

Ethics in biodiversity offsetting – legal responsibility and social equity

Aim and research questions

The **overall aim** of this research project is to produce knowledge that can be used to improve the Swedish system of biodiversity offsetting so that it is not only ecologically relevant, legally feasible, and economically cost efficient, but ethically justified, including acceptable from a social equity viewpoint. Specifically, the project addresses the following themes and **research questions**:

1. *Ethically justified exchange restrictions*: Are there any impacts on biodiversity or ecosystem services that, from an ethical point of view, ought not to be part of any offsetting scheme (so-called “no go areas”)? Are there any types of exchanges (impacts-offsets matches) that ought to be considered impermissible? To what extent does Swedish law – mainly the Swedish Environmental Code and related case-law – make room for ethically motivated exchange restrictions? How does Swedish law and policy compare to that of other countries with longer experiences of offsetting, for example the United States and Australia? How can the Swedish legal framework for biodiversity offsetting, if needed, be reformed towards greater inclusion of such restrictions?
2. *Social equity implications*: What are the possible social equity implications of biodiversity offsetting? To what extent are social equity impacts (understood in terms of distribution of opportunities and risks in a safe and healthy environment among different groups, geographically and temporally) considered by the Swedish licensing authorities and in case-law, and what measures are prescribed in order to mitigate those impacts? How do Swedish administrative decisions and legal rulings compare to those of other countries, for example the United States and Australia? How can the Swedish legal framework for biodiversity offsetting, if needed, be reformed towards greater inclusion of social equity impacts?
3. *Fairness in allocation of legal responsibility over time*: In light of Swedish and EU law, to what degree are operators obliged to compensate for negative impacts on biodiversity or ecosystem services over time? How far should the responsibility extend and how should uncertainty be factored into the decisions? What possible reasons (moral or legal) could be given in favour of deviating from the principle of full compensation? What are the arguments for and against assigning legal and moral responsibility in a very long time perspective, say more than 80 years? How can the Swedish legal framework for biodiversity offsetting, if needed, be reformed towards greater inclusion of uncertainty and fairness considerations in and a long-time perspective?

The research will be performed by a **transdisciplinary** team of senior researchers in environmental ethics, environmental science, environmental law and ecology, using both conceptual/normative (conceptual analysis, argumentation analysis, environmental law methodology) and empirical (desk-based reviews of policy literature and case-law, case studies

based on documents and interviews, etc.) research **methodology**. We will apply an interactive research approach in relation to stakeholders, in particular in the case studies.

The **novelty** of the research is two-fold. First, to our knowledge this would be the first project specifically investigating the ethical and social equity implications of biodiversity offsetting from a transdisciplinary perspective, combining environmental science and ecology with legal science and ethics. From this point of view, the project's potential scientific value is significant.

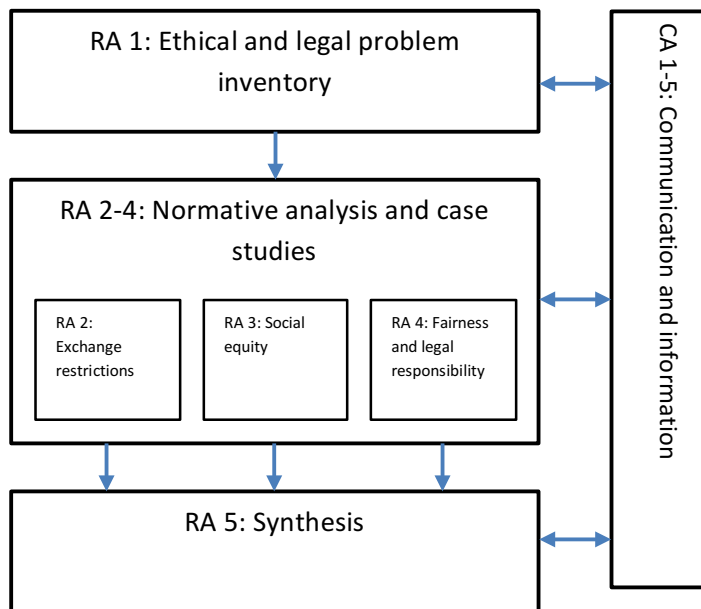
Second, the practical outcomes of the research in the form of research that will include proposals for how to include ethical and social equity considerations in biodiversity offsetting, constitute a novel attempt to further several of the Swedish environmental quality objectives, most significantly the objectives *A rich diversity of plant and animal life*, *Flourishing lakes and streams*, *A balanced marine environment*, *Thriving wetlands*, *Sustainable forests*, *A magnificent mountain landscape*, and *A good built environment*. In addition, the exploration of equity will support implementing the socioeconomic dimensions inherent in the concept of ecosystem approach to management.

In the following, we will mainly use the term “biodiversity offsetting”. However, it is important to keep in mind that the term is contested. Some maintain that “biodiversity offsetting” denotes a broader set of values and possible measures (SOU 2017:34, p. 85), whereas others argue that “compensate” and “mitigate”, which are often used interchangeably with “offsets”, are broader concepts that should not refer to what true biodiversity offsets represent (Bull et al., 2016). During the course of the planned project, we might use different concepts in different situations, as well as contribute to clarifications on this issue.

Theory and methods

The goal of any biodiversity offsetting scheme is to counterbalance the negative impacts on biodiversity and other ecosystem services resulting from property and infrastructure development. Arguably, in addition to securing environmental and human welfare goals, biodiversity offsetting should be effective and cost-efficient, scientifically grounded, and socially and ethically justified. This project focuses on the ethical and legal foundations of biodiversity offsetting, and, thus, constitutes a valuable complement to research on the biological, economic and broader governance aspects of offsetting.

The overall aim and research questions outlined above will be addressed through five research areas (RAs) organized in three constituent project parts. We will (a) conduct an ethical and legal problem inventory (RA1), (b) carry out a set of normative analyses based on i) the ethical inventory and ii) a set of case studies selected after consultation with the reference group (RA2-4), and (c) link the findings in a forward-oriented synthesis (RA5), see figure below.



RA1: Ethical and legal problem inventory

As a first step in the project, an ethical and legal problem inventory will be conducted. This will include a systematic literature study on the ethical and legal issues, including social equity issues, in biodiversity offsetting. The ethical review, which will give a state-of-the art of the ethical landscape in biodiversity offsetting, will focus on academic literature published in peer-reviewed international journals in the last 50 years (1968-2018) and will cover both consequential (‘consequence-based’, e.g. utilitarian) and deontological (‘rule-based’) ethical perspectives. The legal review will focus on legal obstacles for accountability in biodiversity offsetting and legal possibilities for overcoming them. We will study legal scientific literature, e.g. published in the form of peer-reviewed articles in Nordic and international journals, as well as dissertations in the field from recent years.

The results of the literature study will be summarized in the form of a taxonomy of ethical and legal problems related to biodiversity offsetting. The taxonomy will be presented and discussed at a seminar to which stakeholders with an interest in biodiversity offsetting, such as national politicians, municipalities, county administrative boards, land developers, organizations representing the interests of land owners (e.g. LRF), and nature conservation NGOs, are invited. Based on the questions, comments, and discussions at the seminar a refined version of the taxonomy will be produced. It will then serve as a departure point for the selection and fine-tuning of research questions to be addressed in RA2-4.

Method: The literature review will be structured and performed using Denyer and Tranfield’s (2009) five steps of a systematic review process: question formulation, locating studies, study selection and evaluation, analysis and synthesis, and reporting and using the results. The databases Web of Science, Scopus, and Philosopher’s Index will be used as main sources of information together with EU law journals and WestLaw when applicable.

Outcomes: D1.1, D2.1, CA1.1, CA1.2

RA2: “No go areas” and other ethically impermissible exchanges

Even if the conclusion is valid, that there are good moral reasons for permitting biodiversity offsetting as a general policy measure, there could still be limits to what type of trades can permissibly be made. To begin with, there could be limits to what types of impacts can be offset. For example, some jurisdictions are claimed to prevent offsetting of impacts to threatened species or habitats (Ives and Bekessy, 2015). In the literature, these impermissible areas of offsetting are sometimes referred to as “no go areas”, or “off-limits areas” (Walker et al., 2009). Philosophically, setting limits to what can be part of an offsetting scheme represents a deontological approach (certain types of impacts or ecological entities are off-limits, regardless of whether the trade is expected to generate a larger amount of overall utility, or welfare). This is to be contrasted with consequential ethical (e.g. utilitarian) thinking, which underlies offsetting in general.

Second, even if all types of impacts could permissibly be allowed to be offset, one could argue that there are limits to what types of compensation measures should be allowed to make up for a certain impact. It is sometimes argued that only “like-for-like” offsetting ought to be permitted, that is, loss of a certain wetland should be compensated by creating a wetland at a different location, and not by creating, for example, a meadow or grassland. However, as pointed out in the Swedish Government’s report on ecological compensation, there could be good reasons for allowing “out-of-kind” exchanges (SOU 2017:34). For example, if there are plenty of forests in a certain area but only few wetlands, there could be good reasons to allow an exchange of a piece of forest land for a wetland (SOU 2017:34, p. 99, see also Habib et al., 2013 on “trading up”).

In RA2 we will investigate the ethical limits of biodiversity offsetting, in particular whether there are impacts that ought not to be part of any offsetting schemes (impacts on threatened species and habitats are strong candidates as well as impacts on place-based social and cultural values). We will also investigate if there are certain types of exchanges (impacts-offsets matches) that ought not to be permitted. The philosophical justifications of such limits to biodiversity offsetting schemes will be scrutinized, including how that might be expressed in a specific case.

Method: We will analyse the arguments given in the literature for and against “no go areas” policies and “out-of-kind” exchanges. In order to get a better picture of what impacts ought to be considered “no go areas” we will compare the Swedish Environmental Code’s rules and Swedish case-law, and when applicable also EU law and ECJ case-law, on biodiversity offsetting with that of other jurisdictions, tentatively those of the United States and Australia, two countries that have had extensive offsetting schemes in place for some time. We combine desk-based studies of academic literature with environmental law methodology (see e.g. Westerlund, 1997 and 2004; Michanek, 2003; and Gipperth and Zetterberg, 2013), that is, analysis of the environmental law system (including case law) with the further aim to identify inconsistencies and obstacles in relation to key objectives set in policy and the legislation (domestic, EU, international) and to propose changes in the existing regulatory system. In addition, we will conduct an interactive transdisciplinary in-depth case-study (Yin, 2003; Lang et al. 2012) with field visits and interviews. The selection of specific case will be done after discussions with the reference group and based on the preliminary outcomes of RA1.

Outcomes: D2.1, CA2.1, CA2.2, CA2.3

RA3: Social equity issues in biodiversity offsetting

Even if one accepts the utilitarian idea that a higher overall value, utility, or (human) welfare can sometimes be created by biodiversity offsetting, the distribution of utility across a population could be considered ethically problematic. Offsetting policies could create “winners” and “losers”, between groups (e.g. between land owners and NGOs or between NGOs representing different interest groups), geographically or temporally. This is particularly problematic in relation to the loss of ecosystem services, which often have direct and indirect welfare implications for local populations. Compensating for the destruction of a wetland at one geographic location by contributing to a wetlands restoration project somewhere else may lead to inequitable distributions of risks and welfare and, in some cases, exacerbate already existing inequities (Salzman and Ruhl, 2000; Mandle et al., 2015). Similarly, impacts may be distributed unequally over time so that those who suffer from an impact may not be the ones who benefit from the offsetting measures. Furthermore, as time passes the grounds for upholding a particular compensation scheme may disappear, for example if the ‘new’ composition of species or habitats is considered ‘natural’ or no longer endangered? This may present a significant problem, since time lags are not uncommon in biodiversity offsetting and some ecological entities can only be compensated in a long-time perspective (old growth forests are one example) (SOU 2017:34, p. 100). (However, forest offsets are sometimes possible to stimulate within shorter timeframes, for example by controlled forest fires that are needed for threatened species that depend on such (natural) disturbances.)

Although it is generally acknowledged that offsetting measures could have negative impacts on private and public interests, the social equity implications of offsetting have received surprisingly little attention in the academic literature. In a policy guidance published by the Swedish Environmental Protection Agency, though, it is acknowledged that offsetting measures could have social equity implications and that possible impacts on public and private interests ought to be factored into the localization decisions (Naturvårdsverket, 2016, see section 5.4.2). Internationally, the social equity implications of offsetting have been studied in relation to e.g. wetland mitigation in Chicago (BenDor et al., 2007) and North Carolina (BenDor and Stewart, 2011), and in relation to road development in the Peruvian Amazon (Mandle et al., 2015). The studies suggest that social equity impacts are particularly challenging when offset policies are aimed towards ecosystem services, which can be linked to large areas of land or water where the property rights are distributed between several owners, both public and private at times.

Constructing a compensation that is both ecologically effective and ethically justified, including acceptable from a social equity viewpoint, is a challenge that could be legally “solved” by requiring public participation in the licensing process. However, such participatory approaches are rare in the area of biodiversity offsetting. Moreover, there is the more general problem of participation processes being used for disseminating information and achieving acceptance for already established aims or measures, rather than for deliberation of the ends and means themselves. Such a restricted application of public participation is obviously problematic from the viewpoint of procedural justice.

In RA3 we will investigate the possible social equity implications of biodiversity offsetting, focusing on ecosystem services. The possibility to set up compensation that is both socially and ecologically acceptable will be investigated, together with the legal responsibilities and challenges that follow. We will produce a preliminary taxonomy of social equity dimensions that

are important to consider in offsetting decisions. In addition, we will analyse to what extent social equity impacts have been explicitly considered by Swedish licensing authorities, including in a specific in-depth case study, and what measures have been demanded in order to mitigate those impacts. Comparisons will be made with case law from the United States and Australia.

Method: In RA3 we will combine desk-based studies of academic literature and ethical analysis with environmental law methodology, see above. As in RA2, we will carry out an interactive transdisciplinary in-depth case-study, with field visits and interviews. The selection of specific case will be done after discussions with the reference group and based on the preliminary outcomes of RA1.

Outcomes: D3.1, CA3.1, CA3.2, CA3.3

RA4: Allocation of legal responsibility over time – uncertainty and fairness

Biodiversity offsetting is an operationalization of the internationally recognized Polluter Pays Principle (PPP) and found in the Treaty on the Functioning of the EU. PPP builds on the moral norm that a person who causes damage ought to take measures to redress that damage and to compensate for the damage that remain thereafter. Different measures can redress damage caused to biodiversity or other ecosystem services. Commonly employed measures include restoration of damaged areas, creating new habitats, and various forms of habitat management maintenance. As a general principle, PPP requires that impacts are fully offset, that is, 1:1 compensation is minimally required. However, due to e.g. uncertainties and time lags one could argue that operators should be required to “over-compensate” (SOU 2017:34, p. 138). This is in fact often done by the European Commission in its opinions in Art. 6(4) (Habitats Directive) situations (Krämer, 2009; McGillivray, 2012). This could ensure adequate offsetting in accordance with the precautionary principle, but it remains to be investigated how wide such margins ought to be, considering the uncertainty involved as well as factors related to the operator. Evidently, decisions will have to be made on a case-by-case basis, taking precautionary requirements that are not unproportional into consideration.

In RA4 we will scrutinize the ethical reasons for and against potentially deviating from the principle of full compensation. We will scrutinize how the Swedish licensing authorities have reasoned when assessing the degree of compensation, focusing specifically on how uncertainty and fairness aspects, such as expected effectiveness of the suggested offsets and expected costs to the operator, are factored into the decisions. The ratios used by the Commissions in its opinions under the HD Art. 6(4) can be used as a reference for the analysis of the Swedish licensing authorities.

We will also investigate the normative question of what time perspective ought to be used in biodiversity offsetting, including in-depth in a specific case. As a departure point, offsets should be effective for as long as the negative impact remains. However, for offsetting with very long time lags it may be impractical, maybe impossible, to demand legal responsibility. A reference for the analysis of time and responsibility could be the timespan of permit regimes, i.e., if the responsibility to maintain a dam or some other licensing-dependent infrastructure is 50 years before a new permit is needed, it could be reasonable to demand the same timeframe of responsibility for an offset.

Method: We will mainly use argumentation analysis and environmental law methodology, as outlined above. As in RA2 and RA3, we will carry out an interactive transdisciplinary in-depth case-study, with field visits and interviews. The selection of specific case will be done after discussions with the reference group and based on the preliminary outcomes of RA1.

Outcomes: D4.1, CA4.1, CA4.2, CA4.3

RA5: Synthesis

As a final step in the project, the results obtained will be synthesized in the form of a special report (tentative form) published in Swedish with concerned authorities and stakeholders as primary target groups. The report will discuss possible ways of including ethical and social equity considerations in biodiversity offsetting policy and law. A preliminary version of the report will be prepared based on deliberations with the project reference group. The preliminary version of the report will then be presented at a final seminar to which the key stakeholders of the project are invited. Based on the discussions and comments received, a final version of the report will be prepared and disseminated.

Outcomes: D5.1, CA5.1

Background

Biodiversity offsetting is a conservation tool that is used to counterbalance losses of biodiversity in one place by generating equivalent benefits elsewhere. The origins of the tool can be traced back to the United States, where offsetting emerged as part of an ideological move towards neoliberalisation of environmental issues in the 1970s and 80s (Bonneuil, 2015; Calvet et al., 2015). Offsetting mechanisms were initially set up in line with the polluter pays principle to regulate polluting emissions but quickly spread to other fields of environmental management, such as forest and wildlife conservation. In 1982, the first “mitigation bank” was introduced in Louisiana as part of a pilot-program encouraged by the Reagan administration (Bonneuil, 2015). Today, the global reach of biodiversity offsetting schemes is growing, with more than 60 countries known to have national offsetting policies in place, among them several EU member states, Canada, Australia, South Africa, and New Zealand (Maron et al., 2016).

Although cherished by many as a valuable device in the biodiversity conservation toolbox, biodiversity offsetting has been termed a “contentious conservation tool” (Maron et al., 2016). To begin with, concerns have been raised over the substandard performance of some offsetting schemes. In a recently published article on the effectiveness of offsets in Western Australia, May et al. (2017) showed that at most 39% of the offsets under investigation were effective and 30% were not at all or inadequately implemented (see also Lindenmayer et al., 2017 on the effectiveness of a nest box program designed to offset clearing of hollow-bearing trees in southern Australia). Although assessments of the effectiveness of environmental offsets have been rare to date, the abovementioned studies, as well as others, suggest that some offsetting schemes may indeed fail to reach expected performance standards.

Second, concerns have been raised over the technical difficulties involved in quantifying and comparing different ecological units (Walker et al., 2006; Goncalves et al., 2015). Here, the

choice of metrics, or currency, presents a particular difficulty. Trade-offs often have to be made between user-friendliness (simplicity) and ecological adequacy (complexity) (Maron et al., 2016).

Third, there are significant governance challenges associated with biodiversity offsetting, in particular monitoring, evaluation and auditing of offsetting schemes over time. There are technical difficulties involved in measuring the outcomes of a conservation intervention due to long time delays and, in some cases, issues of natural variation (Maron et al., 2016). In addition, establishing regulatory frameworks with adequate capacity to monitor and evaluate policies remains a challenge. This presents a legal challenge, since ownership, depending on the timeframe of the offset, could shift and the incentives for the offset could disappear, or the target of the compensation could turn inappropriate due to, e.g., climate change.

In addition to the abovementioned concerns, fundamental ethical objections have been raised against biodiversity offsetting. Some authors believe that biodiversity offsetting violates the intrinsic value of nature, or represents an ethically illegitimate commodification, marketization, or privatization of nature (McCauley, 2006; Spash and Aslaksen, 2015; see Vaissière et al. (2017) for an important critique of the conceptual misunderstanding involved in equating commodification with marketization and privatization.) Others worry that offsetting will engender negative societal attitudes toward nature, by way of making environmental destruction socially more acceptable (Moreno-Mateos et al., 2015; Maron et al., 2016). For example, Ives and Bekessy (2015) suggest that offsetting may undermine environmental virtues, such as respect for nature, or “being rightly oriented to nature” (Hursthouse, 2007). Yet others question the ethical permissibility of “out-of-kind” exchanges or are concerned about the social equity implications of offsetting (BenDor et al., 2007; Mandle et al., 2015).

Conservationists are split over whether or not to allow for market-based trading schemes in environmental policy. In an article published in *The Guardian* in June 2014, Ariel Brunner, head of EU policy at Birdlife International at the time, is quoted saying: “Offsetting very easily becomes an off-the-shelf way to trash biodiversity and allow developers to bypass regulation (Vidal, 2014). In the same article, Hannah Mowat, of Fern, which tracks EU forest policies, is quoted saying: “It is a license to trash. It makes the assumption that you can swap nature. We lose things when we offset things. It reinforces the belief that we can keep on going with business as usual” (ibid.). Other environmental organizations have a more positive view, for example, the Swedish Society for Nature Conservation (SSNC, 2017). The defenders of biodiversity offsetting argue that that conserving nature for nature’s sake is a too optimistic stance. More substantial progress can be made, it is argued, by translating nature’s intrinsic value into the language of economics (see Spash and Aslaksen, 2015 on “environmental pragmatism”).

Despite the fact that many of the questions that arise in connection with biodiversity offsetting are fundamentally ethical and cannot be resolved on scientific or economic grounds alone (the permissibility of “out-of-kind” offsets and the underlying reasons for upholding the “mitigation hierarchy” are two examples), they have received surprisingly little attention in academic and policy literature. As argued by Ives and Bekessy (2015:569), “[e]thical questions that underpin the debate about biodiversity offsetting are largely absent in both the academic literature and public discourse”. In a recent legal publication, ethical questions are highlighted as important for biodiversity offsetting, however with little discussion of how they should be included in the creation of markets for biodiversity credits (Reid and Nsoh 2016). In other publications on, e.g., compensation and no net loss, ethical aspects are not mentioned (e.g. Schoukens and Cliquet

2016 and Schoukens 2017). There is, evidently, a research gap related to the social and ethical aspects of biodiversity offsetting, despite their occurrence in the debate.

Practical relevance

As noted above, analyses of the ethical aspects underpinning biodiversity offsetting are largely missing in both the academic literature and the public debate, despite the fact that much of the questioning of offsetting indeed concerns ethical issues, albeit implicitly. This shortcoming is unfortunate, since by implementing a system for nature conservation without scrutinizing its normative foundations we will put in place a system that does not protect what really matters. To ensure that the system protects what really matters, we must not only analyse the technical feasibility of the system, including its scientific underpinnings and economic rationale, but reassess the fundamental values upon which it is based. This is furthermore of central importance for, as far as possible, ensuring a robust support for the system, not least from a democratic point of view.

Beside the Swedish Environmental Protection Agency, the Swedish Agency for Marine and Water Management, and the Swedish Forest Agency, the main recipients of the results of the present project are: politicians at the national government level, the county administrative boards and the Land and Environmental Courts, organizations representing land owners (e.g. LRF) and environmental NGOs (e.g. WWF, Swedish Society for Nature Conservation). We envisage that the project will benefit these actors in four principal ways. The project will contribute towards better (environmentally effective and socially just) biodiversity offsetting policies and decisions by:

- Raising awareness and understanding among governmental decision makers, nature conservation organizations, operators, and land owners about the ethical aspects of biodiversity offsetting, including social equity implications.
- Identifying the key scientific findings concerning the ethical aspects of biodiversity offsetting and communicating them to the licensing authorities involved in offsetting at national and local levels in the form of policy briefs.
- Giving directions for how to include ethical and social equity considerations in biodiversity offsetting policy and law, for example in guidance documents issued by the Swedish EPA and the Swedish Agency for Marine and Water Management.
- Enhancing research capacity and fostering communication and exchange between the environmental research community and stakeholders in the biodiversity policy area.

Through these efforts the project will contribute to the achievement of several environmental quality objectives, which are shown to be difficult to reach, most significantly the objectives: *A rich diversity of plant and animal life*, *Flourishing lakes and streams*, *A balanced marine environment*, *Thriving wetlands*, *Sustainable forests*, *A magnificent mountain landscape* and *A good built environment*. In addition, the exploration of equity will support implementation of the socioeconomic dimensions inherent in the concept of ecosystem approach to management, and by extension the social dimension of sustainable development.

Organization and personnel

The project will be carried out by four senior researchers from the fields of environmental ethics, environmental science, environmental law, and ecology. A reference group will be set up and play a key role in the project, as described below.

Karin Edvardsson Björnberg (KTH) will lead the project. She is associate professor of environmental philosophy at KTH Royal Institute of Technology. She is currently involved in three research projects, financed by Formas and Mistra, on delay mechanisms in environmental policy (“Mind the Gap”, Formas 2015-2017), ethical and regulatory aspects on genetically modified varieties in agriculture (“Mistra Biotech”, Mistra 2012-2016, 2016-2020), and ethical aspects on local planning for raising global mean sea levels (“SeaRims”, Formas 2017-2022). Karin has established research collaborations with SLU, Uppsala University, Södertörn University, and London School of Economics and Political Science (LSE).

Mikael Karlsson (KTH) is Agronomist and PhD in Environmental and Energy Systems. He is currently involved in e.g. the research project “Mind the Gap” (Formas 2015-2017), which focuses on science-policy interactions and delay mechanisms in environmental policy. His research interests since almost twenty years concern environmental governance related to e.g. climate change, chemicals and biodiversity. Mikael has a broad background in the field of nature protection in Sweden and abroad, and has an extensive national and international network in the academy as well as among public institutions, companies and civil society. He was President of the Swedish Society for Nature Conservation 2002-2014 and chairs the European Environmental Bureau today. Mikael is member of the board of the Swedish Forest Agency and has been member of e.g. the All-Party Committee on Environmental Objective, the Swedish Species Information Centre at SLU, the Environmental Objectives Council, and expert in several environmental committees set up by the Swedish government and the European Commission. Besides research, Mikael is Senior Advisor at 2050 Consulting, working on environmental issues with numerous companies and administrative bodies.

Charlotta Zetterberg is professor of environmental law and belongs to the Department of Environmental Law, Uppsala University, which has a well-established environmental law circuit with extensive interdisciplinary collaboration with other universities and research institutions at both national and international level (e.g. the China University of Political Science and Law in Beijing and Sun Yat-sen University in Guangzhou, as well as several universities in the US, e.g. Minnesota Law School, Pace University, NYC and Vermont Law School). She has on-going projects in the research programme “Mistra Biotech” and she is the project leader of two other research programmes: “Legal compensation for losses in biodiversity – a net loss?”, founded by the Swedish Research Council, and “Nature protection and dispensation: Improving the application of the Environmental Code to achieve environmental quality objectives”, founded by the Swedish Environmental Protection Agency. Charlotta was an expert in the Committee on ecological compensation (SOU 2017:34).

Henrik Josefsson is a postdoctoral researcher in environmental law and is part of the environmental research group at the Faculty of Law, Uppsala University. He has an ongoing project on “Legal compensation for losses in biodiversity – a net loss?”, founded by the Swedish Research Council. The project focuses on fundamental legal-ecological questions attached to the compensation of net loss of biodiversity in planning situations that demand a Strategic

Environmental Assessment. Other current areas of research are, e.g., the interaction between the Water Framework Directive and other EU directives (such as the EU Nitrates Directive); the project is termed ‘Coherence and Coordination under the Water Framework Directive’.

Tim Schnoor is Master of Science (MSc) in environmental science and PhD in Ecology. He works a consultant at Ekologigruppen AB, one of Sweden’s leading ecology and planning consultancy companies. Tim has a wide experience of strategic environmental planning and practical and theoretical nature conservation. His experiences include biodiversity offsetting, identifying and developing biodiversity and ecosystem services, management of natural resources and analysis of ecological data. Tim was previously Municipal Ecologist and Strategic Planner in Lomma municipality, and is currently also a member of the Advisory Council for the urban development think-tank Movium at SLU.

A reference group will be set-up consisting of six persons (confirmed):

Karolina Ardesjö Lundén: Lawyer; Public Prosecutor at Kammarkollegiet (The Legal, Financial and Administrative Services Agency); recently Secretary in the Swedish Governmental Inquiry on Ecological Compensation.

Jan Terstad: Biologist, Head of Dep for Forests and Nature Conservation at the Swedish Society for Nature Conservation; previously at e.g. the Swedish EPA, the Environmental Ministry and the Swedish University of Agricultural Sciences.

Isabel Moretti: MSc in Ecology, Head of the Unit for Environment and Energy at LRF, the Federation of Swedish Farmers; previously e.g. Political Advisor, Government of Sweden; Political Advisor, European Parliament.

Charlotta Szczepanowski: Civil Engineer; Head of Sustainability at Riksbyggen, one of the largest building companies in Sweden; previously e.g. Environmental Coordinator PostNord (Posten), and responsible for environmental issues at Electrolux.

John Askling: MSc in Biology; Senior Environment Consultant and founder, Calluna AB; also Chairman of the board for Ekologiföretagen Sverige; chairman of the board for Cleantech Östergötland.

Fredrik Bengtsson: Ecologist Municipal Ecologist, Helsingborg municipality; specialist on ecological compensation issues.

The reference group will act as “extended peer reviewers”, that is, will be asked to give input to the set-up and implementation of the RAs, including the research questions and hypothesis to be addressed, the methods used for data collection, and the application of the research, including communication of the research findings to key stakeholders. The reference group will play a key role not the least in the selection of case studies and in the project synthesis. Since the reference group will be used extensively throughout the project, the project budget includes a special budget item that will be used to pay for their expenses (time spent as well as travel), see below (at least one member is expected to not need any reimbursement so the budget is calculated for five persons).

Open access, data and publications

All data generated in the project will be communicated in the form of scientific articles published with open access in international peer reviewed journals. Data collected in the project will mainly consist of policy documents and case law relating to biodiversity offsetting. Such data is generally available to the public via online services. When interviews are conducted, the interviews will be transcribed and the data (audio files and transcribed documents) will be archived in accordance with filing regulations.

Communication

The project results will be communicated to the identified stakeholders (see above) throughout the duration of the project. The aims of the communication activities are:

- Raise awareness among end-users and other stakeholders about the ethical aspects of biodiversity offsetting.
- Stimulate and receive feedback on research design, including hypotheses, data collection, analysis, tentative conclusion, and communication.
- Convey knowledge about the scientific outcomes of the project and ensure to the greatest extent possible that it is considered by the stakeholders/end-users. Special efforts will be made to facilitate that potential uncertainties and points of disagreement are communicated in a way that allows for enlightened deliberation and constructive dialogue.
- Facilitate policy dialogue among the stakeholders and end-users of the projects as well as between the research community and the stakeholders/end-users.

The following categories of communication activities will be undertaken in the project to achieve the stated communication aims:

- *Policy briefs.* Four policy briefs will be produced, specifically designed to synthesize and communicate the research findings to the stakeholders of the project. The policy briefs, which will be used to initiate policy dialogue among the stakeholders of the project, will be around 2-4 pages and written in Swedish. The policy briefs will be presented and discussed at meetings to which the stakeholders of the project, including representatives of the Swedish EPA and the Swedish Agency for Marine and Water Management are invited.
- *Oral presentations.* The results of the project will be communicated through oral presentations at national and international meetings and conferences. Regular international conferences of relevance to the present project are: The Nordic Environmental Social Science Conference (NESS), the European Environmental Law Forum (EELF), and the ISEE Annual Meeting on Environmental Philosophy.
- *Seminars.* The results of the project will be communicated at seminars to which the stakeholders of the project are invited.
- *Op-eds.* Popular articles in the form of op-eds in news media will be produced when a particular research finding is deemed to be of importance to the general public. (The op-eds are not specified in the plan of activities below.)
- *Website.* A project website will be set up at the KTH Philosophy Division's internet website (<https://www.kth.se/en/abe/om-skolan/organisation/inst/philhist/phil>). The

website will contain information about the project as well as links to published articles, policy briefs, op-eds, and power point presentations, and will function as the primary source of information during the project.

- *Scientific publication.* A minimum of four articles intended for publication in international peer reviewed journals will be produced.

Plan of activities (deliverables and communication activities)

The project will be carried out between January 2018 and December 2020 (36 months). During that period, the following deliverables and communication activities will be delivered. As indicated below we will deliver 4-7 scientific articles in the project (D1.1-D4.1), depending on outcome and journal format.

<i>Deliverable</i>	<i>Commun. activity</i>	<i>Description</i>	<i>Month (1-36)</i>
D1.1		Report on the ethical and legal aspects of biodiversity offsetting	6
	CA1.1	Stakeholder seminar initiating policy dialogue related to D1.1	6
D1.2		Article (literature review) on the ethical and legal aspects of biodiversity offsetting	9
	CA1.2	Policy brief summarizing the results of D1.2 and CA1.1	12
D2.1		1-2 articles on the ethical limits of biodiversity offsetting, including report from the case study	18
	CA2.1	Policy brief summarizing the results of D2.1	21
	CA2.2	Stakeholder seminar initiating policy dialogue related to D2.1	21
	CA2.3	Conference presentation of the results of D2.1	21
D3.1		1-2 articles on the social equity implications of biodiversity offsetting, including report from the case study	24
	CA3.1	Policy brief summarizing the results of D3.1	27
	CA3.2	Stakeholder seminar initiating policy dialogue related to D3.1	27
	CA3.3	Conference presentation of the results of D3.1	27
D4.1		1-2 articles on uncertainty and fairness aspects of responsibility allocation, including report from the case study	30
	CA4.1	Policy brief summarizing the results of D4.1	33
	CA4.2	Stakeholder seminar initiating policy dialogue related to D4.1	33
	CA4.3	Conference presentation of the results of D4.1	33
D5.1		Synthesis report in Swedish (with additional summary or policy brief in English)	36
	CA5.1	Final seminar	36

Budget

Salaries

Karin Edvardsson Björnberg, KTH (48 500 SEK/month, 25%)

Mikael Karlsson, KTH (45 810 SEK/month, 25%)

Charlotta Zetterberg, Uppsala University (53 000 SEK/month, 25%)

Henrik Josefsson, Uppsala University (37 400 SEK/month, 25%)

Tim Schnoor, Ekologigruppen (41 000 SEK/month, 10%) (Tim will be hired as project assistant. His salary is calculated based on the KTH rates used in our application.)

Social taxes at KTH and Uppsala university are 53.2% and 51% respectively.

	2018	2019	2020	Total sum
Karin	222 906	222 906	222 906	668 718
Mikael	210 543	210 543	210 543	631 629
Charlotta	240 090	240 090	240 090	720 270
Henrik	169 422	169 422	169 422	508 266
Tim	73 374	73 374	73 374	220 122
Total sum	916 335	916 335	916 335	2 749 005

Travels

Field visits will take place in each of the three in-depth case-studies, in order to e.g. carry out interviews and conduct group discussions on site. At least two researchers will participate each time. We estimate that accommodation is needed for at least two nights on each occasion, depending on the location and travel options, in total not exceeding six nights in all per person. The travel costs are estimated to 1 000 SEK per field visit and person (6 000 SEK for three field trips for two persons). Accommodation is estimated to 3 000 SEK per field visit and person (18 000 SEK for three field trips for two persons). In all, 24 000 SEK is needed to carry out the field trips.

We will present and discuss the project and its results at strategically identified scientific conferences. We estimate that each conference trip will cost around 15 000 SEK. We estimate that we will do at least one conference trip in 2019 and two conference trips in 2020 (45 000 SEK in total).

Other costs

Premises

At KTH premise costs are calculated as a fixed percentage (12%) of the salary costs (including social taxes). At Uppsala University it is calculated in a similar way with a fixed percentage of 10%.

	2018	2019	2020	Total sum
Karin	26 749	26 749	26 749	80 247
Mikael	25 265	25 265	25 265	75 795
Charlotta	24 009	24 009	24 009	72 027

Henrik	16 942	16 942	16 942	50 826
Tim	8 805	8 805	8 805	26 415
Total sum	101 770	101 770	101 770	305 310

Open access

We estimate the OA fee to be 20 000 SEK per article (80 000 SEK in total for four OA articles).

Conferences and workshops organized by the project

Four stakeholder dialogue seminars and one final seminar are planned. We estimate that around 20 people, including the researchers, will participate in the seminars. The estimated cost for lunch is 300 SEK per person, that is, 6 000 SEK per seminar. In addition, we estimate that the premises will cost around 2 000 SEK per seminar. Thus, each seminar will cost 8 000 SEK (40 000 SEK in total).

Reference group meetings

The reference group will meet once a year (3 meetings in all). The estimated cost per meeting is 6 000 SEK and includes travelling expenses for people located outside Stockholm and food (18 000 SEK in total). In addition, the members of the reference group will be paid a small enumeration for the “extended peer review” that they perform. We estimate that they will perform around 4 hours of work in connection with each meeting, including preparations (reading texts, etc.) and actual meeting time. The cost is calculated using the KTH hourly wage amount for a professor, which is 1578 SEK/hour. Each reference group meeting will thus cost 6 312 SEK/person. The reference group will consist of 6 persons (one doesn’t need reimbursement). Each reference group meeting will thus cost 31 560 SEK in total (94 680 SEK for three meetings).

	2018	2019	2020	Total sum
Premises	101 770	101 770	101 770	305 310
OA fee	20 000	20 000	40 000	80 000
Seminars	8 000	8 000	24 000	40 000
Ref gr meet	6 000	6 000	6 000	18 000
Ref gr work	31 560	31 560	31 560	94 680
Total sum	167 330	167 330	203 330	537 990

Indirect costs (calculated differently in “Ansökningsportalen”)

Indirect costs are calculated as fixed percentages of the total direct salary costs (including social taxes). At KTH the percentage rate is 47.15% and at Uppsala University it is 46%.

	2018	2019	2020	Total sum
Karin	105 100	105 100	105 100	315 300
Mikael	99 271	99 271	99 271	297 813
Charlotta	110 441	110 441	110 441	331 323
Henrik	77 934	77 934	77 934	233 802
Tim	34 596	34 596	34 596	103 788
Total sum	427 342	427 342	427 342	1 282 026

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