoration Law Proposal: Bringing nature back in Europe against the backdrop of political turmoil? *Restoration Ecology*, 32(5), e14158. <https://doi.org/10.1111/rec.14158>
- Cocco, V., Chakir, R., & Mouysset, L. (2025). Guilty or scapegoat? Land consolidation and hedgerow decline. *Journal of Environmental Economics and Management*, 133, 103196. <https://doi.org/10.1016/j.jeem.2025.103196>
- Convention on Biological Diversity. (2022). Kunming-Montreal Global Biodiversity Framework. *CBD/COP/DEC/15/4*.
- Coral-Guerrero, C. A., García-Quero, F., & Guardiola, J. (2021). What is Sumak Kawsay?: A Qualitative Study in the Ecuadorian Amazon. *Latin American Perspectives*, 48(3), 35–50. <https://doi.org/10.1177/0094582X211004913>
- Dalby, S. (2020). *Anthropocene Geopolitics: Globalization, Security, Sustainability*. University of Ottawa Press.
- Dean, M. (2010). Governmentality: Power and Rule in Modern Society. *Foucault Studies*, 169–172. <https://doi.org/10.22439/fs.v0i10.3113>
- Derrida, J., & Kittler, F. A. (2000). *Nietzsche - Politik des Eigennamens: Wie man abschafft, wovon man spricht*. Merve.
- Dial, R., & Roughgarden, J. (1998). Theory of Marine Communities: The Intermediate Disturbance Hypothesis. *Ecology*, 79(4), 1412–1424. [https://doi.org/10.1890/0012-9658\(1998\)079%5B1412:TOMCTI%5D2.0.CO;2](https://doi.org/10.1890/0012-9658(1998)079%5B1412:TOMCTI%5D2.0.CO;2)
- Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M. A., Baste, I. A., Brauman, K. A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P. W., Van Oudenhoven, A. P. E., Van Der Plaats, F., Schröter, M., Lavorel, S., ... Shirayama, Y. (2018). Assessing nature's contributions to people. *Science*, 359(6373), 270–272. <https://doi.org/10.1126/science.aap8826>
- Dietz, R., Sonne, C., Jenssen, B. M., Das, K., de Wit, C. A., Harding, K. C., Siebert, U., & Olsen, M. T. (2021). The Baltic Sea: An ecosystem with multiple stressors. *Environment International*, 147, 106324. <https://doi.org/10.1016/j.envint.2020.106324>

- Ecuador's Constitution. (2008). *Ecuador 2008 (rev. 2021)*. https://www.constituteproject.org/constitution/Ecuador_2021
- El-Maarouf-Bouteau, H. (2022). The Seed and the Metabolism Regulation. *Biology*, 11(2), 168. <https://doi.org/10.3390/biology11020168>
- Escobar, A. (1998). Whose Knowledge, Whose nature? Biodiversity, Conservation, and the Political Ecology of Social Movements. *Journal of Political Ecology*, 5(1). <https://doi.org/10.2458/v5i1.21397>
- Euller, K., Zmelik, K., Schneidergruber, A., Wrba, T., & Korner, I. (2014). *Auswirkungen der Beweidung in der Bewahrungszone des Nationalparks Neusiedlersee-Seewinkel – Eine statistische Analyse der Vegetationsdaten des Dauerflächenmonitorings*.
- European Commission. (2009). *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Codified version)*. 020. <http://data.europa.eu/eli/dir/2009/147/oj>
- European Commission. (2019). *Managing Natura 2000 sites—The provisions of Article 6 of the Habitats Directive 92/43/EEC*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1777300751858&uri=CELEX%3A52019XC0125%2807%29>
- European Commission. (2020). *EU Biodiversity Strategy for 2030: Bringing nature back into our lives*.
- European Commission. (2024). *Regulation (EU) 2024/1991 on nature restoration*.
- European Commission. (2025). *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora*. <http://data.europa.eu/eli/dir/1992/43/2025-07-14>
- European Parliament & Council. (2008). *Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe*. 152. <http://data.europa.eu/eli/dir/2008/50/oj>
- European Parliamentary Research Service. (2025). *Baltic Sea fishing area: Current challenges* (PE 767.190).
- Fabian, R. (2026, May 17). *Toter Wal in Dänemark ist „Timmy“: Experten fordern einheitliches Protokoll für Deutschland* (Hamburger Abendblatt, Interviewer). <https://www.abendblatt.de/mecklenburg-vorpommern/article411532336/daenen-las-sen-toten-buckelwal-timmy-am-strand-moewen-fressen-sich-satt-120.html>

- Forterre, P. (2010). Defining Life: The Virus Viewpoint. *Origins of Life and Evolution of Biospheres*, 40(2), 151–160. <https://doi.org/10.1007/s11084-010-9194-1>
- Foster, J. B. (1999). Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology. *American Journal of Sociology*, 105(2), 366–405. <https://doi.org/10.1086/210315>
- Foster, J. B., & Burkett, P. (2016). *Marx and the Earth: An Anti-Critique*. BRILL.
- Foucault, M. (1974). *Michel Foucault on Attica: An Interview* (J. K. Simon, Interviewer). Social Justice.
- Foucault, M. (1978). *The History of Sexuality. Volume I: An Introduction* (1st ed.). Pantheon Books.
- Foucault, M. (1995). *Discipline and Punish: The Birth of the Prison* (A. Sheridan, Trans.; 2nd ed.). Vintage Books.
- Foucault, M. (1999). *Of Other Spaces*. 16(1), 22–27. <https://doi.org/https://doi.org/10.2307/464648>
- Foucault, M. (2003a). *Schriften. Band 3: 1976-1979* (1st ed.). Suhrkamp.
- Foucault, M. (2003b). *Society must be defended: Lectures at the Collège de France, 1975-76* (M. Bertani & A. Fontana, Eds.). Picador.
- Foucault, M. (2007). Security, territory, population: Lectures at the College de France, 1977-78. *Palgrave Macmillan*, 45(04), 45-1971-45–1971. <https://doi.org/10.5860/CHOICE.45-1971>
- Foucault, M. (2020). *Sicherheit, Territorium, Bevölkerung: Vorlesung am Collège de France 1977-1978* (C. Brede-Konersmann & J. Schröder, Trans.; 7th ed.). Suhrkamp.
- Foucault, M. (2023). *Der Wille zum Wissen: Sexualität und Wahrheit I* (24th ed.). Suhrkamp.
- Foucault, M. (2024). *Überwachen und Strafen: Die Geburt des Gefängnisses* (W. Seitter, Trans.; 20th ed.). Suhrkamp.
- Gessner, N. (2026, May 18). *Seile, spitze Bootshaken, rohe Gewalt: Wal-Experte erhebt schwere Vorwürfe*. <https://www.mopo.de/im-norden/seile-spitze-bootshaken-rohe-gewalt-wal-experte-erhebt-schwere-vorwuerfe/>
- Graeber, D. (2008). *Frei von Herrschaft: Fragmente einer anarchistischen Anthropologie*. Hammer.

- Gramsci, A. (2020). Selections from the Prison Notebooks. In *On Violence* (pp. 159–179). Duke University Press. <https://doi.org/10.1515/9780822390169-020>
- Grove, K. (2014). Biopolitics and Adaptation: Governing Socio-Ecological Contingency Through Climate Change and Disaster Studies. *Geography Compass*, 8(3), 198–210. <https://doi.org/10.1111/gec3.12118>
- Gudynas, E. (2009). La dimension ecológica del buen vivir: Entre el fantasma de la modernidad y el desafío biocéntrico. *OBETS: Revista de Ciencias Sociales*, (4), 49–54.
- Gudynas, E. (2011). Development, Nature Rights, and Good Living: The Equatorian Experience. *Mouvements*, 68(4), 15–37. <https://doi.org/10.3917/mouv.068.0015>
- Gudynas, E. (2016). Beyond varieties of development: Disputes and alternatives. *Third World Quarterly*, 37(4), 721–732. <https://doi.org/10.1080/01436597.2015.1126504>
- Hajer, M. A. (1995). *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Clarendon Press. (264746). <https://research.ebsco.com/linkprocessor/plink?id=d687e2f2-a9af-33ab-ba23-17ed8913bd52>
- Hansson, I. (2012). *Ecological Principles of Nature Conservation: Application in Temperate and Boreal Environments*. Springer Science & Business Media.
- Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.
- Hartigan, J. (2021). Knowing Animals: Multispecies Ethnography and the Scope of Anthropology. *American Anthropologist*, 123(4), 846–860. <https://doi.org/10.1111/aman.13631>
- HELCOM. (2021). *Baltic Sea Action Plan* [Baltic Marine Environment Protection Commission].
- HELCOM. (2023). *Number of drowned mammals and waterbirds in fishing gear*. HELCOM Core Indicator Report. <https://indicators.helcom.fi/indicator/bycatch/>
- Hidalgo, F. (2011). *Buen vivir, Sumak Kawsay: Aporte contrahegemónico del proceso andino*. 16(53), 85–94.
- Hinchliffe, S., Allen, J., Lavau, S., Bingham, N., & Carter, S. (2013). Biosecurity and the topologies of infected life: From borderlines to borderlands. *Transactions - Institute of British Geographers (1965)*, 38(4), 531–543. <https://doi.org/10.1111/j.1475-5661.2012.00538.x>

- Hix, S., & Høyland, B. K. (2022). *The political system of the European Union* (4th ed.). Bloomsbury Academic, ProQuest Ebook Central.
- Hooghe, L., & Marks, G. (2003). *Multi-Level Governance in the European Union*.
- Houtart, F. (2011). El concepto de Sumak Kawsay y su correspondencia con el bien comun de la humanidad. *Revista de filosofía*, (69).
- Hughes, H., & Vadrot, A. B. M. (Eds.). (2023). *Conducting Research on Global Environmental Agreement-Making* (1st ed.). Cambridge University Press.
<https://doi.org/10.1017/9781009179454>
- IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Zenodo. <https://doi.org/10.5281/zenodo.3831674>
- Ivits, E. (2026, April 23). *Gestrandeter Wal vor Poel: "Betrüger" und Blender übernehmen das Kommando bei Timmy*. t-online. https://www.t-online.de/nachrichten/panorama/tiere/id_101223794/wal-in-ostsee-vor-poel-betrueger-und-blender-uebernehmen-das-kommando.html
- Jönsson, K. I., Rabbow, E., Schill, R. O., Harms-Ringdahl, M., & Rettberg, P. (2008). Tardigrades survive exposure to space in low Earth orbit. *Current Biology*, 18(17), 729–731. <https://doi.org/10.1016/j.cub.2008.06.048>
- Jordan, A., & Gravey, V. (Eds.). (2021). *Environmental Policy in the EU: Actors, Institutions and Processes* (4th ed.). Routledge. <https://doi.org/10.4324/9780429402333>
- Jordan, A., Gravey, V., & Adelle, C. (2021a). EU environmental policy at 50: Retrospect and prospect. In *Environmental Policy in the EU*. Taylor & Francis.
<https://doi.org/10.4324/9780429402333>
- Jordan, A., Gravey, V., & Adelle, C. (2021b). EU environmental policy: Contexts, actors and policy dynamics. In *Environmental Policy in the EU* (4th ed., pp. 1–10). Routledge.
<https://doi.org/10.4324/9780429402333-1>
- Kauffman, C. M., & Martin, P. L. (2017). Can Rights of Nature Make Development More Sustainable? Why Some Ecuadorian lawsuits Succeed and Others Fail. *World Development*, 92, 130–142. <https://doi.org/10.1016/j.worlddev.2016.11.017>

- Kirby, K. J., & Drake, C. M. (1993). Dead wood matters: The ecology and conservation of saproxylic invertebrates in Britain. *English Nature Science*. <https://www.cabidigitallibrary.org/doi/full/10.5555/19930670382>
- Kirksey, E. (2015). *Emergent Ecologies*. Duke University Press.
<https://doi.org/10.1515/9780822374800>
- Kirksey, E., & Helmreich, S. (2010). The Emergence of Multispecies Ethnography. *Cultural Anthropology*, 25(4), 545–576. <https://doi.org/10.1111/j.1548-1360.2010.01069.x>
- Knappett, C., & Malafouris, L. (Eds.). (2008). *Material Agency*. Springer US.
<https://doi.org/10.1007/978-0-387-74711-8>
- Knipe, D. M., & Howley, P. (2013). *Fields Virology* (6th ed.). Lippincott Williams & Wilkins.
- Korner, I., Wrška, T., Staudinger, M., & Manuel, B. (2008). *Beweidungsmonitoring im Nationalpark Neusiedler See—Seewinkel Ergebnisse der vegetationsökologischen Langzeitmonitoring-Studie 1990 bis 2007*.
- Kroll, T., & Heinemann, C. (2026, April 26). Wal-Rettung in der Ostsee: Die absurde Timmy-Verschwörung. *Die Zeit*. <https://www.zeit.de/politik/deutschland/2026-04/rettung-wal-timmy-ostsee-rechtsextreme-verschwuerungen>
- Laclau, E. (2007). *On populist reason*. Verso.
- LAMASUS - Land Management for Sustainability. (2022, August 11). <https://www.lamasus.eu/>
- Landecker, H. (2011). Food as exposure: Nutritional epigenetics and the new metabolism. *BioSocieties*, 6(2), 167–194. <https://doi.org/10.1057/biosoc.2011.1>
- Landecker, H. (2024). Life as Aftermath: Social Theory for an Age of Anthropogenic Biology. *Science, Technology, & Human Values*, 50(4), 679–712.
<https://doi.org/10.1177/01622439241233946>
- Latour, B. (2000). *Pandora's Hope*. Harvard University Press.
- Latour, B. (2004a). *Politics of nature: How to bring the sciences into democracy*. Harvard University Press.
- Latour, B. (2004b). *Why has critique run out of stream*. The University of Chicago.

- Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford University Press.
- Latour, B. (2012). *We Have Never Been Modern*. Harvard University Press.
- Latour, B. (2022). *Eine neue Soziologie für eine neue Gesellschaft: Einführung in die Akteur-Netzwerk-Theorie* (G. Roßler, Trans.; 6th ed.). Suhrkamp.
- Latour, B. (2023). *Kampf um Gaia: Acht Vorträge über das neue Klimaregime* (A. Russer & B. Schwibs, Trans.; 3rd ed.). Suhrkamp.
- Latour, B. (2024). *Das Parlament der Dinge: Für eine politische Ökologie* (G. Roßler, Trans.; 6th ed.). Suhrkamp.
- Latour, B., & Schultz, N. (with Rose, J.). (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*. Polity.
- Lemke, T., Casper, M. J., & Moore, L. J. (2020). *Biopolitics: An Advanced Introduction*. New York University Press. <https://doi.org/10.18574/nyu/9780814753378.001.0001>
- Lessing, G. E. (1976). *Nathan der Weise*. Reclam.
- Lorimer, J. (2015). *Wildlife in the Anthropocene: Conservation after nature*. University of Minnesota Press.
- Lorimer, J., & Hodgetts, T. (2024). *More-than-Human* (1st ed.). Routledge. <https://doi.org/10.4324/9781315164304>
- Lunstrum, E. (2014). Green Militarization: Anti-Poaching Efforts and the Spatial Contours of Kruger National Park. *Annals of the Association of American Geographers*, 104(4), 816–832. <https://doi.org/10.1080/00045608.2014.912545>
- Machery, E. (2012). Why I stopped worrying about the definition of life... And why you should as well. *Synthese*, 185(1), 145–164. <https://doi.org/10.1007/s11229-011-9880-1>
- Malo Larrea, A., Ambrosi de la Cadena, M., Collado Ruano, J., & Gallardo Fierro, L. (2024). Transcending the nature-society dichotomy: A dialogue between the Sumak Kawsay and the epistemology of complexity. *Ecological Economics*, 216, 108044. <https://doi.org/10.1016/j.ecolecon.2023.108044>
- Marković, A., Blaženčić, J., Tanasković, A., & Šinžar-Sekulić, J. (2023). Diversity and Ecology of Charophytes from Vojvodina (Serbia) in Relation to Physico-Chemical and Bioclimatic Habitat Properties. *Diversity*, 15(3), 342. <https://doi.org/10.3390/d15030342>

- Marx, K. (1956). *Karl Marx, Friedrich Engels: Das Kapital, 3. Band*. Dietz.
- Mbaria, J., & Ogada, M. (2016). *The Big Conservation Lie: The Untold Story of Wildlife Conservation in Kenya*. Lens & Pens Publishing.
- Mbembe, A. (2019). *Necropolitics*. Duke University Press.
<https://doi.org/10.1215/9781478007227>
- McAninch, A. (1999). Seeds: Ecology, Biogeography, and Evolution of Dormancy and Germination. *Northeastern Naturalist*, 6(4).
- Mitchell, A. (2016). Beyond Biodiversity and Species: Problematizing Extinction. *Theory, Culture & Society*, 33(5), 23–42. <https://doi.org/10.1177/0263276415619219>
- Mitchell, A. (2024). *Revenant Ecologies: Defying the Violence of Extinction and Conservation*. University of Minnesota Press.
- Moore, J. W. (2016). *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*. PM Press. <https://research.ebsco.com/linkprocessor/plink?id=69b8dab1-3792-3327-b330-580ed1a62f31>
- Nixon, R. (2011). *Slow Violence and the Environmentalism of the Poor*. Harvard University Press.
- OECD, & Nations, F. and A. O. of the U. (2022). *OECD-FAO Agricultural Outlook 2022-2031*. <https://www.oecd-ilibrary.org/content/publication/flb0b29c-en>
- Olson, V. A. (2010). The Ecobiopolitics of Space Biomedicine. *Medical Anthropology*, 29(2), 170–193. <https://doi.org/10.1080/01459741003715409>
- Parmar, T. K., Rawtani, D., & Agrawal, Y. K. (2016). Bioindicators: The natural indicator of environmental pollution. *Frontiers in Life Science*, 9(2), 110–118.
<https://doi.org/10.1080/21553769.2016.1162753>
- Pe’er, G., Kachler, J., Herzon, I., Hering, D., Arponen, A., Bosco, L., Bruelheide, H., Friedrichs-Manthey, M., Hagedorn, G., Hansjürgens, B., Ladouceur, E., Lakner, S., Lique, C., Quaas, M., Robuchon, M., Saavedra, D., Selva, N., Settele, J., Sirami, C., ... Bonn, A. (2023). *Scientists support the EU’s Green Deal and reject the unjustified argumentation against the Sustainable Use Regulation and the Nature Restoration Law*. Zenodo. <https://doi.org/10.5281/zenodo.8128624>

- Perissi, I. (2025). Assessing the EU27 Potential to Meet the Nature Restoration Law Targets. *Environmental Management*, 75(4), 711–729. <https://doi.org/10.1007/s00267-024-02107-9>
- Pitron, G. (2024). *The Rare Metals War: The Dark Side of Clean Energy and Digital Technologies: Updated Edition*. Scribe Publications.
- Povinelli, E. A. (2016). *Geontologies: A Requiem to Late Liberalism* (p. dup;9780822373810/1). Duke University Press. <https://doi.org/10.1215/9780822373810>
- Radu, S. (2006). The Ecological Role of Deadwood in Natural Forests. In D. Gafta & J. Akeroyd (Eds.), *Nature Conservation: Concepts and Practice* (pp. 137–141). Springer. https://doi.org/10.1007/978-3-540-47229-2_16
- Ranawakage, V. P., Fujino, T., & Herbst, A. (2021). Copper contaminated water mediated biochemical changes on charophyte species *Chara braunii*. *IOP Conference Series: Earth and Environmental Science*, 776(1), 012005. <https://doi.org/10.1088/1755-1315/776/1/012005>
- Ray, D. K., Mueller, N. D., West, P. C., & Foley, J. A. (2013). Yield Trends Are Insufficient to Double Global Crop Production by 2050. *PLOS ONE*, 8(6), e66428. <https://doi.org/10.1371/journal.pone.0066428>
- Read, A. (2024). Eutrophicated: Tracking colonial histories of phosphate matter and the Plantationocene inheritances of the River Wye. *Environment and Planning E: Nature and Space*, 7(6), 2413–2436. <https://doi.org/10.1177/25148486241288377>
- Schmidt, K. (2026, April 17). *Möchte der Ostsee-Wal befreit werden? Meeresbiologin erklärt, warum wir ihm nicht mehr helfen*. <https://www.fr.de/panorama/ostsee-wal-timmy-warum-wurde-rettung-eingestellt-gestrandeter-94255729.html>
- Schroer, M. (2022). *Geozoologie: Die Erde als Raum des Lebens*. Suhrkamp.
- Searle, A., Turnbull, J., & Oliver, C. (2024). Climate Cattle: Metabolic Intervention in the Good Anthropocene. *Environmental Humanities*, 16(3), 784–806. <https://doi.org/10.1215/22011919-11327348>
- Secretariat for the Convention on Biological Diversity. (1992). *Convention on Biological Diversity*.

- Secretariat for the Convention on Biological Diversity. (2020). *Aichi Biodiversity Targets*.
<https://ga.chm-cbd.net/en/aichi-biodiversity-targets-2011-2020>
- Seitz, S. (2024). *Gegeninstitutionen* [Lecture].
- Sokal, A., & Bricmont, J. (1998). *Fashionable nonsense: Postmodern intellectuals' abuse of science* (1st ed.). Picador.
- Sörensen, P. (2023). *Präfigurative Politik: Eine Einführung*. Mandelbaum.
- Spivak, G. C. (2004). Can the Subaltern Speak? In *Imperialism*. Routledge.
- Srinivasan, K. (2013). The biopolitics of animal being and welfare: Dog control and care in the UK and India. *Transactions - Institute of British Geographers* (1965), 38(1), 106–119. <https://doi.org/10.1111/j.1475-5661.2012.00501.x>
- Toter Buckelwal „Timmy“: Meeresbiologe nennt mutmaßliche Todesursache (J. Karrasch & F. Ritter, Interviewers). (2026, May 20). Münchener Zeitungs-Verlag.
<https://www.merkur.de/welt/nennt-wahrscheinliche-todesursache-fund-von-buckelwal-timmy-vor-anholt-meeresbiologe-zr-94310162.html>
- Tsing, A. L. (2015). *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton University Press.
- United Nations et al. (2021). *System of Environmental-Economic Accounting-Ecosystem Accounting (SEEA EA)*. <https://seea.un.org/ecosystem-accounting>
- Vadrot, A. (2014). *The Politics of Knowledge and Global Biodiversity*. Routledge.
<https://www.routledge.com/The-Politics-of-Knowledge-and-Global-Biodiversity/Vadrot/p/book/9781138209879>
- von Schaper, D. (2026). *Die Ostsee-Odyssee des Buckewals* (E. Ivits, Interviewer). t-online.
<https://datawrapper.dwcdn.net/z3ymt/2/>
- Wadiwel, D. J. (2015). *The War against Animals* (1st ed., Vol. 3). Brill Rodopi.
<https://doi.org/10.1163/9789004300422>
- Wadiwel, D. J. (2016). Do Fish Resist? *Cultural Studies Review*, 22(1).
<https://doi.org/10.5130/csr.v22i1.4363>
- Walker, G., Devine-Wright, P., Hunter, S., High, H., & Evans, B. (2010). Trust and community: Exploring the meanings, contexts and dynamics of community renewable energy. *Energy Policy, The Role of Trust in Managing Uncertainties in the Transition to a*

- Sustainable Energy Economy, Special Section with Regular Papers*, 38(6), 2655–2663. <https://doi.org/10.1016/j.enpol.2009.05.055>
- Wesche, T. (2023). *Die Rechte der Natur: Vom nachhaltigen Eigentum* (1st ed.). Suhrkamp.
- Youatt, R. (2015). *Counting Species: Biodiversity in Global Environmental Politics*. University of Minnesota Press.
- Zehr, H. (2010). *Fairsöhnt: Restaurative Gerechtigkeit*. Neufeld.