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**Environmental law in the age of the Anthropocene: How to normatively communicate on environmental change and risks?**

**Abstract:**

Environmental law has been developed cross-disciplinary in close contact with empirical natural sciences on the state of the environment. With the increasingly more intensive and comprehensive interventions of human beings into the environment, defining environmental damage and hazards empirically as well as politically and normatively has become not only increasingly complex and controversial, but also crucial. How we assess empirical data, and how we conceptualize the values and the risks involved is decisive. Empirical and legal dogmatic methods are currently insufficient in terms of grasping the complexity of communicating environmental hazards. Communication and semantic theory is consequently suggested as a methodological approach in order to critically analyse more precisely the present state of environmental law, and how it could develop in order to convey the complexities of environment hazards in a legal language. It is suggested in the article that the planet has entered the age of the Anthropocene and with that an immensely complex environmental situation requiring new concepts and standards of environmental law. Sustainability and precaution have been tried out as reflexive legal concepts, but often losing conflictual situations to the more binary concepts of economic law. It is suggested to apply the insights of theories of communicative differentiation in order to analyse more specifically what type of semantics and concepts are required to normatively express the current situation of environmental hazards and risks.

**Introduction – from the holocene to the anthropocene**
Environmental law is relatively new as a systematic legal discipline. It has evolved in close contact with empirical natural sciences. Increasingly there is more awareness of the complex qualities of the environment and its changes, hazards and risks, empirically as well as how to normatively define and regulate it. The legal regulation of the environment has emerged to be a qualitatively different task than any other area of law in terms of substantive, temporal and relational complexity. It is suggested in the following that communicative theory emphasizing communicative differentiation, complexity and semantic and conceptual analysis are necessary parts of the theory and method of environmental law. The complexity of the environment and its current status must be translated into legal and normative concepts which can adequately express the high degree of complexity and the urgency of the changes and the risks involved, rather than relying on existing legal concepts. In order to develop a more specialized and societally adequate legal language law needs to apply theories of communicative and semantic differentiation.

The intensity and scope of social, technological and economic change over the last seventy years has been comprehensive, formidable and unprecedented. Homo Sapiens’ exploitation of the natural habitat of the planet, the air, the seas, the earth, all biological life, has become extremely extensive and intensive. Human activity has transformed between a third and half of the surface of the earth. Untouched areas of the globe are diminishing. Non-renewable natural resources have been disproportionately exploited. Fertilizer industries currently bind more atmospheric nitrogen than all other land-based ecosystems and have fundamentally changed the phosphor-cycle. Over the last forty years the number of animals on earth has been reduced by 50%. The high seas are heavily polluted. Fisheries are exploiting a very large part of the marine organisms of
the seas. Industrial fishfarming has become a vital producer of fish products. Many more examples could be mentioned. We are thus currently facing natural degradation, pollution and exploitation in practically all areas of the globe far beyond our generations´ fair share. There are fewer and fewer unspoilt areas, and our use of large areas involves several interdepending forms of exploitation, many of which have irreversible effects. The planet has been taken to use by human beings in such a way that it is difficult to establish knowledge of any “natural” or original state of the environment, or of what sustainable human practices would be. Human beings have so to speak taken over the planet. Even the Arctic areas are heavily polluted in the sea, air, ice, land and natural habitat. The climate is changing in ways which are difficult to predict. The temperature is raising and some of the probable prospects are that extremely severe consequences cannot be avoided any longer.

Geologists and environmentalists have on the basis of an enormous amount of data suggested that the planet has left the geological epoch of holocene and entered the epoch of anthropocene. The gist of proposing a new epoch is the documented dominance of human beings on the state of the earth. Over the last years a new understanding of the immense scope of the influence of human beings on the earth’s eco-systems has emerged based on big-data, long-time surveillance of the earth and international research cooperation. Such immense forms of change do not happen overnight, but scientists claim that a particularly intensive acceleration of the geological and biological changes referred to occurred at the same time as the high acceleration of

technological and economic development after 1945. Even if many of the changes are part of natural variations or human made consequences which started a long time ago, it is claimed that the particularly high intensity of the biological and geological changes which we currently are experiencing, have taken place from the middle of the twentieth century. A cross-disciplinary working group was established in 2009 with high-ranking scientists in order to give recommendations to The International Stratigraphic Commission. There is so far not a consensus on this, but many scientists favour the proposition to declare the current epoch as the anthropocene. The reasons are partly the scientific documentation on the immense and now dominant influence of human beings on planet earth, and partly the need to more clearly address and give attention to these changes in order to attempt to deal with them or delimit some of the deterioration.

The scientists´ writing on the anthropocene emphasise the extensive impact of human beings, and the complexity of the interdependencies of the different types of impact on the different eco-systems. “The human imprint on the global environment has now become so large and active that it rivals some of the great forces of Nature in its impact on the functioning of the Earth system.”3 The extensive and intensive use of natural resources by human beings is said to have emerged first with the possibility of using coal for production energy which enabled industrialization and mass-production. The possibilities this led to, implied a focus on production facilities and economic growth. A techno-economic discourse became prevalent and was without recourse to environmental thinking or sustainability. The possibilities seemed limitless, and there was little attention to the consequences over time on the natural habitat. The attention was rather on how the natural resources in the different regions of the world could be

exploited for economic growth and the purposes of human welfare. Natural resources were seen as more or less limitless and as instruments for humans. Local pollution from coal mines, industry and urban spaces have been attended to and at times successfully dealt with. Over the last fifty years or so various more endemic non-dissolvable forms of pollution of the earth, the high seas and the air have increased. Chemicals, plastics etc. have increasingly and systematically been detected even in the most remote areas of the world. Nitrogen and phosphor are massively applied as fertilizers in enormous territories, but today it is probably the increase in CO2 in the atmosphere and the ensuing increase in temperature and other climate changes which are seen as the most serious threats to human life at the planet. Even a 2-2.5 degrees increase in the temperature may over time lead to the melting of the ice caps and the permafrost in the north which again will escalate the increase of the temperature.\textsuperscript{4} The consequences are and will be extremely extensive and unpredictable in their dynamics. The coming of ‘the sixth extinction’ has also been suggested as an evaluation of the present situation based on scientific documentation.\textsuperscript{5}

The current documentation of environmental degradation and climate change implies that some forms of degradation such as the reduction of the number of species, pollution of the seas, climate change etc. may be beyond control, or at least beyond our present knowledge of how to deal with it. The different forms of degradation are interconnected, interdependent and highly complex in how they have come about, and how they evolve. Many forms are chaos-like in their dynamics and thus severely unpredictable. Legal regulations of environmental protection have been enacted for some time and have had some, but clearly insufficient effects. The political economic


\textsuperscript{5} Elizabeth Kolbert, \textit{The Sixth Extinction}, London: Bloomsbury, 2014
growth regime has so far proved to be quite resilient. Environmental and sustainable political regimes have proved complex to establish. The current extensive and intensive forms of environmental degradation seem to require new and much more comprehensive forms of regulation as well as new ways of thinking about the significance and the dynamics of the environment for humans and the relations between humans, society and the environment.

A main argument of this chapter will be that our current legal forms of environmental regulation have relied too much on traditional forms of private and public regulatory law with their inherent forms of protection of private property, contract law, and the principles of legality and national sovereignty. New ways of thinking about law and forms of legal regulations are needed where protection of the environment and our natural resources are a main point of departure. Judging from the above the challenges of creating a more sustainable environmental situation are immense. Much attention has been given to the fact that nature cannot itself be the voice and subject of its own protection. Environmental protection will thus unavoidably be imperfect. Society is however equivalently complex. Research on and knowledge of the environment is primarily a task for natural scientists. Environmental law is part of our communication about the environment and society. Research on environmental law will consequently have to include communication on the relations between the environment, society and law as its object. Law and legal regulation depend on our abilities to communicate adequately about society and the environment, cognitively and normatively. In the following theories of communicative and semantic differentiation will be applied partly to critically analyse and deconstruct existing concepts of environmental law, and partly to discuss how an improved understanding of the current status of the environment and of our communication about it, might be applied to construct a more adequate language
and concepts of environmental law. Environmental law must be based on an understanding and a communication about the environment as such and not on the environment as a side-product of other forms of societal change. Inevitably however human communication on the environment will be flawed and imperfect due to the double complexity of the environment and of social communication.

Existing concepts of environmental law: sustainability and precaution?

In this section we will discuss some of the main existing concepts and semantics of environmental law and their attempts to create a more reflexive environmental law. Several attempts have been made to formulate first an understanding of the problems of environmental change and degradation and secondly how this might be dealt with and formulated in legal and governmental decision-making systems. The most official approach has been the proposals made through international UN-organized conferences resulting in inter alia the Stockholm and Rio Declarations, and the World Commission on Environment and Development. These organizations and events contributed to bringing forward a more complex and environmentally based understanding of the problems than previously resulting in declarations, agreements and reports introducing new concepts and guidelines which in time led to more formal treaties and domestic legislation. The Stockholm Declaration focused on ‘the responsibility to protect’, but accepted the sovereign right to exploit natural resources. Increasing attention was however paid to the inevitable and systematic cross-border pollution and environmental degradation. The UN appointed World Commission on Environment and Development (the Brundtland Commission) highlighted sustainable development as a new program.

6 http://www.unep.org/documents.multilingual/default.asp?documentid=97&articleid=1503;
for environmental politics and law.\(^7\) The report and the introduction of the principle of sustainability led to a world-wide comprehensive launch of political and legal programs on sustainability, but with huge variations in how it is interpreted. The balancing between environmental and social sustainability are also complex and unresolved, but the report was a starting point for an increased emphasis on environmental regulations with protection of the environment as its substantive basis.\(^8\) The *precautionary principle* was first applied internationally at the 1984 North Sea conference inspired by German and Swedish environmental law. In the 1992 UNDP meeting in Rio a text with an obligation to and a definition of the precautionary principle was agreed upon: “Where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”\(^9\) The precautionary principle has further been applied in EU and domestic legislation both as part of specific regulations and as a general standard. It is however still a rather general and indeterminate standard in not specifying the seriousness of damage required and what lack of full scientific certainty means. There are clearly very different views on both aspects in the various specific situations and generally. The complexity of the different situations when the precautionary principle might be applied, makes it difficult to implement effectively. The EU has favoured applying it in many situations where the WTO DSB have been more sceptical in their decisions.

Both sustainability and the precautionary principle are vital new legal concepts. They attempt to express new directions in environmental law, but are unavoidably general

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and have turned out to be ambiguous and imprecise when confronted with economic legal concepts and purposes. Free movement and competition have been interpreted as more precise and sharp legal concepts. They refer back to long traditions of trade law, non-discrimination and competition and thus to how these concepts have been interpreted. The economic concepts have been seen as rights-carrying norms which have further emphasized their binary character. Environmental protection is for obvious reasons seen as a complex and context-dependent purpose. There are significantly different scientific as well as political views as to the appropriate levels of protection in the different situations, for example regarding changes in the level of biodiversity. Sustainability refers to a comprehensive situation more than to specific parameters. It is politically vital, but complex to implement as a legal concept. The precautionary principle is equally ambiguous. There are clearly quite different views as to when a situation is hazardous enough to employ the concept. Many new technologies have risks, and this has to a great extent been systematically and culturally accepted. With the precautionary principle it has been accepted not to accept all risks. This has been interpreted as allowing for precaution only in situations where there is scientific proof of hazards. In the EU it has been accepted to use precaution when there are clear indications of hazardous risks even if the scientific evidence if incomplete. There is however still much uncertainty as to the more exact conditions for applying the precautionary principle.

Environmental protection has consequently in many instances lost to the more sharply defined economic rights in several WTO DSU panel and appellate body decisions and

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in EU law as well. Neither environmental protection nor sustainable development have been sufficiently backed up by international institutions and treaty systems which could have developed more specific concepts and institutionally more robust dispute settlement systems in environmental law. The legal concepts we have so far in environmental law do not seem to precisely enough describe environmental protection and sustainable development as substantive concepts of their own. There are not concepts which sufficiently express the significance of a healthy environment for humanity. The existing concepts have accepted to play a secondary role to other legal concepts protecting private property and individual rights and interests. Free movement and competition in the EU and in WTO law are still seen as the values and purposes which have been given primary treaty protection. Conflicting values and interests have to prove that they refer to accepted public policies, that they are necessary and proportional, and that they are supported by scientific evidence for why they are necessary. There are so far not international environmental law treaties or dispute settlement bodies with supranational status in relation to domestic law. Environmental protection, in its widest sense, has thus so far not been sufficiently precisely and robustly described in legal terms, or been given the necessary position in the legal hierarchy for the present regulation of protection to be effective. This is not to say that there have not been positive experiences with environmental protection. The Montreal Protocol and EU directives on water quality can be mentioned. When scientific knowledge, with consensus, can be used specifically to attain specific purposes, vital progress can be made. When scientific knowledge is more contested, it is more difficult to achieve the necessary agreement on legally effective regulations.

The 2015 UN Paris Agreement on climate change may arguably be seen as a breakthrough of a science-based international law consensus on environmental policies. Still,
The background scientific material is comprehensive and can obviously be interpreted in several ways. The agreement on keeping the average temperature rise well below 2°C and attempt to limit the increase to 1.5°C are quite modest goals considering what is known about the uncertainties of the scientific material.¹³

The particular complexity of a legal language for the environmental crisis

The examples referred to above have been vital legal innovations and attempts at expressing how the environment and its protection might be represented in legal norms and regulations. In this section we will more closely address the qualitatively different challenges of creating concepts and semantics of environmental law. Reflexive standards and procedural regulations have been preferred. The complexity and dynamics of the environment itself and of the effects of human interventions have turned out to be difficult to find adequate legal representations for. In situations of conflict with economic regulations and contract law environmental law have often turned out to be too indeterminate and vague, cfr WTO DSB cases referred to above. It is however unclear whether environmental law is overruled due to unclear legal norms, factual complexity, a lack of environmental treaty courts or a political bias in favour of economic efficiency over environmental protection.

The view put forward in this article is that effective protection of the environment and the commitment to dealing with climate change are qualitatively different tasks in terms of political decision-making and legal regulation than other areas of law. First environmental change and degradation evolve in extremely complex ways with

multitudes of interacting dynamics which at times have unpredictable and chaos-like trajectories. Humanly effected interventions in the environment have become a significant part of environmental change and degradation. The interactions between biological change and humanly induced interventions are diverse, complex and often impossible to distinguish. Scientific reports indicate that human interventions have become so comprehensive and intensive that they now dominate the evolution of the natural environment and resources of the earth. Environmental degradation is further occurring on an increasingly rapid rate. Assessing the consequences of environmental degradation and the effects of human intervention is overly complex even applying the foremost scientific expertise.14 A particular problem is delayed or invisible consequences which may be irreversible. Secondly it is complex to assess and to agree on what the necessary, acceptable or sufficient levels of sustainable environmental protection are, in order to make the necessary political and legal decisions for a normative and stabilizing regulation.15 There are vital scientific disagreements concerning both the assessment of various forms of environmental degradation and what the levels of necessary or sustainable environmental protection are. Third the environment cannot speak for itself. We depend on citizens, politicians, activists and scientists to describe, interpret and communicate on the state of the environment, and on what forms of environmental protection are necessary.16 Environmental protection is decided on by humans who have several conflicting interests and societal purposes to regulate on. Economic regulations protecting trade and competition have so far been

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15 Godard, ibid.; Philippopoulos-Mihalopoulos, ibid. 2007
given priority for more short term economic as well as welfare reasons.\textsuperscript{17} Fourth protection of the environment is \textit{a condition for life on earth} and thus a \textit{particularly significant area} of (effectively functioning) legal regulation and politics.\textsuperscript{18} The general problems of creating effective forms of legal regulation are particularly important to understand and to deal with in this area.

Different methods of research are applied in environmental law, and for good reasons, in order to achieve insight from different perspectives. Legal dogmatic and positivist methods are insufficient due to their lack of contextuality and openness to dynamic empirical change. Various \textit{cross-disciplinary methods} are being developed in order to better take the realities of environmental and climate changes crisis into account in developing concepts and legislative programs in environmental law. Biological and climate scientific research is necessary to document the state of affairs as far as possible. On several areas this has already proved vitally important. The Montreal Protocol and the Climate Change IPCC reports and subsequent treaties and agreements (Kyoto, Paris) are some examples. Law has to rely on scientific reports on environmental change and crisis as facts. Sociological research on human behaviour may contribute to science on how humans react to environmental crisis. Theories on \textit{risk society} and on \textit{catastrophes or crisis} are examples of theories where biological sciences are used as part of the basis for developing theories on the evolution of society.\textsuperscript{19} \textit{Eco-systems} inspired theories have been developed in order to be sure to take the point of departure for environmental law in a biological or ecological understanding and documentation of the environment. Risk society theories have helped focus on environmental change and environmental law as part of society and social change. Such

\textsuperscript{17} Niklas Luhmann, «Demands on Politics», in \textit{Risk: A Sociological Theory}, Berlin: de Gruyter, 1992
\textsuperscript{18} See references in footnotes 2 and 4
theories have suggested applying *theories of communication and communicative differentiation* in legal research in order to analyse *how we communicate on law, society and the environment*, and how environmental law is created under the current conditions. Theories on communicative differentiation may enable analysis more specifically comparing the interaction between the different relevant communicative functions: the scientific, political, economic, ethical and legal, and the gaps and connections of meaning between the different functions.

**Applying communicative theory with the tools of differentiation and semantic and risk analysis to environmental law**

The specific qualities and complexities of environmental change and the urgency of such changes for humanity offer particular challenges for developing environmental law as a discipline. The recent comprehensive and intensive interventions of human beings into the environment have created massive and increasingly rapid degradation and damage which are difficult to assess also because many of the effects are long-term, ‘invisible’ and with unpredictable trajectories, but still with extreme consequences. The regulatory target of environmental protection is thus complex, constantly moving and difficult to describe adequately precise and robust in legal terms. The concepts of sustainability, precaution, bio-diversity and eco-systems-approach are taken from scientific ways of thinking about the environment, but they are also discretionary standards which can be interpreted in a number of ways. The scientific definitions of these concepts are standard-like, not precise. The same is true for their legal definitions. Attempts have been to contribute to the legal definitions with more specific legal norms

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and detailed annexes to treaties, such as Annex I on risk assessments of the SPS agreement. The often conflicting legal considerations of economic and contract law have longer legal disciplinary and conceptual traditions. They have thus developed sharper legal definitions and more robust interpretive patterns than the concepts of environmental law, or they may have a higher authority in the legal discourse.

It is difficult to explain why environmental law has not been more precisely and robustly developed when we have comprehensive knowledge of the urgency and complexity of the environmental crisis and risks. Communicative theory has offered some contributions towards an explanation the communicative complexity of law. According to communicative theory society consists of social communication among human beings and organisations. Communication is however a vulnerable medium. We observe from different points of observation, and consequently communicate differently. We can only communicate with the language that we have which does not necessarily cover all things we observe.21 Communication is consequently always imperfect. In complex societies communication has been *systematically differentiated* in order to communicate from different highly specialized spheres. Within different organisations and institutions one might develop highly detailed and precise communication, but there will always be gaps to other organisations and their language. Communicative theory focuses on how law and legal communication consequently is limited to the legal function.22 Law cannot contain the whole vocabulary of the natural sciences on the environment, or its rationality and dynamic. Environmental law can only develop as part of the legal function. It depends for its information on the interaction between political, scientific, economic, ethical and legal communication.

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Communicative theory focusses on the qualities and abilities, and on the limits of the different communicative functions. Law alone cannot solve societal problems. It is only a normative and regulatory function which depends on its interaction with other communicative functions.

Analysis of environmental law as communication and as part an interaction among different functions of communication may consequently be a vital method of research on the evolution of environmental law if the purpose is to understand environmental law as part of law as communication and as part of a larger field of social communication on the environment. Communicative theory may help us understand how the different concepts and standards of environmental law evolve with qualities, abilities and limitations, within the field of law and in the interaction between the different, but relevant communicative functions. It may shed light on what qualities of the political, the ethical, the scientific and the legal functions within the field of environmental regulation, are.

Bio-systems and the eco-systems approach have been seen as promising in creating close couplings to biological and ecological sciences. The complexity of bio-systems and the translation of their qualities to political and legal languages remain however, with the uncertainty of the (un)acceptable levels of human intervention. Sustainability and precaution have not solved the problems of finding the proper standards of protection. Vulnerability has been proposed as another standard emphasizing the uncertainty and the necessity of finding conservative levels of precaution. The eco-systems approach may serve as an infrastructure for thinking and acting ecologically

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even in legal and political contexts. The problem of what the ecologically acceptable levels are, remain.

Analysis of communicative differentiation with its language on complexity, contingency and limits of communication may serve the function of identifying how the different discourses and standards of law function in their larger communicative context.

Inspired by risk society and eco-systems theories various forms of critical environmental law have been developed. Some approaches have been based on ecological or deep-ecological theories of society emphasizing a need for radical societal change in order to save the environment.\textsuperscript{25} Other theories have applied a more societal or legal critical perspective and included the protection of the environment therein. In the following there will be a focus on theories of communicative differentiation, systems theory, risk society and reflexive law which are part of a greater scenario of socio-legal theories, and on their possible qualities in research on environmental law.\textsuperscript{26} The core of the argumentation in the following is that because environmental law is produced under conditions of communicative differentiation and complex interaction between different codes and semantics of communication, this analytical strategy should be applied in an analysis of the evolution of environmental law in relation to its societal context.

In communicatively differentiated societies, legal regulation involves complex processes of interaction between the scientific, political, economic, legal and ethical languages and systems of communication. According to communication and systems


theory environmental law is a construction resulting from a large number of different scientific, political, ethical, legal and other communications on the environment.\textsuperscript{27} The environment, as it is, is first described \textit{scientifically} and systematically. There may however be different scientific versions, methods and theories with vital disagreements and controversies.\textsuperscript{28} Further, the environment consists of multitudes of different species and eco-systems. How each scientific description is delimited (does it look at one or more species, or at a small or larger eco-system), may be another source of conflicting scientific versions. Scientific reports and statistics are a vital basis for political views on environmental regulation and on political proposals for legislation, but they may be interpreted and applied in very different ways. On the level of \textit{political} communication the scientific representation of the environment will be interpreted and transformed by the political code. The political communication will apply its own semantics and select its own normative standards and forms of regulation. There may at any time be a variety of political semantics and values going in different directions, such as economic, social redistributive, ecological etc, which will influence the forms and substance of environmental legislation. Ethical issues may be part of the discussions. In the legislative processes political semantics and legal forms and traditions will interact and produce different regulatory forms. In legal practice and judicial processes the \textit{legal} semantic and code will be further developed. Environmental politics and law depend on scientific expertise to authoritatively report on the state of the environment. Obviously it is interpreted differently and applied to different degrees. The scientific information may be fully lost or transformed in the interaction between the different codes of

\textsuperscript{28} Godard, ibid.; Joerges et al, ibid.
communication and the actors promoting different scientific, political or legal semantics.

In his book on risk, Luhmann describes partly the complexity and contingency of the processes of translating societal dynamics and purposes into political and legislative decisions and functioning legal norms in highly specialized and modern societies, and partly the consequences of the extreme forms of complexity and contingency. The different communicative systems have different codes and functions. Their semantics may look similar on the surface, but they are totally different in their functions. Communication in modern societies depends on high degrees of functional differentiation and specialization. Information is processed through different codes and functions. New information and semantics are produced, but also changed and lost. The interaction between different functions of communication and different actors and organization systems is a key to understanding how modern societies function and how political and legal decisions are taken. Luhmann focusses on how information is passed, but meaning lost between the different function systems and organizations: “The impossibility for the political system effectively to control other systems with an adequate grasp of consequences and limited risk is inversely proportional to the facility with which such decisions can put into force and, however sporadically, actually implemented.”

In systems and communication theory the above is seen as the general dynamic of how modern societies function. The consequences for the political and the legal systems which are presumed to convey meaning, values, decisions and norms from other systems are particularly vital. The consequence is that ‘environmental law’ is not a

29 Niklas Luhmann, ibid., 1992, ch.8 Demands on Politics
30 Niklas Luhmann, ibid., p.145.
result of directly transferred semantics and meaning from scientific reports, political programs or international negotiations etc. In terms of research methods for law and environmental law in particular the consequence is that we need to analyse how information is transferred, coded and ‘translated’ from one function or organization system to another. How is different information represented in the different communicative systems? How are they changed when going from one system to another? Why are values and purposes lost on the way? How does the legal system specifically react in processes of legislation and in administration and the judiciary?

The different texts and communications need to be analysed both as part of a larger societal and textual context, and as specific texts which are part of specific function or organization systems, both on the basis of theories of communicative differentiation and complexity. Communicative analysis can additionally draw on Michel Foucault’s theories of the archaeology of knowledge and the discourse of language in the understanding of how texts are constructed from other texts, build on each other and construct new meanings. Jacques Derrida’s theories of ‘différance’ and deconstructive analysis may be applied to go beyond the specific semantics and apply a more fundamentally critical mode of analysis.

What is however the particular relevance of theories on communicative differentiation for research on environmental law? As referred to in the introduction we are living in a time of extreme and comprehensive human exploitations of the globe and its ‘natural’ environment. Most areas of the earth are being used in some kind of way, or they are significantly affected by air, sea, water or earth pollution. The technologies human

32 Michel Foucault, The Archeology of Knowledge and The Discourse on language, New York: Panthon Books, 1972;
beings have at hand have enabled us to take the environment into use and to produce multitudes of forms of pollution dangerous for humans, animals and the environment itself. The high seas are heavily polluted by plastics and many forms of chemicals. The air of the arctic is polluted, affecting the vulnerable animal and plant life in those regions. The food we eat is polluted with chemicals and various artificial substances. These forms of pollution and application of technologies with unknown consequences are deeply and comprehensively parts of how we live. The environmental damage and hazards are also parts of what is productive and useful and hard to distinguish from what is not damaging. The dangerous and the acceptable practices are intensively intertwined and translated into ‘the normal’ because they are ‘necessary’. If environmental hazardous and environmental friendly practices are combined in the ways we live, and presented as normality, then deconstructing our communication might be one way of illuminating how our definitions of environmental hazards are created.

**How are the semantics of environmental law created?**

*In this section we will look at how the legal semantics of environmental law are created from the various societal semantics via political, scientific and normative semantics to a legal coding. Each legal area or program is a result of a combination of societal descriptions of the problems to be regulated and the relevant legal semantics. The societal description may be socially, culturally, economically, scientifically or politically coded. The political and legislative processes select what societal description of the area and problems in question will be the basis of the legal regulation. Simultaneously the existing legal semantics of the more general area of law will work as the legal infrastructure for new legal programs. The purposes of law may be taken from the societal as well as the legal area preceding the new legislative programs.*
Environmental protection may be the societal purpose of environmental law. Legal coherence, justice, fairness and predictability may be general legal purposes and values which contribute to shaping the selection and the form of the specific legal concepts, semantics and norms in the currently evolving forms of environmental law. An underlying premise of critical environmental law is that the current significant and extraordinary challenges of environmental degradation and climate change have not been met with legal regulations and semantics which are sufficiently adequate and effective in relation to the challenges referred to above. New technologies and expansive and highly competitive capitalistic transnational economic markets have so far been given more effective and adequate legal regulatory forms in relation to the demands of those societal dynamics. The confrontation between the current forms of environmental degradation and the legal system has however so far not created sufficiently adequate expressions in legal norms and regulation.

Gunther Teubner has in several works written on the problems of modern law in developing adequate normative expressions of the current societal problems and conflicts in a societally and communicatively highly differentiated and specialized society.\(^{34}\) Factual change and cognitive expectations are continuously and rapidly changing. The environment is comprehensively and intensively affected by humans. Environmental degradation is closely interwoven in the economic development of current societies. Describing what environmental degradation is, and what parts of it need to be reduced or banned, is extremely complex. Finding the adequate legal forms for environmental regulations, is equivalently complex.\(^{35}\) Legal forms are still

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\(^{35}\) Niklas Luhmann, ibid., 2005, p.467-469
dominated by either contract or sovereignty based programs and logics. The complexity of new biotechnologies, environmental degradation, new forms of cooperation in networks, knowledge based normative standards etc. cannot always be adequately expressed in existing legal semantics.

Law is expanding to more areas of society. Law and politics are expected to contribute to solving any societal problems and conflicts in modern societies. The problems of ‘translating’ new societal constellations to adequate forms of the legal language have however not been solved. Niklas Luhmann writes on how applying the theories of communicative differentiation enable us to understand the specific qualities and the limitations of the legal function of communication.

Legal regulations do not ‘represent’ society directly. Legal regulations communicate a specific aspect of society. New knowledge and technologies and a more global economy are new and highly specialized dynamics which are not easily translated into existing legal norms and concepts. They create new conflictual constellations which do not have adequate legal representations. They are difficult to translate into normative, generalized and more stabilized categories of law. Complex and technology-based modern societies have unleashed an enormous burden on the legal and political communicative systems. Law and politics have a general responsibility of making generalized and conflict-resolving decisions in society. The function of the legal system is however, according to Luhmann, to produce and stabilize normative expectations of normative expectations. This implies the production of legal norms which can be applied with a legal certainty.

Conditional legal norms have been the most accepted legal form under the program of

36 Niklas Luhmann, Ökologische Kommunikation, Opladen: Westdeutscher Verlag, 1988, ch.11 Law
37 Niklas Luhmann, ibid., 2005; ibid., 1992; ibid., 1988, ch.11
39 Niklas Luhmann, ibid., 1992, ch.8, p145 flw
legal certainty, so far.\textsuperscript{40} The introduction into the legal system of political and societal purposes and scientifically based standards implies new challenges in terms of creating legal forms which are consistent with the demands of predictability and legal certainty as defining qualities of the legal program.

Luhmann admits that environmental law poses new challenges for the legal system. Law as a program of the control of freedom and with conditional norms and predictability as its defining qualities cannot regulate a complex, unpredictable and continuously changing environment without creating new legal forms or mechanisms. The concept of risk has been central to Luhmann’s and Teubner’s theories on how to think about many of the new technologies which are applied in modern societies on a large scale and often without certain knowledge of the consequences.\textsuperscript{41} Complex new technologies create an enormous amount of possibilities, but without consensus on how to apply them, or on what the acceptable levels of risk should be. Ecological and environmental problems are created on an ever increasing scale. ‘Risks’ have become part of what we accept in society. The threshold for risks which are too ‘dangerous’ depends on scientific criteria, but is under any circumstances very complex to make decisions on. The legal system will have to accept standards and thresholds which are scientifically based. The decisions on what thresholds of environmental hazards or degradation are politically and legally acceptable, are inevitably contingent. They are the ‘societally acceptable’ risks.

Luhmann defines law as a socially regulative which can be changed. In works on law he defines law in a classical way as a normative, freedom protecting, conditional and

\textsuperscript{40} Ibid., 1988, ch.11
predictable structure. In his works on risk and ecological communication he is more open to the challenges of the current forms of environmental change and degradation for the legal and the political systems if they are going to be part of regulating the comprehensive forms of environmental change. He does not further define how that can be done. He continues to warn that ecological problems are too complex, uncertain, unpredictable and contextually dependent for there to be any possibility of making rational and consensual legal decisions on them. From what he wrote on environmental law, ecological law and risk it is clear that he was aware of the enormous ecological problems and the extreme forms of complexity implied in how they evolve, and consequently how they may be regulated.

Others may however view the possibilities of some form of legal regulation differently. The implication of a more adequate environmental law is however first of all accepting scientific data as the basis of environmental legal regulations and boundary levels. Secondly it implies accepting more explicit forms and degrees of contingency and risk. Third it implies a considerable degree of trust in the legal system. Fourth it implies an acceptance of a much more open, dynamic and uncertain form of law. In environmental law scientific data and reports will inevitably have to play a crucial role both in establishing the facts and in normatively assessing the various risks, before political and legal decisions are taken. There is no “Natur der Sache” which can be consensually or legally objectively referred to. Ecological and environmental problems are crucial for human beings to be aware of and to deal with. Their complexity cannot easily be

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42 Niklas Luhmann, ibid., 2005, ch.2, 3, 11 and 12.
reduced for legal regulatory purposes. They have to be referred to in all their complexity.

**Is translating environmental complexity into law possible?**

Law is social communication. The renewed interest in communicative and semantic differentiation more generally offers new tools for more legal discipline specific methods and theories in legal research. Certain areas of law may require more specific understandings and semantics in order to understand and to analyse the tasks and the consequences of normative regulation. Insisting on legal unity may disguise some of the particular challenges of legal regulation. It has been argued above that communicative theory with a focus on communicative differentiation and semantic and risk analysis might be constructive tools for more specific methods and theories of environmental law.

Law is a normative regulatory which must be based upon some form of predictability, equality, justice and legitimacy in order to fulfil a normative function. In environmental law the objects of regulation are extremely complex and continuously changing dynamics. The programs of environmental regulation in terms of dealing with the reduction of biodiversity, the pollution of the high seas, the pollution of foodstuffs, climate change etc. have to be able to respond to constant change, chaos-like dynamics, distances between cause and effects, global dynamics and complex international negotiations. Temporal, material and social dimensions of regulation are different than for most other legal programs. From what we know of communicative differentiation that translation between highly specialized scientific knowledge into political decisions
and legal norms has substantive limitations. This knowledge must be taken into consideration when analysing the parallel and interacting forms of communication.

With the close dependence on a changing environment described by scientific data environmental law can hardly be the standard form of autonomous law envisaged by legal positivists. The references on the state of the environment and on environmental problems must be based on scientific reports. The construction of the norms, their logics and their form must take the changeability and the complexity of the environment into consideration. Environmental law as a new legal field may have been patterned on the legal forms of other legal areas. New forms of law have been attempted, but arguably environmental law still borrows from the logics of other legal norms. The semantics of the programs of environmental law may have borrowed from scientific and political forms of communication. A vital task for environmental law research is to critically analyse how environmental law has been constructed partly by borrowing concepts and semantics from other communicative functions and partly by applying existing forms of law from other legal fields. Another vital task will consist of trying to describe the dynamics of environmental change in the age of the anthropocene in order to understand what specific forms of law are needed. The temporal mode of environmental regulations must take the changeability and unpredictability into consideration. The material mode will need to relate to scientific descriptions of the environment. The social mode must relate to the relevant actors and institutions.