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Do Conceptual Innovations Facilitate Transformative Change? The Case of Biodiversity Governance

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This paper explores to what extent and in what ways conceptual innovations matter for biodiversity governance. A three-step analysis is employed, starting with identifying theoretical insights on how concepts matter for transformative change. These insights provide a lens for examining the academic debate on the Ecosystem Services concept and for identifying critical conceptual challenges related to transformative change. Finally, how the concept is used and valued in policy practice is explored through an empirical study of policy practitioners in Sweden. Based on this investigation we conclude that the ES concept holds important but restricted properties for transformative change. The ES concept provides new meanings in the form of economic valuation of nature, but these remain highly contested and difficult to practice; ES function as a boundary object, but poorly integrates social analysis and, in practice engages professionals, rather than resulting in more inclusive public participation; and ES function performatively by reflecting a technocratic ideal and raising awareness rather than targeting fundamental political challenges. Finally, the paper returns to the general questions of how conceptual innovations can generate transformative change and argues that in the continued work of conceptually developing the Nature's Contribution to People, researchers and practitioners need to pay close attention to interpretive frames, political dimensions, and institutional structures, necessitating a strong role for social analysis in this process of conceptual innovation.

Keywords: ecosystem services, nature's contribution to people, transformative change, boundary objects, conceptual innovations, biodiversity policy, environmental governance

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INTRODUCTION

Whereas, researchers have long stressed the inextricable link between society and nature and the need to move away from the unsustainable path society is on, they are significantly more uncertain about how to initiate, facilitate, and guide this change. There is an increasing accumulation of scientific data on human impact on the environment, some even claiming that we have surpassed planetary boundaries (Rockström et al., 2009) and entered the qualitatively new epoch of the Anthropocene (Steffen et al., 2011). Despite international agreements and declarations—such as Agenda 2030 and the 17 Sustainable Development Goals—there are few signs that society is

radically changing track. This has led international environmental expert organizations to stress an urgent need for transformative change. The IPCC (2018) stresses that we need to address the root causes of climate change, and the IPBES (2019) assesses the conditions for transformative change to investigate options for achieving the 2050 vision for biodiversity. In addition, there is continuous hope that disseminating knowledge and understanding will lead to transformative action (Boström et al., 2018). By providing broader narratives (of which the Anthropocene is one of the most recent), inventing new concepts (such as Nature's Contribution to People) and developing new objectives, indicators, and targets (such as the IPCC's 1,5-degree report), experts aim to guide actors' understanding and thereby their actions. Constructing and spreading concepts and narratives are a central means of convincing companies, organizations, politicians, and citizens of the high value that nature contributes to people and society.

Within the field of biodiversity protection and nature conservation, the concept of Ecosystem Services (ES) has for the last 15 years—following the publication of the Millennium Ecosystem Assessment (2005)—become one of the most prominent ways to conceptualize the interdependency between ecosystem processes and functions and societal and human well-being (Stålhammar, 2020). ES serves as a boundary object that facilitates communication and collaboration between policymakers and different scientific disciplines (Abson et al., 2014; Ainscough et al., 2019) and has been integrated into policy documents and strategies on international, European Union, national, and local levels (e.g., Schleyer et al., 2015; Beery et al., 2016; Verburg et al., 2016; Hysing and Lidskog, 2018). Nonetheless, the concept has been debated and severely criticized, not the least for not fulfilling its promise of initiating and facilitating transformative change. Barriers to a stronger transformative role have been attributed both to its conceptual construct (e.g., anthropocentrism and economic valuations) (Schröter et al., 2014) and policy and institutional factors, such as competing political agendas and entrenched professional norms (Saarikoski et al., 2018).

A new concept—Nature's Contribution to People (NCP)—has been introduced with the aim to improve biodiversity governance that foster necessary changes (Pascual et al., 2017). Great expectations have been placed on this concept, stating that it implies a paradigm shift by including aspects that ES is missing. In particular, it claims to better include value pluralism in decision-making as well as to better incorporate knowledge from the fields of social sciences and humanities. The NCP and the expectations attached to it have been subjected to strong debate, not least by proponents of ES (Faith, 2018). The criticism spans from claiming that the concept is almost synonymous with ES (De Groot et al., 2018) and thus will not solve the problem associated with ES (Kenter, 2018), to that it underemphasizes social-ecological processes (Peterson et al., 2018) and threatens the established science-policy relation that ES successfully has made possible (Kenter, 2018). A way to avoid a conceptual conflict between NCP and ES has been to tone down the differences (Maes et al., 2018; Kadykalo et al., 2020) and claim that they can co-exist, either seeing NCP (Díaz et al., 2018) or ES (Kenter, 2018) as the overarching concept.

Whereas, the debate has explored benefits and limitations of introducing NCP as a key concept for biodiversity governance, there has been limited discussion on what way and to what extent conceptual innovations really matter for environmental governance. Despite substantial policy development and increased media attention, the gap between what is done and what needs to be done is still growing for many environmental issues, not least including that of biodiversity loss, which has led to a lot of hope being placed on new concepts, methods, and understandings for how to value nature. While it is too early to assess whether the adoption of NCP in practice leads to improved stakeholder dialogue, value pluralism, and integration of knowledge from social sciences and humanities, it is important to develop a more comprehensive understanding of conceptual innovations and to explore in more detail how concepts may matter for biodiversity governance.

The aim of this paper is to explore to what extent and in what ways conceptual innovations matter for biodiversity governance. The study is explorative, investigating how scientific concepts are discussed in research and used in practice. It uses insights generated from the field of science and technology studies (STS), academic debates on the ES concept, and empirical data on how the concept of ES is used and valued among policy practitioners in Sweden. The rationale behind this design is that while NCP is a concept that has not yet been integrated into policymaking, ES has, and there is still a lot of knowledge to gather about to what extent and in what way it has (or has not) influenced this policy area. Thus, ES is utilized as a window to explore how new concepts are perceived and used in practice and to discuss the role of conceptual innovations in (transformative) biodiversity governance. The aim is thus explorative, it does not aspire to provide a full review of conceptual developments or challenges for the ES concept, nor to generate general (cross-contextual) insights on how concepts function in every policy area. At the same time, by exploring and analyzing challenges that ES has faced in its integration in biodiversity governance, knowledge is gained relevant for NCP when it is now introduced as an important concept to foster transformative change in biodiversity governance.

This paper consists of four sections. The second section describes the design of the study. The third section presents the findings and is structured as a three-step analysis. First, we review how concepts matter for policy development and transformative change. Thereafter, we make use of this knowledge to analyze the academic debate on ES, to discern critical issues raised regarding its transformative power. Third, we draw on a recently conducted empirical study to illustrate how policy actors use and value the concept of ES in practice and what challenges they experience when acting based on this concept. Based on these findings, the concluding section returns to the general question of how conceptual innovations can generate transformative change, summarizing the lessons learned from the application of ES to biodiversity governance, and distinguishing crucial aspects of importance for the further conceptual elaboration of NCP.

MATERIALS AND METHODS

This paper focuses on conceptual innovations to transform biodiversity governance. For this study, the concepts of ES and NCP are the focus. The reason is that these concepts explicitly aim to help decisionmakers better value biodiversity and to facilitate action. ES and NCP are also institutionalized concepts in the sense that they are part of environmental discourse and are actively propagated within and outside of the academic community. These concepts are also under debate, with ongoing discussions about to what extent they are appropriate for this task; do they strengthen the worth of nature in deliberations and decisionmaking (Braat, 2018; Díaz et al., 2018; Peterson et al., 2018; Kadykalo et al., 2020)? A study of the critical issues raised in the academic debate on ES regarding its transformative effects and how it has been used and valued among policy practitioners is particularly timely as the launch of new concepts—such as NCP—have generated a vivid debate on the pros and cons of these concepts.

Studying conceptual innovations means investigating what kind of communication a concept constructs, what meanings it is assigned and by whom, and to what extent it facilitates shared objectives and actions. It is important to note, however, that there is rarely a single communicative space created; rather, discussions and deliberations take place in many settings and domains. Therefore, a concept may function differently in different contexts.

This paper adresses how concepts matter in policy practice, including the design of policy tools and measures and the actual implementation efforts among various private and public organizations. A three-step analysis is used. The first step is to investigate how concepts can produce change in society. This is done using literature from the STS field, especially how it has been applied in studies on environmental discourses and policymaking. In this review, attention is paid to the concept boundary object, which aims to create a communicative and collaborative space among diverse actors (Star, 1989, see also Bowker et al., 2015 for a discussion and application of this concept). The reason for focusing on the boundary object and its functioning is that biodiversity governance involves diverse actors with different social beliefs, material interests, and ways of valuing nature and biodiversity (Star, 1989, p. 21).

These insights are used as an analytical lens, as attention turns to the concept of ES and the extensive scientific discussion about to what extent the concept can foster transformative change, which has also been a basis for suggesting NCP as a more apt concept. Concepts and arguments from the STS literature guided the review, identifying key search terms such as conceptual innovation, boundary objectives, and transformative change. A broad database was used (Google Scholar) but we restricted the analysis to peer-reviewed materials. Articles were appraised qualitatively for bringing new insights into the function of the ES concepts for transformative changes (i.e., conceptual contribution). Most selected articles come from the policy-oriented or critical literature on ES. In analyzing the material, areas of controversy were of particular interest, therefore, ensuring that different perspectives were clearly visible in the analysis, was important. This explorative review design means that it is does not provide a systematic overview of the literature but it is restricted to explore critical issues raised in the ES debate, providing an important context for the conceptual elaboration of NCP.

In a third step, the focus turns to how the concept has been used in practice. Introducing a new concept in policy documents is one thing, turning it into practice is another. Research on environmental governance (Hysing and Olsson, 2018) as well as on ES policy implementation (Saarikoski et al., 2018), have highlighted the importance of individuals actively championing new concepts and approaches within their organizations and sectors to facilitate change. Based on an interview study among policy practitioner identified as "frontrunners" in the implementation of ES in Sweden, the paper explores the functions and value of the concept in the practical implementation of biodiversity policies (similar designs have been used in e.g., Blicharska and Hilding-Rydevik, 2018; Keenan et al., 2019; Martin-Ortega et al., 2019). The study was carried out in the spring of 2020 and included 35 respondents. Semi-structured interviews were conducted with representatives of governmental agencies, municipalities, county administrative boards, farmer and forest owner organizations, forest companies, food processing companies, housing and construction companies, and others. The analysis was conducted using a contextualized thematic approach over several stages (Bryman, 2012; Kvale and Brinkmann, 2014). A detailed description of the interview study—data collection and data analysis—is provided in the **Supplementary Materials**.

This study is explorative with the aim of better understanding conditions for conceptual innovations to work transformatively. Thus, the investigation of the ES concept is used to better understand the challenges involved when putting concepts into practice. This knowledge is of great relevance when pondering how to make new conceptual innovations matter for biodiversity governance.

RESULTS: CONCEPTUAL INNOVATIONS FOR TRANSFORMATIVE CHANGE

The call for transformative change has dramatically increased in environmental discourse and politics because many environmental problems are worsening despite different international and national initiatives to combat them. Gradually and slowly adapting regulations and practices seems insufficient for meeting the current environmental challenges, such as biodiversity loss and climate change; instead, more radical, and far-reaching solutions are needed. Transformative change means that fundamental institutional arrangements, norms, and practices in society need to be changed, often by developing new ones (Scoones et al., 2015; Buch-Hansen, 2018; Linnér and Wibeck, 2019). As for any intentional social change, this transformation needs to be initiated, supported, fostered, and governed. Thus, transformative change implies a need for agency—meaning social actors enable and facilitate this transformation. However, in what ways can conceptual

innovations, and their dissemination and appropriation enable transformative change?

How Do Concepts Matter?

To grasp environmental changes, new concepts are invented, and old concepts cease to be used or include new meanings. Concepts such as air pollution, climate change, and biodiversity loss have developed and gained prominence in environmental politics and public debates through the dynamic interaction of environmental changes and scientific knowledge. Similarly, solution-oriented concepts have been invented to mobilize action in the form of either negative concepts, such as planetary boundaries that should not be crossed, or positive concepts that point to a state that needs to be reached, such as resilience and sustainable development.

At the same time, some concepts are more apt than others for enabling us to understand a particular environmental issue, and the fact that a concept becomes widespread and frequently used does not necessarily imply that it is well-founded and well-formulated. There are several examples of concepts that originally had mobilizing effects and policy impact but that later came to be questioned or marginalized. However, even if a concept currently is, or will later be, scientifically rejected, it may nevertheless have great importance and can influence our understanding of the world and thereby how we act in this world (Lidskog and Waterton, 2016). Sometimes, a concept has a primarily pedagogical function, conveying an accessible understanding of a complex scientific context (Lidskog, 2014). "Ozone hole," "clean air" and "greenhouse effect" are all frequently used notions that were developed not to capture a distinct scientific meaning but to create a popular understanding and to facilitate communication with people and organizations outside the scientific community. Additionally, it is notoriously difficult to achieve a shared definition of fundamental concepts such as "nature," "society," and "culture," but they nevertheless have important communicative functions.

Concepts as Meaning Providers

It is important not to restrict the discussion of conceptual definitions, as it is not formal conceptual definitions that matter but the larger meaning they provide. A concept's meaning can shift radically in relation to the context in which it appears and its place in a wider interpretive frame. Many interpretive frames—which often take the form of narratives—not only condense large amounts of information and assumptions about the world but also assign meanings to it, thereby directing attention and motivating action (Arnold, 2018). However, to facilitate action, it is not sufficient to explain the world (factual knowledge) and to describe what actions are needed (normative orientation and value connection). There is also a need to give the issue priority and to create engagement, which is done by connecting to emotions (Barbalet, 2002). Research has long stressed that feelings are a constitutive part of human judgment and decision-making, that feelings and cognition are interrelated and that emotions are an important factor in motivating action (Finucane, 2013; Hysing and Olsson, 2018). If a message does not invoke any emotion, there is a risk that no action will be taken despite shared agreement on the situation and what needs to be done. Expert organizations face a delicate balance in shaping persuasive narratives that involve normative guidance and emotional appeals but in ways that do not negatively affect their epistemic authority (Lidskog et al., 2020). Thus, it is a great challenge to balance the dynamics between emotional and normative messages and relevant and valid knowledge to create an understanding of the world that provides incentives for action.

However, even if an expert organization successfully performs this delicate task, providing firm knowledge about an environmental problem as well as guidance regarding what to do and motivation to act, this is not sufficient. Environmental problems appear in a particular society and must be solved in and by this society. Thus, to develop valid and relevant solutions to an environmental problem, there is a need to understand, not only the state of the environment and how nature works, but also how society works. In striving for transformative change, any relevant and efficient proposal needs to be based on a valid view of how society is organized and how it functions (Jasanoff, 2005; Beck et al., 2014). There is a need for qualified social analysis of the social causes of an environmental problem; why it has developed, why it is maintained and how it can be changed. If no social analysis is performed, suggested solutions may work on paper but not in practice. If a proposed solution is not based on a valid understanding of the world—how nature as well as society works—it will be difficult to implement it, and even if it is possible to implement it, the implementation will probably lead to cascades of unintended consequences (Boudon, 1982).

Historically, knowledge of environmental problems and their solutions has been provided mainly by environmental scientists based in natural science. Gradually, however, social scientists have started to research environmental problems and have been included in the work of expert organizations to synthesize knowledge and to provide policy advice (ISSC and UNESCO, 2013). There is, however, a risk that the dynamics of society are not treated as seriously as the dynamics of ecosystem processes, not least that social scientists are invited mainly to facilitate the implementation of solutions that are not based on an analysis of the social causes of a particular environmental problem.

Understanding environmental issues requires us to move away from traditional disciplinary research into more substantial interdisciplinary collaborations (Lidskog et al., 2015). To understand and handle environmental problems, the starting point cannot be changes in nature but recognition of the socioenvironmental dynamics, where environmental problems are co-constituted by the dynamic interactions between social and natural processes. Therefore, discussions of environmental issues, such as biodiversity, are of a truly interdisciplinary character, which means that concepts are crucial in enabling (or hindering) cross-disciplinary communications and collaborations. Many times, this kind of concept has the character of a boundary object.

Boundary Objects as Places for Communication and Dissension

A boundary object aims to create a communicative and collaborative space among diverse actors where they can meet and work together (Star, 2010). Whereas boundary work

(Gieryn, 1983, 1999) mainly concerns how actors strategically draw boundaries to make a knowledge claim credible and authoritative, a boundary object functions to connect different social worlds and meanings. It is an object (artifact, conceptual model, classification system, etc.) that allows members of different communities to interact and coordinate even if they have divergent perceptions of the object (Star and Griesemer, 1989, p. 393). The boundary object makes this possible by being both elastic enough to adapt to the local needs and constraints of the actors employing it and robust enough to maintain a common identity across sites (Star, 1989, p. 21). In functional terms, this means that a boundary object can serve as a point of reference where actors from different social worlds can meet, shape mutual interests, and work to reach a shared objective. By providing a minimalistic (thin) understanding of an issue without claiming a particular meaning (a thick understanding), the interests of different actors and experts can be linked, and communication is made possible. Therefore, a boundary object is both recognizable for different interests and open to different meanings; it is simultaneously understandable and relevant for actors from different social worlds because it is both universal and vague across them.

Importantly, as Star (2010) heavily stresses, boundary objects do not presuppose a consensual view of an issue. On the contrary, a boundary object is a meeting point for diverse actors and therefore involves different perspectives, interests, and worldviews. This means that different standpoints often come to the fore, and by articulating this dissension, actors are better equipped to negotiate, navigate around, and collaborate on an issue. Thus, the central function of a boundary object is that it allows communication between actors from different social worlds. There is, however, no guarantee that a pluralistic perspective will be protected and maintained in the collaborative work. Not least due to power asymmetries, distinct disciplinary traditions, and different sociopolitical interests—there is always a risk that a hegemonic understanding suppresses the pluralistic meaning of an issue (Tengö et al., 2014; Löfmarck and Lidskog, 2017). In such a situation, the interpretive flexibility of a boundary object diminishes, and the balance between adapting to and constraining all actors' needs is disturbed; a powerful actor may succeed in restricting flexibility in such a way that there is almost no constraint on its needs at the expense of other actors' needs. Consequently, the boundary object ceases to function.

Concepts Describing but Also Changing the World

Language and concepts are central to our understanding of the world. Changes in the environment create a need to adapt language by giving old concepts new meanings and by inventing new concepts that enable us to better grasp changing circumstances, emerging questions, and new findings. Conceptual innovations, in turn, pave the way for modifying and changing environments. In this sense, concepts and interpretive frames are performative; they *do* something with the world. They are navigational (directing our attention), normative (shaping our priorities), and performative (guiding our actions) (Lidskog and Waterton, 2016). This means that the development, spread, and appropriation of concepts not only describe the world but also change the realities they are meant to describe, since they may influence how we interact in and make use of this world. By encouraging organizations and people to see and act in particular ways, concepts may mitigate or, alternatively, intensify environmental problems.

It is therefore of the utmost importance not only to make use of concepts but also to reflect on their more fundamental implications; what understanding of reality does a concept contain? What kind of interpretive framework (explicit or implicit) underlies the meaning attached to a concept? To what extent and in what way does a concept fit in with existing governance structures? Thus, concepts that seem to have been successfully spread and adopted with the aim of strengthening the worth of nature in decision-making, raising environmental awareness, and guiding environmental action may not necessarily do so. It is time to approach what seems to be a successful, but contested, conceptual innovation within the biodiversity field, namely, ES.

Is Ecosystem Services (in)Capable of Generating Transformative Change?

ES, defined as "the benefits people obtain from ecosystems" (Millennium Ecosystem Assessment, 2005), has become one of the most prominent ways to conceptualize the interdependency between nature and society. The concept has been widely embraced by policymakers, corporations, and environmental organizations. It was made an essential part of the Convention on Biodiversity Strategic Plan for Biodiversity 2011–2020 (UNEP, 2010) and the EU 2020 Biodiversity Strategy (European Commission, 2011) and has been integrated into a range of national and local policies, plans and management strategies (e.g., Matzdorf and Meyer, 2014; Schleyer et al., 2015; Beery et al., 2016; Verburg et al., 2016).

ES is frequently portrayed as a boundary object that can facilitate communication and collaboration between policymakers and different scientific disciplines (Abson et al., 2014; Ainscough et al., 2019). There are various frameworks such as the ecosystem cascade model to explain how the ES concept can be used to link nature and society, identifying key elements of what have been termed "the ES paradigm" (Potschin-Young et al., 2018). Essentially, ES has three key functions for changing policy practice. The concept helps to (1) translate functional characteristics of ecosystems into services of use for society and human well-being. The benefits and values of these services, and the costs associated with their degradation, are (2) identified, calculated and communicated to decision-makers using a language that is convincing and easy to understand (e.g., monetary valuation). By furthering recognition of these benefits and values of ecosystems to society (3) the concept will help upgrade the worth of nature among decision makers and thus initiate and foster further policy actions to address key societal drivers of ecosystem degradation and biodiversity loss, limiting pressure on ecosystems, achieving substantial environmental improvements, and promoting sustainable development (**Figure 1**).

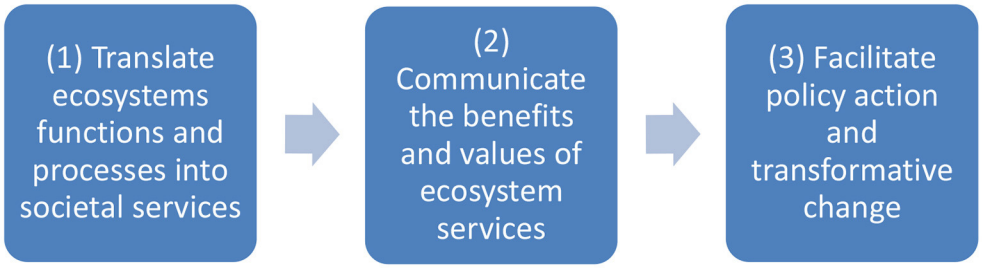

FIGURE 1 | Three interrelated functions of ES to change biodiversity governance.

Although the concept has successfully entered both academia and policymaking, it has also been contested and criticized both as a concept and as a policy approach (Hysing and Lidskog, 2018). The next section will revisit critical issues raised in this debate—and made explicit with the introduction of NCP (cf. Kadykalo et al., 2020)—regarding the ability of ES to successfully facilitate transformative change.

Missing Social Analysis

The ES concept has successfully facilitated communication between the fields of ecology and economy but has been less successful in engaging social sciences and humanities (Díaz et al., 2018; for a rebuttal, see Braat, 2018). One reason is that the concept is founded in the natural sciences, discouraging social scientists and limiting what questions are seen as valid and important as well as the theories and methods used (Stenseke, 2016). Social science thus risks being assigned the restricted role of facilitating and improving the uptake of the concept, that is, a policy orientation, rather than contributing to its scientific meaning. This has furthered a polarized debate between the applied and critical literature with limited constructive dialogue between them (Kull et al., 2015). This poses a serious problem for the function of ES as a boundary object that hinges on its capacity to generate open communication and cooperation across disciplinary fields.

A poorly elaborated social analysis also risks reducing the potential of ES to generate transformative change because social science offers critical insights into the social causes and drivers of environmental problems and solutions (Jetzkowitz et al., 2018). Additionally, social science provides knowledge on how society works, and by including issues of power, interests, equity, and the like (Stenseke, 2016), why conceptual innovations such as ES has (or do not have) transformative effects becomes understandable.

Restricted View on Nature's Value

An important innovation of ES compared to more traditional nature conservation approaches is that nature has an instrumental value for human well-being and social prosperity (i.e., the anthropocentric rationale). While this value can be expressed in various ways depending on the circumstances, the connection between ES and monetary valuation has been present from the start (Costanza et al., 1997) and has been seen as a powerful instrument for attracting decision-makers' attention (Polasky and Segerson, 2009; Adams and Redford, 2010).

While few researchers question whether monetary valuation is important in public and private decision-making, critics question whether economic instruments can capture the full range of values associated with ecosystems (Ainscough et al., 2019) and thus whether ES assessments will provide decision-makers with convincing but basically incorrect or partial information. Research has shown that people often find it difficult to express their appreciation of nature in terms of "willingness to pay" for services, as this appreciation is often based on emotional attachments or relational values (Chan et al., 2016; Stålhammar, 2020). The experienced and appreciated values of nature are also contingent on the cultural context, which varies across the globe (Díaz et al., 2018). Critics fear that setting a price on nature to save it will lead to underestimating the value people attach to nature, generating a low price and thus resulting in nature being destroyed (Spash, 2015). This problem is, however, not unique to ES but is also the case for traditional conservation methods and rationales (Potschin-Young et al., 2016).

In addition to criticism of economic instruments, there are concerns about the discursive impact of using economic metaphors and language. It has been argued that conjoining economics and ecology will enable ES to generate a degree of momentum for environmental actions that would not be possible otherwise (Sukhdev et al., 2014). By (re)articulating the value of nature using an economic logic that decision-makers understand, ES is hoped to neutralize traditional conflicts, generating additional resources, and overcoming political resistance from economically minded actors. Adhering to, rather than challenging the economic logics that are behind ecosystem degradation, is seen by others as a misguided and an overly pragmatic strategy that risks alienating important stakeholders and decision-makers; undermining other rationales for nature conservation; furthering economic self-interest as the logic of environmental protection (Fletcher and Breitling, 2012; Suarez and Corson, 2013; Hysing and Lidskog, 2018); and risking privileging economic actors, interests, and modes of governance over others, thus discursively limiting the range of available policy alternatives (e.g., Turnhout et al., 2013; Gómez-Baggethun and Muradian, 2015).

Technocratic View of Science and Change

A key rationale behind ES is that the concept can get the message of the value of ecosystems across to decisionmakers (i.e., it can function as a boundary object). Critics have argued

that ES is founded on a technocratic ideal, placing power in the hands of presumedly neutral experts, privileging scientific knowledge claims over others, and disregarding the fact that all knowledge claims are situated (rather than universal) and based on specific values, preferences, and priorities (Turnhout, 2018). This linear model of science-policy interactions means that professional experts play a prominent role because they are assigned the epistemic authority to identify the problems and to assess different knowledge claims. However, this may dampen the genuine participation of a broader set of stakeholders, local communities, and indigenous people who bring valuable knowledge and whose involvement is necessary to generate change that is legitimate and sustainable (e.g., Schleyer et al., 2015).

Assigning values is portrayed as a largely neutral, scientific, technical, and uncontroversial process that lies largely beyond ideology and politics. This expert valuation and deliberation has, however, been accused of being ill-suited to handling the conflicting interests and social values inherent in biodiversity governance, masking ecological complexities and uncertainties as well as scientific contention to "cherry-pick" the ecosystem functions and processes that can be easily measured, counted, and valued (Robertson, 2006; Turnhout et al., 2013; Kull et al., 2015). While producing relevant and usable knowledge is a laudable ideal, adapting too much to the needs and wants of decision-makers risks turning science into an obedient instrument for those in power (Turnhout, 2018). To support transformative change, researchers also need to question and contest dominant conceptualizations and understandings of the relationship between humans and nature.

Furthermore, ES is seen as portraying the transformation of human-nature relationships as a "technical" rather than a political challenge (Ernstson and Sörlin, 2013). Decisions on the use of ecosystems are not always about unrealized synergies and win-win relationships but more often about difficult choices and trade-offs. The ES concept is criticized as unhelpful in resolving trade-offs or providing answers regarding who will win and lose and who has the right to decide. To be able to do that, necessitates an understanding of the political side of ES, in which decision-making involves not only scientific knowledge and monetary valuation but also competing and vested political interests, public opinion, and pre-existing formal and informal institutional structures (Kull et al., 2015; Saarikoski et al., 2018). Hence, fulfilling ambitions for transformative change requires more active engagement with questions of the functioning of political systems, governance, and policy processes (Abson et al., 2014; Keenan et al., 2019).

In summary, the academic debate on the transformative power of ES has revealed both strengths and weaknesses of the concept. For these reasons, ES has both been embraced and criticized in scientific discourse. Three interrelated challenges have been vividly debated; the need of further social (science) analysis, the importance of weighing the short-term benefits of monetarization against far-reaching, discursive impacts, and a more nuanced idea of science-policy interfaces that integrates the political aspects of ES. Next, we turn to how policy practitioners, heavily engaged in turning the concept into practice, make use of and value the ES concept.

How Do Conceptual Innovations Matter for Practice?

Within various contexts, ES has moved from being an "eye-opening metaphor" to being integrated into policy, planning, and management (Norgaard, 2010). Crucial to successfully integrating and implementing ES are actors who actively promote the ES concept, facilitate communication between knowledge producers and users, and who foster new ideas within and between organizations (Saarikoski et al., 2018). It is therefore important to consider the uptake, interpretation, and translation of ES among such actors when discussing how the concept may change practices (Martin-Ortega et al., 2019). This section presents the results of an interview study with actors identified as "frontrunners" in the implementation of ES in Sweden, exploring their experiences with using the concept and illustrating critical challenges for policy practice.

A Communication Tool for the Value of Nature

The primary utility of ES—as almost all the interviewed practitioners argued—is as a pedagogical and communicative tool, a way to communicate the benefits that nature provides to people (cf. McKenzie et al., 2014; Beery et al., 2016; Blicharska and Hilding-Rydevik, 2018). As described by a property company representative, ES provides a way to talk about nature's essential contribution to humankind—"to get people to understand that nature is more than just pretty scenery with yellow rapeseed fields and forests to walk in." Most often, the concept was described as useful in making visible otherwise unnoticed aspects, raising awareness, enabling a more holistic view of nature, and helping people understand why they need to protect nature. Although the practical implications of the concept—in terms of transforming practices on the ground—were generally questioned, several respondents had experienced a (slow) shift in perspectives within their organizations. Thus, as in previous studies (Saarikoski et al., 2018; van Oudenhoven et al., 2018), policy actors appreciate the ES concept primarily for its usefulness in raising awareness and changing mindsets.

As a tool to communicate the value of nature, the ES focus on human needs (i.e., anthropocentric orientation) was particularly appreciated by the respondents, providing a different kind of argumentation than traditional nature conservation discourses. As explained by a government official, different people have different interests and perceive different values in nature, and it is therefore important to be able to communicate with them differently. In that way, you can bring more politicians, landowners, and others on board, increase their understanding of and commitment to biodiversity, and ultimately obtain more resources for nature conservation.

ES was also appreciated for helping to reframe the argument for nature considerations as a "positive message" that you can do things that will benefit (and be appreciated by) humans as well as nature rather than the "negative message" of restricting actions associated with traditional nature conservation. A sustainability manager at a construction company explained that "to say that it

benefits people can make it easier to take in, because otherwise we often get the response [from project managers] that "we were not allowed to build because of some strange frog that no one has ever seen." And then you get a rather negative attitude toward biodiversity."

The most frequently expressed concern about ES functioning as a communication tool was its theoretical and abstract nature. Consequently, simpler metaphors and concepts, most prominently "nature's benefits," were used as complements. These concepts were most often treated as synonyms, and the choice depended on the audience. Some respondents also argued that "it is better to use ordinary words to explain what it is all about. That is often good enough. Pollination is a great example. ES is unnecessarily difficult, so people are unable to take it in or are afraid of using it" (municipal official).

Better but Restricted Interactions?

In the academic literature, ES is often portrayed as a boundary object (Abson et al., 2014). Similarly, respondents saw broadening the discussion and engaging new actors as a fundamental function of ES. As argued by a municipal official, "Within nature conservation, you have had this perspective for a very long time, long before the ES concept was established. But [through ES] it has widened to include other parts of the local government such as urban planning." Several respondents had experienced a stronger uptake of ES in urban planning than in other sectors, bridging different departments within local administrations as well as helping developers recognize the added market value of "greenery" in the city. On the national level, the concept had similarly provided a common language for communication across policy sectors, e.g., forestry, agriculture, and urban planning.

Communication and collaboration on ES were, however, largely between professionals. Respondents representing government agencies, interest organizations, and companies testified that the concept was not useful for engaging landowners, consumers, or the public. As argued by one government official, the concept of ES "filters reality" in a way that does not benefit dialog between authorities and landowners. Thus, while the literature highlights the potential of ES as a platform for stakeholder involvement and participation (e.g., Schleyer et al., 2015), the respondents described a concept useful mainly for communication between professionals.

Regarding the concept's function to enable convincing communication with policymakers—central to the function of ES as a boundary object—several respondents argued that politicians as well as corporate managers have been attentive to and interested in ES. However, the respondents also questioned whether ES helps to transform biodiversity governance. As a government official put it: "A new concept or new mindset is not enough. It requires a transformation of society and a stronger political will to preserve biodiversity."

How (Monetary) Valuation Matters to Decision-Making

Respondents across organizations argued that if an explicit value is not assigned to ecosystem services, they risk being disregarded in decision-making, essentially being of zero value. While few had personal experience with using monetary valuations, many saw the ability to express the value of nature in monetary terms as highly useful, as decision-makers often request and are convinced by such estimates. A municipal official described the importance of monetary valuations in influencing political decisions: "They [politicians] are realists /…/ all political parties talk of the importance of nature and ecosystem services, but when it comes to the fore and the budget needs to be balanced, they need to prioritize, and then they look at the money and nothing else." As explained by another municipal official, decision-makers' demand for monetary valuations is partially a result of how ES is conceptually constructed. Once actions (and non-actions) start to be motivated by how society will gain, earn, and benefit from these actions, the next logical question from decision-makers is *how much* do we gain, earn, and benefit?

The practitioners expressed different attitudes toward monetary valuations. While some saw them as a necessary solution to the main problem—that exploitation does not cost enough (environmental organization representative)—others were fearful that it would ease the exploitation of nature that is deemed invaluable (official at county administrative board). Still, others had lost interest because they had been unable to find enough commercial value in furthering non-provisional ecosystem services (forest company representative). Generally, however, the respondents expressed a nuanced view of the possibility of monetary valuations, reflecting on the potential as well as the difficulty of setting monetary values, e.g., due to a lack of data and knowledge. There were also concerns that despite monetary valuations being presented with many caveats, in the end, "decision-makers may pay more attention to the final numbers than the caveats" (environmental consultant).

In addition to problems of insufficient knowledge to perform good valuations and the fear that decision-makers would use even bad ones, there were concerns that the values would end up being too low. For most respondents, ES is of strategic use in terms of offering to support, legitimate, and justify policy actions to improve nature conservation. Consequently, fear of the concept being captured by other interests inhibits its use. Respondents experience that ES is subject to organized interests trying to frame the concept in ways that promote their interests. According to a government official, this is not unique but rather is how all concepts are treated. For example, organizations representing forestry and agriculture use ES to explain to the outside world what they do [producing ecosystem services] while representatives of the indigenous Sámi community, saw the concept as a way to explain its worldview and traditional ways of living to Swedish society.

The Value of Adding a New Concept

ES is situated in a complex conceptual landscape consisting of new and old concepts designed to strengthen biodiversity and nature considerations, e.g., environmental considerations, green infrastructure, and nature's benefits. One critical issue raised by the respondents was the value of adding another concept. Some described ES as a buzzword of limited importance both conceptually and practically. As stated by one forest company representative, "It's like they are trying to invent the wheel all

TABLE 1 | Summary of key findings on conceptual innovations for transformative change.

Analytical steps		Key roles for conceptual innovation	
How concepts matter	Providing new meanings (facts and values)	Providing new collaboration and communication (boundary objects)	Providing impetus for change (performative role)
Academic criticism of ES	Overly dominant role of economic valuation	Limited social analysis	Basing solutions on a technocratic view, rather than political changes
Practical challenges of ES	Monetary valuation, imperfect but important?	Strengthens professional collaboration and communication, but not public participation	Raise awareness, but do not facilitate fundamental change

over again; it is a new concept, but the work is the same." Other respondents argued that introducing new concepts brings new energy to the policy debate. As stated by a government official with long experience in environmental policy work, politics needs new key concepts: "If we play with the idea that we still had the traditional nature conservation politics of, say, 1988, that we haven't got the impact of the biodiversity concept or ES. Where would nature conservation be then? I think that it would have been very marginalized; a pretty small operation within protected areas."

A related concern was the complementarity between ES and existing concepts. Within forestry and agriculture in particular, the respondents regarded ES as a way to conceptualize what is already occurring rather than to generate new impetus for practice. Other concepts were also preferred over ES, as exemplified by a government official who stated that it is much more common to talk about "social values" than about "cultural ecosystem services." As explained by a forest company representative, previous efforts by the government to integrate other concepts ("good environmental quality") had made the company launch an educational program, and that investment now made them reluctant to switch concepts.

Respondents also argued that introducing new concepts could hinder environmental actions. As argued by one municipal official, new concepts increase conceptual complexity, causing confusion, and even legal uncertainty when people use different words for similar things and in the end, risks weakening environmental work. This was explicated by another local official in relation to legal statutes using older terms, which made it more difficult for authorities such as county administrative boards to take decisive action, despite having legal support for ES. Additionally, as expressed by one government official in relation to the introduction of NCP on the international level, introducing a new concept risks environmental policy-making becoming mired in conceptual discussions instead of furthering environmental measures.

DISCUSSION: HOW DO CONCEPTUAL INNOVATIONS MATTER?

Society faces growing global sustainability challenges, and scientific expertise is deeply involved in the development of policy to meet these challenges, such as the UN's 2030 Agenda for Sustainable Development. An important part of the impact of science on policy is not only producing facts and figures but also developing new understandings that help us orient ourselves and to navigate an increasingly complex global landscape. When new concepts are introduced with the aim of better catalyzing social change than previous concepts, it is important to investigate the challenges experienced in translating conceptual innovations into (transformative) social output, thereby digging more deeply into the link between valuation and actions. This concluding section will first summarize the key findings from our analysis (**Table 1**). Thereafter, the question is raised of what can be learned from this case for the current elaboration of NCP, to which the hope is attached that it will enable to better grasp the value of nature and facilitate much-needed action. Finally, the paper will reflect on the role of social science in conceptual innovations and social transformations.

Concepts do not neutrally mirror the world but influence our way of understanding and navigating the world, thereby also changing it. By introducing new concepts, facts and values are organized in new ways, thereby creating incentives for action. New concepts, if agreed on, can serve as boundary objects that facilitate communication and collaboration. However, actors do not mechanically adhere to concepts and their meanings but relate to them in different ways. This means that there is no simple relationship between concepts used to value nature and actions taken.

The ES concept has successfully reframed and broadened the rationale to strengthen considerations of nature in decision-making, especially by raising awareness and engaging new groups. As illustrated in the interview study, the impetus for change generated by the concept is varied across policy sectors and has primarily been made relevant as a communication tool to raise awareness with more limited impact on on-the-ground practices. The concept has partially fulfilled its function as a boundary object, facilitating communication among professionals and thus helping to address problems of compartmentalization. The academic literature points to shortcomings in terms of limited engagement of social science—thus risking providing a too limited analysis of the social drivers behind ecosystem degradation—and among policy practitioners, the complexity of the concept makes them question its usefulness to engage stakeholders more broadly or to further public participation. Adding new concepts might not be what policy actors need. In terms of generating transformative change, rather, the empirical results point to the importance of political will. Previous research has also raised the political side of ES and

indicated a technocratic ideal inherent in ES that makes it difficult to connect the concept to emotional and relational values of nature, restricting its ability to mobilize the broad social pressure and commitment necessary to generate political change.

In terms of expressing meaning and value of nature, ES' close association to monetary valuation is regarded as a key attribute but is also very challenging. As argued among both academics and practitioners, expressing values in monetary terms is potentially very useful for convincing decision-makers of the worth of nature, thereby enabling reprioritization and change. However, it has also been conceded that it is very difficult in practice and risks decision-makers basing their decisions on convincing but incorrect or partial valuation of nature and, in the long run, support rather than challenge some of the drivers behind ecosystem degradation.

Lessons to Learn for NCP

As shown in the academic debate and as illustrated by interviews with policy practitioners, the conceptual innovation of ES has achieved mixed results thus far; some actors claim that the concept has substantially strengthened the worth of biodiversity in decision-making and planning practices, whereas others find that it has had rather limited functions and lacks transformative potential. However, what more general lessons can be learned from our analysis of ES when NCP is now introduced as a concept that is better equipped to handle the multifarious issue of biodiversity? We wish to stress three lessons that are important to consider when researchers and practitioners elaborate on NCP: interpretive frames, political dimensions, and institutional structures.

First, NCP has directed substantial criticism of ES being subsumed within an economic narrative. The conjoining of economy and ecology is both the greatest strength and greatest weakness of ES; because they are of critical importance in policy-making, economic considerations can facilitate valuable nature being protected, while also indirectly upholding the social order in which economic valuation has supremacy. This situation highlights a crucial dilemma between long-term and short-term impacts, where the former requires transforming existing institutional and discursive structures, whereas the latter require adhering to them. When evaluating the impact of conceptual innovation, it is therefore important to recognize that concepts work performatively in two ways: (i) they tell us what to do (guide actions), and (ii) they provide a wider understanding of the world (influence discourses). If aiming for long-term and transformative change, it is therefore important to focus not only on conceptual definitions but also the wider interpretive frame, and the meaning and motivation it creates.

Second, NCP stresses that nature is valued differently and in conflicting ways. To function as a boundary object, NCP needs to stress—and even welcome—the articulation of different and even conflictual views; something that ES has had a limited success in doing. Being inclusive in terms of stakeholders, perspectives, and knowledge claims is important and normatively appealing, but it is also very demanding and has uncertain outcomes, as shown in the literature on public participation (e.g., Irvin and Stansbury, 2004). Furthermore, it is important to acknowledge the political dimensions of conceptual innovation aimed at transformative change. The reason is that all transformations generate winners and losers and that conceptual innovations will be used as a political tool by specific interests to promote change or the status quo. Hence, it is important not to hold a naïve belief that a conceptual innovation will result in win-win situations or that the adoption of a particular concept will result in an inclusive and consensual understanding of key goals and measures.

Third, NCP strives to strengthen the effectiveness and legitimacy of biodiversity governance as well as to develop a concept that is more contextual and thus relevant to governance around the world. To fulfill this ambition requires an understanding of how policy processes work. As illustrated in the interview study, even in Sweden, where the ES concept has been successfully adopted in policy (policy formulation), it may nevertheless be difficult to turn it into practice (policy implementation) that substantially impacts the current situation. Even if policy actors support and adhere to a concept, as well as having necessary knowledge and resources, pre-established formal and informal institutional structures often make it difficult to integrate that concept into their organizations and practices in a way that makes a real difference (Saarikoski et al., 2018). Thus, if the aim is not only to influence an environmental discourse in a restricted sense but also to influence action, there is a need to develop conceptual meanings that integrate more elaborate theoretical ideas on change and transformation of existing institutional structures (Lowndes and Roberts, 2013; Hysing and Olsson, 2018). Otherwise, the risk is that a concept will be nothing more than nice words on paper.

These three lessons need to be seriously considered in ongoing conceptual elaborations on ES and the NCP, but they also warrant further research, both on how these aspects have affected the uptake and implementation of ES (empirical orientation) and how they can be better integrated into conceptual and theoretical frameworks (theoretical orientation).

When Do Conceptual Innovations Matter?

In addition to these three lessons, in developing conceptual innovations for transformative change, one fundamental aspect needs to be stressed. Concepts are important for our understanding, navigating, and shaping of the world, but concepts are not all that matter. Even the most carefully elaborated conceptual meaning, flexible in adapting to different contexts, connecting to different stakeholders' interests, and involving strong emotional appeals to act, may not be sufficient to initiate transformative change. The reason is that there are broader and deeper trends at work. A major reason for the lack of progress in many environmental issues, including that of biodiversity, is that many significant environmental problems are deeply embedded in the socioeconomic fabric of modern society (Görg et al., 2017). To close the gap between what has been done so far and what remains to be done, there is an urgent need to alter the fundamental social structures of modern societies (Deacon, 2016).

A particular problem is that much scientific advice to policymakers, including conceptual innovations, is less qualified in social analyses than in environmental ones, which has led to

a narrowly defined situation in which science suggests solutions that do not account for the complex social and cultural task of transforming certain institutions and structures, while ensuring that others—e.g., democracy—are maintained and strengthened. Likewise, many science-based solutions to environmental problems do not fully consider that social transformations always create winners and losers. Divergences in values, priorities, and interpretations are still poorly addressed in research on biodiversity governance, and there is a pressing need for more research on the driving forces behind social activities that cause environmental problems, social implications for different groups, and whether an environmental problem is solvable through system modifications (transitions within established institutions) or whether system changes (transformations of institutions) are needed (Boström et al., 2018). Therefore, it is important for social analyses to be placed on an equal footing with environmental ones, where a fundamental task is to identify implicit assumptions and framings of issues and to ensure that they are not based on unsupported views of how society works and how institutional, organizational, and behavioral changes occur (Beck et al., 2014; Jetzkowitz et al., 2018; Jasanoff 2005).

The current quest for transformative change implies a need for more and deeper social analysis; analysis of social dynamics that can match existing knowledge on environmental dynamics. To focus on causes and not only symptoms means that much research is needed on current social drivers. Furthermore, when aiming for transformative change—change on a system level—it is of the greatest importance to see how issues are interlinked and how they influence each other. Today, humanity faces several fundamental challenges such as climate change and accelerating extinction of species, but also other severe challenges such as pandemics, growing global inequalities and poverty, strong anti-democratic movements, and flows of migration and globally displaced people. A feature of these, and other global challenges is that they are constituted by intertwined ecological, social, and economic factors and that these challenges are interrelated. It is therefore crucial not to develop particular policies and cures for each challenge without considering how action taken for handling one issue may deeply affect others. Today, there are too many examples of realized remedies that have resulted in unanticipated and severe effects. A current example of this is the proposal of large-scale deployment of negative emission technologies (NETs). To meet the Paris agreement's target on staying well below 2°C, these kind of new and unproven technologies are included into IPCC emission scenarios. But NETs ecological and social impacts in terms of changes in land rights, dislocation of people, and competition for food supplies are not included in the analysis (Beck and Mahony, 2017). Assuming environmental benefits without identifying and considering costs (environmental as well as social) is relatively common, and there is therefore a growing need for further research on the wider social consequences of future-oriented action intended to initiate transformative change (Lidskog et al., 2020).

Last but not least, it is also important to stress that conceptual innovations and policy developments matter. There are a number of political innovations—such as democracy and human rights—that are the result of long-term and committed action, often in the form of power struggles, and the development and spread of concepts (such as citizenship), institutions (such as parliamentary elections), and discourses (such as equality) have been pivotal in these innovations. It is evident that by opening a new way to see, understand, and valuate the world, actors may change their former priorities and practices. Thus, conceptual innovation has been shown to be, and is, an important part of the complex and challenging efforts to initiate transformative change.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the national legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

EH and RL contributed equally to the study design, analysis, and manuscript writing. EH was responsible for data collection (section How Do Conceptual Innovations Matter for Practice?) and wrote the first version of section Is Ecosystem Services (in)Capable of Generating Transformative Change? and How Does Conceptual Innovations Matter for Practice? RL wrote the first version of How Do Concepts Matter?. Both authors contributed equally to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

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