Received: 29 April 2019 | Accepted: 16 June 2020

DOI: 10.1002/pan3.10137

RESEARCH ARTICLE

PEOPLE AND NATURE | BRITISH ECOLOGICAL SOCIETY

The maturation of ecosystem services: Social and policy research expands, but whither biophysically informed valuation?

Kai M. A. Chan | Terre Satterfield

Institute of Resources, Environment and Sustainability, The University of British Columbia, Vancouver, BC, Canada

Correspondence
Kai M. A. Chan
Email: kaichan@ires.ubc.ca

Funding information
Natural Sciences and Engineering Research Council of Canada, Grant/Award Number: RGPIN-2015-05105; Social Sciences and Humanities Research Council of Canada, Grant/Award Number: 435-2013-2017 and 435-2017-1071

Handling Editor: Unai Pascual

Abstract

1. The concept of ecosystem services (ES) has risen to prominence based on its promise to vastly improve environmental decision-making and to represent nature's many benefits to people. Yet the field has continued to be plagued by fundamental concerns, leading some to believe that the field of ES must mature or be replaced.
2. In this paper, we quantitatively survey a stratified random sample of more than 1,000 articles addressing ES across three decades of scholarship. Our purpose is to examine the field's attention to common critiques regarding insufficient credible valuations of realistic changes to services; an unjustified preoccupation with monetary valuation; and too little social and policy research (e.g. questions of access to and demand for services).
3. We found that very little of the ES literature includes *valuation of biophysical* change (2.4%), despite many *biophysical* studies of services (24%). An initially small but substantially rising number of papers address crucial *policy* (14%) and *social* dimensions, including access, demand and the social consequences of change (5.8%). As well, recent years have seen a significant increase in non-monetary valuation (from 0% to 2.5%).
4. Ecosystem service research has, we summarize, evolved in meaningful ways. But some of its goals remain unmet, despite the promise to improve environmental decisions, in part because of a continued pre-occupation with numerical valuation often without appropriate biophysical grounding. Here we call for a next generation of research: Integrative biophysical-social research that characterizes ES change, and is coupled with multi-metric and qualitative valuation, and context-appropriate decision-making.

KEYWORDS

access to benefits, biodiversity, ecosystem services, environmental decision making, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), nature's contributions to people, policymaking, relational values, social sciences and humanities, values and valuation

1 | INTRODUCTION

The concept of ecosystem services (ES)—the processes by which nature renders benefits for humans (Levine & Chan, 2011)—has risen to prominence remarkably quickly. From a virtual birth in 1997 with the publication of both *Nature's Services* (Daily, 1997) and an audacious bid to value the world's total ES (Costanza et al., 1997), the field has blossomed as reported in 2012 to be larger than environmental history, environmental ethics or ecological economics (Costanza & Kubiszewski, 2012). Since then, ES became a primary focus of a new intergovernmental UN body, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). It is thus now central to many science-policy efforts to describe and address the current ecological crisis (Secretariat of the Convention on Biological Diversity, 2010b; Chaplin-Kramer et al., 2019; Díaz et al., 2019; IPBES, 2019a, 2019b). And yet, the field has been plagued by controversy, from its birth (Nature, 1998) and throughout (De Lucia, 2018; Gómez-Baggethun, de Groot, Lomas, & Montes, 2010; Robertson, 2012). Most recently, controversy surrounds the ES name itself, as opposed to the umbrella term 'nature's contributions to people' (Díaz et al., 2018; Pascual et al., 2017). Misunderstanding or disbelieving the argument that 'nature's contributions to people' *includes* ES, some have even reported that the same UN body with ES in its name is distancing itself from both the term and the broader concept (Masood, 2018). Clearly, it is time for a taking stock of the field's intent as well as several substantial critiques. Is there evident progress? That is, is ES as a field delivering the science needed to fulfil its promise, including the knowledge and policy gaps long deemed critical?

There are innumerable decisions at stake, often highly consequential, wherein the role of ES could be decisive and for which ES was designed. Human activities and the infrastructures they introduce often involve large-scale impacts on ecosystems and people's use and enjoyment of them. Consider high-profile oil and gas pipelines (e.g. Keystone in Canada and the United States), hydroelectric megadams (e.g. Three Gorges in China), proposed/new roads (e.g. Trans-African Highway), or compensation for accidents such as oil spills (e.g. Deepwater Horizon in the US) and dam collapses (e.g. Mariana and Brumadinho mining dams in Brazil). Both democratic principles and legislation in almost every nation require the linking of ecosystem impacts and public interest or well-being. For instance, environmental assessment legislation asks whether a project's purported net benefits merit approval given a suite of impacts to ecosystems and ES. IPBES marks the latest effort to support such public policy decisions by leveraging research on biodiversity and ecosystem services (BES) as central to global governance. Antecedents include the Convention on Biological Diversity (CBD), of which most countries are signatories.

Such policy initiatives have recognized implicitly that better societal decisions will follow from a combination of (a) a deeper understanding of *value knowledge and reflection*: what people care about and how this relates to decisions at hand; and (b) *decision support*: decision-making that links biophysical and social considerations. The CBD's 2010 Aichi targets commit governments to making people aware of the 'values of biodiversity' (i.e. *value knowledge and reflection*), and to integrate 'biodiversity values' (including the importance of ES) into planning and policy (i.e. *decision support*; Secretariat of the Convention on Biological Diversity, 2010b). This is equally so in IPBES, which also explicitly addresses the importance of diverse conceptions of values and multiple knowledge traditions (Pascual et al., 2017). Note that the above uses of 'values' cover several different meanings, which we seek to distinguish from here on: we use 'value' in the singular (e.g. 'value of') or specify 'monetary' or 'non-monetary' to signal 'value as a magnitude of preference'; otherwise we generally use values 'as notions of appropriate or desired relationships between people and nature' (Tadaki, Sinner, & Chan, 2017). When ES research is not designed optimally to facilitate knowledge and reflection about the values associated with nature, or to aid environmental decisions, it offers only compromised support in responding to the current ecological crisis. ES research in this form is thus of limited utility to efforts to shift societal trajectories and decisions that undermine nature and its widespread and equitable benefits (Chan et al., 2020; IPBES, 2019a).

Within academia, the legitimacy of ES as a research field has also been called into question. Longstanding debates concern a purported over-reliance on economic approaches to valuation, and the field's resistance to critical and interpretive scholarship in social sciences and humanities (Adams, 2014; Fish, 2011; Gómez-Baggethun & Ruiz-Pérez, 2011; McCauley, 2006). Recently, IPBES has become a lightning rod for these concerns (Díaz et al., 2015, 2018).

To fulfil the needs of CBD, IPBES, and multiple organizations and levels of government world-wide, what matters is that a broad expanse of ES research fulfils both value-knowledge and decision-support goals. Although key ES publications have long pursued these two objectives as primary (e.g. Costanza et al., 1997; Daily, 1997; Daily et al., 2009; TEEB, 2009), they have not always done so in recognition of the literatures on how to achieve value-knowledge and decision-support. This paper first delineates five substantial areas of critique and potential growth for the ES field, five calls for better or 'best practices' and for addressing the needs of specific applied contexts. From these five areas, which were inspired by the above concepts of *value knowledge and reflection* and *decision support*, we derive commensurate hypotheses regarding how this interdisciplinary field is maturing (or not). We then use these to analyse a randomly selected representative set of ES papers from a bibliometric list of all those published between 1990 and 2017 (inclusive; see Methods). Others have sought to answer whether the field of ES already had elements that inspired the term 'nature's contributions to people' (Kadykalo et al., 2019); here we ask, how responsive was the field of ES across years to a broader set of fundamental critiques?

1.1 | Critiques and associated best practice

1.1.1 | Valuation at the margin, informed by biophysical science about change

Most experts agree that economic values are only useful for aiding decisions when they express or reflect differences in human well-being across a set of options; and in an ES context, such options must include assessments of realistic changes in ecological (biophysical) function or outputs (Bockstael, Freeman, Kopp, Portney, & Smith, 2000; Ricketts et al., 2016; Wainger & Boyd, 2009). If the choice at hand is whether to manage an upstream watershed for water quality services, the biophysical science needed would express the difference in water quality associated with management. The marginal change is thus the difference between status quo future and watershed management options.

This need for biophysically informed valuation 'at the margin'—that is, valuation of realistic ecological changes—might seem obvious, but it was not always so. Early ES research valued ES of whole systems in temporally static dollar equivalents, as would be appropriate if the decision at hand was possible biome obliteration. Most famously, Costanza et al. (1997) calculated the average value of the world's ES as $33 trillion per year. The continued interest in 'total value' (Costanza et al., 2014) estimates associated with the wholesale loss of a habitat, ecosystem or even biome—despite their lack of decision-aiding—can be explained by their utility as a pragmatically useful signal for raising awareness of natural capital itself (Nature, 1998). This paradox of apparent utility was best expressed by the juxtaposition of Michael Toman's critique of the $33T figure as 'a serious underestimate of infinity' (without ecosystems, there is no economy; Toman, 1998), and Trudy Cameron's assessment that the effort was 'a recklessly heroic attempt to do something that's futile … [but] … very useful' (Nature, 1998).

Responding to these critiques, newer 'production-function' approaches have advanced the characterization of changes in ES and how their 'marginal' valuation varies across alternative resource management decisions (Daily et al., 2009; Fisher et al., 2008; Kareiva, Tallis, Ricketts, Daily, & Polasky, 2011; Nelson et al., 2009). The point to be characterized ecologically, the biophysical culmination of the ES (e.g. water quality at the point of consumption), is the 'ecological endpoint' and so the quantity change that can be valued (Wainger & Boyd, 2009).

Given the resounding critiques and the shift towards this more technical, decision-support role for ES research, we should expect that most *valuation* research includes some characterization of biophysical differences across scenarios. We might also expect an increase in this proportion of *biophysically informed valuation* across time (*Expectation 1*).

1.1.2 | An important, but limited, role for monetary valuation

Also prominent but less prevalent in the ES literature is recognition that monetary valuation is necessary, but also limited in applicability. Monetization is a key mechanism by which trade-offs can be weighed, a fundamental objective of evidence-based policymaking. Few would deny that, if an ecosystem change affects production of a market commodity, such effects should be valued in monetary terms (but see Melathopoulos, Cutler, & Tyedmers, 2015). For example, coffee production is enhanced by native habitat via pollination by native bees (Ricketts, Daily, Ehrlich, & Michener, 2004), and by pest control by native birds (Karp et al., 2013). Yet few are fully comfortable with monetary valuation of an endangered species. For instance, after Canada's environment ministry commissioned an economic valuation of polar bears, the proponent himself (Minister Kent) acknowledged the appropriateness of public scepticism, and admitted himself that polar bears are 'priceless' (Canadian Press, 2011). These limitations mean that monetary values in isolation are of limited utility to either *value knowledge and reflection* or *decision making*. A balance of monetary and non-monetary valuation would seem important for both overarching purposes.

While a thread of the ES literature continues to value all manner of things in monetary terms, another thread has emerged to challenge such applications (Saner & Bordt, 2016; Turnhout, Neves, & De Lijster, 2014). Costanza et al.'s aforementioned valuation of all the world's ES relied heavily on studies of stated willingness to pay, which were countered by Sagoff as inappropriately conflating *consumer* and *citizen* preferences (what each of us wants vs. what we believe is right for society; Sagoff, 1998). More recently, we and colleagues have argued that valuation methods should match the values at hand (the reason something matters; Chan et al., 2011)—for example, monetary valuation is effective for characterizing consumer but not citizen preferences. As one dimension, one can distinguish consumer versus citizen preferences (as expressions of value), adding also virtues (expressions of morals as standards or values). In addition, there are at least seven other dimensions by which we might categorize a given preference, principle or virtue (market-mediated vs. non; self- vs. other-oriented; individual vs. holistic/group; physical vs. metaphysical; final vs. supporting; transformative vs. non; anthropocentric vs. bio-/ecocentric; Chan, Satterfield, & Goldstein, 2012). Across this multidimensional values 'space', only one component is amenable to economic valuation (other components conflict with its assumptions). Importantly, these critiques apply not only to stated willingness to pay (e.g. McFadden & Train, 2017) but they also question the ability of revealed willingness-to-pay methods to reflect how much a thing matters or is worth. In essence, using monetary value to measure the worth of biodiversity is akin to measuring a person's worth based on their salary.

The ES literature has thus called for experimentation with a greater suite of valuation methods (Cheng, Van Damme, Li, & Uyttenhove, 2019; Scholte, van Teeffelen, & Verburg, 2015), alongside the recommendation that the focus of new methods be those services too complicated or contentious to value economically. Examples of trial methodological innovations have followed: group-discursive methods (Kenter et al., 2016; Wilson & Howarth, 2002), deliberative monetary valuation (Lliso, Mariel, Pascual, & Engel, 2020; Lo & Spash, 2013; Spash, 2008), use of exploratory interviews to identify benefits and values at stake connected to ES (Gould et al., 2015; Klain & Chan, 2012; Klain, Satterfield, & Chan, 2014; Walz, Grêt-Regamey, & Lavorel, 2016), photo elicitation of values (Sherren, Fischer, & Price, 2010; Southon, Jorgensen, Dunnett, Hoyle, & Evans, 2017), articulation and quantification of values using newly 'constructed' metrics fit for purpose (Failing, Gregory, & Higgins, 2013; Satterfield, Gregory, Klain, Roberts, & Chan, 2013) and more. A further critique is that many services include things for which monetary valuation would be controversial (e.g. biodiversity), and so only biophysical metrics are provided (Bateman et al., 2013; Guerry et al., 2012; Nelson et al., 2009; Ruckelshaus et al., 2015). And, lastly, many contend that mainstream ES research had avoided whole classes of 'intangible' or 'messy' benefits—those less amenable to monetary valuation—which led to the frequent representation of cultural ES as recreation and aesthetic value only (Daniel et al., 2012; Langemeyer, Calcagni, & Baró, 2018; Milcu, Hanspach, Abson, & Fischer, 2013).

Given these critiques, we expected that the longer tradition of monetary valuation will prevail, but that—as the field has matured—we might also see greater balance of *monetary* and *non-monetary valuation*. That is, accepting the longer tradition of *monetary valuation*, we should only see an increase in the proportion of *non-monetary valuation* over time (*Expectation 2*).

1.1.3 | Without demand and access, there is no value

If people do not want or need a thing (including existence value), or if they cannot or do not obtain it, there is no valued benefit (Wieland, Ravensbergen, Gregr, Satterfield, & Chan, 2016). Conversely, shifts in demand and access have devastating implications for some ES (Erdozain et al., 2019). Thus understanding access and demand is crucial to both *value knowledge and reflection* and *decision-support*. When the demand for coffee on the global market made coffee-growing less feasible economically, large tracts of Costa Rican coffee plantations turned to pineapples, which wholly eliminated demand for insect pollination (Chan et al., 2007). And when First Nations people in BC, Canada were forcibly moved to residential schools, harvest of edible seaweed and the concomitant transmission of the knowledge and practice of harvest was largely lost (Turner & Turner, 2008). Access and so demand for marine foods has also curbed as a function of perceived contamination near industrial sites and increased price of boat fuel necessary for reaching harvest sites (Chan et al., 2011).

In recognition of the critical nature of both demand and access, other fields have scrutinized these aspects explicitly. Demand, for example, has been shown to be a product of much more than personal preferences or individual behaviour; it is also largely a function of the social-technical context in which decisions take place (Wilhite, Shove, Lutzenhiser, & Kempton, 2000). Thus energy demand is a function of infrastructure (e.g. the transmission grid), devices owned and social norms about their use (Shove & Walker, 2010; Wilson & Dowlatabadi, 2007). Surely the same is true of demand for many ES (e.g. demand for water-purifying ES depends on presence of filtration plants, private filters, habits and norms about water use).

The social sciences have also placed great emphasis on access—focusing on the ability to actually derive benefit from a thing, determined not just by a 'bundle of rights' but more broadly by 'a bundle of powers' (Ribot & Peluso, 2003). Such a broad notion of access inspires investigation of not only rules, but also skills, social networks and capital, access to markets and labour, tenure security, etc. (ibid). Accordingly, if we are to understand the value (and justice) of ES in various future scenarios, we need also to understand changes in these aspects of demand and access.

The ES field has paid little explicit attention to the dynamics of demand and access (Villamagna, Angermeier, & Bennett, 2013; Wieland et al., 2016), with some exceptions. This may stem from the origin of ES as a field to help communicate the benefits and value of nature (Daily, 1997; Gómez-Baggethun et al., 2010; Mooney & Ehrlich, 1997). Consequently, the focus has often conflated the role of changing *ecosystems* as changes in ES, while ignoring the role of changing *social systems* (including demand and access; Figure 1). This is so despite researchers explicitly identifying the importance of accounting for spatial variation in ES access and demand, especially for spatial prioritization (Bateman et al., 2013; Chan, Shaw, Cameron, Underwood, & Daily, 2006; Fisher et al., 2011; González-García, Palomo, González, López, & Montes, 2020; Luck, Chan, & Fay, 2009; Luck, Chan, & Klein, 2012; Naidoo & Ricketts, 2006; van Jaarsveld et al., 2005; Verhagen, Kukkala, Moilanen, van Teeffelen, & Verburg, 2017; Wolff, Schulp, Kastner, & Verburg, 2017). Similarly,

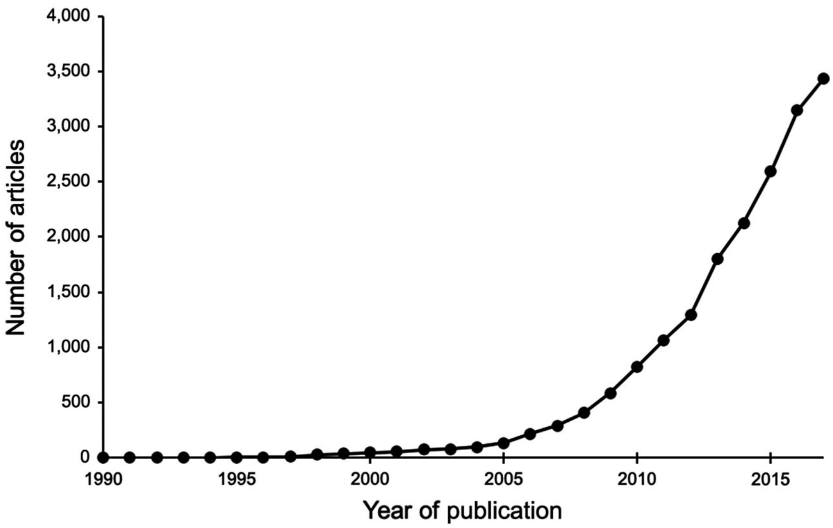

FIGURE 1 Number of articles published each year with 'ecosystem service*' in the title, abstract or keywords, from the ISI Web of Knowledge

and borrowing from the field of vulnerability studies, there is much evidence to suggest that social drivers such as poverty and inequality obstruct access to ES (Berbés-Blázquez, González, & Pascual, 2016; Hicks & Cinner, 2014; Nesbitt, Meitner, Girling, Sheppard, & Lu, 2019; Robards, Schoon, Meek, & Engle, 2011; Turner & Turner, 2008; Wieland et al., 2016).

Given the ecological roots of ES, we expected less examination of demand and access or other social factors than that of biophysical dimensions. Interpreted generously to include how valuations of ES vary due to social factors across space, time or social group, we thus anticipate only a small number of studies examining the *social* drivers of value, with an increase over time (*Expectation 3*).

1.1.4 | ES for tailored communication

A key part of the mandate of ES research from the beginning was that it be useful to policymakers and lay people (in both *value knowledge and reflection* and *decision-support*); that is, to be specific, relevant and timely. An example is the critical difference between an agronomist touting the necessity of native prairie vegetation in hopes of changing farmer decision-making around field buffers, versus demonstrating that modest buffers of native prairie could improve ES such as soil retention and moisture, reduce runoff and also increase biodiversity on farms, even within a year (Liebman, Helmers, Schulte, & Chase, 2013). In this example of useful research, researchers calculated the costs of such on-farm changes, and demonstrated their economic feasibility (Tyndall, Schulte, Liebman, & Helmers, 2013). The combination of this tailored information and an appropriate participatory engagement strategy has led to widespread interest in this new farm management practice (Jordan et al., 2013). The general knowledge of prairie vegetation's ability to provide ES was widespread but alone was insufficient to garner such changes. Further optimal examples include demonstrating to foresters how alternative forestry business practices can supply ES and a sustainable stream of revenue (Goldstein et al., 2012), to regional planners and environmental regulators how marine plans can improve water quality, recreation, renewable energy, coastal protection and more (Guerry et al., 2012), and to policymakers and philanthropists how renewed support for ES programs could enhance carbon sequestration and reduce dust export (Liu, Li, Ouyang, Tam, & Chen, 2008).

While some ES studies have paid great attention to specificity and relevance of this kind, many have called for more and better demonstration in concrete terms. For example, how might biodiversity enhance needed services or human well-being more broadly. ES research should, ideally, change discussions and decisions (Balvanera et al., 2001; Daily et al., 2000; de Groot, Alkemade, Braat, Hein, & Willemen, 2010; Kumar, 2010; Posner, McKenzie, & Ricketts, 2016). The very design of the Natural Capital Project's InVEST tool was to meet the needs of decision-makers, supplying relevant information even without sophisticated data (Daily et al., 2009; Tallis & Polasky, 2011a, 2011b). And lessons from applications of this tool reveal that such simple information is useful, especially when linked with an iterative science-policy process and on-ground capacity building (Ruckelshaus et al., 2015).

Given this strong intellectual foundation as a solution-oriented science, we expected to see a large number of studies demonstrating how the *biophysical* underpinnings of ES are affected by particular decisions, scenarios or other factors—with or without valuation. We also expected a smaller number of studies directly addressing the effectiveness of policies (but not necessarily characterizing the biophysical underpinnings of ES; '*policy efficacy*'). Furthermore, we expected an increase in both of these aspects over time (*Expectation 4*).

1.1.5 | A social turn to ES?

Three other social considerations have been central to ES critiques. First, at the heart of alternative framings like 'nature's contributions to people', as adopted by IPBES, is the contention that the language of ES may alienate a variety of audiences, including Indigenous people as well as scholars from the more interpretive social sciences (qualitative research, e.g. anthropology and critical human geography; Sikor, 2013), as opposed to the more predictive disciplines of psychology and economics (Díaz et al., 2015, 2018; Satz et al., 2013). Certainly, several reviews have found limited engagement with the social sciences in ES research (Chaudhary, McGregor, Houston, & Chettri, 2015; Fagerholm, Torralba, Burgess, & Plieninger, 2016; Haase et al., 2014; Liquete et al., 2013; Luederitz et al., 2015; Nieto-Romero, Oteros-Rozas, González, & Martín-López, 2014). Second, issues of justice, equity and the social implications of ES programs and policies have long been prominent in critiques of ES (Corbera, Kosoy, & Martínez Tuna, 2007; Daw, Brown, Rosendo, & Pomeroy, 2011; Gould et al., 2020; Pascual et al., 2014; Sikor, 2013). Finally, the recent rise in research on relational values (Chan et al., 2016; Chan, Gould, & Pascual, 2018; Pascual et al., 2017) stems in part from the recognition that values are not only the output of valuation exercises, but are also reciprocal responsibilities, relations and structured priorities that can drive changes in ES and social–ecological systems (Chan, Satterfield, et al., 2012; Comberti, Thornton, Wylliede Echeverria, & Patterson, 2015; Fish, Church, & Winter, 2016; Gould, Pai, Muraca, & Chan, 2019; Tadaki et al., 2017). By better including scholars from the qualitative social sciences and humanities, better attending to the social implications of programs and policies, and better reflecting diverse conceptions of values, ES research could improve in both *value knowledge and reflection* and *decision-support*.

Given this, we expected to see a relatively small engagement from the *qualitative social sciences and humanities*, investigating the social dimensions of ES policies and programs (*policy equity*), or investigating *values as drivers of change* (Figure 1). Believing ES to be a field responsive to critique, however, we also expected to see a rise in all three of these aspects over time (*Expectation 5*).

2 | METHODS

We tested the above predictions via a stratified random sample (n = 1,047) of all eligible ES studies in ISI Web of Knowledge as our sample frame. The sample frame comprised 16,833 studies, which had to include the term 'ecosystem service*' (in the title, abstract or keywords), which was too many to be evaluated comprehensively (hence the random sample). We separated the frame into five time periods: incipient (1990–2001—242 studies, n = 64 included), early (2002–2008—1,465 studies, n = 70), early-middle (2009–2011—2,989 studies, n = 172), late-middle (2012–2015—5,487 studies, n = 335) and recent (2015–2017—6,650 studies, n = 406). Recognizing that any time division is somewhat arbitrary, we thought of the first period as the era of Nature's Services (Daily, 1997) and Costanza et al. (1997), the second as the era of the Millennium Ecosystem Assessment (2005), and the last being the era of IPBES (with the third and fourth periods evenly splitting the intervening years). Because of the near-exponential growth of publications (Figure 1), we employed wider temporal windows for the first two periods (assuming that change might occur more rapidly later) and oversampled from the first period (adding 50 to the initial 14). Contributions of the oversampled early period were proportionally weighted in the all-time-period averages of the 1,047 studies. This sample was sufficient for 95% confidence intervals with a margin of error of ±0.04.

Based on reviews of the abstracts (and where necessary, article text), each study was coded in binary terms for five qualities that directly addressed the hypotheses above (not mutually exclusive; as per *Coding* explanation below). These are summarized in Figure 2 and include whether the sampled study reported any (a) ***valuation*** results (*total* or *marginal* values), including any reporting of valuation in *non-monetary* terms; (b) ***biophysical*** changes pertinent to ES; (c) ***social*** changes or differences pertinent to ES (access, demand or differential valuations across time, space or social group—'*use*'), and any contribution from *qualitative social sciences and humanities*; (d) ***policy*** research, either about *efficacy* in achieving desired changes in biophysical or ES outcomes, or about *equity* and other social dimensions; and (e) ***values*** as drivers of change. Because any given coding for any paper involves a degree of subjective judgment and substantial grey areas that do not neatly fit into classifications, we strived first and foremost for consistency, but assume that absolute proportions matter much less than the trends.

We interpreted these coded qualities (above) as tests of our five expectations: (Expectation 1, E1) the proportion of *valuation* studies also reporting relevant *biophysical* changes as the fraction of *biophysically grounded marginal valuation*; (E2) the proportion of *valuation* studies reporting *non-monetary* metrics; (E3) the number of studies investigating *social* aspects; (E4) the proportion of studies characterizing *biophysical* underpinnings of ES, and those investigating *policy efficacy*; and (E5) the proportions of studies using approaches from the *qualitative social sciences and humanities*, addressing *policy equity*, and *values as drivers of change*. Figure 2 summarizes these expectations.

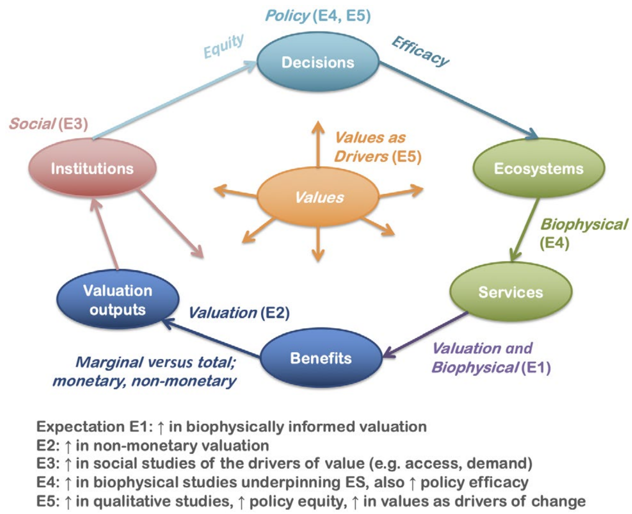

FIGURE 2 The study codes for areas of focus of ecosystem service (ES) studies, which correspond to the five expectations (E1-5), overlaid on a graphical representation of how ES research might inform decisions (edited from Chan, Guerry, et al. (2012), based on Daily et al. (2009); arrows depict influence relationships). The six coding categories shown in italics are not mutually exclusive: ***Biophysical*** (green)—investigating biophysical dynamics underpinning ES; ***Valuation*** (blue)—characterizing ES values in some manner (including subcodes *marginal*, *total*, *monetary* and *non-monetary*); ***Valuation and Biophysical*** (purple arrow)—characterizing biophysical dynamics and linked ES values; ***Social*** (pink)—characterizing social dynamics underpinning ES; and ***Policy*** (aqua)—characterizing the effects or design of programs and policies on/for ES (subcodes *equity* and *efficacy*); and ***Values as Drivers*** (orange)—characterizing values as affecting other elements of the system. Not shown is ***Qualitative Social Sciences and Humanities***, which pertained to methodological approach and could apply to any area of focus (see text)

More detail about coding appears below. All data generated or analysed during this study are included in this published article (and Supplementary Data).

2.1 | Coding

Codes were intended to enable quantitative testing of the five hypotheses. Each code was binary and independent (so non-mutually exclusive, e.g. papers could be scored as *biophysical* and *social*). Papers could in theory be scored as '1' for many codes, or '0' for all codes (e.g. if the paper mentioned ES in a valorizing, that is as a pragmatically useful signal, without engaging substantially in biophysical or social classification, etc.). Codes were developed by Chan and Satterfield and operationalized by a team of research assistants. Papers were assigned codes based largely on abstracts, but where abstracts were unavailable or ambiguous, we consulted the full article. Discrepancies were noted and resolved, by iteratively coding selected papers (amounting to >30%) and resolving discrepancies in outcomes and fine-tuning criteria. Chan second-coded all papers where difficult or discrepant codes persisted.

2.1.1 | Biophysical

Articles were scored as *biophysical* characterizations of ES if they investigated biological, physical or biophysical patterns or processes that pertained directly or explicitly to ES (which could directly inform valuation). For example, a study investigating the crop-pollinating behaviour of bees and its response to landscape characteristics would qualify as *biophysical*. In contrast, a study that merely notes that bats are ES providers while investigating bat mate preference (without any stated or apparent link between mate preference and ES) would not qualify. Articles can qualify as *biophysical* even if not gathering primary field or remote-sensing data, for example, by combining existing data to illuminate a fuller characterization of ecosystems' contributions to benefits for people.

2.1.2 | Valuation

Articles were scored as valuation if they explicitly characterized the importance or value of ES to people by one or more quantitative metrics (in practice, most used monetary metrics such as dollars). Articles were counted as *valuation* if they reported on a primary study of this nature or if they employed the results of other studies to characterize values associated with one or more ES or their changes; articles were not counted if they simply reviewed or mapped valuation data reported elsewhere. However, including such applications of valuation data had little effect on results. Articles assessing emergy were not counted as *valuation* due to the lack of an explicit link to any benefits or beneficiaries. One set of subcodes included *monetary* and *non-monetary*, where *monetary* included any expression of willingness to pay (in any currency), and *non-monetary* included any other subjective expression of importance or priority including, for example, indices of risk. A second set of subcodes included *marginal* versus *total* valuation, where *marginal* pertained to valuation of a realistic change and *total* pertained to the value of the whole of something (e.g. a whole ecosystem, a whole class of ES).

2.1.3 | Social

Articles were scored as *social* characterizations of ES if they investigated social, cultural or psychological patterns or processes that pertained directly or explicitly to ES. Articles were counted as *social* if they investigated beneficiaries' perceptions of an ES or even how valuation data varied across groups; articles were not counted if they investigated perceptions of an intervention (e.g. a park—but see *policy*, below) without specific reference to particular ES or if they only discussed the role of social dynamics without new data or analysis.

2.1.4 | Policy

Articles were scored as *policy* if they investigated programs or policies for ES (e.g. payments for ES programs), or the effects of a broader range of programs and policies on ES (e.g. forest policy). Articles were counted as *policy* only if they investigated the effects and design of specified programs and policies, not—for example—potential biophysical effects assuming changes on landscapes resulting from purely hypothetical policies or programs via scenario modelling. *Policy* articles were subcoded into those that investigated the *efficacy* (effectiveness, efficiency) of a policy or program effecting a change in BES outcomes, and *equity* or other social side effects of those programs.

2.1.5 | Valuation and biophysical

Because of the core promise of ES research to provide valuation data to relate the implications of biophysical changes for human well-being, we tracked the number of articles that did just that. This scoring is simply the union of *valuation* and *biophysical* above.

2.1.6 | Qualitative social sciences and humanities

Articles were scored as *qualitative social sciences and humanities* if they adhered to the methods and conventions that emphasized the qualitative research that also engages with co-production of knowledge, traditional knowledge, meanings of nature as well as contextual and historical explanations of inequity and policy outcomes (e.g. as might a political ecologist using ethnographic methods). Articles could be scored as *qualitative social sciences and humanities* even if they also engaged in some quantitative research, but not if the prevailing approach was one generally associated with economics, psychology and other predictive social sciences.

2.2 | Analysis

We calculated *SE*s for the proportions for each time period following standard protocol. For the total (across all time periods), we accounted for oversampling of 1990–2001 by normalizing the pertinent numbers (by multiplying by the original $n = 14$/the oversampled $n = 64$). Accordingly, error bars reflect a total $n = 997$, not $n = 1{,}047$. For all proportions, however, we applied the finite population correction (Isserlis, 1918).

3 | RESULTS

Our analysis of the ES literature depicted in Figure 3 indicates relatively little valuation research, and very little valuation informed by needed biophysical or social changes or differences. There is however a marked increase in studies examining the social dimensions of ES-pertinent policy, and in the proportion of studies attending to social dynamics underpinning ES.

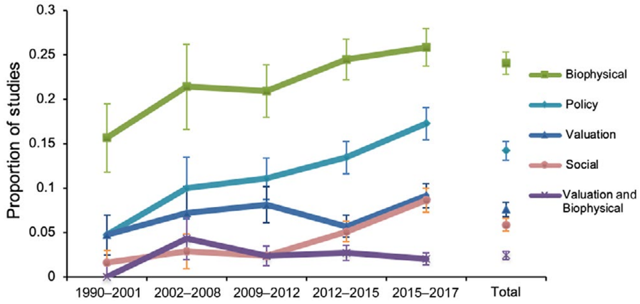

FIGURE 3 The relative proportion of ecosystem services studies. The sample and five categories are as in Figure 1: **Biophysical** (■, 15%–26%); **Policy** (◆, 5%–17%); **Valuation** (▲, 5%–9%); **social** (●, 2%–9%); and ***Valuation and Biophysical*** (×, 0%–4%—a subset, biophysically grounded valuation). Error bars represent *SE*s. Proportions do not add to 1, as codes were independent (except *valuation and biophysical*) and some papers were coded as 0 for all categories depicted here. Colours conform to Figure 1

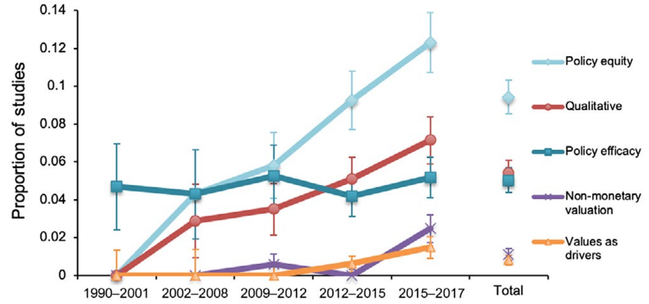

FIGURE 4 Relative proportions of ecosystem service studies, finer categories and subcodes. The sample is as in Figure 1, but here ***Policy*** is decomposed into ***equity*** (and other social dimensions; ◆, 0%–12%) and ***efficacy*** (■, 4%–5%); also shown are ***Qualitative** social sciences and humanities* (●, 0%–7%), ***non-monetary valuation*** (×, 0%–2%); ***Values as drivers*** (▲, 0%–1.5%). Proportions do not add to 1, as codes were largely independent (note *policy equity* and *policy efficacy* are subcodes of *Policy* in Figure 3, and *non-monetary valuation* is a subcode of *Valuation*), and some papers were coded as 0 for all categories depicted here. Error bars represent *SE*s. Colours conform to Figure 1

Specifically, some key best practices for ES research are not yet manifest in substantial changes in ES scholarship: we see little biophysically grounded valuation of realistic changes (see 1 below), and little inclusion of non-monetary metrics alongside monetary ones. While it is unreasonable to expect any one study to 'do it all' (original biophysical, social and valuation research), our analysis did not require *biophysical*, *social* or *valuation* research to be fully original research—they could equally have integrated data or findings reported elsewhere. Furthermore, although in theory biophysical research could be published separately and subsequently integrated into valuation, until the final period (2015–2017), most ecological research in our sample was so removed from the processes or components of value that it could not even be integrated with valuation post hoc (that is, it did not qualify as *biophysical* ES research by our coding).

In contrast, the field shows clear trends towards improvement in a variety of respects, with impressive increases in many social aspects (including social aspects of policy; Figures 3 and 4), as described below (2–5 below). The following sections report on the findings in relation to the five expectations identified earlier (Figure 2).

3.1 | Whither the biophysically grounded 'marginal' valuation?

Expectation 1: In contrast to optimistic expectations, a tiny fraction of the representative sample (n = 1,047) conducted *biophysically grounded valuation* (2.4 ± 0.5%, Figure 3), and this fraction seemed invariant across time.

Many of the qualifying papers were from agricultural contexts, where pest control or pollination services associated with field edges, forest patches or floristic diversity were quantified monetarily through enhanced yields (Geslin et al., 2017; Woodcock et al., 2016; Yang, Elbakidze, Marsh, & McIntosh, 2016). These contexts, with clear marketed commodities, might be atypical of other ES—low-hanging fruit, as it were.

Despite repeated calls for 'marginal' valuation of realistic biophysical changes, the ES literature continues to contain a large share of studies taking a 'total' (not marginal) valuation approach. All parties seemed to agree that marginal valuation is more relevant (Bockstael et al., 2000; Costanza et al., 1997; Fisher, Naidoo, & Ricketts, 2015; Nature, 1998). Yet the ease of publishing such total valuation results appears to continue to tempt many authors to report these results, often borrowing from existing global values, sometimes with revisions.

Of course, total values have some purpose. The continued presence of total valuation studies even in the last period is partly due to the rise of non-monetary valuation, most of which was not measuring the importance of realistic changes but of whole categories of benefits (one example of a 'total' valuation approach). If the ES field is to contribute meaningfully to on-ground decision-making, much greater use and examination of marginal valuation will be needed, including with non-monetary metrics.

3.2 | Whither the balanced multi-metric valuation?

Expectation 2: In contrast to expectations, only a small fraction included *valuation* results (7.6 ± 0.8%). This number includes studies re-using others' results but not straightforward re-mapping exercises, as in several studies applying values from Costanza et al. (1997) at finer scales. There was less balance than expected between *monetary* and *non-monetary valuation*, and the rise of *non-monetary* came later than predicted. Only 1 of 641 papers in the sample until mid-2015 assessed people's values using *non-monetary* approaches (0.2 ± 0.2%; in contrast, 40 provided *monetary* values in that sample), but this proportion changed significantly and positively in the final period (to 2.5 ± 0.7%—10 non-monetary vs. 27 monetary across the 406 sampled; Figure 4). Only one paper in our sample appeared to integrate *monetary* and *non-monetary* valuation (Villegas-Palacio, Berrouet, López, Ruiz, & Upegui, 2016). Interestingly, the rise in *non-monetary* valuation appears to have worked against a rise in *marginal* valuation, as most *non-monetary* valuation studies used a *total* valuation approach (all but three).

Despite prominent calls for non-monetary valuation (EPA, 2009; IPBES, 2015; Value of Nature to Canadians Study Taskforce, 2017), the vast majority of studies report only monetary values (or simple biophysical quantities, which does not signal relative importance or need). The lack of attention to non-monetary valuation in the ES literature until 2015 was wholly out-of-sync with the balance of attention to monetary and non-monetary valuation in best-practice guides (approximately equal; EPA, 2009; IPBES, 2015; Value of Nature to Canadians Study Taskforce, 2017). This pattern did change dramatically in the 2015–2017 period, but monetary valuation continues to dominate—perhaps owing to a common notion that policymakers and the media only care about monetary values (a notion contradicted by documented engagements with decision-makers—Ruckelshaus et al., 2015).

Both monetary and non-monetary values have important contributions to make. To reflect the diverse ways in which nature matters to people, we need more of both kinds of valuation (Chan, Satterfield, et al., 2012; IPBES, 2015), more integration across the two (Jacobs et al., 2016; Kenter et al., 2016; Pascual et al., 2017) and more marginal non-monetary valuation to valuate realistic changes in ES.

3.3 | Is ES research responsive to social drivers of change?

Expectation 3: As expected, characterization of relevant *social* patterns, changes or processes (5.8 ± 0.7%; Figure 3) was rare, particularly in the early periods. Until the final period, very few of these *social* studies of ES examined changing demand or access to ES—most examined only spatial or social variation in management practices or willingness to pay. The increase in the *social* dimensions of ES studies was marked (1.6%–8.6%; Figure 3).

The contribution of the social sciences to interdisciplinary ES science has thus far been largely to assess which ES matter, rather than to understand underlying access and demand. Our review also encountered a paucity of studies explicitly addressing social dimensions of ES, particularly pre-2012, even by the most generous scoring (Figure 3). Of course, there are whole fields studying access to and distribution of environmental goods and bads (e.g. environmental justice, Schlosberg, 2007), but these fields are having limited effect within the ES literature as we operationalized it (with noteworthy exceptions, e.g. Sikor, 2013). Thus, most studies qualifying as 'social' investigated only how valuation data varied across social groups, or made a link between a biophysical or policy change and loss of access to some groups. Very few studies in our sample explicitly studied social dynamics affecting access and demand for ES, or the social consequences of ES change, but these more sophisticated *social* studies were increasingly common. This dearth is perhaps unsurprising as even best-practice guides have largely overlooked these aspects.

Social sciences have much more to offer ES than the measurement of value. To understand how changing ES will affect people, we must include the studies of access, demand, exposure and co-production, among other dimensions (Chan & Satterfield, 2016; Fish et al., 2016; Palomo, Felipe-Lucia, Bennett, Martín-López, & Pascual, 2016; Soga, Gaston, Koyanagi, Kurisu, & Hanaki, 2016; Soga, Gaston, Yamaura, Kurisu, & Hanaki, 2016; Wolff, Schulp, & Verburg, 2015). We find optimism, however, in the increase in *social* dimensions studies since 2012 (Figure 3), and the qualitatively heightened sophistication of these studies with time.

3.4 | Is ES research strong in targeted biophysical and policy studies?

Expectation 4: Approximately one quarter of the representative sample (n = 1,047) of studies included characterizations of *biophysical* processes relevant for ES (24.1 ± 1.3%; Figure 3). Thus, *biophysical* was the most common code depicted in Figure 1, but it was perhaps still too rare given that biophysical change is fundamental to ES and original research was not required in coding. *Biophysical* studies adopted a range of approaches including field experiments (especially in agricultural and forest contexts) and modelling using ES software and available data (e.g. for many hydrological and carbon storage studies). A smaller but rising number of studies addressed policies directly (Figure 3), but further differentiation revealed that the growth in *policy* studies was not true of the subset investigating *policy efficacy* (Figure 4).

Although initially a large number of studies referenced ES in a perfunctory 'buzzword' (valorizing) manner (as found by Abson et al., 2014), this proportion decreased substantially over time, in part due to the substantial rise in studies characterizing the biophysical underpinnings of ES (Figure 3). There was also a steady proportion of studies addressing the efficacy of policies (Figure 4).

3.5 | Has ES made better use of the social science of values?

Expectation 5: As predicted, results suggest a substantial turn towards influences from a broader representation of the social sciences and humanities in the last or last two periods (2012–2015, 2015–2017) after near invisibility pre-2012, in three respects. First, there has been a substantial increase in the proportion of studies addressing the key social considerations of ES-driven policies or programs, including equity—the starkest rise we observed (*policy equity*: 0%–12%; Figure 4). Second, there is an evident rise in studies from the *qualitative social sciences and humanities* (0%–7%; Figure 4). Third, following a near complete domination of thinking about values as merely the outputs of valuation, since 2012 studies considering values as structured priorities or relations have increased, with the potential to drive change in social-ecological systems research (*values as drivers*: 0%–1.5%, but only eight studies of 1,047; Figure 4).

4 | DISCUSSION

The partial maturation of ES research detailed here suggests that what initially began as a framework for ecological-economic integration has attracted other analytical approaches but resisted the long-sought integration. The rise of non-monetary valuation, qualitative social assessment, social studies of access, demand and equity reveals that economics is clearly no longer the only social science deeply engaged with ES. And yet the rarity of integrative studies—for example, that both characterize relevant biophysical changes underpinning services and the implications of those changes via valuation (Gregr et al., 2020)—suggests that the interdisciplinary integration that excited so many remains only partly fulfilled.

4.1 | The answer? Not a number

Much of the ES literature we reviewed still appears to imagine (naïvely) that research is most effective if we can distil the value of nature into a number (monetary or otherwise), and then communicate that number broadly. In keeping with this additive and linear view of 'valuation-plus-dissemination', policy agents at the highest levels are developing methods for BES valuation (EPA, 2009; IPBES, 2015; Value of Nature to Canadians Study Taskforce, 2017) to supply indices—economic or otherwise—for planning and policymaking. We might hope that the communication of such unspecific values to 'the public' and policymakers will foster 'changes in personal consumption and behaviour' (Secretariat of the Convention on Biological Diversity, 2010a) and integration into management and policymaking, but this may be largely wishful thinking (Allum, Sturgis, Tabourazi, & Brunton-Smith, 2008; Singh et al., 2020). Indeed, abundant research on environmental values (i.e. as statements of economic and non-economic importance) reveals that the valuation-dissemination approach conveys only a detached and one-dimensional representation of why BES matters to people (Chan et al., 2016; Turnhout, Waterton, Neves, & Buizer, 2013). As such, this approach will likely fail to realize the key goals of (a) value knowledge and reflection and (b) decision-support, for two kinds of reasons: analytical and practical.

4.2 | The analytical shortcomings of numerical valuation

Any approach that characterizes societal value primarily through an analytical aggregation of individual valuations ('numerical valuation')—as did most of the valuation papers in our sample—will fail to properly account for what matters and why (Gregory, Lichtenstein, & Slovic, 1993; Spash, 2008). This includes numbers derived from life-satisfaction surveys, which avoid some of the limitations of monetary valuation and offer solutions to some coarse-scale policy contexts (e.g. green-accounting measures as indicators of national well-being). The problem is that values of biodiversity and ES are diverse (Chan et al., 2011; Mace, Norris, & Fitter, 2011) and can be characterized by multiple qualities that defy appropriate representation via simple aggregation across individual valuations (Lliso, Mariel, et al., 2020). The reasons for this are well-articulated in the literature, including the following.

Many BES values are of a non-material (intangible) or extra-material nature (linked to material objects; e.g. place attachment, inspiration), and not amenable to simple numerical valuation (Chan, Satterfield, et al., 2012; Turner, Gregory, Brooks, Failing, & Satterfield, 2008). Some values are so culturally or socially sensitive as to defy analytical resolutions of trade-offs with other values, but often trade-offs can be resolved through discussion and negotiation (Chan, Satterfield, et al., 2012; Daw et al., 2015; Gregory, Failing, Harstone, Long, & McDaniels, 2012). One cannot determine group values—which are often crucial for BES—through individual polling alone (by group values we mean what a group wants for itself as a social whole; Kenter et al., 2016; Wilson & Howarth, 2002). Abundant evidence demonstrates that preferences—about non-market goods in particular—are malleable and dependent on framing (Fischhoff, 1991; Gregory et al., 1993). Some have argued persuasively that therefore values should be systematically and consistently 'constructed' in structured participatory decision-making approaches that reflect shared values (Gregory et al., 1993; Keeney & Gregory, 2005). Further, values can pertain not merely to outcomes, but also to rights and to *processes* of decision-making and implementation (Chan, Satterfield, et al., 2012; Spash, 2006). To ignore such values about *how* decisions are made or management is conducted seems folly: how something is done matters as much to many constituents as the outcomes produced. These issues can be addressed by using such methods as narrative approaches (Gould et al., 2015), negotiation (Vignola, McDaniels, & Scholz, 2012), group deliberation and participatory decision-making mechanisms (Gregory et al., 2012; Spash, 2008).

4.3 | In practice, engagement is the problem and the solution

Despite the pre-occupation of ES studies with numerical valuation, numbers alone are an ineffective tool for crucial task of promoting value-knowledge and reflection (Spash, 2008). For this purpose, of helping people to truly understand the contributions of nature to their lives, we cannot expect a complete solution from the most space-efficient representations of importance. Perhaps we need to focus more on stories (including the one that speaks for many—Slovic, Zionts, Woods, Goodman, & Jinks, 2011), quotes, images and videos that viscerally express value, and more directly engage audiences (Echeverri et al., 2020; Echeverri, Naidoo, Karp, Chan, & Zhao, 2019; Klain, Satterfield, Sinner, Ellis, & Chan, 2018). By this logic, constituents would only understand and reflect on the importance of nature by engaging directly with it, or engaging with it through another's eyes.

Although valuation and engagement steps have often been thought of as sequential, it might be that the most appropriate methods for eliciting the intangible values of nature are simultaneously most effective for communicating them. Indeed, several interviewees of a novel value-elicitation protocol thanked interviewers for the opportunity to reflect on their connections to the natural world (Gould et al., 2015; Klain et al., 2014).

In addition to deliberative approaches, widespread interventions might enable large numbers of people to effectively express values that they already hold—for example, by making it much easier to live a low-impact lifestyle. Such 'nudge'-like approaches have manifest thus far mainly through efforts to encourage particular favoured behaviours (e.g. saving for retirement; John, Smith, & Stoker, 2009; Thaler & Sunstein, 2008), rather than a conscious effort to transform broader systems and norms towards sustainability (Abson et al., 2017). One kind of effort that might help fill this gap is to investigate how people are currently engaging with environmental programs and policies (e.g. incentive programs, Chapman, Satterfield, & Chan, 2019), and how those programs and policies might be designed to better engage those people—and the full spectrum of populations—towards broad norm change for sustainability (Chan et al., 2019; Chan, Olmsted, Bennett, Klain, & Williams, 2017; Chapman et al., 2017; Fischer & Riechers, 2019; Raymond, Weldon, Kelly, Arriaga, & Clark, 2014).

4.4 | Guidance for research

Such progress in practice rests upon a major expansion of existing ES research to characterize the linked biophysical *and social* dynamics underpinning ES. The stark difference we observed between such prominent calls and actual practice demonstrates the utility of systematic examinations of the literature; practice does change, with time and effort. Social research on access and demand will likely remain on the sidelines until it is explicitly recognized as critical.

Many benefits might also accrue from a diverse set of approaches to ES valuation and decision-making. Research could address real-world participatory valuation and decision-making and its potential to improve decisions (Beierle, 2002), empower stakeholders and facilitate acceptance (Irvin & Stansbury, 2004), and foster deeper understanding of the values of biodiversity and ES (Gregory et al., 1993). A particular area for growth will be to investigate the non-monetary values associated with marginal, realistic changes in ES (Chan, Guerry, et al., 2012).

4.5 | Guidance for policymaking

There is ample opportunity to better account for the complex values of nature in policymaking, planning and assessment. There is impetus in CBD targets and the post-2020 Biodiversity Framework, where nations and researchers are fostering BES valuation to achieve 'communication, education and awareness raising' regarding 'the value of biodiversity' and to foster reflection of those values 'within economic systems and markets' (Secretariat of the Convention on Biological Diversity, 2010a).

As hinted above, characterizing and making people aware of BES values (to paraphrase Secretariat of the Convention on Biological Diversity, 2010a) might be better achieved by a series of experimental innovations in planning and policymaking (as detailed above), some of which include a melding of valuation and decision-making. These add to economic valuation, rather than replace it:

- Cost–benefit analysis (CBA), environmental impact assessment and trade-off analysis more broadly (e.g. multi-criteria decision-making) might be adapted to assess a range of BES concerns. This might include scoring some benefits using appropriately constructed alternate metrics (Keeney & Gregory, 2005; Satterfield et al., 2013) or in reference to indicators of well-being (Biedenweg et al., 2014; Hicks et al., 2016). CBA results might be displayed on one axis and other metrics on other axes (DeFries, Foley, & Asner, 2004; Polasky, Nelson, Lonsdorf, Fackler, & Starfield, 2005). Participants and experts can together identify creative alternatives, and citizen juries can assist with decision-making.
- Planning/zoning can and must account for non-monetary benefits and values (Klain & Chan, 2012; Tew, Simmons, & Sutherland, 2019). This might involve structured decision-making that is value-focused (expresses what matters to people), analytic (addresses trade-offs and alternatives) and participatory (Gregory et al., 2012). Thus values can drive the development of broad alternative scenarios, and spatial analyses of benefits and costs can illuminate particular spatial configurations.
- New environmental policy and management mechanisms like payments for ES might identify appropriate rules and incentives through negotiation analysis (Vignola et al., 2012), rather than, for example, market valuation and CBA. Such innovations would more appropriately deal with equity concerns and the ambiguity of property rights and duties ('polluter' vs. 'beneficiary'), and might also foster creative solutions (Chan, Anderson, Chapman, Jespersen, & Olmsted, 2017).

In sum, policymakers should think of values as not only the outputs of valuation, but also the preferences, principles and virtues that people have about relationships involving nature (relational values, Chan et al., 2016). In particular, policymaking would ideally involve considering how policies articulate these relational values (including especially notions of equity, justice and responsibility), and how they might do so more appropriately and strategically (Chapman et al., 2019; Chapman, Satterfield, Wittman, & Chan, 2020; Kaltenborn, Linnell, & Gómez-Baggethun, 2020; Lliso, Pascual, Engel, & Mariel, 2020; Schröter et al., 2020).

5 | CONCLUSION

In ES research and other fields at the intersection of people and nature (Echeverri, Karp, Naidoo, Zhao, & Chan, 2018; Gaston et al., 2019) lies the makings of BES research that is grounded in ecological *and social* systems and research, with a diverse suite of appropriate valuation metrics and novel involvement of stakeholders and constituents. In multiple respects, the field *is* maturing in response to five fundamental critiques, with more progress on some fronts than others, and more progress needed on all fronts. Such advances could position new initiatives including IPBES to greatly improve environmental decision-making and its uptake, and to foster a deep and meaningful engagement of people with the ecosystems on which they depend. More broadly, although we argued that numerical valuation is rarely appropriate as a sole description of what matters, we should also question whether the use of ecosystem service approaches is standardizing knowledge and particular forms of biodiversity governance, with negative effects (Turnhout et al., 2014), such as crowding out governance approaches more conducive to genuine partnerships with Indigenous people and local communities (Gavin et al., 2018; Sterling et al., 2017).

ACKNOWLEDGEMENTS

We gratefully acknowledge Adrian Semmelink and Caitlin Millar for their help coding the papers, and both—along with Mollie Chapman and Cameron Bullen—for helping to format various drafts of this manuscript. We also benefited from comments and suggestions from Mollie Chapman, Alejandra Echeverri, Sarah Klain, Jordan Levine, Matthew Mitchell, Robin Naidoo, Gerald Singh and Jordan Tam. In review, this paper was improved by suggestions from Rob Fish, Unai Pascual, Becky Chaplin-Kramer, Esther Turnhout and an anonymous reviewer. This work was enabled by a Canadian Natural Sciences and Engineering Research Council Discovery Grant (RGPIN-2015-05105) and two Social Sciences and Humanities Research Council Insight Grants (#435-2013-2017 and #435-2017-1071).

CONFLICT OF INTEREST

Kai M. A. Chan is a Lead Editor at *People and Nature*. He had no involvement with the assessment of this article. The authors have no competing financial interests.

AUTHORS' CONTRIBUTIONS

K.M.A.C. and T.S. designed the analysis, wrote the first draft of the paper and revised multiple versions of the paper; K.M.A.C. coded and analysed the data along with two research assistants, including refinements to the analysis.

DATA AVAILABILITY STATEMENT

This manuscript does not include data beyond the 1,047 references that were reviewed, which are included below under 'Data Sources'.

ORCID

Kai M. A. Chan https://orcid.org/0000-0002-7804-3276
Terre Satterfield https://orcid.org/0000-0001-9807-6836

REFERENCES

Abson, D. J., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., … Lang, D. J. (2017). Leverage points for sustainability transformation. *Ambio*, *46*(1), 30–39. https://doi.org/10.1007/s13280-016-0800-y

Abson, D. J., von Wehrden, H., Baumgärtner, S., Fischer, J., Hanspach, J., Härdtle, W., … Walmsley, D. (2014). Ecosystem services as a boundary object for sustainability. *Ecological Economics*, *103*, 29–37. https://doi.org/10.1016/j.ecolecon.2014.04.012

Adams, W. M. (2014). The value of valuing nature. *Science*, *346*(6209), 549–551. https://doi.org/10.1126/science.1255997

Allum, N., Sturgis, P., Tabourazi, D., & Brunton-Smith, I. (2008). Science knowledge and attitudes across cultures: A meta-analysis. *Public Understanding of Science*, *17*(1), 35–54. https://doi.org/10.1177/0963662506070159

Balvanera, P., Daily, G. C., Ehrlich, P. R., Ricketts, T. H., Bailey, S. A., Kark, S., … Pereira, H. (2001). Conserving biodiversity and ecosystem services. *Science*, *291*(5511), 2047. https://doi.org/10.1126/science.291.5511.2047

Bateman, I. J., Harwood, A. R., Mace, G. M., Watson, R. T., Abson, D. J., Andrews, B., … Termansen, M. (2013). Bringing ecosystem services into economic decision-making: Land use in the United Kingdom. *Science*, *341*(6141), 45–50. https://doi.org/10.1126/science.1234379

Beierle, T. C. (2002). The quality of stakeholder-based decisions. *Risk Analysis*, *22*(4), 739–749. https://doi.org/10.1111/0272-4332.00065

Berbés-Blázquez, M., González, J. A., & Pascual, U. (2016). Towards an ecosystem services approach that addresses social power relations. *Current Opinion in Environmental Sustainability*, *19*, 134–143.

Biedenweg, K., Hanein, A., Nelson, K., Stiles, K., Wellman, K., Horowitz, J., & Vynne, S. (2014). Developing human wellbeing indicators in the Puget Sound: Focusing on the watershed scale. *Coastal Management*, *42*(4), 374–390. https://doi.org/10.1080/08920753.2014.923136

Bockstael, N. E., Freeman, A. M., Kopp, R. J., Portney, P. R., & Smith, V. K. (2000). On measuring economic values for nature. *Environmental Science & Technology*, *34*(8), 1384–1389.

Canadian Press, T. (2011). Saving each polar bear worth $400K? *CBC News*.

Chan, K. M. A., Agard, J., Liu, J., Aguiar, A. P. D. D., Armenteras, D., Boedhihartono, A. K., … Tubenchlak, F. (2019). Pathways towards a sustainable future. In E. S. Brondízio, J. Settle, S. Díaz, & H. Ngo (Eds.). *Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Bonn, Germany: IPBES Secretariat. https://doi.org/10.5281/zenodo.3832100

Chan, K. M. A., Anderson, E., Chapman, M., Jespersen, K., & Olmsted, P. (2017). Payments for ecosystem services: Rife with problems and potential – For transformation towards sustainability. *Ecological Economics*, *140*, 110–122. https://doi.org/10.1016/j.ecolecon.2017.04.029

Chan, K. M. A., Balvanera, P., Benessaiah, K., Chapman, M., Díaz, S., Gómez-Baggethun, E., … Turner, N. J. (2016). Why protect nature? Rethinking values and the environment. *Proceedings of the National Academy of Sciences of the United States of America*, *113*(6), 1462–1465.

Chan, K. M. A., Boyd, D. R., Gould, R. K., Jetzkowitz, J., Liu, J., Muraca, B., … Brondízio, E. S. (2020). Levers and leverage points for pathways to sustainability. *People and Nature*. https://doi.org/10.1002/pan3.10124

Chan, K. M. A., Goldstein, J., Satterfield, T., Hannahs, N., Kikiloi, K., Naidoo, R., Woodside, U. (2011). Cultural services and non-use values. In P. Kareiva, H. Tallis, T. H. Ricketts, G. C. Daily, & S. Polasky (Eds.). *Natural capital: Theory & practice of mapping ecosystem services* (pp. 206–228). Oxford, UK: Oxford University Press.

Chan, K. M. A., Gould, R. K., & Pascual, U. (2018). Editorial overview: Relational values: What are they, and what's the fuss about? *Current Opinion in Environmental Sustainability*, *35*, A1–A7. https://doi.org/10.1016/j.cosust.2018.11.003

Chan, K. M. A., Guerry, A. D., Balvanera, P., Klain, S., Satterfield, T., Basurto, X., … Woodside, U. (2012). Where are 'cultural' and 'social' in ecosystem services: A framework for constructive engagement. *BioScience*, *6*(8), 744–756. https://doi.org/10.1525/bio.2012.62.8.7

Chan, K. M. A., Olmsted, P., Bennett, N. J., Klain, S. C., & Williams, E. (2017). Can ecosystem services make conservation normal and commonplace? In P. S. Levin & M. R. Poe (Eds.). *Conservation for the Anthropocene Ocean: Interdisciplinary science in support of nature and people* (pp. 225–252). San Diego, CA: Elsevier.

Chan, K. M. A., Pringle, R. M., Ranganathan, J., Boggs, C. L., Chan, Y. L., Ehrlich, P. R., … Macmynowski, D. P. (2007). When agendas collide: Human welfare and biological conservation. *Conservation Biology*, *21*(1), 59–68. https://doi.org/10.1111/j.1523-1739.2006.00570.x

Chan, K. M. A., & Satterfield, T. (2016). Managing cultural ecosystem services for sustainability. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.). *Routledge handbook of ecosystem services* (pp. 343–358). London, UK and New York, NY: Routledge.

Chan, K. M. A., Satterfield, T., & Goldstein, J. (2012). Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics*, *74*, 8–18. https://doi.org/10.1016/j.ecolecon.2011.11.011

Chan, K. M. A., Shaw, M. R., Cameron, D. R., Underwood, E. C., & Daily, G. C. (2006). Conservation planning for ecosystem services. *PLoS Biology*, *4*(11), 2138–2152. https://doi.org/10.1371/journal.pbio.0040379

Chaplin-Kramer, R., Sharp, R. P., Weil, C., Bennett, E. M., Pascual, U., Arkema, K. K., … Daily, G. C. (2019). Global modeling of nature's contributions to people. *Science*, *366*(6462), 255–258. https://doi.org/10.1126/science.aaw3372

Chapman, M., Klassen, S., Kreitzman, M., Semmelink, A., Sharp, K., Singh, G., & Chan, K. M. A. (2017). 5 Key challenges and solutions for governing complex adaptive (food) systems. *Sustainability*, *9*(9), 1594.

Chapman, M., Satterfield, T., & Chan, K. M. A. (2019). When value conflicts are barriers: Can relational values help explain farmer participation in conservation incentive programs? *Land Use Policy*, *82*, 464–475. https://doi.org/10.1016/j.landusepol.2018.11.017

Chapman, M., Satterfield, T., Wittman, H., & Chan, K. M. A. (2020). A payment by any other name: Is Costa Rica's PES a payment for services or a support for stewards? *World Development*, *129*, 104900. https://doi.org/10.1016/j.worlddev.2020.104900

Chaudhary, S., McGregor, A., Houston, D., & Chettri, N. (2015). The evolution of ecosystem services: A time series and discourse-centered analysis. *Environmental Science & Policy*, *54*, 25–34.

Cheng, X., Van Damme, S., Li, L., & Uyttenhove, P. (2019). Evaluation of cultural ecosystem services: A review of methods. *Ecosystem Services*, *37*, 100925.

Comberti, C., Thornton, T. F., Wylliede Echeverria, V., & Patterson, T. (2015). Ecosystem services or services to ecosystems? Valuing cultivation and reciprocal relationships between humans and ecosystems. *Global Environmental Change*, *34*, 247–262.

Corbera, E., Kosoy, N., & Martínez Tuna, M. (2007). Equity implications of marketing ecosystem services in protected areas and rural communities: Case studies from Meso-America. *Global Environmental Change*, *17*(3–4), 365–380.

Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., … van den Belt, M. (1997). The value of the world's ecosystem services and natural capital. *Nature 387*, 253–260.

Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S. J., Kubiszewski, I., … Turner, R. K. (2014). Changes in the global value of ecosystem services. *Global Environmental Change*, *26*, 152–158. https://doi.org/10.1016/j.gloenvcha.2014.04.002

Costanza, R., & Kubiszewski, I. (2012). The authorship structure of 'ecosystem services' as a transdisciplinary field of scholarship. *Ecosystem Services*, *1*(1), 16–25.

Daily, G. C. (Ed.). (1997). *Nature's services: Societal dependence on natural ecosystems*. Washington, DC: Island Press.

Daily, G. C., Polasky, S., Goldstein, J., Kareiva, P. M., Mooney, H. A., Pejchar, L., … Shallenberger, R. (2009). Ecosystem services in decision making: Time to deliver. *Frontiers in Ecology and the Environment*, *7*(1), 21–28. https://doi.org/10.1890/080025

Daily, G. C., Soderqvist, T., Aniyar, S., Arrow, K., Dasgupta, P., Ehrlich, P. R., … Walker, B. (2000). The value of nature and the nature of value. *Science*, *289*(5478), 395–396.

Daniel, T. C., Muhar, A., Arnberger, A., Aznar, O., Boyd, J. W., Chan, K. M. A., … von der Dunk, A. (2012). Contributions of cultural services to the ecosystem services agenda. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(23), 8812–8819. https://doi.org/10.1073/pnas.1114773109

Daw, T., Brown, K., Rosendo, S., & Pomeroy, R. (2011). Applying the ecosystem services concept to poverty alleviation: The need to disaggregate human well-being. *Environmental Conservation*, *38*(04), 370–379. https://doi.org/10.1017/S0376892911000506

Daw, T. M., Coulthard, S., Cheung, W. W. L., Brown, K., Abunge, C., Galafassi, D., … Munyi, L. (2015). Evaluating taboo trade-offs in ecosystems services and human well-being. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(22), 6949–6954. https://doi.org/10.1073/pnas.1414900112

de Groot, R. S., Alkemade, R., Braat, L., Hein, L., & Willemen, L. (2010). Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity*, *7*(3), 260–272. https://doi.org/10.1016/j.ecocom.2009.10.006

De Lucia, V. (2018). A critical interrogation of the relation between the ecosystem approach and ecosystem services. *Review of European, Comparative & International Environmental Law*, *27*(2), 104–114. https://doi.org/10.1111/reel.12227

DeFries, R. S., Foley, J. A., & Asner, G. P. (2004). Land-use choices: Balancing human needs and ecosystem function. *Frontiers in Ecology and the Environment*, *2*(5), 249–257. https://doi.org/10.1890/1540-9295(2004)002[0249:LCBHNA]2.0.CO;2

Díaz, S., Demissew, S., Joly, C., Lonsdale, W., Larigauderie, A., Adhikari, J. R., … Zlatanova, D. (2015). The IPBES Conceptual Framework – Connecting nature and people. *Current Opinion in Environmental Sustainability*, *14*(June), 1–16.

Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., … Shirayama, Y. (2018). Assessing nature's contributions to people. *Science*, *359*(6373), 270–272. https://doi.org/10.1126/science.aap8826

Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Agard, J., Arneth, A., … Zayas, C. N. (2019). Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science*, *366*(6471), eaax3100.

Echeverri, A., Karp, D. S., Naidoo, R., Tobias, J. A., Zhao, J., & Chan, K. M. A. (2020). Can avian functional traits predict cultural ecosystem services? *People and Nature*, *2*(1), 138–151. https://doi.org/10.1002/pan3.10058

Echeverri, A., Karp, D. S., Naidoo, R., Zhao, J., & Chan, K. M. A. (2018). Approaching human-animal relationships from multiple angles: A synthetic perspective. *Biological Conservation*, *224*, 50–62.

Echeverri, A., Naidoo, R., Karp, D. S., Chan, K. M. A., & Zhao, J. (2019). Iconic manakins and despicable grackles: Comparing cultural ecosystem services and disservices across stakeholders in Costa Rica. *Ecological Indicators*, *106*, 105454.

EPA (U.S. Environmental Protection Agency Science Advisory Board). (2009). *Valuing the protection of ecological systems and services* (p. 121). Washington, DC: EPA.

Erdozain, M., Freeman, E. C., Ouellet Dallaire, C., Teichert, S., Nelson, H. W., & Creed, I. F. (2019). Demand for provisioning ecosystem services as a driver of change in the Canadian boreal zone. *Environmental Reviews*, *27*(2), 166–184.

Fagerholm, N., Torralba, M., Burgess, P. J., & Plieninger, T. (2016). A systematic map of ecosystem services assessments around European agroforestry. *Ecological Indicators*, *62*, 47–65.

Failing, L., Gregory, R., & Higgins, P. (2013). Science, uncertainty, and values in ecological restoration: A case study in structured decision-making and adaptive management. *Restoration Ecology*, *21*(4), 422–430. https://doi.org/10.1111/j.1526-100X.2012.00919.x

Fischer, J., & Riechers, M. (2019). A leverage points perspective on sustainability. *People and Nature*, *1*(1), 115–120. https://doi.org/10.1002/pan3.13

Fischhoff, B. (1991). Value elicitation: Is there anything in there? *American Psychologist*, *46*(8), 835–847. https://doi.org/10.1037/0003-066X.46.8.835

Fish, R. D. (2011). Environmental decision making and an ecosystems approach. *Progress in Physical Geography*, *35*(5), 671–680. https://doi.org/10.1177/0309133311420941

Fish, R., Church, A., & Winter, M. (2016). Conceptualising cultural ecosystem services: A novel framework for research and critical engagement. *Ecosystem Services*, *21*(Part B), 208–217.

Fisher, B., Naidoo, R., & Ricketts, T. (2015). *A field guide to economics for conservationists*. Greenwood Village, CO: Roberts & Company.

Fisher, B., Turner, K., Zylstra, M., Brouwer, R., Groot, R. D., Farber, S., … Balmford, A. (2008). Ecosystem services and economic theory: Integration for policy-relevant research. *Ecological Applications*, *18*(8), 2050–2067. https://doi.org/10.1890/07-1537.1

Fisher, B., Turner, R. K., Burgess, N. D., Swetnam, R. D., Green, J., Green, R. E., … Balmford, A. (2011). Measuring, modeling and mapping ecosystem services in the Eastern Arc Mountains of Tanzania. *Progress in Physical Geography*, *35*(5), 595–611. https://doi.org/10.1177/0309133311422968

Gaston, K. J., Aimé, E., Chan, K. M. A., Fish, R., Hails, R. S., & Maller, C. (2019). *People and Nature* – A journal of relational thinking. *People and Nature*, *1*(1), 4–5.

Gavin, M., McCarter, J., Berkes, F., Mead, A., Sterling, E., Tang, R., & Turner, N. (2018). Effective biodiversity conservation requires dynamic, pluralistic, partnership-based approaches. *Sustainability*, *10*(6), 1846.

Geslin, B., Aizen, M. A., Garcia, N., Pereira, A.-J., Vaissière, B. E., & Garibaldi, L. A. (2017). The impact of honey bee colony quality on crop yield and farmers' profit in apples and pears. *Agriculture*, *Ecosystems and Environment*, *248*, 153–161.

Goldstein, J. H., Caldarone, G., Duarte, T. K., Ennaanay, D., Hannahs, N., Mendoza, G., … Daily, G. C. (2012). Integrating ecosystem-service tradeoffs into land-use decisions. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(19), 7565–7570. https://doi.org/10.1073/pnas.1201040109

Gómez-Baggethun, E., de Groot, R., Lomas, P. L., & Montes, C. (2010). The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes. *Ecological Economics*, *69*(6), 1209–1218. https://doi.org/10.1016/j.ecolecon.2009.11.007

Gómez-Baggethun, E., & Ruiz-Pérez, M. (2011). Economic valuation and the commodification of ecosystem services. *Progress in Physical Geography*, *35*(5), 613–628. https://doi.org/10.1177/0309133311421708

González-García, A., Palomo, I., González, J. A., López, C. A., & Montes, C. (2020). Quantifying spatial supply-demand mismatches in ecosystem services provides insights for land-use planning. *Land Use Policy*, *94*, 104493.

Gould, R. K., Klain, S. C., Ardoin, N. M., Satterfield, T., Woodside, U., Hannahs, N., … Chan, K. M. (2015). A protocol for eliciting nonmaterial values using a cultural ecosystem services frame. *Conservation Biology*, *29*(2), 575–586.

Gould, R. K., Pai, M., Muraca, B., & Chan, K. M. A. (2019). He ʻike ʻana ia i ka pono (it is a recognizing of the right thing): How one indigenous worldview informs relational values and social values. *Sustainability Science*, *14*, 1213–1232.

Gould, R. K., Ricketts, T. H., Howarth, R. B., Telle, S., Gladkikh, T., Posner, S., Yoshida, Y. (2020). How ecosystem services research can advance ecological economics principles. In R. Costanza, J. D. Erickson, J. Farley, & I. Kubiszewski (Eds.). *Sustainable wellbeing futures*. Cheltenham: Edward Elgar Publishing.

Gregory, R., Failing, L., Harstone, M., Long, G., & McDaniels, T. (2012). *Structured decision making: A practical guide to environmental management choices*. Hoboken, NJ: John Wiley & Sons, Incorporated.

Gregory, R., Lichtenstein, S., & Slovic, P. (1993). Valuing environmental resources: A constructive approach. *Journal of Risk and Uncertainty*, *7*(2), 177–197. https://doi.org/10.1007/BF01065813

Gregr, E. J., Christensen, V., Nichol, L., Martone, R. G., Markel, R. W., Watson, J. C., … Chan, K. M. A. (2020). Cascading social-ecological costs and benefits triggered by a recovering keystone predator. *Science*, *368*(6496), 1243–1247. https://doi.org/10.1126/science.aay5342

Guerry, A., Ruckelshaus, M., Arkema, K., Bernhardt, J., Guannel, G., Kim, C., … Tallis, H. (2012). Modelling benefits from nature: Using ecosystem services to inform coastal and marine spatial planning. *International Journal of Biodiversity Science*, *Ecosystem Services & Management*, *8*(1–2), 1–15.

Haase, D., Larondelle, N., Andersson, E., Artmann, M., Borgström, S., Breuste, J., … Elmqvist, T. (2014). A quantitative review of urban ecosystem service assessments: Concepts, models, and implementation. *Ambio*, *43*(4), 413–433. https://doi.org/10.1007/s13280-014-0504-0

Hicks, C. C., & Cinner, J. E. (2014). Social, institutional, and knowledge mechanisms mediate diverse ecosystem service benefits from coral reefs. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(50), 17791–17796. https://doi.org/10.1073/pnas.1413473111

Hicks, C. C., Levine, A., Agrawal, A., Basurto, X., Breslow, S. J., Carothers, C., … Levin, P. S. (2016). Engage key social concepts for sustainability. *Science*, *352*(6281), 38–40. https://doi.org/10.1126/science.aad4977

IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services). (2015). *Preliminary guide regarding diverse conceptualization of multiple values of nature and its benefits, including biodiversity and ecosystem functions and services (Deliverable 3 (d))* (p. 95). Bonn, Germany: IPBES Secretariat.

IPBES. (2019a). *Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (S. Díaz, J. Settele, E. Brondízio, & H. T. Ngo [Eds.]). Bonn, Germany: IPBES Secretariat, 1753 pp. https://doi.org/10.5281/zenodo.3831674

IPBES. (2019b). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (S. Díaz, J. Settele, E. Brondízio, & H. T. Ngo [Eds.]). Bonn, Germany: IPBES Secretariat.

Irvin, R. A., & Stansbury, J. (2004). Citizen participation in decision making: Is it worth the effort? *Public Administration Review*, *64*(1), 55–65. https://doi.org/10.1111/j.1540-6210.2004.00346.x

Isserlis, L. (1918). On the value of a mean as calculated from a sample. *Journal of the Royal Statistical Society*, *81*(1), 75–81. https://doi.org/10.2307/2340569

Jacobs, S., Dendoncker, N., Martín-López, B., Barton, D. N., Gomez-Baggethun, E., Boeraeve, F., … Washbourne, C.-L. (2016). A new valuation school: Integrating diverse values of nature in resource and land use decisions. *Ecosystem Services*, *22*(Part B), 213–220.

John, P., Smith, G., & Stoker, G. (2009). Nudge nudge, think think: Two strategies for changing civic behaviour. *The Political Quarterly*, *80*(3), 361–370. https://doi.org/10.1111/j.1467-923X.2009.02001.x

Jordan, N., Schulte, L. A., Williams, C., Pitt, D., Slotterback, C. S., Jackson, R., … Rickenbach, M. (2013). Landlabs: An integrated approach to creating agricultural enterprises that meet the triple bottom line. *Journal of Higher Education Outreach and Engagement*, *17*(4), 175–200.

Kadykalo, A. N., López-Rodriguez, M. D., Ainscough, J., Droste, N., Ryu, H., Ávila-Flores, G., … Harmáčková, Z. V. (2019). Disentangling 'ecosystem services' and 'nature's contributions to people'. *Ecosystems* *and People*, *15*(1), 269–287. https://doi.org/10.1080/26395916.2019.1669713

Kaltenborn, B. P., Linnell, J. D. C., & Gómez-Baggethun, E. (2020). Can cultural ecosystem services contribute to satisfying basic human needs? A case study from the Lofoten archipelago, northern Norway. *Applied Geography*, *120*, 102229.

Kareiva, P., Tallis, H., Ricketts, T. H., Daily, G. C., & Polasky, S. (2011). *Natural capital: Theory & practice of mapping ecosystem services*. Oxford, UK: Oxford University Press.

Karp, D. S., Mendenhall, C. D., Sandí, R. F., Chaumont, N., Ehrlich, P. R., Hadly, E. A., & Daily, G. C. (2013). Forest bolsters bird abundance, pest control and coffee yield. *Ecology Letters*, *16*(11), 1339–1347. https://doi.org/10.1111/ele.12173

Keeney, R. L., & Gregory, R. S. (2005). Selecting attributes to measure the achievement of objectives. *Operations Research*, *53*(1), 1–11. https://doi.org/10.1287/opre.1040.0158

Kenter, J. O., Jobstvogt, N., Watson, V., Irvine, K. N., Christie, M., & Bryce, R. (2016). The impact of information, value-deliberation and group-based decision-making on values for ecosystem services: Integrating deliberative monetary valuation and storytelling. *Ecosystem Services*, *21*, 270–290.

Klain, S. C., & Chan, K. M. A. (2012). Navigating coastal values: Participatory mapping of ecosystem services for spatial planning. *Ecological Economics*, *82*(October), 104–113.

Klain, S., Satterfield, T., & Chan, K. M. A. (2014). What matters and why? Ecosystem services and their bundled qualities. *Ecological Economics*, *107*, 310–320.

Klain, S. C., Satterfield, T., Sinner, J., Ellis, J. I., & Chan, K. M. A. (2018). Bird killer, industrial intruder or clean energy? Perceiving risks to ecosystem services due to an offshore wind farm. *Ecological Economics*, *143*, 111–129.

Kumar, P. (Ed.). (2010). *The economics of ecosystems and biodiversity: Ecological and economic foundations*. Washington, DC: Earthscan.

Langemeyer, J., Calcagni, F., & Baró, F. (2018). Mapping the intangible: Using geolocated social media data to examine landscape aesthetics. *Land Use Policy*, *77*, 542–552.

Levine, J., & Chan, K. M. A. (2011). Global human dependence on ecosystem services. In T. Koellner (Ed.). *Ecosystem services and global trade of natural resources: Ecology, economics and policies* (pp. 11–28). London, UK: Routledge.

Liebman, M., Helmers, M. J., Schulte, L. A., & Chase, C. A. (2013). Using biodiversity to link agricultural productivity with environmental quality: Results from three field experiments in Iowa. *Renewable Agriculture and Food Systems*, *28*(02), 115–128. https://doi.org/10.1017/S1742170512000300

Liquete, C., Piroddi, C., Drakou, E. G., Gurney, L., Katsanevakis, S., Charef, A., & Egoh, B. (2013). Current status and future prospects for the assessment of marine and coastal ecosystem services: A systematic review. *PLoS ONE*, *8*(7), e67737.

Liu, J. G., Li, S. X., Ouyang, Z. Y., Tam, C., & Chen, X. D. (2008). Ecological and socioeconomic effects of China's policies for ecosystem services. *Proceedings of the National Academy of Sciences of the United States of America*, *105*(28), 9477–9482. https://doi.org/10.1073/pnas.0706436105

Lliso, B., Mariel, P., Pascual, U., & Engel, S. (2020). Increasing the credibility and salience of valuation through deliberation: Lessons from the Global South. *Global Environmental Change*, *62*, 102065. https://doi.org/10.1016/j.gloenvcha.2020.102065

Lliso, B., Pascual, U., Engel, S., & Mariel, P. (2020). Payments for ecosystem services or collective stewardship of Mother Earth? Applying deliberative valuation in an indigenous community in Colombia. *Ecological Economics*, *169*, 106499. https://doi.org/10.1016/j.ecolecon.2019.106499

Lo, A. Y., & Spash, C. L. (2013). Deliberative monetary valuation: In search of a democratic and value plural approach to environmental policy. *Journal of Economic Surveys*, *27*(4), 768–789. https://doi.org/10.1111/j.1467-6419.2011.00718.x

Luck, G. W., Chan, K. M. A., & Fay, J. P. (2009). Protecting ecosystem services and biodiversity in the world's watersheds. *Conservation Letters*, *2*, 179–188.

Luck, G. W., Chan, K. M. A., & Klein, C. J. (2012). Identifying spatial priorities for protecting ecosystem services. *F1000Research*, *1*, 17. https://doi.org/10.12688/f1000research.1-17.v1

Luederitz, C., Brink, E., Gralla, F., Hermelingmeier, V., Meyer, M., Niven, L., … von Wehrden, H. (2015). A review of urban ecosystem services: Six key challenges for future research. *Ecosystem Services*, *14*, 98–112.

Mace, G. M., Norris, K., & Fitter, A. H. (2011). Biodiversity and ecosystem services: A multilayered relationship. *Trends in Ecology & Evolution*, *27*(1), 19–26.

Masood, E. (2018). The battle for the soul of biodiversity. *Nature*, *560*, 423–425.

McCauley, D. J. (2006). Selling out on nature. *Nature*, *443*(7107), 27–28. https://doi.org/10.1038/443027a

McFadden, D., & Train, K. (2017). *Contingent valuation of environmental goods: A comprehensive critique*. Cheltenham and Northampton, UK: Edward Elgar Publishing.

Melathopoulos, A. P., Cutler, G. C., & Tyedmers, P. (2015). Where is the value in valuing pollination ecosystem services to agriculture? *Ecological Economics*, *109*, 59–70. https://doi.org/10.1016/j.ecolecon.2014.11.007

Milcu, A. I., Hanspach, J., Abson, D., & Fischer, J. (2013). Cultural ecosystem services: A literature review and prospects for future research. *Ecology and Society*, *18*(3). https://doi.org/10.5751/ES-05790-180344

Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Synthesis*. Washington, DC: Island Press.

Mooney, H. A., & Ehrlich, P. R. (1997). Ecosystem services: A fragmentary history. In G. C. Daily (Ed.). *Nature's services: Societal dependence on natural ecosystems* (pp. 11–19). Washington, DC: Island Press.

Naidoo, R., & Ricketts, T. H. (2006). Mapping the economic costs and benefits of conservation. *PLoS Biology*, *4*(11), 2153–2164. https://doi.org/10.1371/journal.pbio.0040360

Nature. (1998). Audacious bid to value the planet whips up a storm. *Nature*, *395*(6701), 430.

Nelson, E., Mendoza, G., Regetz, J., Polasky, S., Tallis, H., Cameron, D. R., … Shaw, M. R. (2009). Modeling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales. *Frontiers in Ecology and the Environment*, *7*(1), 4–11. https://doi.org/10.1890/080023

Nesbitt, L., Meitner, M. J., Girling, C., Sheppard, S. R. J., & Lu, Y. (2019). Who has access to urban vegetation? A spatial analysis of distributional green equity in 10 US cities. *Landscape and Urban Planning*, *181*, 51–79.

Nieto-Romero, M., Oteros-Rozas, E., González, J. A., & Martín-López, B. (2014). Exploring the knowledge landscape of ecosystem services assessments in Mediterranean agroecosystems: Insights for future research. *Environmental Science and Policy*, *37*, 121–133.

Palomo, I., Felipe-Lucia, M. R., Bennett, E. M., Martín-López, B., & Pascual, U. (2016). Disentangling the pathways and effects of ecosystem service co-production. In W. Guy & A. B. David (Eds.) *Advances in ecological research* (Vol. 54, pp. 245–283). San Diego, CA: Academic Press.

Pascual, U., Balvanera, P., Díaz, S., Pataki, G., Roth, E., Stenseke, M., … Yagi, N. (2017). Valuing nature's contributions to people: The IPBES approach. *Current Opinion in Environmental Sustainability*, *26–27*, 7–16.

Pascual, U., Phelps, J., Garmendia, E., Brown, K., Corbera, E., Martin, A., … Muradian, R. (2014). Social equity matters in payments for ecosystem services. *BioScience*, *64*(11), 1027–1036. https://doi.org/10.1093/biosci/biu146

Polasky, S., Nelson, E., Lonsdorf, E., Fackler, P., & Starfield, A. (2005). Conserving species in a working landscape: Land use with biological and economic objectives. *Ecological Applications*, *15*(4), 1387–1401. https://doi.org/10.1890/03-5423

Posner, S. M., McKenzie, E., & Ricketts, T. H. (2016). Policy impacts of ecosystem services knowledge. *Proceedings of the National Academy of Sciences of the United States of America*, *113*(7), 1760–1765. https://doi.org/10.1073/pnas.1502452113

Raymond, L., Weldon, S. L., Kelly, D., Arriaga, X. B., & Clark, A. M. (2014). Making change: Norm-based strategies for institutional change to address intractable problems. *Political Research Quarterly*, *67*(1), 197–211. https://doi.org/10.1177/1065912913510786

Ribot, J. C., & Peluso, N. L. (2003). A theory of access. *Rural Sociology*, *68*(2), 153–181. https://doi.org/10.1111/j.1549-0831.2003.tb00133.x

Ricketts, T. H., Daily, G. C., Ehrlich, P. R., & Michener, C. D. (2004). Economic value of tropical forest to coffee production. *Proceedings of the National Academy of Sciences of the United States of America*, *101*(34), 12579–12582. https://doi.org/10.1073/pnas.0405147101

Ricketts, T. H., Watson, K. B., Koh, I., Ellis, A. M., Nicholson, C. C., Posner, S., … Sonter, L. J. (2016). Disaggregating the evidence linking biodiversity and ecosystem services. *Nature Communications*, *7*, 13106.

Robards, M. D., Schoon, M. L., Meek, C. L., & Engle, N. L. (2011). The importance of social drivers in the resilient provision of ecosystem services. *Global Environmental Change*, *21*(2), 522–529. https://doi.org/10.1016/j.gloenvcha.2010.12.004

Robertson, M. (2012). Measurement and alienation: Making a world of ecosystem services. *Transactions of the Institute of British Geographers*, *37*(3), 386–401. https://doi.org/10.1111/j.1475-5661.2011.00476.x

Ruckelshaus, M., McKenzie, E., Tallis, H., Guerry, A., Daily, G., Kareiva, P., … Bernhardt, J. (2015). Notes from the field: Lessons learned from using ecosystem service approaches to inform real-world decisions. *Ecological Economics*, *115*, 11–21.

Sagoff, M. (1998). Aggregation and deliberation in valuing environmental public goods: A look beyond contingent pricing. *Ecological Economics*, *24*(2–3), 213–230.

Saner, M. A., & Bordt, M. (2016). Building the consensus: The moral space of earth measurement. *Ecological Economics*, *130*, 74–81.

Satterfield, T., Gregory, R., Klain, S., Roberts, M., & Chan, K. M. (2013). Culture, intangibles and metrics in environmental management. *Journal of Environmental Management*, *117*, 103–114.

Satz, D., Gould, R. K., Chan, K. M. A., Guerry, A., Norton, B., Satterfield, T., … Klain, S. (2013). The challenges of incorporating cultural ecosystem services into environmental assessment. *Ambio*, *42*(6), 675–684. https://doi.org/10.1007/s13280-013-0386-6

Schlosberg, D. (2007). *Defining environmental justice: Theories, movements, and nature*. Oxford, UK: Oxford University Press.

Scholte, S. S. K., van Teeffelen, A. J. A., & Verburg, P. H. (2015). Integrating socio-cultural perspectives into ecosystem service valuation: A review of concepts and methods. *Ecological Economics*, *114*, 67–78.

Schröter, M., Başak, E., Christie, M., Church, A., Keune, H., Osipova, E., … Martín-López, B. (2020). Indicators for relational values of nature's contributions to good quality of life: The IPBES approach for Europe and Central Asia. *Ecosystems and People*, *16*(1), 50–69. https://doi.org/10.1080/26395916.2019.1703039

Secretariat of the Convention on Biological Diversity. (2010a). *Global Biodiversity Outlook (GBO-3)*. Convention on Biological Diversity: Montreal.

Secretariat of the Convention on Biological Diversity. (2010b). *Strategic plan for biodiversity 2011–2020 and the Aichi targets: 'Living in harmony with nature'* (p. 2). Montreal, QC: Secretariat of the Convention on Biological Diversity.

Sherren, K., Fischer, J., & Price, R. (2010). Using photography to elicit grazier values and management practices relating to tree survival and recruitment. *Land Use Policy*, *27*(4), 1056–1067. https://doi.org/10.1016/j.landusepol.2010.02.002

Shove, E., & Walker, G. (2010). Governing transitions in the sustainability of everyday life. *Research Policy*, *39*(4), 471–476. https://doi.org/10.1016/j.respol.2010.01.019

Sikor, T. (2013). *The justices and injustices of ecosystem services*. New York, NY: Taylor & Francis.

Singh, G. G., Lerner, J., Mach, M., Murray, C. C., Ranieri, B., St-Laurent, G. P., … Chan, K. M. A. (2020). Scientific shortcomings in environmental impact statements internationally. *People and Nature*, *2*(2), 369–379. https://doi.org/10.1002/pan3.10081

Slovic, P., Zionts, D., Woods, A. K., Goodman, R., & Jinks, D. (2011). Psychic numbing and mass atrocity. In E. Shafir (Ed.). *The behavioral foundations of public policy* (pp. 126–142). Princeton, NJ: Princeton University Press.

Soga, M., Gaston, K. J., Koyanagi, T. F., Kurisu, K., & Hanaki, K. (2016). Urban residents' perceptions of neighbourhood nature: Does the extinction of experience matter? *Biological Conservation*, *203*, 143–150. https://doi.org/10.1016/j.biocon.2016.09.020

Soga, M., Gaston, K., Yamaura, Y., Kurisu, K., & Hanaki, K. (2016). Both direct and vicarious experiences of nature affect children's willingness to conserve biodiversity. *International Journal of Environmental Research and Public Health*, *13*(6), 529. https://doi.org/10.3390/ijerph13060529

Southon, G. E., Jorgensen, A., Dunnett, N., Hoyle, H., & Evans, K. L. (2017). Biodiverse perennial meadows have aesthetic value and increase residents' perceptions of site quality in urban green-space. *Landscape and Urban Planning*, *158*, 105–118.

Spash, C. L. (2006). Non-economic motivation for contingent values: Rights and attitudinal beliefs in the willingness to pay for environmental improvements. *Land Economics*, *82*(4), 602–622. https://doi.org/10.3368/le.82.4.602

Spash, C. L. (2008). Deliberative monetary valuation and the evidence for a new value theory. *Land Economics*, *84*(3), 469–488. https://doi.org/10.3368/le.84.3.469

Sterling, E. J., Filardi, C., Toomey, A., Sigouin, A., Betley, E., Gazit, N., … Jupiter, S. D. (2017). Biocultural approaches to well-being and sustainability indicators across scales. *Nature Ecology & Evolution*, *1*(12), 1798–1806. https://doi.org/10.1038/s41559-017-0349-6

Tadaki, M., Sinner, J., & Chan, K. M. A. (2017). Making sense of environmental values: A typology of concepts. *Ecology and Society*, *22*(1). https://doi.org/10.5751/ES-08999-220107

Tallis, H., & Polasky, S. (2011a). Assessing multiple ecosystem services: an integrated tool for the real world. In P. Kareiva, H. Tallis, T. H. Ricketts, G. C. Daily, & S. Polasky (Eds.). *Natural capital: Theory & practice of mapping ecosystem services* (pp. 34–50). Oxford, UK: Oxford University Press.

Tallis, H., & Polasky, S. (2011b). How much information do managers need? The sensitivity of ecosystem service decisions to model complexity. In P. Kareiva, H. Tallis, T. H. Ricketts, G. C. Daily, & S. Polasky (Eds.). *Natural capital: Theory & practice of mapping ecosystem services* (pp. 264–277). Oxford, UK: Oxford University Press.

TEEB. (2009) *The economics of ecosystems and biodiversity report for business – Executive summary 2010*. United Nations Environment Programme. Malta, Europe: Progress Press.

Tew, E. R., Simmons, B. I., & Sutherland, W. J. (2019). Quantifying cultural ecosystem services: Disentangling the effects of management from landscape features. *People and Nature*, *1*(1), 70–86. https://doi.org/10.1002/pan3.14

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, CT: Yale University Press.

Toman, M. (1998). Why not to calculate the value of the world's ecosystem services and natural capital. *Ecological Economics*, *25*(1), 57–60.

Turner, N. J., Gregory, R., Brooks, C., Failing, L., & Satterfield, T. (2008). From invisibility to transparency: Identifying the implications. *Ecology and Society*, *13*(2). https://doi.org/10.5751/ES-02405-130207

Turner, N. J., & Turner, K. L. (2008). 'Where our women used to get the food': Cumulative effects and loss of ethnobotanical knowledge and practice; case study from coastal British Columbia. *Botany-Botanique*, *86*(2), 103–115.

Turnhout, E., Neves, K., & De Lijster, E. (2014). 'Measurementality' in biodiversity governance: Knowledge, transparency, and the intergovernmental science-policy platform on biodiversity and ecosystem services (IPBES). *Environment and Planning A*, *46*, 581–597.

Turnhout, E., Waterton, C., Neves, K., & Buizer, M. (2013). Rethinking biodiversity: From goods and services to 'living with'. *Conservation Letters*, *6*(3), 154–161. https://doi.org/10.1111/j.1755-263X.2012.00307.x

Tyndall, J., Schulte, L., Liebman, M., & Helmers, M. (2013). Field-level financial assessment of contour prairie strips for enhancement of environmental quality. *Environmental Management*, *52*(3), 736–747. https://doi.org/10.1007/s00267-013-0106-9

Value of Nature to Canadians Study Taskforce. (2017). *Completing and using ecosystem service assessment for decision-making: An interdisciplinary toolkit for managers and analysts* (p. 276). Ottawa, ON: Federal, Provincial, and Territorial Governments of Canada.

van Jaarsveld, A. S., Biggs, R., Scholes, R. J., Bohensky, E., Reyers, B., Lynam, T., … Fabricius, C. (2005). Measuring conditions and trends in ecosystem services at multiple scales: The Southern African Millennium Ecosystem Assessment (SAfMA) experience. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *360*(1454), 425–441.

Verhagen, W., Kukkala, A. S., Moilanen, A., van Teeffelen, A. J. A., & Verburg, P. H. (2017). Use of demand for and spatial flow of ecosystem services to identify priority areas. *Conservation Biology*, *31*(4), 860–871. https://doi.org/10.1111/cobi.12872

Vignola, R., McDaniels, T. L., & Scholz, R. W. (2012). Negotiation analysis for mechanisms to deliver ecosystem services: The case of soil conservation in Costa Rica. *Ecological Economics*, *75*, 22–31. https://doi.org/10.1016/j.ecolecon.2012.01.004

Villamagna, A. M., Angermeier, P. L., & Bennett, E. M. (2013). Capacity, pressure, demand, and flow: A conceptual framework for analyzing ecosystem service provision and delivery. *Ecological Complexity*, *15*, 114–121.

Villegas-Palacio, C., Berrouet, L., López, C., Ruiz, A., & Upegui, A. (2016). Lessons from the integrated valuation of ecosystem services in a developing country: Three case studies on ecological, socio-cultural and economic valuation. *Ecosystem Services*, *22*, 297–308.

Wainger, L. A., & Boyd, J. W. (2009). Valuing ecosystem services. In K. McLeod & H. Leslie (Eds.). *Ecosystem-based management for the oceans* (pp. 92–111). Washington, DC: Island Press.

Walz, A., Grêt-Regamey, A., & Lavorel, S. (2016). Social valuation of ecosystem services in mountain regions. *Regional Environmental Change*, *16*(7), 1985–1987. https://doi.org/10.1007/s10113-016-1028-x

Wieland, R., Ravensbergen, S., Gregr, E. J., Satterfield, T., & Chan, K. M. A. (2016). Debunking trickle-down ecosystem services: The fallacy of omnipotent, homogeneous beneficiaries. *Ecological Economics*, *121*, 175–180.

Wilhite, H., Shove, E., Lutzenhiser, L., & Kempton, W. (2000). The legacy of twenty years of energy demand management: We know more about individual behaviour but next to nothing about demand. In E. Jochem, J. Sathaye, & D. Bouille (Eds.), *Society, behaviour, and climate change mitigation*. Advances in Global Change Research, Vol. 8. Dordrecht, The Netherlands: Springer. https://doi.org/10.1007/0-306-48160-X_4

Wilson, C., & Dowlatabadi, H. (2007). Models of decision making and residential energy use. *Annual Review of Environment and Resources*, *32*(1), 169–203. https://doi.org/10.1146/annurev.energy.32.053006.141137

Wilson, M. A., & Howarth, R. B. (2002). Discourse-based valuation of ecosystem services: Establishing fair outcomes through group deliberation. *Ecological Economics*, *41*(3), 431–443. https://doi.org/10.1016/S0921-8009(02)00092-7

Wolff, S., Schulp, C. J. E., Kastner, T., & Verburg, P. H. (2017). Quantifying spatial variation in ecosystem services demand: A global mapping approach. *Ecological Economics*, *136*, 14–29.

Wolff, S., Schulp, C. J. E., & Verburg, P. H. (2015). Mapping ecosystem services demand: A review of current research and future perspectives. *Ecological Indicators*, *55*, 159–171.

Woodcock, B. A., Bullock, J. M., McCracken, M., Chapman, R. E., Ball, S. L., Edwards, M. E., … Pywell, R. F. (2016). Spill-over of pest control and pollination services into arable crops. *Agriculture, Ecosystems and Environment*, *231*, 15–23.

Yang, L., Elbakidze, L., Marsh, T., & McIntosh, C. (2016). Primary and secondary pest management in agriculture: Balancing pesticides and natural enemies in potato production. *Agricultural Economics*, *47*(6), 609–619. https://doi.org/10.1111/agec.12259

DATA SOURCES

Literature review articles, 1990–2012

Aburto-Oropeza, O., Ezcurra, E., Danemann, G., Valdez, V., Murray, J., & Sala, E. (2008). Mangroves in the Gulf of California increase fishery yields. *Proceedings of the National Academy of Sciences of the United States of America*, *105*(30), 10456–10459.

Adams, B. J., Bardgett, R. D., Ayres, E., Wall, D. H., Aislabie, J., Bamforth, S., … Stevens, M. I. (2006). Diversity and distribution of Victoria Land biota. *Soil Biology & Biochemistry*, *38*(10), 3003–3018.

Al Omari, K. (2011). Protected areas in the Arabian Peninsula. *Zoology in the Middle East*, 21–26.

Alkire, C. (2000). Funding strategies for wilderness management. Wilderness Science in a Time of Change Conference, Vol 2: Wilderness within the Context of Larger Systems, Missoula, MT, United States Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Allendorf, T. D., Aung, M., & Songer, M. (2012). Using residents' perceptions to improve park-people relationships in Chatthin Wildlife Sanctuary, Myanmar. *Journal of Environmental Management*, *99*, 36–43.

Alvarez-Filip, L., Gill, J. A., Dulvy, N. K., Perry, A. L., Watkinson, A. R., & Cote, I. M. (2011). Drivers of region-wide declines in architectural complexity on Caribbean reefs. *Coral Reefs*, *30*(4), 1051–1060.

Ando, A. W., & Mallory, M. L. (2012). Optimal portfolio design to reduce climate-related conservation uncertainty in the Prairie Pothole Region. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(17), 6484–6489.

Arts, G., Davies, J., Dobbs, M., Ebke, P., Hanson, M., Hommen, U., … Poulsen, V. (2010). AMEG: The new SETAC advisory group on aquatic macrophyte ecotoxicology. *Environmental Science and Pollution Research*, *17*(4), 820–823.

Atwell, R. C., Schulte, L. A., & Westphal, L. M. (2011). Tweak, adapt, or transform: Policy scenarios in response to emerging bioenergy markets in the US Corn Belt. *Ecology and Society*, *16*(1).

Atyeo, C., & Thackway, R. (2009). Mapping and monitoring revegetation activities in Australia – Towards national core attributes. *Australasian Journal of Environmental Management*, *16*(3), 140–148.

Ayers, J. M., & Huq, S. (2009). The value of linking mitigation and adaptation: A case study of Bangladesh. *Environmental Management*, *43*(5), 753–764.

Baral, A., Bakshi, B. R., & Smith, R. L. (2012). Assessing resource intensity and renewability of cellulosic ethanol technologies using Eco-LCA. *Environmental Science & Technology*, *46*(4), 2436–2444.

Barbier, E. (2011). The policy challenges for green economy and sustainable economic development. *Natural Resources Forum*, *35*(3), 233–245.

Barbier, E. B., Koch, E. W., Silliman, B. R., Hacker, S. D., Wolanski, E., Primavera, J., … Reed, D. J. (2008). Coastal ecosystem-based management with nonlinear ecological functions and values. *Science*, *319*(5861), 321–323.

Beard Jr., T. D., Arlinghaus, R., Cooke, S. J., McIntyre, P. B., De Silva, S., Bartley, D., & Cowx, I. G. (2011). Ecosystem approach to inland fisheries: Research needs and implementation strategies. *Biology Letters*, *7*(4), 481–483.

Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). Impacts of climate change on the future of biodiversity. *Ecology Letters*, *15*(4), 365–377.

Bellmer, R. J. (2001). *Restoration success criteria*. OCEANS, 2001. MTS/IEEE Conference and Exhibition, IEEE.

Benayas, J. M. R., Bullock, J. M., & Newton, A. C. (2008). Creating woodland islets to reconcile ecological restoration, conservation, and agricultural land use. *Frontiers in Ecology and the Environment*, *6*(6), 329–336.

BenDor, T., Brozovic, N., & Pallathucheril, V. G. (2008). The social impacts of wetland mitigation policies in the United States. *Journal of Planning Literature*, *22*(4), 341–357.

BenDor, T. K., & Doyle, M. W. (2010). Planning for ecosystem service markets. *Journal of the American Planning Association*, *76*(1), 59–72.

Biggs, R., Raudsepp-Hearne, C., Atkinson-Palombo, C., Bohensky, E., Boyd, E., Cundill, G., … Zurek, M. (2007). Linking futures across scales: A dialog on multiscale scenarios. *Ecology and Society*, *12*(1).

Bingham, G., Bishop, R., Brody, M., Bromley, D., Clark, E., Cooper, W., … Suter, G. (1995). Issues in ecosystem valuation: Improving information for decision making. *Ecological Economics*, *14*(2), 73–90.

Birch, J. C., Newton, A. C., Alvarez Aquino, C., Cantarello, E., Echeverria, C., Kitzberger, T., … Garavito, N. T. (2010). Cost-effectiveness of dryland forest restoration evaluated by spatial analysis of ecosystem services. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(50), 21925–21930.

Bischof, B. G. (2010). Negotiating uncertainty: Framing attitudes, prioritizing issues, and finding consensus in the coral reef environment management "crisis". *Ocean & Coastal Management*, *53*(10), 597–614.

Blackwood, J. C., Hastings, A., & Mumby, P. J. (2012). The effect of fishing on hysteresis in Caribbean coral reefs. *Theoretical Ecology*, *5*(1), 105–114.

Blitzer, E. J., Dormann, C. F., Holzschuh, A., Klein, A.-M., Rand, T. A., & Tscharntke, T. (2012). Spillover of functionally important organisms between managed and natural habitats. *Agriculture Ecosystems & Environment*, *146*(1), 34–43.

Bohan, D. A., Caron-Lormier, G., Muggleton, S., Raybould, A., & Tamaddoni-Nezhad, A. (2011). Automated discovery of food webs from ecological data using logic-based machine learning. *PLoS ONE*, *6*(12), 1–9.

Bott, T. L., Newbold, J. D., & Arscott, D. B. (2006). Ecosystem metabolism in piedmont streams: Reach geomorphology modulates the influence of riparian vegetation. *Ecosystems*, *9*(3), 398–421.

Brandon, K., Turner, W. R., Schroth, G., & Bakarr, M. (2008). Benefits of biodiversity conservation to agriculture and rural livelihoods. *Biodiversity*, *9*(1–2), 82–85.

Brosi, B. J., Daily, G. C., Shih, T. M., Oviedo, F., & Duran, G. (2008). The effects of forest fragmentation on bee communities in tropical countryside. *Journal of Applied Ecology*, *45*(3), 773–783.

Brown, I. (2010). Multi-functional assessment of coastal landscapes with climate change. In D. R. Green (Ed.), *Coastal and marine geospatial technologies* (Vol. 13, pp. 335–346). The Netherlands: Springer.

Brown, P. H., & Lant, C. L. (1999). The effect of wetland mitigation banking on the achievement of no-net-loss. *Environmental Management*, *23*(3), 333–345.

Brummer, E. C., Barber, W. T., Collier, S. M., Cox, T. S., Johnson, R., Murray, S. C., … Thro, A. M. (2011). Plant breeding for harmony between agriculture and the environment. *Frontiers in Ecology and the Environment*, *9*(10), 561–568.

Bryan, B. A., Raymond, C. M., Crossman, N. D., & King, D. (2011). Comparing spatially explicit ecological and social values for natural areas to identify effective conservation strategies. *Conservation Biology*, *25*(1), 172–181.

Bulte, E. H., Boone, R. B., Stringer, R., & Thornton, P. K. (2008). Elephants or onions? Paying for nature in Amboseli, Kenya. *Environment and Development Economics*, *13*, 395–414.

Buteau, E. R., Lilieholm, R. J., & Toth, R. E. (2007). Protecting open space at multiple scales along Utah's Wasatch Front. In E. Tiezzi, J. C. Marques, C. A. Brebbia, & S. E. Jorgensen (Eds.), *Ecosystems and sustainable development VI* (Vol. 106, pp. 195–204). Southampton, UK: WIT Press.

Cadotte, M. W., Carscadden, K., & Mirotchnick, N. (2011). Beyond species: functional diversity and the maintenance of ecological processes and services. *Journal of Applied Ecology*, *48*(5), 1079–1087.

Cai, Q., Tang, T., & Liu, J. (2003). Several research hotspots in river ecology. *Yingyong Shengtai Xuebao*, *14*(9), 1573–1577.

Cairns, J. (1995). Ecological integrity of aquatic systems. *Regulated Rivers: Research & Management*, *11*(3–4), 313–323.

Cairns, J. (1997). Sustainability, ecosystem services, and health. *International Journal of Sustainable Development and World Ecology*, *4*(3), 153–165.

Cairns Jr., J. (1998). Maintaining the habitable condition of the planet: Balancing technological and ecosystem services. *Quality Assurance (San Diego, Calif.)*, *6*(1).

Cairns, J., & Palmer, S. E. (1995). Restoration of urban waterways and vacant areas – The first steps toward sustainability. *Environmental Health Perspectives*, *103*(5), 452–453.

Carpenter, S., Walker, B., Anderies, J. M., & Abel, N. (2001). From metaphor to measurement: Resilience of what to what? *Ecosystems*, *4*(8), 765–781.

Carpenter, S. R., & Folke, C. (2006). Ecology for transformation. *Trends in Ecology & Evolution*, *21*(6), 309–315.

Carrer, G. M., Bonato, M., Smania, D., Barausse, A., Comis, C., & Palmeri, L. (2011). Beneficial effects on water management of simple hydraulic structures in wetland systems: The Vallevecchia case study, Italy. *Water Science and Technology*, *64*(1), 220–227.

Castro, A., & Wise, D. H. (2010). Influence of fallen coarse woody debris on the diversity and community structure of forest-floor spiders (Arachnida: Araneae). *Forest Ecology and Management*, *260*(12), 2088–2101.

Charman, T. G., Sears, J., Green, R. E., & Bourke, A. F. G. (2010). Conservation genetics, foraging distance and nest density of the scarce Great Yellow Bumblebee (*Bombus distinguendus*). *Molecular Ecology*, *19*(13), 2661–2674.

Chen, Z. X., & Zhang, X. S. (2000). Value of ecosystem services in China. *Chinese Science Bulletin*, *45*(10), 870–876.

Chisholm, R. A., & Wintle, B. A. (2012). Choosing ecosystem service investments that are robust to uncertainty across multiple parameters. *Ecological Applications*, *22*(2), 697–704.

Chopra, K., & Dasgupta, P. (2008). Assessing the economic and ecosystem services contribution of forests: Issues in modelling, and an illustration. *International Forestry Review*, *10*(2), 376–386.

Cirone, P. A., & Duncan, P. B. (2000). Integrating human health and ecological concerns in risk assessments. *Journal of Hazardous Materials*, *78*(1–3), 1–17.

Coates, K. D., & Burton, P. J. (1997). A gap-based approach for development of silvicultural systems to address ecosystem management objectives. *Forest Ecology and Management*, *99*(3), 337–354.

Cochrane, M. A. (2003). Fire science for rainforests. *Nature*, *421*(6926), 913–919.

Coen, L. D., Brumbaugh, R. D., Bushek, D., Grizzle, R., Luckenbach, M. W., Posey, M. H., … Tolley, S. G. (2007). Ecosystem services related to oyster restoration. *Marine Ecology-Progress Series*, *341*, 303–307.

Coen, L. D., & Luckenbach, M. W. (2000). Developing success criteria and goals for evaluating oyster reef restoration: Ecological function or resource exploitation? *Ecological Engineering*, *15*(3–4), 323–343.

Cognetti, G., & Maltagliati, F. (2010). Ecosystem service provision: An operational way for marine biodiversity conservation and management. *Marine Pollution Bulletin*, *60*(11), 1916–1923.

Colding, J., & Folke, C. (2009). The role of golf courses in biodiversity conservation and ecosystem management. *Ecosystems*, *12*(2), 191–206.

Coleman, W. G. (1996). Biodiversity and industry ecosystem management. *Environmental Management*, *20*(6), 815–825.

Comello, S. D., Lepech, M. D., & Schwegler, B. R. (2012). Project-level assessment of environmental impact: Ecosystem services approach to sustainable management and development. *Journal of Management in Engineering*, *28*(1), 5–12.

Corbera, E., Soberanis, C. G., & Brown, K. (2009). Institutional dimensions of Payments for Ecosystem Services: An analysis of Mexico's carbon forestry programme. *Ecological Economics*, *68*(3), 743–761.

Cornell, S. (2010). Valuing ecosystem benefits in a dynamic world. *Climate Research*, *45*(1), 261–272.

Coscieme, L., Marchettini, N., Bastianoni, S., & Pulselli, F. (2011). Biomes, ecosystem services and emergy: Is there a relationship? In Y. Villacampa (Ed.), *Ecosystems and sustainable development VIII. WIT transactions on ecology and the environment* (pp. 125–131). Southampton, UK: WIT Press.

Costanza, R. (1998). Introduction – Special section: Forum on valuation of ecosystem services – The value of ecosystem services. *Ecological Economics*, *25*(1), 1–2.

Costanza, R. (2006). Nature: ecosystems without commodifying them. *Nature*, *443*(7113), 749.

Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., … van den Belt, M. (1998). The value of the world's ecosystem services and natural capital (Reprinted from Nature, vol 387, pg 253, 1997). *Ecological Economics*, *25*(1), 3–15.

Costanza, R., & Daly, H. E. (1992). Natural capital and sustainable development. *Conservation Biology*, *6*(1), 37–46.

Council for Agricultural Science and Technology. (1999). *Benefits of biodiversity*. Ames, IA: Council for Agricultural Science and Technology.

Cranford, M., & Mourato, S. (2011). Community conservation and a two-stage approach to payments for ecosystem services. *Ecological Economics*, *71*, 89–98.

Crumpacker, D. W. (1998). Prospects for sustainability of biodiversity based on conservation biology and US Forest Service approaches to ecosystem management. *Landscape and Urban Planning*, *40*(1–3), 47–71.

Cumming, G. S., & Child, M. F. (2009). Contrasting spatial patterns of taxonomic and functional richness offer insights into potential loss of ecosystem services. *Philosophical Transactions of the Royal Society B-Biological Sciences*, *364*(1524), 1683–1692.

Daniels, A. E., Bagstad, K., Esposito, V., Moulaert, A., & Rodriguez, C. M. (2010). Understanding the impacts of Costa Rica's PES: Are we asking the right questions? *Ecological Economics*, *69*(11), 2116–2126.

Davison, J. E., Graumlich, L. J., Rowland, E. L., Pederson, G. T., & Breshears, D. D. (2012). Leveraging modern climatology to increase adaptive capacity across protected area networks. *Global Environmental Change-Human and Policy Dimensions*, *22*(1), 268–274.

Dayton, P. K., Sala, E., Tegner, M. J., & Thrush, S. (2000). Marine reserves: Parks, baselines, and fishery enhancement. *Bulletin of Marine Science*, *66*(3), 617–634.

de Lange, W. J., Wise, R. M., Forsyth, G. G., & Nahman, A. (2010). Integrating socio-economic and biophysical data to support water allocations within river basins: An example from the Inkomati Water Management Area in South Africa. *Environmental Modelling & Software*, *25*(1), 43–50.

de Villiers, S., & Thiart, C. (1970s). The nutrient status of South African rivers: Concentrations, trends and fluxes from the 1970s to 2005. *South African Journal of Science*, *103*(7–8), 343–349.

Decker, K. L., Allen, C. R., Acosta, L., Hellman, M. L., Jorgensen, C. F., Stutzman, R. J., … Yans, M. (2012). Land use, landscapes, and biological invasions. *Invasive Plant Science and Management*, *5*(1), 108–116.

Derbel, S., Cortina, J., & Chaieb, M. (2009). *Acacia saligna* plantation impact on soil surface properties and vascular plant species composition in central Tunisia. *Arid Land Research and Management*, *23*(1), 28–46.

Dick, J. M., Smith, R. I., & Scott, E. M. (2011). Ecosystem services and associated concepts. *Environmetrics*, *22*(5), 598–607.

Dickinson, N., Baker, A., Doronila, A., Laidlaw, S., & Reeves, R. (2009). Phytoremediation of inorganics: Realism and synergies. *International Journal of Phytoremediation*, *11*(2), 97–114.

dos Santos, J. E., Nogueira, F., Pires, J. S. R., Obara, A. T., & Pires, A. M. Z. C. R. (2000). The value of the ecological station of Jatai's ecosystem services and natural capital. *Naturalia*, *25*, 171–203.

Duraiappah, A. K., & Rogers, D. (2011). The Intergovernmental Platform on Biodiversity and Ecosystem Services: Opportunities for the social sciences. *Innovation: The European Journal of Social Science Research*, *24*(3), 217–224.

Durigon, D., Hickey, G. M., & Kosoy, N. (2012). Assessing national wetland policies' portrayal of wetlands: Public resources or private goods? *Ocean & Coastal Management*, *58*, 36–46.

Eardley, C. (2001). Pollinator biodiversity – A co-ordinated global approach. *Proceedings of the Eight International Pollination Symposium Pollination: Integrator of Crops and Native Plant Systems*.

Edwards, P. J., & Abivardi, C. (1998). The value of biodiversity: Where ecology and economy blend. *Biological Conservation*, *83*(3), 239–246.

Egan, J. F., & Mortensen, D. A. (2012). A comparison of land-sharing and land-sparing strategies for plant richness conservation in agricultural landscapes. *Ecological Applications*, *22*(2), 459–471.

Ehrenfeld, J. G. (2000). Defining the limits of restoration: The need for realistic goals. *Restoration Ecology*, *8*(1), 2–9.

Ehrlich, P. R., & Ehrlich, A. H. (1992). The value of biodiversity. *Ambio*, *21*(3), 219–226.

El-Nashaar, H. M., Griffith, S. M., Steiner, J. J., & Banowetz, G. M. (2009). Mineral concentration in selected native temperate grasses with potential use as biofuel feedstock. *Bioresource Technology*, *100*(14), 3526–3531.

Elmqvist, T., Berkes, F., Folke, C., Angelstam, P., Crepin, A. S., & Niemela, J. (2004). The dynamics of ecosystems, biodiversity management and social institutions at high northern latitudes. *Ambio*, *33*(6), 350–355.

Emmerson, M. (2000). Remedial habitat creation: Does *Nereis diversicolor* play a confounding role in the colonisation and establishment of the pioneering saltmarsh plant, *Spartina anglica*? *Helgoland Marine Research*, *54*(2–3), 110–116.

Euliss Jr., N. H., Smith, L. M., Liu, S., Feng, M., Mushet, D. M., Auch, R. F., & Loveland, T. R. (2010). The need for simultaneous evaluation of ecosystem services and land use change. *Environmental Science & Technology*, *44*(20), 7761–7763.

Farinha-Marques, P., Lameiras, J. M., Fernandes, C., Silva, S., & Guilherme, F. (2011). Urban biodiversity: A review of current concepts and contributions to multidisciplinary approaches. *Innovation: The European Journal of Social Science Research*, *24*(3), 247–271.

Faulkner, S., Barrow Jr., W., Keeland, B., Walls, S., & Telesco, D. (2011). Effects of conservation practices on wetland ecosystem services in the Mississippi Alluvial Valley. *Ecological Applications*, *21*(3), S31–S48.

Firbank, L. G., Petit, S., Smart, S., Blain, A., & Fuller, R. J. (2008). Assessing the impacts of agricultural intensification on biodiversity: A British perspective. *Philosophical Transactions of the Royal Society B-Biological Sciences*, *363*(1492), 777–787.

Fischer, B. C., & Ruseva, T. B. (2010). Response: What is happening in and outside America's private woodlands? *Journal of Forestry*, *108*(6), 304–306.

Fisher, B., Bradbury, R. B., Andrews, J. E., Ausden, M., Bentham-Green, S., White, S. M., & Gill, J. A. (2011). Impacts of species-led conservation on ecosystem services of wetlands: Understanding co-benefits and tradeoffs. *Biodiversity and Conservation*, *20*(11), 2461–2481.

Fitch, R., Theodose, T., & Dionne, M. (2009). Relationships among upland development, nitrogen, and plant community composition in a Maine salt marsh. *Wetlands*, *29*(4), 1179–1188.

Folke, C. (1998). Ecosystem approaches to the management and allocation of critical resources. In M. L. Pace, & P. M. Groffman (Eds.), *Successes, limitations, and frontiers in ecosystem science* (pp. 313–345). New York: Springer.

Folke, C., Kautsky, N., Berg, H., Jansson, A., & Troell, M. (1998). The ecological footprint concept for sustainable seafood production: A review. *Ecological Applications*, *8*(1), S63–S71.

Fornara, D. A., & Tilman, D. (2008). Plant functional composition influences rates of soil carbon and nitrogen accumulation. *Journal of Ecology*, *96*(2), 314–322.

France, K. E., & Duffy, J. E. (2006). Diversity and dispersal interactively affect predictability of ecosystem function. *Nature*, *441*(7097), 1139–1143.

Freedman, B., Love, S., & Oneil, B. (1996). Tree species composition, structure, and carbon storage in stands of urban forest of varying character in Halifax, Nova Scotia. *Canadian Field-Naturalist*, *110*(4), 675–682.

Friedel, M. (2011). Climate change effects on ecosystem services in the United States – Issues of national and global security. In A. Baba, G. Tayfur, O. Gündüz, et al. *Climate change and its effects on water resources* (Vol. 3, pp. 17–24). The Netherlands: Springer.

Fromm, O. (2000). Ecological structure and functions of biodiversity as elements of its total economic value. *Environmental & Resource Economics*, *16*(3), 303–328.

Fürst, C., Lorz, C., & Makeschin, F. (2011). Integrating land management and land-cover classes to assess impacts of land use change on ecosystem services. *International Journal of Biodiversity Science, Ecosystem Services & Management*, *7*(3), 168–181.

Garrett, K. A., Forbes, G. A., Savary, S., Skelsey, P., Sparks, A. H., Valdivia, C., … Yuen, J. (2011). Complexity in climate-change impacts: An analytical framework for effects mediated by plant disease. *Plant Pathology*, *60*(1), 15–30.

Gathorne-Hardy, F. J., & Jones, D. T. (2002). A regional perspective on the effects of human disturbance on the termites of Sundaland. *Biodiversity and Conservation*, *11*(11), 1991–2006.

Gatto, M., & De Leo, G. A. (2000). Pricing biodiversity and ecosystem services: The never-ending story. *BioScience*, *50*(4), 347–355.

Ghazoul, J. (2008). Debating the ecosystem service rationale for conservation: Response to Kremen et al. *Conservation Biology*, *22*(3), 799–801.

Giannetti, B. F., Ogura, Y., Bonilla, S. H., & Almeida, C. M. V. B. (2011). Emergy assessment of a coffee farm in Brazilian Cerrado considering in a broad form the environmental services, negative externalities and fair price. *Agricultural Systems*, *104*(9), 679–688.

Glenday, J. (2008). Carbon storage and carbon emission offset potential in an African riverine forest, the lower Tana River forests, Kenya. *Journal of East African Natural History*, *97*(Part 2), 207–223.

Godfray, H. C. J., Crute, I. R., Haddad, L., Lawrence, D., Muir, J. F., Nisbett, N., … Whiteley, R. (2010). The future of the global food system. *Philosophical Transactions of the Royal Society B-Biological Sciences*, *365*(1554), 2769–2777.

Gong, C., Xu, C., Chen, L., & Cao, S. (2012). Cost-effective compensation payments: A model based on Buying Green Cover to sustain ecological restoration. *Forest Policy and Economics*, *14*(1), 143–147.

Gordon, J. E., Barron, H. F., Hansom, J. D., & Thomas, M. F. (2012). Engaging with geodiversity—Why it matters. *Proceedings of the Geologists Association*, *123*(1), 1–6.

Gordon, L., & Folke, C. (2000). Ecohydrological landscape management for human well-being. *Water International*, *25*(2), 178–184.

Gosper, C. R., & Vivian-Smith, G. (2009). Approaches to selecting native plant replacements for fleshy-fruited invasive species. *Restoration Ecology*, *17*(2), 196–204.

Gowdy, J. M., & Carbonell, A. F. (1999). Toward consilience between biology and economics: The contribution of Ecological Economics. *Ecological Economics*, *29*(3), 337–348.

Gross, L. (2006). Assessing ecosystem services to identify conservation priorities. *PLOS Biology*, *4*(11), e392.

Grumbine, R. E., Dore, J., & Xu, J. (2012). Mekong hydropower: Drivers of change and governance challenges. *Frontiers in Ecology and the Environment*, *10*(2), 91–98.

Guimaraes, B. C. M., Arends, J. B. A., van der Ha, D., Van de Wiele, T., Boon, N., & Verstraete, W. (2010). Microbial services and their management: Recent progresses in soil bioremediation technology. *Applied Soil Ecology*, *46*(2), 157–167.

Hajjar, R., Jarvis, D. I., & Gemmill-Herren, B. (2008). The utility of crop genetic diversity in maintaining ecosystem services. *Agriculture Ecosystems & Environment*, *123*(4), 261–270.

Hall, J. S., Love, B. E., Garen, E. J., Slusser, J. L., Saltonstall, K., Mathias, S., … Ashton, M. S. (2011). Tree plantations on farms: Evaluating growth and potential for success. *Forest Ecology and Management*, *261*(10), 1675–1683.

Hansson, C. B., & Wackernagel, M. (1999). Rediscovering place and accounting space: How to re-embed the human economy. *Ecological Economics*, *29*(2), 203–213.

Harper, D. M., Morrison, E. H. J., Macharia, M. M., Mavuti, K. M., & Upton, C. (2011). Lake Naivasha, Kenya: Ecology, society and future. *Freshwater Reviews*, *4*(2), 89–114.

Harrington, L. W., & Hobbs, P. R. (2009). Challenge and threats to sustainable food production. In W. G. Pond, B. L. Nichols, & D. L. Brown (Eds.), *Adequate food for all: Culture, science, and technology of food in the 21st century*. Boca Raton, FL: CRC Press-Taylor & Francis Group.

Harrington, R., & McInnes, R. (2009). Integrated Constructed Wetlands (ICW) for livestock wastewater management. *Bioresource Technology*, *100*(22), 5498–5505.

Haslett, J. R., Berry, P. M., Bela, G., Jongman, R. H. G., Pataki, G., Samways, M. J., & Zobel, M. (2010). Changing conservation strategies in Europe: A framework integrating ecosystem services and dynamics. *Biodiversity and Conservation*, *19*(10), 2963–2977.

Haygarth, P. M., & Ritz, K. (2009). The future of soils and land use in the UK: Soil systems for the provision of land-based ecosystem services. *Land Use Policy*, *26*, S187–S197.

He, H. S., Shifley, S. R., & Thompson III, F. R. (2011). Overview of contemporary issues of forest research and management in China. *Environmental Management*, *48*(6), 1061–1065.

Helmer, E. H. (2000). The landscape ecology of tropical secondary forest in montane Costa Rica. *Ecosystems*, *3*(1), 98–114.

Hershner, C., & Havens, K. J. (2008). Managing invasive aquatic plants in a changing system: Strategic consideration of ecosystem services. *Conservation Biology*, *22*(3), 544–550.

Hiedanpaa, J., Kotilainen, J., & Salo, M. (2011). Unfolding the organised irresponsibility: Ecosystem approach and the quest for forest biodiversity in Finland, Peru, and Russia. *Forest Policy and Economics*, *13*(3), 159–165.

Hilaire, R. S., Arnold, M. A., Wilkerson, D. C., Devitt, D. A., Hurd, B. H., Lesikar, B. J., … Zoldoske, D. F. (2008). Efficient water use in residential urban landscapes. *HortScience*, *43*(7), 2081–2092.

Hirsch, P. D., Adams, W. M., Brosius, J. P., Zia, A., Bariola, N., & Dammert, J. L. (2011). Acknowledging conservation trade-offs and embracing complexity. *Conservation Biology*, *25*(2), 259–264.

Hodgkinson, K. C. (2001). De-intensification of grasslands: Understanding the processes to find the balance. *Proceedings of the XIX International Grassland Congress: Grassland Ecosystems: An outlook into the 21st century, Sao Paulo, Brazil*. Brazilian Society of Animal Husbandry.

Holland, R. A., Eigenbrod, F., Armsworth, P. R., Anderson, B. J., Thomas, C. D., & Gaston, K. J. (2011). The influence of temporal variation on relationships between ecosystem services. *Biodiversity and Conservation*, *20*(14), 3285–3294.

Holmlund, C. M., & Hammer, M. (1999). Ecosystem services generated by fish populations. *Ecological Economics*, *29*(2), 253–268.

Honey-Roses, J., Lopez-Garcia, J., Rendon-Salinas, E., Peralta-Higuera, A., & Galindo-Leal, C. (2009). To pay or not to pay? Monitoring performance and enforcing conditionality when paying for forest conservation in Mexico. *Environmental Conservation*, *36*(2), 120–128.

Horwitz, P., & Finlayson, C. M. (2011). Wetlands as settings for human health: Incorporating ecosystem services and health impact assessment into water resource management. *BioScience*, *61*(9), 678–688.

Jansson, A., Folke, C., & Langaas, S. (1998). Quantifying the nitrogen retention capacity of natural wetlands in the large-scale drainage basin of the Baltic Sea. *Landscape Ecology*, *13*(4), 249–262.

Jewitt, G. (2002). Can integrated water resources management sustain the provision of ecosystem goods and services? *Physics and Chemistry of the Earth, Parts A/B/C*, *27*(11–22), 887–895.

Jha, S. (2009). Household-specific variables and forest dependency in an Indian hotspot of biodiversity: Challenges for sustainable livelihoods. *Environment Development and Sustainability*, *11*(6), 1215–1223.

Johnston, R. J., Schultz, E. T., Segerson, K., Besedin, E. Y., & Ramachandran, M. (2012). Enhancing the content validity of stated preference valuation: The structure and function of ecological indicators. *Land Economics*, *88*(1), 102–120.

Kaffashi, S., Shamsudin, M. N., Radam, A., Rahim, K. A., Yacob, M. R., Muda, A., & Yazid, M. (2011). Economic valuation of Shadegan International Wetland, Iran: Notes for conservation. *Regional Environmental Change*, *11*(4), 925–934.

Kearns, C. A., Inouye, D. W., & Waser, N. M. (1998). Endangered mutualisms: The conservation of plant-pollinator interactions. *Annual Review of Ecology and Systematics*, *29*, 83–112.

King, J., & Brown, C. (2010). Integrated basin flow assessments: Concepts and method development in Africa and South-east Asia. *Freshwater Biology*, *55*(1), 127–146.

Kingsford, R. T., & Watson, J. E. M. (2011). Climate change in Oceania—A synthesis of biodiversity impacts and adaptations. *Pacific Conservation Biology*, *17*(3, Sp., Iss. SI), 270–284.

Kirwan, M. L., Guntenspergen, G. R., & Morris, J. T. (2009). Latitudinal trends in *Spartina alterniflora* productivity and the response of coastal marshes to global change. *Global Change Biology*, *15*(8), 1982–1989.

Koch, E. W., Barbier, E. B., Silliman, B. R., Reed, D. J., Perillo, G. M. E., Hacker, S. D., … Wolanski, E. (2009). Non-linearity in ecosystem services: Temporal and spatial variability in coastal protection. *Frontiers in Ecology and the Environment*, *7*(1), 29–37.

Koren, H. S., & Butler, C. D. (2006). The interconnection between the built environment ecology and health. *Environmental Security and Environmental Management: The Role of Risk Assessment*, *5*, 109–125.

Kraft, S., & Penberthy, J. (2000). Conservation policy for the future: What lessons have we learned from watershed planning and research. *Journal of Soil and Water Conservation*, *55*(3), 327–333.

Krauss, J., Gallenberger, I., & Steffan-Dewenter, I. (2011). Decreased functional diversity and biological pest control in conventional compared to organic crop fields. *PLoS ONE*, *6*(5).

Kumar, P. (2011). Capacity constraints in operationalisation of payment for ecosystem services (PES) in India: Evidence from land degradation. *Land Degradation & Development*, *22*(4), 432–443.

Kunz, T. H., Braun de Torrez, E., Bauer, D., Lobova, T., & Fleming, T. H. (2011). Ecosystem services provided by bats. *Annals of the New York Academy of Sciences*, *1223*(1), 1–38.

Lambert, G. I., Jennings, S., Kaiser, M. J., Hinz, H., & Hiddink, J. G. (2011). Quantification and prediction of the impact of fishing on epifaunal communities. *Marine Ecology Progress Series*, *430*, 71–86.

Lant, C. L., Ruhl, J. B., & Kraft, S. E. (2009). The tragedy of political services—Response. *BioScience*, *59*(2), 102.

Lapointe, B. E., & Bedford, B. J. (2011). Stormwater nutrient inputs favor growth of non-native macroalgae (Rhodophyta) on O'ahu, Hawaiian Islands. *Harmful Algae*, *10*(3), 310–318.

Lavelle, P. (2000). Ecological challenges for soil science. *Soil Science*, *165*(1), 73–86.

Lederer, M. (2011). From CDM to REDD+—What do we know for setting up effective and legitimate carbon governance? *Ecological Economics*, *70*(11), 1900–1907.

Lei, L., Jian, L., Yutao, W., Nvjie, W., & Renqing, W. (2011). Cost-benefit analysis and payments for watershed-scale wetland rehabilitation: A case study in Shandong Province, China. *International Journal of Environmental Research*, *5*(3), 787–796.

Lennox, M. S., Lewis, D. J., Jackson, R. D., Harper, J., Larson, S., & Tate, K. W. (2011). Development of vegetation and aquatic habitat in restored riparian sites of California's North Coast Rangelands. *Restoration Ecology*, *19*(2), 225–233.

Li, F., Wang, R. S., Paulussen, J., & Liu, X. S. (2005). Comprehensive concept planning of urban greening based on ecological principles: A case study in Beijing, China. *Landscape and Urban Planning*, *72*(4), 325–336.

Li, W., & Jin, X. (2010). The dynamic evaluation of ecosystem service values in Pingdingshan's mining areas. In N. J. Li, Q. Yang, H. Zhang, & W. Xie (Eds.), *Regulatory regional economic challenge for mining, investment, environment and work safety* (pp. 41–44). Sydney: Aussino Academic Publishing House.

Li, W.-J., Zhang, S.-H., & Wang, H.-M. (2011). Ecosystem services evaluation based on geographic information system and remote sensing technology: A review. *Yingyong Shengtai Xuebao*, *22*(12), 3358–3364.

Li, Y., & Meng, Y. (2012). Research on residents' selection on supplying urban forestry ecological service: Empirical analysis on sampling survey in Harbin. *Forest Policy and Economics*, *15*(Feb), 22–26.

Linquist, B., van Groenigen, K. J., Adviento-Borbe, M. A., Pittelkow, C., & van Kessel, C. (2012). An agronomic assessment of greenhouse gas emissions from major cereal crops. *Global Change Biology*, *18*(1), 194–209.

Liu, M.-C., & Li, D.-Q. (2007). Study on biodiversity conservation priorities – Taking Sanjiangyuan region. *Journal of Natural Science-Hunan Normal University*, *30*(3), 110–115.

Lu, H., Campbell, D., Chen, J., Qin, P., & Ren, H. (2007). Conservation and economic viability of nature reserves: An emergy evaluation of the Yancheng Biosphere Reserve. *Biological Conservation*, *139*(3–4), 415–438.

Lu, Y., Wang, J., Wei, L., & Mo, J. (2006). Land use change and its impact on values of ecosystem services in the West of Jilin Province. *Wuhan University Journal of Natural Sciences*, *11*(4), 1028–1034.

Lucey, W. P., Barraclough, C. L., Donaldson, C., Mott, G., & Young, D. (1999). Integrated watershed management plans: Should their design be planning or ecology based? Science into Policy: Water in the Public Realm, Bozeman, Montana, American Water Resources Association.

Luescher, A., Finn, J. A., Connolly, J., Sebastia, M. T., Collins, R., Fothergill, M., … Helgadottir, A. (2008). Benefits of sward diversity for agricultural grasslands. *Biodiversity*, *9*(1–2), 29–32.

Ma, S., & Swinton, S. M. (2011). Valuation of ecosystem services from rural landscapes using agricultural land prices. *Ecological Economics*, *70*(9), 1649–1659.

Manes, F., Incerti, G., Salvatori, E., Vitale, M., Ricotta, C., & Costanza, R. (2012). Urban ecosystem services: Tree diversity and stability of tropospheric ozone removal. *Ecological Applications*, *22*(1), 349–360.

Manring, S. L., & Pearsall, S. (2005). Creating an adaptive ecosystem management network among stakeholders of the lower Roanoke River, North Carolina, USA. *Ecology and Society*, *10*(2).

Marjanizadeh, S., de Fraiture, C., & Loiskandl, W. (2010). Food and water scenarios for the Karkheh River Basin, Iran. *Water International*, *35*(4), 409–424.

Marks, E., Aflakpui, G. K. S., Nkem, J., Poch, R. M., Khouma, M., Kokou, K., … Sebastia, M. T. (2009). Conservation of soil organic carbon, biodiversity and the provision of other ecosystem services along climatic gradients in West Africa. *Biogeosciences*, *6*(8), 1825–1838.

Marrs, R. H., Galtress, K., Tong, C., Cox, E. S., Blackbird, S. J., Heyes, T. J., … Le Duc, M. G. (2007). Competing conservation goals, biodiversity or ecosystem services: Element losses and species recruitment in a managed moorland-bracken model system. *Journal of Environmental Management*, *85*(4), 1034–1047.

Martin-Lopez, B., Garcia-Llorente, M., Palomo, I., & Montes, C. (2011). The conservation against development paradigm in protected areas: Valuation of ecosystem services in the Donana social-ecological system (southwestern Spain). *Ecological Economics*, *70*(8), 1481–1491.

Matete, M., & Hassan, R. (2006). Integrated ecological economics accounting approach to evaluation of inter-basin water transfers: An application to the Lesotho Highlands Water Project. *Ecological Economics*, *60*(1), 246–259.

Maynard, S., James, D., & Davidson, A. (2011). An adaptive participatory approach for developing an ecosystem services framework for South East Queensland, Australia. *International Journal of Biodiversity Science Ecosystem Services & Management*, *7*(3), 182–189.

McAfee, K. (1999). Selling nature to save it? Biodiversity and green developmentalism. *Environment and Planning D-Society & Space*, *17*(2), 133–154.

McEvoy, P. B., & Coombs, E. M. (1999). Biological control of plant invaders: Regional patterns, field experiments, and structured population models. *Ecological Applications*, *9*(2), 387–401.

Meijer, K. S., & Van Beek, E. (2011). A framework for the quantification of the importance of environmental flows for human well-being. *Society & Natural Resources*, *24*(12), 1252–1269.

Mekuria, W., Veldkamp, E., Tilahun, M., & Olschewski, R. (2011). Economic valuation of land restoration: The case of exclosures established on communal grazing lands in Tigray, Ethiopia. *Land Degradation & Development*, *22*(3), 334–344.

Méndez, V. E., Shapiro, E., & Gilbert, G. (2009). Cooperative management and its effects on shade tree diversity, soil properties and ecosystem services of coffee plantations in western El Salvador. *Agroforestry Systems*, *76*(1), 111–126.

Merson, J., Attwater, R., Ampt, P., Wildman, H., & Chapple, R. (2010). The challenges to urban agriculture in the Sydney basin and lower Blue Mountains region of Australia. *International Journal of Agricultural Sustainability*, *8*(1–2), 72–85.

Meynecke, J. O., Lee, S. Y., & Duke, N. C. (2008). Linking spatial metrics and fish catch reveals the importance of coastal wetland connectivity to inshore fisheries in Queensland, Australia. *Biological Conservation*, *141*(4), 981–996.

Midwood, J. D., & Chow-Fraser, P. (2012). Changes in aquatic vegetation and fish communities following 5 years of sustained low water levels in coastal marshes of eastern Georgian Bay, Lake Huron. *Global Change Biology*, *18*(1), 93–105.

Millar, D., Stolt, M., & Amador, J. A. (2010). Quantification and implications of soil losses from commercial sod production. *Soil Science Society of America Journal*, *74*(3), 892–897.

Milne, S., & Adams, B. (2012). Market Masquerades: Uncovering the politics of community-level payments for environmental services in Cambodia. *Development and Change*, *43*(1), 133–158.

Mitsch, W. J., Lu, J., Yuan, X., He, W., & Zhang, L. (2008). Optimizing ecosystem services in China. *Science*, *322*(5901), 528.

Mittermeier, R. A., Mittermeier, C. G., Brooks, T. M., Pilgrim, J. D., Konstant, W. R., da Fonseca, G. A. B., & Kormos, C. (2003). Wilderness and biodiversity conservation. *Proceedings of the National Academy of Sciences of the United States of America*, *100*(18), 10309–10313.

Moon, K., & Cocklin, C. (2011). A landholder-based approach to the design of private-land conservation programs. *Conservation Biology*, *25*(3), 493–503.

Moron-Rios, A., Rodriguez, M. A., Perez-Camacho, L., & Rebollo, S. (2010). Effects of seasonal grazing and precipitation regime on the soil macroinvertebrates of a Mediterranean old-field. *European Journal of Soil Biology*, *46*(2), 91–96.

Murray, P. A., Nichols, K. E., & Delaney, R. (2001). Global climate change: How might it affect the fisheries of the Caribbean's SIDS? *Proceedings of the Gulf and Caribbean Fisheries Institute*, *54*, 112–126.

Naidoo, R., & Ricketts, T. H. (2006). Mapping the economic costs and benefits of conservation. *PLOS Biology*, *4*(11), 2153–2164.

Naselli-Flores, L., & Rossetti, G. (2010). Santa Rosalia, the icon of biodiversity. *Hydrobiologia*, *653*(1), 235–243.

Newburn, D., & Berck, P. (2011). Exurban development. *Journal of Environmental Economics and Management*, *62*(3), 323–336.

Nicoloso, L., Negrini, R., Ajmone-Marsan, P., & Crepaldi, P. (2012). On the way to functional agro biodiversity: Coat colour gene variability in goats. *Animal*, *6*(1), 41–49.

Nikolaidis, N. P. (2011). Human impacts on soils: Tipping points and knowledge gaps. *Applied Geochemistry*, *26*, S230–S233.

Noble, J. C., Mueller, W. J., Detling, J. K., & Pfitzner, G. H. (2007). Landscape ecology of the burrowing bettong: Warren distribution and patch dynamics in semiarid eastern Australia. *Austral Ecology*, *32*(3), 326–337.

Norberg, J. (1999). Linking Nature's services to ecosystems: Some general ecological concepts. *Ecological Economics*, *29*(2), 183–202.

Norkko, J., Norkko, A., Thrush, S. F., Valanko, S., & Suurkuukka, H. (2010). Conditional responses to increasing scales of disturbance, and potential implications for threshold dynamics in soft-sediment communities. *Marine Ecology Progress Series*, *413*, 253–266.

Nowak, D. J., Walton, J. T., Stevens, J. C., Crane, D. E., & Hoehn, R. E. (2008). Effect of plot and sample size on timing and precision of urban forest assessments. *Arboriculture & Urban Forestry*, *34*(6), 386–390.

Nybakk, E., Crespell, P., Hansen, E., & Lunnan, A. (2009). Antecedents to forest owner innovativeness: An investigation of the non-timber forest products and services sector. *Forest Ecology and Management*, *257*(2), 608–618.

Odum, H. T., & Odum, E. P. (2000). The energetic basis for valuation of ecosystem services. *Ecosystems*, *3*(1), 21–23.

Olgyay, V., & Herdt, J. (2004). The application of ecosystems services criteria for green building assessment. *Solar Energy*, *77*(4), 389–398.

Opdam, P., Luque, S., & Jones, K. B. (2009). Changing landscapes to accommodate for climate change impacts: A call for landscape ecology. *Landscape Ecology*, *24*(6), 715–721.

Opperman, J. J., Galloway, G. E., Fargione, J., Mount, J. F., Richter, B. D., & Secchi, S. (2009). Sustainable floodplains through large-scale reconnection to rivers. *Science*, *326*(5959), 1487–1488.

Opschoor, J. B. (1998). The value of ecosystem services: Whose values? *Ecological Economics*, *25*(1), 41–43.

Ormerod, S. J. (2003). Restoration in applied ecology: Editor's introduction. *Journal of Applied Ecology*, *40*(1), 44–50.

Ouyang, Z., Wang, R., & Zhao, J. (1999). Ecosystem services and their economic valuation. *Yingyong Shengtai Xuebao*, *10*(5), 635–640.

Ozawa, C. P., & Yeakley, J. A. (2007). Performance of management strategies in the protection of Riparian vegetation in three Oregon cities. *Journal of Environmental Planning and Management*, *50*(6), 803–822.

Padilla, F. M., Vidal, B., Sanchez, J., & Pugnaire, F. I. (2010). Land-use changes and carbon sequestration through the twentieth century in a Mediterranean mountain ecosystem: Implications for land management. *Journal of Environmental Management*, *91*(12), 2688–2695.

Palmer, M. A. (2010). Beyond infrastructure. *Nature*, *467*(7315), 534–535.

Pant, P. (2011). Carbon, conservation, communities under sustainability (C3S) paradigm for forests. In W. Leal Filho (Ed.), *The economic, social and political elements of climate change* (pp. 543–553). Berlin Heidelberg: Springer.

Parkhurst, G. M., & Shogren, J. F. (2007). Spatial incentives to coordinate contiguous habitat. *Ecological Economics*, *64*(2), 344–355.

Pearce, D. (2007). Do we really care about biodiversity? *Environmental & Resource Economics*, *37*(1), 313–333.

Peltzer, D. A. (2000). Ecology and ecosystem functions of native prairie and tame grasslands in the Northern Great Plains. In T. A. Radenbaugh & P. C. Douaud (Eds.), *Changing prairie landscapes* (Vol. 32, pp. 59–72). Regina: Canadian Plains Research Center.

Penn, B. (2011). A little lecture on the big burn: Bioenergy and the privatization of British Columbia's Crown forests. *Forestry Chronicle*, *87*(5), 598–602.

Peterson, C. H., Able, K. W., DeJong, C. F., Piehler, M. F., Simenstad, C. A., & Zedler, J. B. (2008). Practical proxies for tidal marsh ecosystem services: Application to injury and restoration. *Advances in Marine Biology*, *54*, 221–266.

Petrosillo, I., Zurlini, G., Corliano, M. E., Zaccarelli, N., & Dadamo, M. (2007). Tourist perception of recreational environment and management in a marine protected area. *Landscape and Urban Planning*, *79*(1), 29–37.

Phoenix, G. K., Emmett, B. A., Britton, A. J., Caporn, S. J. M., Dise, N. B., Helliwell, R., … Power, S. A. (2012). Impacts of atmospheric nitrogen deposition: Responses of multiple plant and soil parameters across contrasting ecosystems in long-term field experiments. *Global Change Biology*, *18*(4), 1197–1215.

Pickering, C. M. (2010). Ten factors that affect the severity of environmental impacts of visitors in protected areas. *Ambio*, *39*(1), 70–77.

Pluess, T., Opatovsky, I., Gavish-Regev, E., Lubin, Y., & Schmidt-Entling, M. H. (2010). Non-crop habitats in the landscape enhance spider diversity in wheat fields of a desert agroecosystem. *Agriculture Ecosystems & Environment*, *137*(1–2), 68–74.

Pongsiri, M. J., Roman, J., Ezenwa, V. O., Goldberg, T. L., Koren, H. S., Newbold, S. C., … Salkeld, D. J. (2009). Biodiversity loss affects global disease ecology. *BioScience*, *59*(11), 945–954.

Porfirio, L. L., Steffen, W., Barrett, D. J., & Berry, S. L. (2010). The net ecosystem carbon exchange of human-modified environments in the Australian Capital Region. *Regional Environmental Change*, *10*(1), 1–12.

Prager, K., Reed, M., & Scott, A. (2012). Encouraging collaboration for the provision of ecosystem services at a landscape scale—Rethinking agri-environmental payments. *Land Use Policy*, *29*(1), 244–249.

Prato, T. (2007). Selection and evaluation of projects to conserve ecosystem services. *Ecological Modelling*, *203*(3–4), 290–296.

Price, K. (2011). Effects of watershed topography, soils, land use, and climate on baseflow hydrology in humid regions: A review. *Progress in Physical Geography*, *35*(4), 465–492.

Pulselli, F. M., Coscieme, L., & Bastianoni, S. (2011). Ecosystem services as a counterpart of emergy flows to ecosystems. *Ecological Modelling*, *222*(16), 2924–2928.

Rader, R., Edwards, W., Westcott, D. A., Cunningham, S. A., & Howlett, B. G. (2011). Pollen transport differs among bees and flies in a human-modified landscape. *Diversity and Distributions*, *17*(3), 519–529.

Raghu, S., Spencer, J. L., Davis, A. S., & Wiedenmann, R. N. (2011). Ecological considerations in the sustainable development of terrestrial biofuel crops. *Current Opinion in Environmental Sustainability*, *3*(1–2), 15–23.

Rapport, D. J. (1995). Ecosystem services and management options as blanket indicators of ecosystem health. *Journal of Aquatic Ecosystem Health*, *4*(2), 97–105.

Reid, W. V., Mooney, H. A., Capistrano, D., Carpenter, S. R., Chopra, K., Cropper, A., … Zhao, S. (2006). Nature: The many benefits of ecosystem services. *Nature*, *443*(7113), 749.

Richards, W. H., Koeck, R., Gersonde, R., Kuschnig, G., Fleck, W., & Hochbichler, E. (2012). Landscape-scale forest management in the municipal watersheds of Vienna, Austria, and Seattle, USA: Commonalities despite disparate ecology and history. *Natural Areas Journal*, *32*(2), 199–207.

Richter, D. D., Bacon, A., Mobley, M. L., Richardson, C. J., Andrews, S. S., West, L., … Zobeck, T. M. (2011). Human–soil relations are changing rapidly: Proposals from SSSA's cross-divisional soil change working group. *Soil Science Society of America Journal*, *75*(6), 2079–2084.

Rodriguez, L. C., Henson, D., Herrero, M., Nkedianye, D., & Reid, R. (2012). Private farmers' compensation and viability of protected areas: The case of Nairobi National Park and Kitengela dispersal corridor. *International Journal of Sustainable Development and World Ecology*, *19*(1), 34–43.

Rogers, H. M., Glew, L., Honzak, M., & Hudson, M. D. (2010). Prioritizing key biodiversity areas in Madagascar by including data on human pressure and ecosystem services. *Landscape and Urban Planning*, *96*(1), 48–56.

Roy, E. D., Martin, J. F., Irwin, E. G., Conroy, J. D., & Culver, D. A. (2010). Transient social–ecological stability: The effects of invasive species and ecosystem restoration on nutrient management compromise in Lake Erie. *Ecology and Society*, *15*(1).

Russell, M., Rogers, J., Jordan, S., Dantin, D., Harvey, J., Nestlerode, J., & Alvarez, F. (2011). Prioritization of ecosystem services research: Tampa Bay demonstration project. *Journal of Coastal Conservation*, *15*(4), 647–658.

Ryszkowski, L. (1995). Managing ecosystem services in agricultural landscapes. *Nature & Resources*, *31*(3), 27–36.

Salum, L. A. (2009). Ecotourism and biodiversity conservation in Jozani-Chwaka Bay National Park, Zanzibar. *African Journal of Ecology*, *47*, 166–170.

Salzman, J. (1997). Valuing ecosystem services. *Ecology Law Quarterly*, *24*(4), 887–903.

Salzman, J. (1998). Ecosystem services and the law. *Conservation Biology*, *12*(3), 497–498.

Sanchirico, J. N., Eagle, J., Palumbi, S., & Thompson Jr., B. H. (2010). Comprehensive planning, dominant-use zones, and user rights: A new era in ocean governance. *Bulletin of Marine Science*, *86*(2), 273–285.

Sanchirico, J. N., & Mumby, P. J. (2009). Mapping ecosystem functions to the valuation of ecosystem services: Implications of species-habitat associations for coastal land-use decisions. *Theoretical Ecology*, *2*(2), 67–77.

Saxena, K. G., Rao, K. S., & Ramakrishnan, P. S. (1999). Ecological context of biodiversity.

Scheffer, M., Brock, W., & Westley, F. (2000). Socioeconomic mechanisms preventing optimum use of ecosystem services: An interdisciplinary theoretical analysis. *Ecosystems*, *3*(5), 451–471.

Schon, N. L., Mackay, A. D., Gray, R. A. J., & Minor, M. A. (2011). Influence of phosphorus inputs and sheep treading on soil macrofauna and mesofauna in hill pastures. *New Zealand Journal of Agricultural Research*, *54*(2), 83–96.

Schumacher, J. D., & Kruse, G. H. (2005). Toward sustainable ecosystem services from the Aleutian Archipelago. *Fisheries Oceanography*, *14*, 277–291.

Seidl, A. F., & Moraes, A. S. (2000). Global valuation of ecosystem services: Application to the Pantanal da Nhecolandia, Brazil. *Ecological Economics*, *33*(1), 1–6.

Seiwa, K., & Suyama, Y. (2009). Recent research topics in ecological and genetic approaches for sustainable forest management. *Tohoku Journal of Agricultural Research*, *60*(1–2), 59–62.

Sieben, E. J. J., Ellery, W. N., Kotze, D. C., & Rountree, M. (2011). Hierarchical spatial organization and prioritization of wetlands: A conceptual model for wetland rehabilitation in South Africa. *Wetlands Ecology and Management*, *19*(3), 209–222.

Simon, S., Bouvier, J.-C., Debras, J.-F., & Sauphanor, B. (2010). Biodiversity and pest management in orchard systems. A review. *Agronomy for Sustainable Development*, *30*(1), 139–152.

Sinden, J. A. (2004). Do the public gains from vegetation protection in north-western New South Wales exceed the landholders' loss of land value? *Rangeland Journal*, *26*(2), 204–224.

Smith, R. G., Gareau, T. P., Mortensen, D. A., Curran, W. S., & Barbercheck, M. E. (2011). Assessing and visualizing agricultural management practices: A multivariable hands-on approach for education and extension. *Weed Technology*, *25*(4), 680–687.

Snelder, T., Biggs, B., & Weatherhead, M. (2001). Inclusion of ecosystem concepts in integrated management of river resources. In M. A. Marino & S. P. Simonovic (Eds.), *Integrated water resources management* (pp. 379–385).

Snyder, G. B., Finke, D. L., & Snyder, W. E. (2008). Predator biodiversity strengthens aphid suppression across single- and multiple-species prey communities. *Biological Control*, *44*(1), 52–60.

Sophocleous, M. (2007). The science and practice of environmental flows and the role of hydrogeologists. *Ground Water*, *45*(4), 393–401.

Soranno, P. A., Cheruvelil, K. S., Webster, K. E., Bremigan, M. T., Wagner, T., & Stow, C. A. (2010). Using landscape limnology to classify freshwater ecosystems for multi-ecosystem management and conservation. *BioScience*, *60*(6), 440–454.

Souter, D. W., & Linden, O. (2000). The health and future of coral reef systems. *Ocean & Coastal Management*, *43*(8–9), 657–688.

Spash, C. L. (2008). Contingent valuation design and data treatment: If you can't shoot the messenger, change the message. *Environment and Planning C-Government and Policy*, *26*(1), 34–53.

Spears, B. M., Saunders, J. E., Davidson, I., & Paterson, D. M. (2008). Microalgal sediment biostabilisation along a salinity gradient in the Eden Estuary, Scotland: Unravelling a paradox. *Marine and Freshwater Research*, *59*(4), 313–321.

Stickler, C. M., Nepstad, D. C., Coe, M. T., McGrath, D. G., Rodrigues, H. O., Walker, W. S., … Davidson, E. A. (2009). The potential ecological costs and cobenefits of REDD: A critical review and case study from the Amazon region. *Global Change Biology*, *15*(12), 2803–2824.

Stoate, C., & Jarju, A. K. (2008). A participatory investigation into multifunctional benefits of indigenous trees in West African savanna farmland. *International Journal of Agricultural Sustainability*, *6*(2), 122–132.

Stoeckl, N., Hicks, C. C., Mills, M., Fabricius, K., Esparon, M., Kroon, F., … Costanza, R. (2011). The economic value of ecosystem services in the Great Barrier Reef: Our state of knowledge. *Annals of the New York Academy of Sciences*, *1219*(1), 113–133.

Suckall, N., Fraser, E. D. G., Cooper, T., & Quinn, C. (2009). Visitor perceptions of rural landscapes: A case study in the Peak District National Park, England. *Journal of Environmental Management*, *90*(2), 1195–1203.

Tait, P., Baskaran, R., Cullen, R., & Bicknell, K. (2011). Valuation of agricultural impacts on rivers and streams using choice modelling: A New Zealand case study. *New Zealand Journal of Agricultural Research*, *54*(3), 143–154.

Takeuchi, K. (2010). Rebuilding the relationship between people and nature: The Satoyama Initiative. *Ecological Research*, *25*(5), 891–897.

Thevs, N., Zerbe, S., Gahlert, E., Mijit, M., & Succow, M. (2007). Productivity of reed (*Phragmites australis* Trin. ex Steud.) in continental-arid NW China in relation to soil, groundwater, and land-use. *Journal of Applied Botany and Food Quality*, *81*(1), 62–68.

Thrush, S. F., Lundquist, C. J., & Hewitt, J. E. (2005). Spatial and temporal scales of disturbance to the seafloor: A generalized framework for active habitat management. In B. W. Barnes & J. P. Thomas (Eds.), *Benthic habitats and the effects of fishing* (Vol. 41, pp. 639–649).

Tognetti, P. M., Chaneton, E. J., Omacini, M., Trebino, H. J., & Leon, R. J. C. (2010). Exotic vs. native plant dominance over 20 years of old-field succession on set-aside farmland in Argentina. *Biological Conservation*, *143*(11), 2494–2503.

Trammell, T. L. E., & Carreiro, M. M. (2011). Vegetation composition and structure of woody plant communities along urban interstate corridors in Louisville, KY, USA. *Urban Ecosystems*, *14*(4), 501–524.

Truax, B., Gagnon, D., Fortier, J., & Lambert, F. (2012). Yield in 8 year-old hybrid poplar plantations on abandoned farmland along climatic and soil fertility gradients. *Forest Ecology and Management*, *267*, 228–239.

Tscharntke, T., Clough, Y., Bhagwat, S. A., Buchori, D., Faust, H., Hertel, D., … Wanger, T. C. (2011). Multifunctional shade-tree management in tropical agroforestry landscapes – A review. *Journal of Applied Ecology*, *48*(3), 619–629.

Turner, M. G. (2010). Disturbance and landscape dynamics in a changing world. *Ecology*, *91*(10), 2833–2849.

Van Hecken, G., & Bastiaensen, J. (2010). Payments for ecosystem services: justified or not? A political view. *Environmental Science & Policy*, *13*(8), 785–792.

van Ruijven, J., & Berendse, F. (2007). Contrasting effects of diversity on the temporal stability of plant populations. *Oikos*, *116*(8), 1323–1330.

Van Weerd, M., & Snelder, D. J. (2008). Human-altered tree-based habitats and their value in conserving bird and bat diversity in northeast Luzon, The Philippines. In D. Snelder & R. Lasco (Eds.), *Smallholder tree growing for rural development and environmental services* (Vol. *5*, pp. 347–377). The Netherlands: Springer.

van Wilgen, B. W., Le Maitre, D. C., & Cowling, R. M. (1998). Ecosystem services, efficiency, sustainability and equity: South Africa's Working for Water Programme. *Trends in Ecology & Evolution*, *13*(9), 378.

Vandermeer, J., Perfecto, I., & Philpott, S. (2010). Ecological complexity and pest control in organic coffee production: Uncovering an autonomous ecosystem service. *BioScience*, *60*(7), 527–537.

Veiga, R. S. L., Jansa, J., Frossard, E., & van der Heijden, M. G. A. (2011). Can arbuscular mycorrhizal fungi reduce the growth of agricultural weeds? *PLoS ONE*, *6*(12).

Viglizzo, E. F., & Frank, F. C. (2006). Land-use options for Del Plata Basin in South America: Tradeoffs analysis based on ecosystem service provision. *Ecological Economics*, *57*(1), 140–151.

Villa, F. (2009). Semantically driven meta-modelling: automating model construction in an environmental decision support system for the assessment of ecosystem services flows. In I. Athanasiadis, A. Rizzoli, P. Mitkas, & J. Gómez (Eds.), *Information technologies in environmental engineering* (pp. 23–36). Berlin, Heidelberg: Springer.

Wang, B., Lu, S.-W., You, W.-Z., Ren, X.-X., Xing, Z.-K., & Wang, S.-M. (2010). Evaluation of forest ecosystem services value in Liaoning Province. *Yingyong Shengtai Xuebao*, *21*(7), 1792–1798.

Wen, J., Pu, L., & Li, S. (2010). The spatial-temporal changes of the ecosystem service value by land use and land cover change in Circum-Taihu Lake region. In Y. Liu & A. Chen (Eds.), *18th International conference on geoinformatics 2010*, 18–20 June 2010, Beijing, China. Piscataway, NJ: IEEE.

Wenger, R. B., Harris, H. J., Sivanpillai, R., & DeVault, D. S. (1999). A graph-theoretic analysis of relationships among ecosystem stressors. *Journal of Environmental Management*, *57*(2), 109–122.

Weslawski, J. M., Andrulewicz, E., Kotwicki, L., Kuzebski, E., Lewandowski, A., Linkowski, T., … Zarzycki, T. (2006). Basis for a valuation of the Polish Exclusive Economic Zone of the Baltic Sea: Rationale and quest for tools. *Oceanologia*, *48*(1), 145–167.

West, P. C., Narisma, G. T., Barford, C. C., Kucharik, C. J., & Foley, J. A. (2011). An alternative approach for quantifying climate regulation by ecosystems. *Frontiers in Ecology and the Environment*, *9*(2), 126–133.

Whitehorn, P. R., O'Connor, S., Wackers, F. L., & Goulson, D. (2012). Neonicotinoid pesticide reduces bumble bee colony growth and queen production. *Science*, *336*(6079), 351–352.

Wilcove, D. S. (2008). Animal migration: An endangered phenomenon? *Issues in Science and Technology*, *24*(3), 71–78.

Williams, J. A., & Martin, P. V. (2009). *Ecosystem services: A means to diffuse political land use decisions in peri-urban regions* (pp. 279–291). WIT Transactions. Southampton, UK: WIT Press.

Wilson, M. A., & Carpenter, S. R. (1999). Economic valuation of freshwater ecosystem services in the United States: 1971–1997. *Ecological Applications*, *9*(3), 772–783.

Winfree, R., Gross, B. J., & Kremen, C. (2011). Valuing pollination services to agriculture. *Ecological Economics*, *71*, 80–88.

Winqvist, C., Bengtsson, J., Aavik, T., Berendse, F., Clement, L. W., Eggers, S., … Bommarco, R. (2011). Mixed effects of organic farming and landscape complexity on farmland biodiversity and biological control potential across Europe. *Journal of Applied Ecology*, *48*(3), 570–579.

Wollski, P., & Murray-Hudson, M. (2006). Flooding dynamics in a large low-gradient alluvial fan, the Okavango Delta, Botswana, from analysis and interpretation of a 30-year hydrometric record. *Hydrology and Earth System Sciences*, *10*(1), 127–137.

Woodcock, B. A., Redhead, J., Vanbergen, A. J., Hulmes, L., Hulmes, S., Peyton, J., … Heard, M. S. (2010). Impact of habitat type and landscape structure on biomass, species richness and functional diversity of ground beetles. *Agriculture Ecosystems & Environment*, *139*(1–2), 181–186.

Wu, T., Kim, Y.-S., & Hurteau, M. D. (2011). Investing in natural capital: Using economic incentives to overcome barriers to forest restoration. *Restoration Ecology*, *19*(4), 441–445.

Xiao, H., Ouyang, Z., Zhao, J., & Wang, X. (2000). Forest ecosystem services and their ecological valuation–A case study of tropical forest in Jianfengling of Hainan Island. *Journal of Applied Ecology*, *11*(4), 481–484.

Yu, O. T., & Chmura, G. L. (2009). Soil carbon may be maintained under grazing in a St Lawrence Estuary tidal marsh. *Environmental Conservation*, *36*(4), 312–320.

Yuan, Y., Liu, J.-T., & Jin, Z.-Z. (2011). An integrated assessment of positive and negative effects of high-yielding cropland ecosystem services in Luancheng County, Hebei Province of North China. *Shengtaixue Zazhi*, *30*(12), 2809–2814.

Zaller, J. G., & Arnone, J. A. (1999). Earthworm responses to plant species' loss and elevated CO_2 in calcareous grassland. *Plant and Soil*, *208*(1), 1–8.

Zangerle, A., Pando, A., & Lavelle, P. (2011). Do earthworms and roots cooperate to build soil macroaggregates? A microcosm experiment. *Geoderma*, *167–68*, 303–309.

Zhu, J., & Wang, S. (2010). Urban ecosystem health evaluation based on fuzzy mathematics method. *Proceedings of International Symposium on Statistics and Management Science 2010*.

Zunckel, K. (2003). Managing and conserving Southern African grasslands with high endemism – The Maloti-Drakensberg Transfrontier Conservation Development Program. *Mountain Research and Development*, *23*(2), 113–118.

Literature review articles, 2012–2015

Abe, T., Yasui, T., Yokoya, M., & Knapp, M. (2014). Regaining habitats from invasive weeds by planting limited-recruitment endemic trees on an oceanic island: Successes and failures 11 years later. *Journal of Forest Research*, *20*, 135–142.

Adam, T. C., Brooks, A. J., Holbrook, S. J., Schmitt, R. J., Washburn, L., & Bernardi, G. (2014). How will coral reef fish communities respond to climate-driven disturbances? Insight from landscape-scale perturbations. *Oecologia*, *176*, 285–296.

Adewopo, J. B., VanZomeren, C., Bhomia, R. K., Almaraz, M., Bacon, A. R., Eggleston, E., … Tiedeman, M. (2014). Top-ranked priority research questions for soil science in the 21st century. *Soil Science Society of America Journal*, *78*, 337.

Albert, C., Hauck, J., Buhr, N., & von Haaren, C. (2014). What ecosystem services information do users want? Investigating interests and requirements among landscape and regional planners in Germany. *Landscape Ecology*, *29*, 1301–1313.

Alcántara, J. M., Rey, P. J., & Manzaneda, A. J. (2015). A model of plant community dynamics based on replacement networks. *Journal of Vegetation Science*, *26*, 524–537.

Alix-Garcia, J. M., Shapiro, E. N., & Sims, K. R. E. (2012). Forest conservation and slippage: Evidence from Mexico's national payments for ecosystem services program. *Land Economics*, *88*, 613–638.

Altamirano, A., Aplin, P., Miranda, A., Cayuela, L., Algar, A. C., & Field, R. (2013). High rates of forest loss and turnover obscured by classical landscape measures. *Applied Geography*, *40*, 199–211.

Alvez, J. P., Luiz, A., Fo, S., Farley, J. C., & Erickson, J. D. (2013). Transition from semi-confinement to pasture-based dairy in Brazil: Farmers' view of economic and environmental performances. *Agroecology and Sustainable Food Systems*, *3565*, 37–41.

Anadon, J. D., Sala, O. E., Turner 2nd, B. L., & Bennett, E. M. (2014). Effect of woody-plant encroachment on livestock production in North and South America. *Proceedings of the National Academy of Sciences the United States of America*, *111*, 12948–12953.

Andrade, G. I., Remolina, F., & Wiesner, D. (2013). Assembling the pieces: A framework for the integration of multi-functional ecological main structure in the emerging urban region of Bogotá, Colombia. *Urban Ecosystems*, *16*, 723–739.

Angeler, D. G., Allen, C. R., & Johnson, R. K. (2013). Measuring the relative resilience of subarctic lakes to global change: Redundancies of functions within and across temporal scales. *Journal of Applied Ecology*, *50*, 572–584.

Angelstam, P., Elbakidze, M., Axelsson, R., Koch, N. E., Tyupenko, T. I., Mariev, A. N., & Myhrman, L. (2013). Knowledge production and learning for sustainable landscapes: Forewords by the researchers and stakeholders. *Ambio*, *42*, 111–115.

Aradóttir, Á. L., Petursdottir, T., Halldorsson, G., Svavarsdottir, K., & Arnalds, O. (2013). Drivers of ecological restoration: Lessons from a century of restoration in Iceland. *Ecology and Society*, *18*.

Arroita, M., Aristi, I., Díez, J., Martinez, M., Oyarzun, G., & Elosegi, A. (2015). Impact of water abstraction on storage and breakdown of coarse organic matter in mountain streams. *Science of the Total Environment*, *503–504*, 233–240.

Ashford, O. S., Foster, W. A., Turner, B. L., Sayer, E. J., Sutcliffe, L., & Tanner, E. V. J. (2013). Litter manipulation and the soil arthropod community in a lowland tropical rainforest. *Soil Biology and Biochemistry*, *62*, 5–12.

Audino, L. D., Louzada, J., & Comita, L. (2014). Dung beetles as indicators of tropical forest restoration success: Is it possible to recover species and functional diversity? *Biological Conservation*, *169*, 248–257.

Augustine, D. J., & Baker, B. W. (2013). Associations of grassland bird communities with black-tailed prairie dogs in the North American Great Plains. *Conservation Biology*, *27*, 324–334.

Ayanu, Y. Z., Conrad, C., Nauss, T., Wegmann, M., & Koellner, T. (2012). Quantifying and mapping ecosystem services supplies and demands: A review of remote sensing applications. *Environmental Science & Technology*, *46*, 8529–8541.

Bagstad, K. J., Villa, F., Batker, D., Harrison-Cox, J., Voigt, B., & Johnson, G. W. (2014). From theoretical to actual ecosystem services: Mapping beneficiaries and spatial flows in ecosystem service assessments. *Ecology and Society*, *19*.

Balthazar, V., Vanacker, V., Molina, A., & Lambin, E. F. (2015). Impacts of forest cover change on ecosystem services in high Andean mountains. *Ecological Indicators*, *48*, 63–75.

Balzan, M. V., & Wäckers, F. L. (2013). Flowers to selectively enhance the fitness of a host-feeding parasitoid: Adult feeding by *Tuta absoluta* and its parasitoid *Necremnus artynes*. *Biological Control*, *67*, 21–31.

Barendregt, A., & Swarth, C. W. (2013). Tidal freshwater wetlands: Variation and changes. *Estuaries and Coasts*, *36*, 445–456.

Barra Caracciolo, A., Bustamante, M. A., Nogues, I., Di Lenola, M., Luprano, M. L., & Grenni, P. (2015). Changes in microbial community structure and functioning of a semiarid soil due to the use of anaerobic digestate derived composts and rosemary plants. *Geoderma*, *245–246*, 89–97.

Baumflek, M., DeGloria, S., & Kassam, K. A. (2015). Habitat modeling for health sovereignty: Increasing indigenous access to medicinal plants in northern Maine, USA. *Applied Geography*, *56*, 83–94.

Bawa, K. S., & Seidler, R. (2015). Deforestation and sustainable mixed-use landscapes: A view from the eastern Himalaya. *Annals of the Missouri Botanical Garden*, *100*, 141–149.

Beaumont, N. J., Jones, L., Garbutt, A., Hansom, J. D., & Toberman, M. (2014). The value of carbon sequestration and storage in coastal habitats. *Estuarine, Coastal and Shelf Science*, *137*, 32–40.

Beck, M. B., & Villarroel Walker, R. (2013). Nexus security: Governance, innovation and the resilient city. *Frontiers of Environmental Science and Engineering*, *7*, 640–657.

Beer, N. A., & Joyce, C. B. (2013). North Atlantic coastal lagoons: Conservation, management and research challenges in the twenty-first century. *Hydrobiologia*, *701*, 1–11.

Belnap, J., Miller, D. M., Bedford, D. R., & Phillips, S. L. (2014). Pedological and geological relationships with soil lichen and moss distribution in the eastern Mojave Desert, CA, USA. *Journal of Arid Environments*, *106*, 45–57.

Bennett, M. T., Xie, C., Hogarth, N. J., Peng, D., & Putzel, L. (2014). China's conversion of cropland to forest program for household delivery of ecosystem services: How important is a local implementation regime to survival rate outcomes? *Forests*, *5*, 2345–2376.

Benot, M. L., Saccone, P., Pautrat, E., Vicente, R., Colace, M. P., Grigulis, K., … Lavorel, S. (2014). Stronger short-term effects of mowing than extreme summer weather on a subalpine grassland. *Ecosystems*, *17*, 458–472.

Berbés-Blázquez, M. (2011). A participatory assessment of ecosystem services and human wellbeing in rural Costa Rica using photo-voice. *Environmental Management*, *49*, 862–875.

Bereczki, K., Ódor, P., Csóka, G., Mag, Z., & Báldi, A. (2014). Effects of forest heterogeneity on the efficiency of caterpillar control service provided by birds in temperate oak forests. *Forest Ecology and Management*, *327*, 96–105.

Binet, T., Failler, P., Chavance, P. N., & Mayif, M. A. (2013). First international payment for marine ecosystem services: The case of the Banc d'Arguin National Park, Mauritania. *Global Environmental Change*, *23*, 1434–1443.

Biondi, A., Zappalà, L., Stark, J. D., & Desneux, N. (2013). Do biopesticides affect the demographic traits of a parasitoid wasp and its biocontrol services through sublethal effects? *PLoS ONE*, *8*.

Bizikova, L., Nijnik, M., & Kluvanková-Oravská, T. (2012). Sustaining multifunctional forestry through the developing of social capital and promoting participation: A case of multiethnic mountain communities. *Small-Scale Forestry*, *11*, 301–319.

Blake, R. J., Woodcock, B. A., Westbury, D. B., Sutton, P., & Potts, S. G. (2013). Novel management to enhance spider biodiversity in existing grass buffer strips. *Agricultural and Forest Entomology*, *15*, 77–85.

Blitzer, E. J., Dormann, C. F., Holzschuh, A., Klein, A. M., Rand, T. A., & Tscharntke, T. (2012). Spillover of functionally important organisms between managed and natural habitats. *Agriculture, Ecosystems and Environment*, *146*, 34–43.

Bloor, J. M. G., & Bardgett, R. D. (2012). Stability of above-ground and below-ground processes to extreme drought in model grassland ecosystems: Interactions with plant species diversity and soil nitrogen availability. *Perspectives in Plant Ecology, Evolution and Systematics*, *14*, 193–204.

Blubaugh, C. K., & Kaplan, I. (2015). Tillage compromises weed seed predator activity across developmental stages. *Biological Control*, *81*, 76–82.

Bogdan, P., Coman, C., Stelian, A. B., Dan, M. N., Codreanu, C., Ignea, G., … Ionescu, O. (2013). Total economic value of natural capital—A case study of Piatra Craiului National Park. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, *41*, 608.

Boschetti, F., Fulton, E. A., & Grigg, N. J. (2015). Citizens' views of Australia's future to 2050. *Sustainability (Switzerland)*, *7*, 222–247.

Bouchard, N. R., Osmond, D. L., Winston, R. J., & Hunt, W. F. (2013). The capacity of roadside vegetated filter strips and swales to sequester carbon. *Ecological Engineering*, *54*, 227–232.

Brainard, D., Henshaw, B., & Snapp, S. (2012). Hairy vetch varieties and Bi-Cultures influence cover crop services in strip-tilled sweet corn. *Agronomy Journal*, *104*, 629–638.

Branch, T. (2013). Citation patterns of a controversial and high-impact paper: Worm et al. (2006) “Impacts of biodiversity loss on ocean ecosystem services”. *PLoS ONE*, *8*, 1–7.

Brévault, T., Renou, A., Vayssières, J. F., Amadji, G., Assogba-Komlan, F., Diallo, M. D., … Clouvel, P. (2014). DIVECOSYS: Bringing together researchers to design ecologically-based pest management for small-scale farming systems in West Africa. *Crop Protection*, *66*, 53–60.

Brosi, B. J., & Briggs, H. M. (2013). Single pollinator species losses reduce floral fidelity and plant reproductive function. *Proceedings of the National Academy of Sciences of the United States of America*, *110*, 13044–13048.

Brown, G., & Kyttä, M. (2014). Key issues and research priorities for public participation GIS (PPGIS): A synthesis based on empirical research. *Applied Geography*, *46*, 126–136.

Bryan, B. A., Meyer, W. S., Campbell, C. A., Harris, G. P., Lefroy, T., Lyle, G., … Young, M. (2013). The second industrial transformation of Australian landscapes. *Current Opinion in Environmental Sustainability*, *5*, 278–287.

Busch, D. S., Harvey, C. J., & McElhany, P. (2013). Potential impacts of ocean acidification on the Puget Sound food web. *ICES Journal of Marine Science*, *70*, 823–833.

Buytaert, W., & Bievre, B. D. (2012). Water for cities: The impact of climate change and demographic growth in the tropical Andes. *Water Resources Research*, *48*, 1–13.

Cameira, M. R., Tedesco, S., & Leitão, T. E. (2014). Water and nitrogen budgets under different production systems in Lisbon urban farming. *Biosystems Engineering*, *125*, 65–79.

Cao, S., Ma, H., Yuan, W., & Wang, X. (2014). Interaction of ecological and social factors affects vegetation recovery in China. *Biological Conservation*, *180*, 270–277.

Carbone, J. C., & Kerry Smith, V. (2013). Valuing nature in a general equilibrium. *Journal of Environmental Economics and Management*, *66*, 72–89.

Cardinale, M., Dörner, H., Abella, A., Andersen, J. L., Casey, J., Döring, R., … Stransky, C. (2013). Rebuilding EU fish stocks and fisheries, a process under way? *Marine Policy*, *39*, 43–52.

Carlson, J., Saxena, J., Basta, N., Hundal, L., Busalacchi, D., & Dick, R. P. (2015). Application of organic amendments to restore degraded soil: Effects on soil microbial properties. *Environmental Monitoring and Assessment*, *187*.

Carrer, M., Motta, R., & Nola, P. (2012). Significant mean and extreme climate sensitivity of Norway spruce and silver fir at mid-elevation mesic sites in the Alps. *PLoS ONE*, *7*, 1–10.

Carron, M. P., Auriac, Q., Snoeck, D., Villenave, C., Blanchart, E., Ribeyre, F., … Caliman, J. P. (2015). Spatial heterogeneity of soil quality around mature oil palms receiving mineral fertilization. *European Journal of Soil Biology*, *66*, 24–31.

Carstensen, J., Conley, D. J., Bonsdorff, E., Gustafsson, B. G., Hietanen, S., Janas, U., … Voss, M. (2014). Hypoxia in the Baltic Sea: Biogeochemical cycles, benthic fauna, and management. *Ambio*, *43*, 26–36.

Chan, C., & Jacobs, R. R. (2013). Analysis of potential mercury policies: The impact of stream basin characteristics on susceptible populations. *Integrated Environmental Assessment and Management*, *9*, 124–133.

Chandrakanth, M. G., & Nagaraja, M. G. (2014). Payment for ecosystem services for water – Case of Cauvery. *Current Science*, *107*, 67–68.

Chang, H., Jung, I. W., Steele, M., & Gannett, M. (2012). Spatial patterns of March and September streamflow trends in Pacific Northwest streams, 1958–2008. *Geographical Analysis*, *44*, 177–201.

Chen, T. S., & Lin, H. J. (2013). Development of a framework for landscape assessment of Taiwanese wetlands. *Ecological Indicators*, *25*, 121–132.

Chen, W. Y., & Hua, J. (2015). Citizens' distrust of government and their protest responses in a contingent valuation study of urban heritage trees in Guangzhou, China. *Journal of Environmental Management*, *155*, 40–48.

Christen, N., Calosi, P., McNeill, C. L., & Widdicombe, S. (2013). Structural and functional vulnerability to elevated pCO_2 in marine benthic communities. *Marine Biology*, *160*, 2113–2128.

Ciccarese, L., Mattsson, A., & Pettenella, D. (2012). Ecosystem services from forest restoration: Thinking ahead. *New Forests*, *43*, 543–560.

Cipriotti, P. A., Aguiar, M. R., Wiegand, T., & Paruelo, J. M. (2012). Understanding the long-term spatial dynamics of a semiarid grass-shrub steppe through inverse parameterization for simulation models. *Oikos*, *121*, 848–861.

Clark, J., Wang, Y., & August, P. V. (2014). Assessing current and projected suitable habitats for tree-of-heaven along the Appalachian Trail. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *369*, 20130192.

Clark, K. H., & Nicholas, K. A. (2013). Introducing urban food forestry: A multifunctional approach to increase food security and provide ecosystem services. *Landscape Ecology*, *28*, 1649–1669.

Cohen-Shacham, E., Dayan, T., de Groot, R., Beltrame, C., Guillet, F., & Feitelson, E. (2015). Using the ecosystem services concept to analyse stakeholder involvement in wetland management. *Wetlands Ecology and Management*, *23*, 241–256.

Cole, S. G., & Dahl, E. L. (2013). Compensating white-tailed eagle mortality at the Smøla wind-power plant using electrocution prevention measures. *Wildlife Society Bulletin*, *37*, 84–93.

Comizzolli, P., & Holt, W. V. (2014). Recent advances and prospects in germplasm preservation of rare and endangered species. *Reproductive Sciences in Animal Conservation*, 331–356.

Conti, G., Pérez-Harguindeguy, N., Quètier, F., Gorné, L. D., Jaureguiberry, P., Bertone, G. A., … Díaz, S. (2014). Large changes in carbon storage under different land-use regimes in subtropical seasonally dry forests of southern South America. *Agriculture, Ecosystems and Environment*, *197*, 68–76.

Cooke, S. J., & Murchie, K. J. (2015). Status of aboriginal, commercial and recreational inland fisheries in North America: Past, present and future. *Fisheries Management and Ecology*, *22*, 1–13.

Corson, C., Gruby, R., Witter, R., Hagerman, S., Suarez, D., Greenberg, S., … Campbell, L. M. (2014). Everyone's solution? Defining and redefining protected areas at the Convention on Biological Diversity. *Conservation and Society*, *12*, 190–202.

Corton, J., Bühle, L., Wachendorf, M., Donnison, I. S., & Fraser, M. D. (2013). Bioenergy as a biodiversity management tool and the potential of a mixed species feedstock for bioenergy production in Wales. *Bioresource Technology*, *129*, 142–149.

Cranford, M., & Mourato, S. (2014). Credit-based payments for ecosystem services: Evidence from a choice experiment in Ecuador. *World Development*, *64*, 503–520.

Cullen-Unsworth, L., & Unsworth, R. (2013). Seagrass meadows, ecosystem services, and sustainability. *Environment: Science and Policy for Sustainable Development*, *55*, 14–28.

Culler, L. E., Smith, R. F., & Lamp, W. O. (2014). Weak relationships between environmental factors and invertebrate communities in constructed wetlands. *Wetlands*, *34*, 351–361.

Darvill, B., Lepais, O., Woodall, L. C., & Goulson, D. (2012). Triploid bumblebees indicate a direct cost of inbreeding in fragmented populations. *Molecular Ecology*, *21*, 3988–3995.

Deguines, N., Jono, C., Baude, M., Henry, M., Julliard, R., & Fontaine, C. (2014). Large-scale trade-off between agricultural intensification and crop pollination services. *Frontiers in Ecology and the Environment*, *12*, 212–217.

Deikumah, J. P., McAlpine, C. A., & Maron, M. (2014). Mining matrix effects on West African rainforest birds. *Biological Conservation*, *169*, 334–343.

Díaz, F. J., Ogeen, A. T., & Dahlgren, R. A. (2012). Agricultural pollutant removal by constructed wetlands: Implications for water management and design. *Agricultural Water Management*, *104*, 171–183.

Dicks, L. V., Bardgett, R. D., Bell, J., Benton, T. G., Booth, A., Bouwman, J., … Sutherland, W. J. (2013). What do we need to know to enhance the environmental sustainability of agricultural production? A prioritisation of knowledge needs for the UK food system. *Sustainability (Switzerland)*, *5*, 3095–3115.

Dongming, X., Guohua, J., Yangming, Z., Gengying, J., Lingguang, H., Yuping, Y., & Xingzhao, D. (2013). Ecological function zoning of Poyang Lake wetland: A RAMSAR site in China. *Water Policy*, *15*, 922–935.

Donoso, P. J., Frêne, C., Flores, M., Moorman, M. C., Oyarzún, C. E., & Zavaleta, J. C. (2014). Balancing water supply and old-growth forest conservation in the lowlands of south-central Chile through adaptive co-management. *Landscape Ecology*, *29*, 245–260.

Dragoi, M., & Ciornei, I. (2013). A black-box approach on assessing the opportunity cost of deforestation. *Land Use Policy*, *34*, 314–320.

Dreyer, J., & Gratton, C. (2014). Habitat linkages in conservation biological control: Lessons from the land-water interface. *Biological Control*, *75*, 68–76.

Duarte, B., Couto, T., Freitas, J., Valentim, J., Silva, H., Marques, J. C., … Caçador, I. (2013). Abiotic modulation of *Spartina maritima* photobiology in different latitudinal populations. *Estuarine, Coastal and Shelf Science*, *130*, 127–137.

Edwards, F. A., Edwards, D. P., Sloan, S., & Hamer, K. C. (2014). Sustainable management in crop monocultures: The impact of retaining forest on oil palm yield. *PLoS ONE*, *9*.

Eitzel, M. V., Diver, S., Sardiñas, H., Hallett, L. M., Olson, J. J., Romero, A., … Suding, K. N. (2012). Insights from a cross-disciplinary seminar: 10 pivotal papers for ecological restoration. *Restoration Ecology*, *20*, 147–152.

Ekvall, M. K., de la Calle Martin, J., Faassen, E. J., Gustafsson, S., Lürling, M., & Hansson, L. A. (2013). Synergistic and species-specific effects of climate change and water colour on cyanobacterial toxicity and bloom formation. *Freshwater Biology*, *58*, 2414–2422.

Elmhagen, B., Eriksson, O., & Lindborg, R. (2015). Implications of climate and land-use change for landscape processes, biodiversity, ecosystem services, and governance. *Ambio*, *44*, 1–5.

Epelde, L., Becerril, J. M., Alkorta, I., & Garbisu, C. (2014). Adaptive long-term monitoring of soil health in metal phytostabilization: Ecological attributes and ecosystem services based on soil microbial parameters. *International Journal of Phytoremediation*, *16*, 971–981.

Estoque, R. C., & Murayama, Y. (2013). Landscape pattern and ecosystem service value changes: Implications for environmental sustainability planning for the rapidly urbanizing summer capital of the Philippines. *Landscape and Urban Planning*, *116*, 60–72.

Eyre, M. D., Luff, M. L., Atlihan, R., & Leifert, C. (2012). Ground beetle species (Carabidae, Coleoptera) activity and richness in relation to crop type, fertility management and crop protection in a farm management comparison trial. *Annals of Applied Biology*, *161*, 169–179.

Fearnside, P. M. (2012). Brazil's Amazon forest in mitigating global warming: Unresolved controversies. *Climate Policy*, *12*, 70–81.

Fernandez, A. R., Blumsack, S. A., & Reed, P. M. (2013). Operational constraints and hydrologic variability limit hydropower in supporting wind integration. *Environmental Research Letters*, *8*, 024037.

Ferraro, P. J., & Hanauer, M. M. (2014). Quantifying causal mechanisms to determine how protected areas affect poverty through changes in ecosystem services and infrastructure. *Proceedings of the National Academy of Sciences of the United States of America*, *111*, 4332–4337.

Ferraro, P. J., & Hanauer, M. M. (2014). Advances in measuring the environmental and social impacts of environmental programs. *Annual Review of Environment and Resources*, *39*, 495–517.

Ferraz, S. F. B., Ferraz, K. M. P. M. B., Cassiano, C. C., Brancalion, P. H. S., da Luz, D. T. A., Azevedo, T. N., … Metzger, J. P. (2014). How good are tropical forest patches for ecosystem services provisioning? *Landscape Ecology*, *29*, 187–200.

Fitter, A. H. (2013). Are ecosystem services replaceable by technology? *Environmental and Resource Economics*, *55*, 513–524.

Forouzangohar, M., Crossman, N. D., MacEwan, R. J., Wallace, D. D., & Bennett, L. T. (2014). Ecosystem services in agricultural landscapes: A spatially explicit approach to support sustainable soil management. *The Scientific World Journal*, *2014*, 483298.

Forrester, J., Cook, B., Bracken, L., Cinderby, S., & Donaldson, A. (2015). Combining participatory mapping with Q-methodology to map stakeholder perceptions of complex environmental problems. *Applied Geography*, *56*, 199–208.

Franck, U., Klimeczek, H. J., & Kindler, A. (2014). Social indicators are predictors of airborne outdoor exposures in Berlin. *Ecological Indicators*, *36*, 582–593.

Frank, S., Fürst, C., Koschke, L., & Makeschin, F. (2012). A contribution towards a transfer of the ecosystem service concept to landscape planning using landscape metrics. *Ecological Indicators*, *21*, 30–38.

Fung, T., Seymour, R. M., & Johnson, C. R. (2013). Warning signals of regime shifts as intrinsic properties of endogenous dynamics. *The American Naturalist*, *182*, 208–222.

Gao, Y., Feng, Z., Li, Y., & Li, S. (2014). Freshwater ecosystem service footprint model: A model to evaluate regional freshwater sustainable development – A case study in Beijing-Tianjin-Hebei, China. *Ecological Indicators*, *39*, 1–9.

Georgelin, E., & Loeuille, N. (2014). Dynamics of coupled mutualistic and antagonistic interactions, and their implications for ecosystem management. *Journal of Theoretical Biology*, *346*, 67–74.

Geraldi, N. R., Smyth, A. R., Piehler, M. F., & Peterson, C. H. (2014). Artificial substrates enhance non-native macroalga and N_2 production. *Biological Invasions*, *16*, 1819–1831.

Ghaley, B. B., Vesterdal, L., & Porter, J. R. (2014). Quantification and valuation of ecosystem services in diverse production systems for informed decision-making. *Environmental Science and Policy*, *39*, 139–149.

Giday, K., Eshete, G., Barklund, P., Aertsen, W., & Muys, B. (2013). Wood biomass functions for *Acacia abyssinica* trees and shrubs and implications for provision of ecosystem services in a community managed exclosure in Tigray, Ethiopia. *Journal of Arid Environments*, *94*, 80–86.

Giese, M., Brueck, H., Gao, Y. Z., Lin, S., Steffens, M., Kögel-Knabner, I., … Han, X. G. (2013). N balance and cycling of Inner Mongolia typical steppe: A comprehensive case study of grazing effects. *Ecological Monographs*, *83*, 195–219.

Gilbert, L. (2013). Can restoration of afforested peatland regulate pests and disease? *Journal of Applied Ecology*, *50*, 1226–1233.

Gill, R. J., & Raine, N. E. (2014). Chronic impairment of bumblebee natural foraging behaviour induced by sublethal pesticide exposure. *Functional Ecology*, *28*, 1459–1471.

Gollan, J. R., de Bruyn, L. L., Reid, N., & Wilkie, L. (2013). Monitoring the ecosystem service provided by dung beetles offers benefits over commonly used biodiversity metrics and a traditional trapping method. *Journal for Nature Conservation*, *21*, 183–188.

González-Roglich, M., Swenson, J. J., Villarreal, D., Jobbágy, E. G., & Jackson, R. B. (2000s). Woody plant-cover dynamics in Argentine savannas from the 1880s to 2000s: The interplay of encroachment and agriculture conversion at varying scales. *Ecosystems*, *18*, 481–492.

Gordon, J. E., & Barron, H. F. (2012). Valuing geodiversity and geoconservation: Developing a more strategic ecosystem approach. *Scottish Geographical Journal*, *128*, 278–297.

Grabowski, J. H., Brumbaugh, R. D., Conrad, R. F., Keeler, A. G., Opaluch, J. J., Peterson, C. H., … Smyth, A. R. (2012). Economic valuation of ecosystem services provided by oyster reefs. *BioScience*, *62*, 900–909.

Grand-Clement, E., Anderson, K., Smith, D., Luscombe, D., Gatis, N., Ross, M., & Brazier, R. E. (2013). Evaluating ecosystem goods and services after restoration of marginal upland peatlands in South-West England. *Journal of Applied Ecology*, *50*, 324–334.

Gu, X., Guo, W., Wang, Y., & Yang, G. (2014). Remote sensing evaluation of ecosystem service value of gas regulation with time series Landsat images. *SPIE Proceedings*, *9239*, 92391N.

Guo, J., & Kildow, J. (2015). The gap between science and policy: Assessing the use of nonmarket valuation in estuarine management based on a case study of US federally managed estuaries. *Ocean and Coastal Management*, *108*, 20–26.

Haas, J. R., Calkin, D. E., & Thompson, M. P. (2015). Wildfire risk transmission in the Colorado Front Range, USA. *Risk Analysis*, *35*, 226–240.

Halaburka, B. J., Lawrence, J. E., Bischel, H. N., Hsiao, J., Plumlee, M. H., Resh, V. H., & Luthy, R. G. (2013). Economic and ecological costs and benefits of streamflow augmentation using recycled water in a California coastal stream. *Environmental Science & Technology*, *47*, 10735–10743.

Harland, T. (2012). Higher education as an open-access discipline. *Higher Education Research & Development*, *31*, 703–710.

Heilmann-Clausen, J., Barron, E. S., Boddy, L., Dahlberg, A., Griffith, G. W., Nordén, J., … Halme, P. (2015). A fungal perspective on conservation biology. *Conservation Biology*, *29*, 61–68.

Heleno, R. H., Ramos, J. A., & Memmott, J. (2013). Integration of exotic seeds into an Azorean seed dispersal network. *Biological Invasions*, *15*, 1143–1154.

Hendrych, J., Storm, V., & Pacini, N. (2013). The value of an 1827 cadastre map in the rehabilitation of ecosystem services in the Kremze Basin, Czech Republic. *Landscape Research*, *38*, 750–767.

Hernandez, R. R., & Knudsen, K. (2012). Late-successional biological soil crusts in a biodiversity hotspot: An example of congruency in species richness. *Biodiversity and Conservation*, *21*, 1015–1031.

Hill, R., Miller, C., Newell, B., Dunlop, M., & Gordon, I. J. (2015). Why biodiversity declines as protected areas increase: the effect of the power of governance regimes on sustainable landscapes. *Sustainability Science*, *10*, 357–369.

Hinojosa, L., & Hennermann, K. (2012). A GIS approach to ecosystem services and rural territorial dynamics applied to the case of the gas industry in Bolivia. *Applied Geography*, *34*, 487–497.

Hodge, I. D., & Adams, W. M. (2012). Neoliberalisation, rural land trusts and institutional blending. *Geoforum*, *43*, 472–482.

Honey-Rosés, J., Acuña, V., Bardina, M., Brozović, N., Marcé, R., Munné, A., … Schneider, D. W. (2013). Examining the demand for ecosystem services: The value of stream restoration for drinking water treatment managers in the Llobregat River, Spain. *Ecological Economics*, *90*, 196–205.

Howe, C., Suich, H., van Gardingen, P., Rahman, A., & Mace, G. M. (2013). Elucidating the pathways between climate change, ecosystem services and poverty alleviation. *Current Opinion in Environmental Sustainability*, *5*, 102–107.

Hulme, P. E., Pyšek, P., Jarošík, V., Pergl, J., Schaffner, U., & Vilà, M. (2013). Bias and error in understanding plant invasion impacts. *Trends in Ecology & Evolution*, *28*, 212–218.

Hummel, D., Adamo, S., de Sherbinin, A., Murphy, L., Aggarwal, R., Zulu, L., … Knight, K. (2013). Inter- and transdisciplinary approaches to population-environment research for sustainability aims: A review and appraisal. *Population and Environment*, *34*, 481–509.

Huryna, H., Brom, J., & Pokorny, J. (2014). The importance of wetlands in the energy balance of an agricultural landscape. *Wetlands Ecology and Management*, *22*, 363–381.

Hynes, S., Norton, D., & Corless, R. (2014). Investigating societal attitudes towards the marine environment of Ireland. *Marine Policy*, *47*, 57–65.

Iftekhar, S., Hailu, A., & Lindner, B. (2012). Combinatorial auctions for procuring agri-environmental services: A review of some design issues. *Australasian Journal of Environmental Management*, *19*, 79–90.

Inger, R., Gregory, R., Duffy, J. P., Stott, I., Voříšek, P., & Gaston, K. J. (2015). Common European birds are declining rapidly while less abundant species' numbers are rising. *Ecology Letters*, *18*, 28–36.

Iniesta-Arandia, I., García-Llorente, M., Aguilera, P. A., Montes, C., & Martín-López, B. (2014). Socio-cultural valuation of ecosystem services: Uncovering the links between values, drivers of change, and human well-being. *Ecological Economics*, *108*, 36–48.

Inostroza, L. (2014). Measuring urban ecosystem functions through 'Technomass' – A novel indicator to assess urban metabolism. *Ecological Indicators*, *42*, 10–19.

Jackson, E. L., Rees, S. E., Wilding, C., & Attrill, M. J. (2015). Use of a seagrass residency index to apportion commercial fishery landing values and recreation fisheries expenditure to seagrass habitat service. *Conservation Biology*, *29*, 899–909.

Jalloh, A., Roy-Macauley, H., & Sereme, P. (2012). Major agro-ecosystems of West and Central Africa: Brief description, species richness, management, environmental limitations and concerns. *Agriculture, Ecosystems and Environment*, *157*, 5–16.

Jim, C. Y. (2013). Sustainable urban greening strategies for compact cities in developing and developed economies. *Urban Ecosystems*, *16*, 741–761.

Johnson, C. E. (2013). Chemical properties of upland forest soils in the Catskills region. *Annals of the New York Academy of Sciences*, *1298*, 30–42.

Johnston, R. J., Schultz, E. T., Segerson, K., Besedin, E. Y., & Ramachandran, M. (2012). Enhancing the content validity of stated preference valuation: The structure and function of ecological indicators. *Land Economics*, *88*, 102–120.

Jordaan, L. A., & Downs, C. T. (2012). Comparison of germination rates and fruit traits of indigenous *Solanum giganteum* and invasive *Solanum mauritianum* in South Africa. *South African Journal of Botany*, *80*, 13–20.

Jordan, A., & Russel, D. (2014). Embedding the concept of ecosystem services? The utilisation of ecological knowledge in different policy venues. *Environment and Planning C: Government and Policy*, *32*, 192–207.

Jordan, S. J., & Benson, W. H. (2015). Sustainable watersheds: Integrating ecosystem services and public health. *Environmental Health Insights*, *9*, 1–7.

Jørgensen, S. E., & Nielsen, S. N. (2012). Tool boxes for an integrated ecological and environmental management. *Ecological Indicators*, *21*, 104–109.

Jourdain, D., Boere, E., van den Berg, M., Dang, Q. D., Cu, T. P., Affholder, F., & Pandey, S. (2014). Water for forests to restore environmental services and alleviate poverty in Vietnam: A farm modeling approach to analyze alternative PES programs. *Land Use Policy*, *41*, 423–437.

Junsongduang, A., Balslev, H., Inta, A., Jampeetong, A., & Wangpakapattanawong, P. (2013). Medicinal plants from swidden fallows and sacred forest of the Karen and the Lawa in Thailand. *Journal of Ethnobiology and Ethnomedicine*, *9*, 44.

Kalaba, F. K., Quinn, C. H., Dougill, A. J., & Vinya, R. (2013). Floristic composition, species diversity and carbon storage in charcoal and agriculture fallows and management implications in Miombo woodlands of Zambia. *Forest Ecology and Management*, *304*, 99–109.

Kalda, O., Kalda, R., & Liira, J. (2015). Multi-scale ecology of insectivorous bats in agricultural landscapes. *Agriculture, Ecosystems and Environment*, *199*, 105–113.

Kefford, B. J., Schäfer, R. B., & Metzeling, L. (2012). Risk assessment of salinity and turbidity in Victoria (Australia) to stream insects' community structure does not always protect functional traits. *Science of the Total Environment*, *415*, 61–68.

Kettle, C. J. (2012). Seeding ecological restoration of tropical forests: Priority setting under REDD+. *Biological Conservation*, *154*, 34–41.

Khan, S. M., Page, S. E., Ahmad, H., & Harper, D. M. (2013). Sustainable utilization and conservation of plant biodiversity in montane ecosystems: The western Himalayas as a case study. *Annals of Botany*, *112*, 479–501.

Kim, H. Y. (2014). Ecological valuation in a transportation project: Value transfer and spatial decision support systems. *International Journal of Environmental Science and Technology*, *11*, 2281–2290.

Ko, J. Y., Day, J. W., Lane, R. L., Hunter, R., Sabins, D., Pintado, K. L., & Franklin, J. (2012). Policy adoption of ecosystem services for a sustainable community: A case study of wetland assimilation using natural wetlands in Breaux Bridge, Louisiana. *Ecological Engineering*, *38*, 114–118.

Koetz, T., Farrell, K. N., & Bridgewater, P. (2012). Building better science-policy interfaces for international environmental governance: Assessing potential within the Intergovernmental Platform for Biodiversity and Ecosystem Services. *International Environmental Agreements: Politics, Law and Economics*, *12*, 1–21.

Komarek, A. M., Shi, X., & Heerink, N. (2014). Household-level effects of China's Sloping Land Conversion Program under price and policy shifts. *Land Use Policy*, *40*, 36–44.

Kontogianni, A., Tourkolias, C., Machleras, A., & Skourtos, M. (2012). Service providing units, existence values and the valuation of endangered species: A methodological test. *Ecological Economics*, *79*, 97–104.

Koskela, J., Vinceti, B., Dvorak, W., Bush, D., Dawson, I. K., Loo, J., … Ramamonjisoa, L. (2014). Utilization and transfer of forest genetic resources: A global review. *Forest Ecology and Management*, *333*, 22–34.

Kreitler, J., Papenfus, M., Byrd, K., & Labiosa, W. (2013). Interacting coastal based ecosystem services: Recreation and water quality in Puget Sound, WA. *PLoS ONE*, *8*, 1–10.

Kroeger, T., Escobedo, F. J., Hernandez, J. L., Varela, S., Delphin, S., Fisher, J. R. B., … Wagner, J. E. (2014). Reforestation as a novel compliance measure in State Implementation Plans for ground-level ozone. *Environmental Pollution*, *159*, 2078–2087.

Kutch, I. C., Sevgili, H., Wittman, T., & Fedorka, K. M. (2014). Thermoregulatory strategy may shape immune investment in *Drosophila melanogaster*. *The Journal of Experimental Biology*, *217*, 3664–3669.

La Rosa, D., & Martinico, F. (2013). Assessment of hazards and risks for landscape protection planning in Sicily. *Journal of Environmental Management*, *127*, S155–S167.

Laidlaw, R. A., Smart, J., Smart, M. A., & Gill, J. A. (2013). Managing a food web: Impacts on small mammals of managing grasslands for breeding waders. *Animal Conservation*, *16*, 207–215.

Lal, R. (2013). Soil carbon management and climate change. *Carbon Management*, *4*, 439–462.

Lambin, E. F., Meyfroidt, P., Rueda, X., Blackman, A., Börner, J., Cerutti, P. O., … Wunder, S. (2014). Effectiveness and synergies of policy instruments for land use governance in tropical regions. *Global Environmental Change*, *28*, 129–140.

Langlois, J., Freon, P., Steyer, J.-P., Delgenes, J.-P., & Helias, A. (2014). Sea-use impact category in life cycle assessment: State of the art and perspectives. *The International Journal of Life Cycle Assessment*, *19*, 994–1006.

Laurance, W. F., Clements, G. R., Sloan, S., O'Connell, C. S., Mueller, N. D., Goosem, M., … Arrea, I. B. (2014). A global strategy for road building. *Nature*, *513*, 229–232.

Lavelle, P., Rodríguez, N., Arguello, O., Bernal, J., Botero, C., Chaparro, P., … Fonte, S. J. (2014). Soil ecosystem services and land use in the rapidly changing Orinoco River Basin of Colombia. *Agriculture, Ecosystems and Environment*, *185*, 106–117.

Le Maitre, D. C., Kotzee, I. M., & O'Farrell, P. J. (2014). Impacts of land-cover change on the water flow regulation ecosystem service: Invasive alien plants, fire and their policy implications. *Land Use Policy*, *36*, 171–181.

Lee, J. A., Chon, J., & Ahn, C. (2014). Planning landscape corridors in ecological infrastructure using least-cost path methods based on the value of ecosystem services. *Sustainability*, *6*, 7564–7585.

Leonhardt, S. D., Gallai, N., Garibaldi, L. A., Kuhlmann, M., & Klein, A. M. (2013). Economic gain, stability of pollination and bee diversity decrease from southern to northern Europe. *Basic and Applied Ecology*, *14*, 461–471.

Letnic, M., Baker, L., & Nesbitt, B. (2013). Ecologically functional landscapes and the role of dingoes as trophic regulators in south-eastern Australia and other habitats. *Ecological Management and Restoration*, *14*, 101–105.

Lewanzik, D., & Voigt, C. C. (2014). Artificial light puts ecosystem services of frugivorous bats at risk. *Journal of Applied Ecology*, *51*, 388–394.

Li, J.-B., Dai, Y., Yin, R.-X., Yang, Y., Li, Y.-D., & Wang, K.-Y. (2013). Effects of Three Gorges Reservoir impoundment on the wetland ecosystem service value of Dongting Lake, South-central China. *Chinese Journal of Applied Ecology*, *24*, 809–817.

Li, W., & Wu, C. (2013). A spatially explicit method to examine the impact of urbanisation on natural ecosystem service values. *Journal of Spatial Science*, *58*, 275–289.

Li, X., Liu, Z., Wang, Z., Wu, X., Li, X., Hu, J., … Hou, X. (2015). Pathways of *Leymus chinensis* individual aboveground biomass decline in natural semiarid grassland induced by overgrazing: A study at the plant functional trait scale. *PLoS ONE*, *10*, 1–17.

Li, X. J., Zhang, J., & Xu, L. Y. (2015). An evaluation of ecological losses from hydropower development in Tibet. *Ecological Engineering*, *76*, 178–185.

Li, Y., Viña, A., Yang, W., Chen, X., Zhang, J., Ouyang, Z., … Liu, J. (2013). Effects of conservation policies on forest cover change in giant panda habitat regions, China. *Land Use Policy*, *33*, 42–53.

Lima, L. S., Coe, M. T., Soares Filho, B. S., Cuadra, S. V., Dias, L. C. P., Costa, M. H., … Rodrigues, H. O. (2014). Feedbacks between deforestation, climate, and hydrology in the Southwestern Amazon: Implications for the provision of ecosystem services. *Landscape Ecology*, *29*, 261–274.

Lin, Y., Wen, S. Z., & Wang, D. M. (2014). Demonstration project of wetlands restoration and pollution control – A case study in Xiangtan Manganese Mine, China. *Environmental Engineering*, *864–867*, 1270–1274.

Londoño Cadavid, C., & Ando, A. W. (2013). Valuing preferences over stormwater management outcomes including improved hydrologic function. *Water Resources Research*, *49*, 4114–4125.

Long, H., Liu, Y., Hou, X., Li, T., & Li, Y. (2014). Effects of land use transitions due to rapid urbanization on ecosystem services: Implications for urban planning in the new developing area of China. *Habitat International*, *44*, 536–544.

López-Hoffman, L., Breshears, D. D., Allen, C. D., & Miller, M. L. (2013). Key landscape ecology metrics for assessing climate change adaptation options: Rate of change and patchiness of impacts. *Ecosphere*, *4*, art101.

Lü, Y., Fu, B., Feng, X., Zeng, Y., Liu, Y., Chang, R., … Wu, B. (2012). A policy-driven large scale ecological restoration: Quantifying ecosystem services changes in the Loess Plateau of China. *PLoS ONE*, *7*, 1–11.

Lü, Y., Ma, Z., Zhang, L., Fu, B., & Gao, G. (2013). Redlines for the greening of China. *Environmental Science and Policy*, *33*, 345–353.

Ma, F., Eneji, A. E., & Liu, J. (2014). Understanding relationships among agro-ecosystem services based on emergy analysis in Luancheng County, North China. *Sustainability*, *6*, 8700–8719.

Ma, S., & Swinton, S. M. (2012). Hedonic valuation of farmland using sale prices versus appraised values. *Land Economics*, *88*, 1–15.

Macfadyen, S., Davies, A. P., & Zalucki, M. P. (2015). Assessing the impact of arthropod natural enemies on crop pests at the field scale. *Insect Science*, *22*, 20–34.

Machado, F. H., Silva, L. F., Dupas, F. A., Mattedi, A. P., & Vergara, F. E. (2014). Economic assessment of urban watersheds: Developing mechanisms for environmental protection of the Feijão river, São Carlos–SP, Brazil. *Brazilian Journal of Biology*, *74*, 677–684.

Mackie, K. A., Marhan, S., Ditterich, F., Schmidt, H. P., & Kandeler, E. (2015). The effects of biochar and compost amendments on copper immobilization and soil microorganisms in a temperate vineyard. *Agriculture, Ecosystems and Environment*, *201*, 58–69.

Maes, J., Barbosa, A., Baranzelli, C., Zulian, G., Batista e Silva, F., Vandecasteele, I., … Lavalle, C. (2015). More green infrastructure is required to maintain ecosystem services under current trends in land-use change in Europe. *Landscape Ecology*, *30*, 517–534.

Maher, S. P., Kramer, A. M., Pulliam, J. T., Zokan, M. A., Bowden, S. E., Barton, H. D., … Drake, J. M. (2012). Spread of white-nose syndrome on a network regulated by geography and climate. *Nature Communications*, *3*, 1–8.

Malone, T. C., DiGiacomo, P. M., Gonçalves, E., Knap, A. H., Talaue-McManus, L., & de Mora, S. (2014). A global ocean observing system framework for sustainable development. *Marine Policy*, *43*, 262–272.

Mamat, Z., Yimit, H., Eziz, A., & Ablimit, A. (2014). Oasis land-use change and its effects on the eco-environment in Yanqi Basin, Xinjiang, China. *Environmental Monitoring and Assessment*, *186*, 335–348.

Mann, M. L., Kaufmann, R. K., Bauer, D. M., Gopal, S., Baldwin, J. G., & Del Carmen Vera-Diaz, M. (2012). Ecosystem service value and agricultural conversion in the Amazon: Implications for policy intervention. *Environmental and Resource Economics*, *53*, 279–295.

Marquardt, K., Milestad, R., & Salomonsson, L. (2013). Improved fallows: A case study of an adaptive response in Amazonian swidden farming systems. *Agriculture and Human Values*, *30*, 417–428.

Martins, K. T., Gonzalez, A., & Lechowicz, M. J. (2015). Pollination services are mediated by bee functional diversity and landscape context. *Agriculture, Ecosystems and Environment*, *200*, 12–20.

Mason, O. U., Scott, N. M., Gonzalez, A., Robbins-Pianka, A., Bælum, J., Kimbrel, J., … Jansson, J. K. (2014). Metagenomics reveals sediment microbial community response to Deepwater Horizon oil spill. *The ISME Journal*, *8*, 1464–1475.

Mathur, V. N., Afionis, S., Paavola, J., Dougill, A. J., & Stringer, L. C. (2014). Experiences of host communities with carbon market projects: Towards multi-level climate justice. *Climate Policy*, *14*, 42–62.

Matsuura, T., Sugimura, K., Miyamoto, A., Tanaka, H., & Tanaka, N. (2014). Spatial characteristics of edible wild fern harvesting in mountainous villages in Northeastern Japan using GPS tracks. *Forests*, *5*, 269–286.

Mattsson, K., Ekvall, M. T., Hansson, L.-A., Linse, S., Malmendal, A., & Cedervall, T. (2015). Altered behavior, physiology, and metabolism in fish exposed to polystyrene nanoparticles. *Environmental Science & Technology*, *49*(1), 553–561.

Mayer, A., Winkler, R., & Fry, L. (2014). Classification of watersheds into integrated social and biophysical indicators with clustering analysis. *Ecological Indicators*, *45*, 340–349.

Mbow, C., Smith, P., Skole, D., Duguma, L., & Bustamante, M. (2014). Achieving mitigation and adaptation to climate change through sustainable agroforestry practices in Africa. *Current Opinion in Environmental Sustainability*, *6*, 8–14.

McConnachie, M. M., Cowling, R. M., van Wilgen, B. W., & McConnachie, D. A. (2012). Evaluating the cost-effectiveness of invasive alien plant clearing: A case study from South Africa. *Biological Conservation*, *155*, 128–135.

McInnes, R. J. (2013). Recognizing ecosystem services from wetlands of international importance: An example from Sussex, UK. *Wetlands*, *33*, 1001–1017.

McIntyre, O. (2014). Benefit-sharing and upstream/downstream cooperation for ecological protection of transboundary waters: Opportunities for China as an upstream state. *Water International*, *40*, 48–70.

Mekala, G. D., Jones, R. N., & MacDonald, D. H. (2015). Valuing the benefits of creek rehabilitation: Building a business case for public investments in urban green infrastructure. *Environmental Management*, *55*, 1354–1365.

Milner-Gulland, E. J. (2011). Interactions between human behaviour and ecological systems. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *367*, 270–278.

Minello, T. J., Rozas, L. P., Caldwell, P. A., & Liese, C. (2012). A comparison of salt marsh construction costs with the value of exported shrimp production. *Wetlands*, *32*, 791–799.

Moen, J., Rist, L., Bishop, K., Chapin, F. S., Ellison, D., Kuuluvainen, T., … Bradshaw, C. J. A. (2014). Eye on the taiga: Removing global policy impediments to safeguard the boreal forest. *Conservation Letters*, *7*, 408–418.

Moore, G. E., Gilmer, B. F., & Schill, S. R. (2015). Distribution of mangrove habitats of Grenada and the Grenadines. *Journal of Coastal Research*, *299*, 155–162.

Mora, F., Martínez-Ramos, M., Ibarra-Manríquez, G., Pérez-Jiménez, A., Trilleras, J., & Balvanera, P. (2015). Testing chronosequences through dynamic approaches: time and site effects on tropical dry forest succession. *Biotropica*, *47*, 38–48.

Morales-Reyes, Z., Pérez-García, J. M., Moleón, M., Botella, F., Carrete, M., Lazcano, C., … Sánchez-Zapata, J. A. (2015). Supplanting ecosystem services provided by scavengers raises greenhouse gas emissions. *Scientific Reports*, *5*, 7811.

Morandin, L., Long, R., & Kremen, C. (2014). Hedgerows enhance beneficial insects on adjacent tomato fields in an intensive agricultural landscape. *Agriculture, Ecosystems & Environment*, *189*, 164–170.

Moritz, M. A., Batllori, E., Bradstock, R. A., Gill, A. M., Handmer, J., Hessburg, P. F., … Syphard, A. D. (2014). Learning to coexist with wildfire. *Nature*, *515*, 58–66.

Moura, E. G., Aguiar, A., Piedade, A. R., & Rousseau, G. X. (2015). Contribution of legume tree residues and macrofauna to the improvement of abiotic soil properties in the eastern Amazon. *Applied Soil Ecology*, *86*, 91–99.

Nedkov, S., & Burkhard, B. (2012). Flood regulating ecosystem services—Mapping supply and demand, in the Etropole municipality, Bulgaria. *Ecological Indicators*, *21*, 67–79.

Nelson, E. J., Kareiva, P., Ruckelshaus, M., Arkema, K., Geller, G., Girvetz, E., … Tallis, H. (2013). Climate change's impact on key ecosystem services and the human well-being they support in the US. *Frontiers in Ecology and the Environment*, *11*, 483–493.

Nguyen, T. T., Pham, V. D., & Tenhunen, J. (2013). Linking regional land use and payments for forest hydrological services: A case study of Hoa Binh Reservoir in Vietnam. *Land Use Policy*, *33*, 130–140.

Nieto-Romero, M., Oteros-Rozas, E., González, J. A., & Martín-López, B. (2014). Exploring the knowledge landscape of ecosystem services assessments in Mediterranean agroecosystems: Insights for future research. *Environmental Science and Policy*, *37*, 121–133.

Nowak, D. J., & Greenfield, E. J. (2012). Tree and impervious cover in the United States. *Landscape and Urban Planning*, *107*, 21–30.

Nsanganwimana, F., Pourrut, B., Mench, M., & Douay, F. (2014). Suitability of Miscanthus species for managing inorganic and organic contaminated land and restoring ecosystem services. A review. *Journal of Environmental Management*, *143*, 123–134.

O'Hara, K. L., & Ramage, B. S. (2013). Silviculture in an uncertain world: Utilizing multi-aged management systems to integrate disturbance. *Forestry*, *86*, 401–410.

Okabe, K. (2013). Ecological characteristics of insects that affect symbiotic relationships with mites. *Entomological Science*, *16*, 363–378.

Olson, E. R., & Doherty, J. M. (2012). The legacy of pipeline installation on the soil and vegetation of southeast Wisconsin wetlands. *Ecological Engineering*, *39*, 53–62.

Orams, M. (2013). Economic activity derived from whale-based tourism in Vava'u, Tonga. *Coastal Management*, *41*, 481–500.

Otis, D. L., Crumpton, W. R., Green, D., Loan-Wilsey, A., Cooper, T., & Johnson, R. R. (2013). Predicted effect of landscape position on wildlife habitat value of Conservation Reserve Enhancement Program wetlands in a tile-drained agricultural region. *Restoration Ecology*, *21*, 276–284.

Oyler, J. W., Dobrowski, S. Z., Ballantyne, A. P., Klene, A. E., & Running, S. W. (2015). Artificial amplification of warming trends across the mountains of the western United States. *Geophysical Research Letters*, *42*(1), 153–161.

Page, G., & Bellotti, B. (2015). Farmers value on-farm ecosystem services as important, but what are the impediments to participation in PES schemes? *Science of the Total Environment*, *515–516*, 12–19.

Palomo, I., Montes, C., Martín-López, B., González, J. A., García-Llorente, M., Alcorlo, P., & Mora, M. R. G. (2014). Incorporating the social-ecological approach in protected areas in the Anthropocene. *BioScience*, *64*, 181–191.

Pang, A., Sun, T., & Yang, Z. (2013). Economic compensation standard for irrigation processes to safeguard environmental flows in the Yellow River Estuary, China. *Journal of Hydrology*, *482*, 129–138.

Paredes, D., Cayuela, L., Gurr, G. M., & Campos, M. (2015). Single best species or natural enemy assemblages? A correlational approach to investigating ecosystem function. *BioControl*, *60*, 37–45.

Parravicini, V., Villéger, S., Mcclanahan, T. R., Arias-González, J. E., Bellwood, D. R., Belmaker, J., … Mouillot, D. (2014). Global mismatch between species richness and vulnerability of reef fish assemblages. *Ecology Letters*, *17*, 1101–1110.

Pearson, R. G., Phillips, S. J., Loranty, M. M., Beck, P. S. A., Damoulas, T., Knight, S. J., & Goetz, S. J. (2013). Shifts in Arctic vegetation and associated feedbacks under climate change. *Nature Climate Change*, *3*, 673–677.

Pérez-Barbería, F. J., Hooper, R. J., & Gordon, I. J. (2013). Long-term density-dependent changes in habitat selection in red deer (*Cervus elaphus*). *Oecologia*, *173*, 837–847.

Peter, S., Koetzsch, S., Traber, J., Bernasconi, S. M., Wehrli, B., & Durisch-Kaiser, E. (2012). Intensified organic carbon dynamics in the ground water of a restored riparian zone. *Freshwater Biology*, *57*, 1603–1616.

Petes, L. E., Brown, A. J., & Knight, C. R. (2012). Impacts of upstream drought and water withdrawals on the health and survival of downstream estuarine oyster populations. *Ecology and Evolution*, *2*, 1712–1724.

Pienkowski, T., Williams, S., McLaren, K., Wilson, B., & Hockley, N. (2015). Alien invasions and livelihoods: Economic benefits of invasive Australian Red Claw crayfish in Jamaica. *Ecological Economics*, *112*, 68–77.

Plieninger, T., Bieling, C., Ohnesorge, B., Schaich, H., Schleyer, C., & Wolff, F. (2013). Exploring futures of ecosystem services in cultural landscapes through participatory scenario development in the Swabian Alb, Germany. *Ecology and Society*, *18*.

Poppenborg, P., & Koellner, T. (2014). A Bayesian network approach to model farmers' crop choice using socio-psychological measurements of expected benefits of ecosystem services. *Environmental Modelling and Software*, *57*, 227–234.

Qiao, F. Z., Zheng, Z. M., Li, J. L., & Zheng, W. B. (2014). Landscape connectivity of waterbody network in the new reclamation region of Lianyungang based on effective distance model. *Chinese Journal of Applied Ecology*, *25*, 2327–2333.

Qiu, J., & Turner, M. G. (2013). Spatial interactions among ecosystem services in an urbanizing agricultural watershed. *Proceedings of the National Academy of Sciences of the United States of America*, *110*, 12149–12154.

Quinteiro, P., Dias, A. C., Ridoutt, B. G., & Arroja, L. (2014). A framework for modelling the transport and deposition of eroded particles towards water systems in a life cycle inventory. *International Journal of Life Cycle Assessment*, *19*, 1200–1213.

Raffaelli, D., & White, P. C. L. (2013). Ecosystems and their services in a changing world: An ecological perspective. *Advances in Ecological Research*, *48*, 1–70.

Rambold, G., Stadler, M., & Begerow, D. (2013). Mycology should be recognized as a field in biology at eye level with other major disciplines – A memorandum. *Mycological Progress*, *12*, 455–463.

Rea, C. L., Bisesi, M. S., Mitsch, W., Andridge, R., & Lee, J. (2015). Human health-related ecosystem services of avian-dense coastal wetlands adjacent to a Western Lake Erie swimming beach. *EcoHealth*, *12*, 77–87.

Reithe, S., Armstrong, C. W., & Flaaten, O. (2014). Marine protected areas in a welfare-based perspective. *Marine Policy*, *49*, 29–36.

Reynolds, L. K., McGlathery, K. J., & Waycott, M. (2012). Genetic diversity enhances restoration success by augmenting ecosystem services. *PLoS ONE*, *7*, 1–8.

Ricaurte, L. F., Jokela, J., Siqueira, A., Núñez-Avellaneda, M., Marin, C., Velázquez-Valencia, A., & Wantzen, K. M. (2012). Wetland habitat diversity in the Amazonian Piedmont of Colombia. *Wetlands*, *32*, 1189–1202.

Robbins, A. S. T., & Harrell, S. (2014). Paradoxes and challenges for China's forests in the reform era. *China Quarterly*, *218*, 381–403.

Robert Kiefer, L., Menzel, F., & Bahrs, E. (2015). Integration of ecosystem services into the carbon footprint of milk of South German dairy farms. *Journal of Environmental Management*, *152*, 11–18.

Roces-Díaz, J. V., Díaz-Varela, E. R., & Álvarez-Álvarez, P. (2014). Analysis of spatial scales for ecosystem services: Application of the lacunarity concept at landscape level in Galicia (NW Spain). *Ecological Indicators*, *36*, 495–507.

Romolini, M., Grove, J. M., & Locke, D. H. (2013). Assessing and comparing relationships between urban environmental stewardship networks and land cover in Baltimore and Seattle. *Landscape and Urban Planning*, *120*, 190–207.

Rougerie, R., Lopez-Vaamonde, C., Barnouin, T., Delnatte, J., Moulin, N., Noblecourt, T., … Bouget, C. (2015). PASSIFOR: A reference library of DNA barcodes for French saproxylic beetles (Insecta, Coleoptera). *Biodiversity Data Journal*, *e4078*.

Rowe, R. L., Goulson, D., Doncaster, C. P., Clarke, D. J., Taylor, G., & Hanley, M. E. (2013). Evaluating ecosystem processes in willow short rotation coppice bioenergy plantations. *GCB Bioenergy*, *5*, 257–266.

Rubin, C.-J., Gilbert, E. R., Berglund, J., Wetterbom, A., Laikre, L., Webster, M. T., … Anderssona, L. (2015). Population-scale sequencing reveals genetic differentiation due to local adaptation in Atlantic herring. *Proceedings of the National Academy of Sciences of the United States of America*, *109*, 4696–4701.

Ruppert, J. C., Holm, A., Miehe, S., Muldavin, E., Snyman, H. A., Wesche, K., & Linstädter, A. (2012). Meta-analysis of ANPP and rain-use efficiency confirms indicative value for degradation and supports non-linear response along precipitation gradients in drylands. *Journal of Vegetation Science*, *23*, 1035–1050.

Ruppert, J. C., & Linstädter, A. (2014). Convergence between ANPP estimation methods in grasslands – A practical solution to the comparability dilemma. *Ecological Indicators*, *36*, 524–531.

Saito-Jensen, M., Rutt, R. L., & Chhetri, B. B. K. (2014). Social and environmental tensions: Affirmative measures under REDD + carbon payment initiatives in Nepal. *Human Ecology*, *42*, 683–694.

Sandhu, H., Nidumolu, U., & Sandhu, S. (2012). Assessing risks and opportunities arising from ecosystem change in primary industries using ecosystem-based business risk analysis tool. *Human and Ecological Risk Assessment*, *18*, 47–68.

Sant, E. D., Simonds, G. E., Ramsey, R. D., & Larsen, R. T. (2014). Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales. *Ecological Indicators*, *43*, 297–305.

Sanz, A. S. R., Fernandez, C., Mouillot, F., Ferrat, L., Istria, D., & Pasqualini, V. (2013). Long-term forest dynamics and land-use abandonment in the Mediterranean Mountains, Corsica, France. *Ecology and Society*, *18*(2), 38.

Sauer, J., & Wossink, A. (2013). Marketed outputs and non-marketed ecosystem services: The evaluation of marginal costs. *European Review of Agricultural Economics*, *40*, 573–603.

Schmerbeck, J., Kohli, A., & Seeland, K. (2015). Ecosystem services and forest fires in India – Context and policy implications from a case study in Andhra Pradesh. *Forest Policy and Economics*, *50*, 337–346.

Schneiders, A., Van Daele, T., Van Landuyt, W., & Van Reeth, W. (2012). Biodiversity and ecosystem services: Complementary approaches for ecosystem management? *Ecological Indicators*, *21*, 123–133.

Schulz, H., & Glaser, B. (2012). Effects of biochar compared to organic and inorganic fertilizers on soil quality and plant growth in a greenhouse experiment. *Journal of Plant Nutrition and Soil Science*, *175*, 410–422.

Schwarzer, C., Heinken, T., Luthardt, V., & Joshi, J. (2013). Latitudinal shifts in species interactions interfere with resistance of southern but not of northern bog-plant communities to experimental climate change. *Journal of Ecology*, *101*, 1484–1497.

Segerstedt, A., & Grote, U. (2015). Protected area certificates: Gaining ground for better ecosystem protection? *Environmental Management*, *55*, 1418–1432.

Shackleton, S. E., & Shackleton, C. M. (2012). Linking poverty, HIV/AIDS and climate change to human and ecosystem vulnerability in southern Africa: Consequences for livelihoods and sustainable ecosystem management. *International Journal of Sustainable Development & World Ecology*, *19*, 275–286.

Shen, Z., Wakita, K., Oishi, T., Yagi, N., Kurokura, H., Blasiak, R., & Furuya, K. (2015). Willingness to pay for ecosystem services of open oceans by choice-based conjoint analysis: A case study of Japanese residents. *Ocean and Coastal Management*, *103*, 1–8.

Sherren, K., Yoon, H. J., Clayton, H., & Schirmer, J. (2012). Do Australian graziers have an offset mindset about their farm trees? *Biodiversity and Conservation*, *21*, 363–383.

Shwartz, A., Turbé, A., Simon, L., & Julliard, R. (2014). Enhancing urban biodiversity and its influence on city-dwellers: An experiment. *Biological Conservation*, *171*, 82–90.

Smith, F. P., Prober, S. M., House, A. P. N., & McIntyre, S. (2013). Maximizing retention of native biodiversity in Australian agricultural landscapes—The 10:20:40:30 guidelines. *Agriculture, Ecosystems and Environment*, *166*, 35–45.

Smith, J., Pearce, B. D., & Wolfe, M. S. (2012). A European perspective for developing modern multifunctional agroforestry systems for sustainable intensification. *Renewable Agriculture and Food Systems*, *27*, 323–332.

Smith, L. M., Case, J. L., Smith, H. M., Harwell, L. C., & Summers, J. K. (2013). Relating ecoystem services to domains of human well-being: Foundation for a U.S. index. *Ecological Indicators*, *28*, 79–90.

Sorensen, J. P. R., Maurice, L., Edwards, F. K., Lapworth, D. J., Read, D. S., Allen, D., … Williams, P. J. (2013). Using boreholes as windows into groundwater ecosystems. *PLoS ONE*, *8*, 1–14.

Spalding, M. D., Ruffo, S., Lacambra, C., Meliane, I., Hale, L. Z., Shepard, C. C., & Beck, M. W. (2014). The role of ecosystems in coastal protection: Adapting to climate change and coastal hazards. *Ocean and Coastal Management*, *90*, 50–57.

Spellman, K. V. (2015). Educating for resilience in the North: Building a toolbox for teachers. *Ecology and Society*, *20*.

Sreekar, R., Huang, G., Zhao, J. B., Pasion, B. O., Yasuda, M., Zhang, K., … Harrison, R. D. (2015). The use of species-area relationships to partition the effects of hunting and deforestation on bird extirpations in a fragmented landscape. *Diversity and Distributions*, *21*, 441–450.

Staudinger, M. D., Carter, S. L., Cross, M. S., Dubois, N. S., Duffy, J. E., Enquist, C., … Turner, W. (2013). Biodiversity in a changing climate: A synthesis of current and projected trends in the US. *Frontiers in Ecology and the Environment*, *11*, 465–473.

Stauffert, M., Cravo-Laureau, C., Jézéquel, R., Barantal, S., Cuny, P., Gilbert, F., … Duran, R. (2013). Impact of oil on bacterial community structure in bioturbated sediments. *PLoS ONE*, *8*.

Storkey, J., Brooks, D., Haughton, A., Hawes, C., Smith, B. M., & Holland, J. M. (2013). Using functional traits to quantify the value of plant communities to invertebrate ecosystem service providers in arable landscapes. *Journal of Ecology*, *101*, 38–46.

Strandberg, M., Blomba, K., Jensen, A. M. D., & Knox, J. W. (2012). Priorities for sustainable turfgrass management : A research and industry perspective. *Soil and Plant Science*, *62*, 3–9.

Suo, A., Pan, X., Zhao, J., & Yu, Y. (2012). Response of ecosystem service values to environmental change in the Bohai Sea. *Advanced Materials Research*, *518–523*, 1321–1324.

Sutherland, W. J., Gardner, T., Bogich, T. L., Bradbury, R. B., Clothier, B., Jonsson, M., & Dicks, L. V. (2014). Solution scanning as a key policy tool: Identifying management interventions to help maintain and enhance regulating ecosystem services. *Ecology and Society*, *19*(2), 3.

Tait, P., Baskaran, R., Cullen, R., & Bicknell, K. (2012). Nonmarket valuation of water quality: Addressing spatially heterogeneous preferences using GIS and a random parameter logit model. *Ecological Economics*, *75*, 15–21.

Tallis, H., Mooney, H., Andelman, S., Balvanera, P., Cramer, W., Karp, D., … Walz, A. (2012). A global system for monitoring ecosystem service change. *BioScience*, *62*, 977–986.

Taylor, P., & Malanson, G. P. (2014). Biosphere-human feedbacks: A physical geography perspective. *Physical Geography*, 50–75.

Thapa, R. B., Itoh, T., Shimada, M., Watanabe, M., Takeshi, M., & Shiraishi, T. (2014). Evaluation of ALOS PALSAR sensitivity for characterizing natural forest cover in wider tropical areas. *Remote Sensing of Environment*, *155*, 32–41.

Thomas, R. J., Akhtar-Schuster, M., Stringer, L. C., Marques, M. J., Escadafal, R., Abraham, E., & Enne, G. (2012). Fertile ground? Options for a science-policy platform for land. *Environmental Science and Policy*, *16*, 122–135.

Trivellone, V., Schoenenberger, N., Bellosi, B., Jermini, M., de Bello, F., Mitchell, E. A. D., & Moretti, M. (2014). Indicators for taxonomic and functional aspects of biodiversity in the vineyard agroecosystem of Southern Switzerland. *Biological Conservation*, *170*, 103–109.

Tully, K. L., Lawrence, D., & Scanlon, T. M. (2012). More trees less loss: Nitrogen leaching losses decrease with increasing biomass in coffee agroforests. *Agriculture, Ecosystems and Environment*, *161*, 137–144.

Turnhout, E., Neves, K., & De Lijster, E. (2014). 'Measurementality' in biodiversity governance: Knowledge, transparency, and the intergovernmental science-policy platform on biodiversity and ecosystem services (IPBES). *Environment and Planning A*, *46*, 581–597.

Udawatta, R. P., Adhikari, P., Anoma Senaviratne, G. M. M. M., & Garrett, H. E. (2015). Variability of soil carbon in row crop watersheds with agroforestry buffers. *Agroforestry Systems*, *89*, 37–47.

Ueno, T. (2012). Insect natural enemies as bioindicators in rice paddies. *Korean Journal of Agricultural Science*, *39*, 545–553.

Unsworth, R. K. F., Rasheed, M. A., Chartrand, K. M., & Roelofs, A. J. (2012). Solar radiation and tidal exposure as environmental drivers of *Enhalus acoroides* dominated seagrass meadows. *PLoS ONE*, *7*, e34133.

Urquhart, J., & Acott, T. (2014). A sense of place in cultural ecosystem services: The case of Cornish fishing communities. *Society & Natural Resources*, *27*, 3–19.

Uzomah, V., Scholz, M., & Almuktar, S. (2014). Rapid expert tool for different professions based on estimated ecosystem variables for retrofitting of drainage systems. *Computers, Environment and Urban Systems*, *44*, 1–14.

van der Horst, D., Vermeylen, S., & Kuntashula, E. (2014). The hedgification of maizescapes? Scalability and multifunctionality of *Jatropha curcas* hedges in a mixed farming landscape in Zambia. *Ecology and Society*, *19*(2), 48.

Van Stan, J. T., Levia, D. F., & Jenkins, R. B. (2015). Forest canopy interception loss across temporal scales: Implications for urban greening initiatives. *The Professional Geographer*, *67*(1), 41–51.

van Wensem, J. (2013). Use of the ecosystem services concept in landscape management in the Netherlands. *Integrated Environmental Assessment and Management*, *9*, 237–242.

van Wilgen, B. W. (2012). Evidence, perceptions, and trade-offs associated with invasive alien plant control in the Table Mountain National Park, South Africa. *Ecology and Society*, *17*.

VanLoocke, A., Betzelberger, A. M., Ainsworth, E. A., & Bernacchi, C. J. (2012). Rising ozone concentrations decrease soybean evapotranspiration and water use efficiency whilst increasing canopy temperature. *New Phytologist*, *195*, 164–171.

Verburg, P. H., Koomen, E., Hilferink, M., Pérez-Soba, M., & Lesschen, J. P. (2012). An assessment of the impact of climate adaptation measures to reduce flood risk on ecosystem services. *Landscape Ecology*, *27*, 473–486.

Villamor, G. B., Le, Q. B., Djanibekov, U., van Noordwijk, M., & Vlek, P. L. G. (2014). Biodiversity in rubber agroforests, carbon emissions, and rural livelihoods: An agent-based model of land-use dynamics in lowland Sumatra. *Environmental Modelling and Software*, *61*, 151–165.

Villarino, S. H., Studdert, G. A., Laterra, P., & Cendoya, M. G. (2014). Agricultural impact on soil organic carbon content: Testing the IPCC carbon accounting method for evaluations at county scale. *Agriculture, Ecosystems and Environment*, *185*, 118–132.

Villazán, B., Pedersen, M. F., Brun, F. G., & Vergara, J. J. (2013). Elevated ammonium concentrations and low light form a dangerous synergy for eelgrass *Zostera marina*. *Marine Ecology Progress Series*, *493*, 141–154.

Volety, A. K., Haynes, L., Goodman, P., & Gorman, P. (2014). Ecological condition and value of oyster reefs of the Southwest Florida shelf ecosystem. *Ecological Indicators*, *44*, 108–119.

Walter, R. K., & Hamilton, R. J. (2014). A cultural landscape approach to community-based conservation in Solomon Islands. *Ecology and Society*, *19*(4).

Waltham, N. J., Reichelt-Brushett, A., McCann, D., & Eyre, B. D. (2014). Water and sediment quality, nutrient biochemistry and pollution loads in an urban freshwater lake: Balancing human and ecological services. *Environmental Science: Processes & Impacts*, *16*, 2804–2813.

Wang, H., Ge, Z., Yuan, L., & Zhang, L. (2014). Evaluation of the combined threat from sea-level rise and sedimentation reduction to the coastal wetlands in the Yangtze Estuary, China. *Ecological Engineering*, *71*, 346–354.

Washbourne, C. L., Renforth, P., & Manning, D. A. C. (2012). Investigating carbonate formation in urban soils as a method for capture and storage of atmospheric carbon. *Science of the Total Environment*, *431*, 166–175.

White, C., Halpern, B. S., & Kappel, C. V. (2012). Ecosystem service tradeoff analysis reveals the value of marine spatial planning for multiple ocean uses. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(12), 4696–4701.

Whitehorn, P. R., O'connor, S., Wackers, F. L., & Goulson, D. (2012). Neonicotinoid pesticide reduces bumble bee colony growth and queen production. *Science*, *336*, 351–352.

Williams, A., & Hedlund, K. (2014). Indicators and trade-offs of ecosystem services in agricultural soils along a landscape heterogeneity gradient. *Applied Soil Ecology*, *77*, 1–8.

Wilson, M. C., & Smith, A. T. (2014). The pika and the watershed: The impact of small mammal poisoning on the ecohydrology of the Qinghai-Tibetan Plateau. *Ambio*, *44*, 16–22.

Winfree, R. (2013). Global change, biodiversity, and ecosystem services: What can we learn from studies of pollination? *Basic and Applied Ecology*, *14*, 453–460.

Winthrop, R. H. (2014). The strange case of cultural services: Limits of the ecosystem services paradigm. *Ecological Economics*, *108*, 208–214.

Wu, P., Christidis, N., & Stott, P. (2013). Anthropogenic impact on Earth's hydrological cycle. *Nature Climate Change*, *3*, 807–810.

Xu, L. Y., Yu, B., Yue, W. C., & Xie, X. D. (2013). A model for urban environment and resource planning based on green GDP accounting system. *Mathematical Problems in Engineering*, *2013*, 1–10.

Yang, T. (2015). Dynamic assessment of environmental damage based on the optimal clustering criterion – Taking oil spill damage to marine ecological environment as an example. *Ecological Indicators*, *51*, 53–58.

Zahawi, R. A., Reid, J. L., & Holl, K. D. (2014). Hidden costs of passive restoration. *Restoration Ecology*, *22*, 284–287.

Zaller, J. G., Heigl, F., Ruess, L., & Grabmaier, A. (2014). Glyphosate herbicide affects belowground interactions between earthworms and symbiotic mycorrhizal fungi in a model ecosystem. *Scientific Reports*, *4*, 5634.

Zhang, C., Vornam, B., Volmer, K., Prinz, K., Kleemann, F., Köhler, L., … Finkeldey, R. (2014). Genetic diversity in aspen and its relation to arthropod abundance. *Frontiers in Plant Science*, *5*, 806.

Zhang, L., Fu, B., Lü, Y., & Zeng, Y. (2015). Balancing multiple ecosystem services in conservation priority setting. *Landscape Ecology*, *30*, 535–546.

Zhang, W., Zhang, H., & Zhang, Y. (2012). A method to determine the spatial allocation standard of social ecological compensation. *Journal of Geographical Sciences*, *22*, 283–300.

Zhang, Z., Cui, B., Fan, X., Zhang, K., Zhao, H., & Zhang, H. (2012). Wetland network design for mitigation of saltwater intrusion by replenishing freshwater in an estuary. *CLEAN—Soil, Air, Water*, *40*, 1036–1046.

Zhao, Y., Huang, C.-M., & Zhang, H.-J. (2014). Ecological risk assessment of provincial land-use overall planning in China. *Human and Ecological Risk Assessment: An International Journal*, *20*, 1491–1506.

Literature review articles, 2015–2017

Acuña, V., Hunter, M., & Ruhí, A. (2017). Managing temporary streams and rivers as unique rather than second-class ecosystems. *Biological Conservation*, *211*, 12–19.

Akujärvi, A., Lehtonen, A., & Liski, J. (2016). Ecosystem services of boreal forests – Carbon budget mapping at high resolution. *Journal of Environmental Management*, *181*, 498–514.

Albalawneh, A., Chang, T.-K., Huang, C.-W., & Mazahreh, S. (2015). Using landscape metrics analysis and analytic hierarchy process to assess water harvesting potential sites in Jordan. *Environments*, *2*(4), 415–434.

Albert, C., Galler, C., Hermes, J., Neuendorf, F., von Haaren, C., & Lovett, A. (2016). Applying ecosystem services indicators in landscape planning and management: The ES-in-Planning framework. *Ecological Indicators*, *61*, 100–113.

Allain, S., Plumecocq, G., & Leenhardt, D. (2017). How do multi-criteria assessments address landscape-level problems? A review of studies and practices. *Ecological Economics*, *136*, 282–295.

Allendorf, T. D., Aung, M., Swe, K. K., & Songer, M. (2017). Pathways to improve park-people relationships: Gendered attitude changes in Chatthin Wildlife Sanctuary, Myanmar. *Biological Conservation*, *216*, 78–85.

Allendorf, T. D., & Yang, J. M. (2017). The role of gender in local residents' relationships with Gaoligongshan Nature Reserve, Yunnan, China. *Environment, Development and Sustainability*, *19*(1), 185–198.

Alves, V. M., Hernandez, M. I. M., Alves, V., & Hernández, M. (2017). Morphometric modifications in *Canthon quinquemaculatus* Castelnau 1840 (Coleoptera: Scarabaeinae): Sublethal effects of transgenic maize? *Insects*, *8*(4), 115.

Amberson, S., Biedenweg, K., James, J., & Christie, P. (2016). 'The heartbeat of our people': Identifying and measuring how salmon influences Quinault tribal well-being. *Society & Natural Resources*, *29*(12), 1389.

Amin, A., Zaehringer, J. G., Schwilch, G., & Koné, I. (2015). People, protected areas and ecosystem services: A qualitative and quantitative analysis of local people's perception and preferences in Côte d'Ivoire. *Natural Resources Forum*, *39*(2), 97–109.

Amler, E., Schmidt, M., & Menz, G. (2015). Definitions and mapping of east African wetlands: A review. *Remote Sensing*, *7*(5), 5256–5282.

Anaya-Romero, M., Muñoz-Rojas, M., Ibáñez, B., & Marañón, T. (2016). Evaluation of forest ecosystem services in Mediterranean areas. A regional case study in South Spain. *Ecosystem Services*, *20*, 82–90.

Arkema, K. K., Griffin, R., Maldonado, S., Silver, J., Suckale, J., & Guerry, A. D. (2017). Linking social, ecological, and physical science to advance natural and nature-based protection for coastal communities: Advancing protection for coastal communities. *Annals of the New York Academy of Sciences*, *1399*(1), 5–26.

Arlinghaus, R., Alós, J., Beardmore, B., Daedlow, K., Dorow, M., Fujitani, M., … Wolter, C. (2017). Understanding and managing freshwater recreational fisheries as complex adaptive social-ecological systems. *Reviews in Fisheries Science & Aquaculture*, *25*(1), 1–41.

Arnberger, A., Schneider, I. E., Ebenberger, M., Eder, R., Venette, R. C., Snyder, S. A., … Cottrell, S. (2017). Emerald ash borer impacts on visual preferences for urban forest recreation settings. *Urban Forestry & Urban Greening*, *27*, 235–245.

Arrivabene, H. P., Campos, C. Q., da Costa Souza, I., Wunderlin, D. A., Milanez, C. R. D., & Machado, S. R. (2016). Differential bioaccumulation and translocation patterns in three mangrove plants experimentally exposed to iron. Consequences for environmental sensing. *Environmental Pollution*, *215*, 302–313.

Arruda Almeida, B., Gimenes, M. R., & Anjos, L. (2017). Wading bird functional diversity in a floodplain: Influence of habitat type and hydrological cycle. *Austral Ecology*, *42*(1), 84–93.

Artioli, F., Acuto, M., & McArthur, J. (2017). The water-energy-food nexus: An integration agenda and implications for urban governance. *Political Geography*, *61*, 215–223.

Artmann, M. (2015). Managing urban soil sealing in Munich and Leipzig (Germany)—From a wicked problem to clumsy solutions. *Land Use Policy*, *46*, 21–37.

Artmann, M. (2016). Urban gray vs. urban green vs. soil protection—Development of a systemic solution to soil sealing management on the example of Germany. *Environmental Impact Assessment Review*, *59*, 27–42.

Aspinall, R., & Staiano, M. (2017). A conceptual model for land system dynamics as a coupled human–environment system. *Land*, *6*(4), 81.

Astiaso Garcia, D. (2017). Green areas management and bioengineering techniques for improving urban ecological sustainability. *Sustainable Cities and Society*, *30*, 108–117.

Ayala, H. (2017). The economic might of earth's evolution: The epic promise of knowledge. *SAGE Open*, *7*(2), 215824401770197.

Bajard, M., Poulenard, J., Sabatier, P., Develle, A.-L., Giguet-Covex, C., Jacob, J., … Arnaud, F. (2017). Progressive and regressive soil evolution phases in the Anthropocene. *Catena*, *150*, 39–52.

Balestri, E., Menicagli, V., Vallerini, F., & Lardicci, C. (2017). Biodegradable plastic bags on the seafloor: A future threat for seagrass meadows? *Science of the Total Environment*, *605–606*, 755–763.

Balfour, N. J., & Ratnieks, F. L. W. (2017). Using the waggle dance to determine the spatial ecology of honey bees during commercial crop pollination: Honey bee ecology during crop pollination. *Agricultural and Forest Entomology*, *19*(2), 210–216.

Bani, B. K., & Damnyag, L. (2017). Farmers' willingness to pay for the provision of ecosystem services to enhance agricultural production in Sene East District, Ghana. *Small-scale Forestry*, *16*(4), 451–467.

Barber, M., & Jackson, S. (2017). Identifying and categorizing cobenefits in state-supported Australian indigenous environmental management programs: International research implications. *Ecology and Society*, *22*(2), 11.

Bardos, R. P., Jones, S., Stephenson, I., Menger, P., Beumer, V., Neonato, F., … Wendler, K. (2016). Optimising value from the soft re-use of brownfield sites. *Science of the Total Environment*, *563–564*, 769–782.

Barik, M. G., Adam, J. C., Barber, M. E., & Muhunthan, B. (2017). Improved landslide susceptibility prediction for sustainable forest management in an altered climate. *Engineering Geology*, *230*, 104–117.

Bark, R. H., Colloff, M. J., Hatton MacDonald, D., Pollino, C. A., Jackson, S., & Crossman, N. D. (2016). Integrated valuation of ecosystem services obtained from restoring water to the environment in a major regulated river basin. *Ecosystem Services*, *22*, 381–391.

Barkaoui, K., Roumet, C., & Volaire, F. (2016). Mean root trait more than root trait diversity determines drought resilience in native and cultivated Mediterranean grass mixtures. *Agriculture, Ecosystems and Environment*, *231*, 122–132.

Barton, D. N., Benjamin, T., Cerdán, C. R., DeClerck, F., Madsen, A. L., Rusch, G. M., … Villanueva, C. (2016). Assessing ecosystem services from multifunctional trees in pastures using Bayesian belief networks. *Ecosystem Services*, *18*, 165–174.

Basurto, X., Blanco, E., Nenadovic, M., & Vollan, B. (2016). Integrating simultaneous prosocial and antisocial behavior into theories of collective action. *Science Advances*, *2*(3), e1501220.

Bateman, I. J., Coombes, E., Fitzherbert, E., Binner, A., Bad'ura, T., Carbone, C., … Watkinson, A. R. (2015). Conserving tropical biodiversity via market forces and spatial targeting. *Proceedings of the National Academy of Sciences of the United States of America*, *112*, 7408–7413.

Batilani-Filho, M., & Hernandez, M. I. M. (2017). Decline of ecological functions performed by dung beetles in areas of Atlantic forest and contribution of rollers and tunnellers in organic matter removal. *Environmental Entomology*, *46*(4), 784–793.

Baumert, S., Luz, A. C., Fisher, J., Vollmer, F., Ryan, C. M., Patenaude, G., … Macqueen, D. (2016). Charcoal supply chains from Mabalane to Maputo: Who benefits? *Energy for Sustainable Development*, *33*, 129–138.

Bebber, D. P., & Butt, N. (2017). Tropical protected areas reduced deforestation carbon emissions by one third from 2000–2012. *Scientific Reports*, *7*(1), 14005–14007.

Becerra, T. A., Engle, D. M., Fuhlendorf, S. D., & Elmore, R. D. (2017). Preference for grassland heterogeneity: Implications for biodiversity in the Great Plains. *Society & Natural Resources*, *30*(5), 601–612.

Bello, C., Galetti, M., Pizo, M. A., Magnago, L. F. S., Rocha, M. F., Lima, R. A. F., … Jordano, P. (2015). Defaunation affects carbon storage in tropical forests. *Science Advances*, *1*(11), e1501105.

Beltrán-Esteve, M., Reig-Martínez, E., & Estruch-Guitart, V. (2017). Assessing eco-efficiency: A metafrontier directional distance function approach using life cycle analysis. *Environmental Impact Assessment Review*, *63*, 116–127.

Bennett, J., & Randall, A. (2016). Antipodean agricultural and resource economics at 60: Environmental economics. *Australian Journal of Agricultural and Resource Economics*, *60*(4), 672–687.

Berthe, S. C. F., Derocles, S. A. P., Lunt, D. H., Kimball, B. A., & Evans, D. M. (2015). Simulated climate-warming increases Coleoptera activity-densities and reduces community diversity in a cereal crop. *Agriculture, Ecosystems and Environment*, *210*, 11–14.

Beumer, C., & Martens, P. (2016). BIMBY's first steps: A pilot study on the contribution of residential front-yards in Phoenix and Maastricht to biodiversity, ecosystem services and urban sustainability. *Urban Ecosystems*, *19*(1), 45.

Biasi, R., Brunori, E., Smiraglia, D., & Salvati, L. (2015). Linking traditional tree-crop landscapes and agro-biodiversity in central Italy using a database of typical and traditional products: A multiple risk assessment through a data mining analysis. *Biodiversity and Conservation*, *24*(12), 3009–3031.

Bidaud, C., Schreckenberg, K., Rabeharison, M., Ranjatson, P., Gibbons, J., & Jones, J. P. G. (2017). The sweet and the bitter: Intertwined positive and negative social impacts of a biodiversity offset. *Conservation and Society*, *15*(1), 1–13.

Biel, R. G., Hacker, S. D., Ruggiero, P., Cohn, N., & Seabloom, E. W. (2017). Coastal protection and conservation on sandy beaches and dunes: Context-dependent tradeoffs in ecosystem service supply. *Ecosphere*, *8*(4), e01791-n/a.

Bilkovic, D. M., Mitchell, M., Mason, P., & Duhring, K. (2016). The role of living shorelines as estuarine habitat conservation strategies. *Coastal Management*, *44*(3), 161–174.

Blake, D., Augé, A. A., & Sherren, K. (2017). Participatory mapping to elicit cultural coastal values for Marine Spatial Planning in a remote archipelago. *Ocean and Coastal Management*, *148*, 195–203.

Blake, R. E., & Duffy, J. E. (2016). Influence of environmental stressors and grazer immigration on ecosystem properties of an experimental eelgrass community. *Journal of Experimental Marine Biology and Ecology*, *480*, 45–53.

Bosma, C., Glenk, K., & Novo, P. (2017). How do individuals and groups perceive wetland functioning? Fuzzy cognitive mapping of wetland perceptions in Uganda. *Land Use Policy*, *60*, 181–196.

Bouma, J., van Ittersum, M. K., Stoorvogel, J. J., Batjes, N. H., Droogers, P., & Pulleman, M. M. (2017). Soil capability: Exploring the functional potentials of soils. In D. J. Field, C. L. S. Morgan, & A. B. McBratney (Eds.), *Global soil security* (pp. 27–44). Springer International Publishing.

Bowles, T. M., Jackson, L. E., Loeher, M., Cavagnaro, T. R., & Nuñez, M. (2017). Ecological intensification and arbuscular mycorrhizas: A meta-analysis of tillage and cover crop effects. *Journal of Applied Ecology*, *54*(6), 1785–1793.

Brady, M. V., Hedlund, K., Cong, R. G., Hemerik, L., Hotes, S., Machado, S., ... Thomsen, I. K. (2015). Valuing supporting soil ecosystem services in agriculture: A natural capital approach. *Agronomy Journal*, *107*(5), 1809–1821.

Braito, M. T., Böck, K., Flint, C., Muhar, A., Muhar, S., & Penker, M. (2017). Human-nature relationships and linkages to environmental behaviour. *Environmental Values*, *26*(3), 365–389.

Brancalion, P. H. S., Lamb, D., Ceccon, E., Boucher, D., Herbohn, J., Strassburg, B., & Edwards, D. P. (2017). Using markets to leverage investment in forest and landscape restoration in the tropics. *Forest Policy and Economics*, *85*, 103–113.

Brill, G., Anderson, P., & O'Farrell, P. (2017). Methodological and empirical considerations when assessing freshwater ecosystem service provision in a developing city context: Making the best of what we have. *Ecological Indicators*, *76*, 256–274.

Brown, L. M., Graham, C. H., & Fernandez-Juricic, E. (2015). Demography, traits and vulnerability to urbanization: Can we make generalizations? *Journal of Applied Ecology*, *52*(6), 1455–1464.

Bukoski, J. J., Broadhead, J. S., Donato, D. C., Murdiyarso, D., & Gregoire, T. G. (2017). The use of mixed effects models for obtaining low-cost ecosystem carbon stock estimates in mangroves of the Asia-Pacific. *PLoS ONE*, *12*(1), e0169096.

Buller, L. S., Bayma-Silva, G., Ortega, E., & Bergier, I. (2016). Soil loss as a negative externality in the emergy accounting: Case study of an agricultural commodities municipality in the Brazilian Savannah. *Journal of Environmental Accounting and Management*, *4*(2), 129–147.

Butsic, V., Syphard, A. D., Keeley, J. E., & Bar-Massada, A. (2017). Can private land conservation reduce wildfire risk to homes? A case study in San Diego County, California, USA. *Landscape and Urban Planning*, *157*, 161–169.

Caillon, S., Cullman, G., Verschuuren, B., & Sterling, E. J. (2017). Moving beyond the human-nature dichotomy through biocultural approaches: Including ecological well-being in resilience indicators. *Ecology and Society*, *22*(4), 27.

Calvo-Rodriguez, S., Sanchez-Azofeifa, A. G., Duran, S. M., & Espírito-Santo, M. M. (2017). Assessing ecosystem services in Neotropical dry forests: A systematic review. *Environmental Conservation*, *44*(1), 34–43.

Campbell, L. M., Gray, N. J., Fairbanks, L., Silver, J. J., Gruby, R. L., Dubik, B. A., & Basurto, X. (2016). Global oceans governance: New and emerging issues. *Annual Review of Environment and Resources*, *41*(1), 517–543.

Canedoli, C., Bullock, C., Collier, M. J., Joyce, D., & Padoa-Schioppa, E. (2017). Public participatory mapping of cultural ecosystem services: Citizen perception and park management in the Parco Nord of Milan (Italy). *Sustainability*, *9*(6), 891.

Caputo, J., Beier, C. M., Sullivan, T. J., & Lawrence, G. B. (2016). Modeled effects of soil acidification on long-term ecological and economic outcomes for managed forests in the Adirondack region (USA). *Science of the Total Environment*, *565*, 401–411.

Carval, D., Cotté, V., Resmond, R., Perrin, B., & Tixier, P. (2016). Dominance in a ground-dwelling ant community of banana agroecosystem. *Ecology and Evolution*, *6*(23), 8617–8631.

Carvalho, J. L. N., Nogueirol, R. C., Menandro, L. M. S., de Oliveira Bordonal, R., Borges, C. D., Cantarella, H., & Franco, H. C. J. (2017). Agronomic and environmental implications of sugarcane straw removal: A major review. *GCB Bioenergy*, *9*(7), 1181–1195.

Carvalho-Santos, C., Sousa-Silva, R., Gonçalves, J., & Honrado, J. P. (2016). Ecosystem services and biodiversity conservation under forestation scenarios: Options to improve management in the Vez watershed, NW Portugal. *Regional Environmental Change*, *16*(6), 1557–1570.

Cervelli, E., Pindozzi, S., Capolupo, A., Okello, C., Rigillo, M., & Boccia, L. (2016). Ecosystem services and bioremediation of polluted areas. *Ecological Engineering*, *87*, 139–149.

Cerveny, L. K., Biedenweg, K., & McLain, R. (2017). Mapping meaningful places on Washington's Olympic Peninsula: Toward a deeper understanding of landscape values. *Environmental Management*, *60*(4), 643.

Chen, G., Shi, H., Tao, J., Chen, L., Liu, Y., Lei, G., ... Smol, J. P. (2015). Industrial arsenic contamination causes catastrophic changes in freshwater ecosystems. *Scientific Reports*, *5*(1), 17419.

Chen, H., He, L., Tang, H., Zhao, M., & Shao, L. (2016). A two-step strategy for developing cultivated pastures in China that offer the advantages of ecosystem services. *Sustainability*, *8*(4), 392.

Chen, Q., Hooper, D. U., Li, H., Gong, X. Y., Peng, F., Wang, H., ... Lin, S. (2017). Effects of resource addition on recovery of production and plant functional composition in degraded semiarid grasslands. *Oecologia*, *184*(1), 13–24.

Chen, X., Chen, Y., Shimizu, T., Niu, J., Nakagami, K. I., Qian, X., ... Li, J. (2017). Water resources management in the urban agglomeration of the Lake Biwa region, Japan: An ecosystem services-based sustainability assessment. *Science of the Total Environment*, *586*, 174–187.

Chervier, C., Peresse, A., Millet-Amrani, S., & Méral, P. (2016). Changement institutionnel et paiements pour services environnementaux au Cambodge: l'intérêt de l'approche Commonsienne. *Développement durable et territoires*, *7*(1).

Cohn, A. (2017). Leveraging climate regulation by ecosystems for agriculture to promote ecosystem stewardship. *Tropical Conservation Science*, *10*, 194008291772067.

Cole, L. J., Brocklehurst, S., Robertson, D., Harrison, W., & McCracken, D. I. (2017). Exploring the interactions between resource availability and the utilisation of semi-natural habitats by insect pollinators in an intensive agricultural landscape. *Agriculture, Ecosystems and Environment*, *246*, 157–167.

Colloff, M. J., Lavorel, S., Kerkhoff, L. E., Wyborn, C. A., Fazey, I., Gorddard, R., ... Degeorges, P. (2017). Transforming conservation science and practice for a postnormal world. *Conservation Biology*, *31*(5), 1008–1017.

Connor, J. D., Bryan, B. A., & Nolan, M. (2016). Cap and trade policy for managing water competition from potential future carbon plantations. *Environmental Science and Policy*, *66*, 11–22.

Cooney, D., Kim, H., Quinn, L., Lee, M.-S., Guo, J., Shao-lin, C., ... Lee, D. K. (2017). Switchgrass as a bioenergy crop in the Loess Plateau, China: Potential lignocellulosic feedstock production and environmental conservation. *Journal of Integrative Agriculture*, *16*(6), 1211–1226.

Cooper, M. W., & West, C. T. (2017). Unraveling the Sikasso paradox: Agricultural change and malnutrition in Sikasso, Mali. *Ecology of Food and Nutrition*, *56*(2), 101–123.

Coulibaly, S. F. M., Coudrain, V., Hedde, M., Brunet, N., Mary, B., Recous, S., & Chauvat, M. (2017). Effect of different crop management practices on soil Collembola assemblages: A 4-year follow-up. *Applied Soil Ecology*, *119*, 354–366.

da Motta Portillo, J. T., Londe, V., & Moreira, F. W. A. (2017). Aboveground biomass and carbon stock are related with soil humidity in a mangrove at the Piraquê-Açu River, Southeastern Brazil. *Journal of Coastal Conservation*, *21*(1), 139–144.

Dangles, O., Loirat, J., Freour, C., Serre, S., Vacher, J., & Le Roux, X. (2016). Research on biodiversity and climate change at a distance: Collaboration networks between Europe and Latin America and the Caribbean. *PLoS ONE*, *11*(6), e0157441.

Darvill, R., & Lindo, Z. (2016). The inclusion of stakeholders and cultural ecosystem services in land management trade-off decisions using an ecosystem services approach. *Landscape Ecology*, *31*(3), 533–545.

Davis, A. J. S., & Darling, J. A. (2017). Recreational freshwater fishing drives non-native aquatic species richness patterns at a continental scale. *Diversity and Distributions*, *23*(5/6), 692–702.

De la Rosa Fernandez, L., & Fajardo Vizcayno, J. (2016). Agro-biodiversity as an element of nutritional and environmental security. *Arbor-Ciencia Pensamiento Y Cultura*, *192*(779).

de Moura Leite, F. B. V., Bertolo, L. S., & Santos, R. F. (2016). Practices and perceptions on water resource sustainability in ecovillages. *Water Resources Research*, *52*(8), 6004–6017.

Delacote, P., Robinson, E. J. Z., & Roussel, S. (2016). Deforestation, leakage and avoided deforestation policies: A spatial analysis. *Resource and Energy Economics*, *45*, 192–210.

Delphin, S., Escobedo, F. J., Abd-Elrahman, A., & Cropper, W. P. (2016). Urbanization as a land use change driver of forest ecosystem services. *Land Use Policy*, *54*, 188–199.

Demestihas, C., Plénet, D., Génard, M., Raynal, C., & Lescourret, F. (2017). Ecosystem services in orchards. A review. *Agronomy for Sustainable Development*, *37*(2), 1–21.

Derak, M., Cortina, J., & Taiqui, L. (2017). Integration of stakeholder choices and multi-criteria analysis to support land use planning in semiarid areas. *Land Use Policy*, *64*, 414–428.

Diaci, J., Rozenbergar, D., Fidej, G., & Nagel, T. A. (2017). Challenges for uneven-aged silviculture in restoration of post-disturbance forests in central Europe: A synthesis. *Forests*, *8*(10), 378.

Dissanayake, S. T. M., & Jacobson, S. (2016). Policies with varying costs and benefits: A land conservation classroom game. *The Journal of Economic Education*, *47*(2), 142–160.

Diwediga, B., Agodzo, S., Wala, K., & Le, Q. B. (2017). Assessment of multifunctional landscapes dynamics in the mountainous basin of the Mo River (Togo, West Africa). *Journal of Geographical Sciences*, *27*(5), 579–605.

Đorđević, T., Kašanin-Grubin, M., Gajica, G. D., Popović, Z., Matić, R., Josić, L., … Jovančićević, B. (2016). Fruska gora mountainous environments—Assessing the impact of geological setting and land use on soil properties. *Journal of the Serbian Chemical Society*, *81*(4), 459–468-468.

Doughty, C. E. (2017). Herbivores increase the global availability of nutrients over millions of years. *Nature Ecology & Evolution*, *1*(12), 1820.

Dugan, H. A., Summers, J. C., Skaff, N. K., Krivak-Tetley, F. E., Doubek, J. P., Burke, S. M., … Weathers, K. C. (2017). Long-term chloride concentrations in North American and European freshwater lakes. *Scientific Data*, *4*, 170101.

Duke, J. M., Dundas, S. J., Johnston, R. J., & Messer, K. D. (2015). The effect of spatial interdependencies on prioritization and payments for environmental services. *Land Use Policy*, *48*, 341–350.

Dumont, B., Ryschawy, J., Duru, M., Benoit, M., Delaby, M., Dourmad, J. Y., … Sabatier, R. (2017). Bundles of services make it possible to identify trade-offs and options for livestock production areas. *Productions Animales*, *30*(4), 407–422.

Duncan, C., Thompson, J. R., & Pettorelli, N. (2015). The quest for a mechanistic understanding of biodiversity-ecosystem services relationships. *Proceedings of the Royal Society B. Biological Sciences*, *282*(1817), 20151348.

Dupras, J., Parcerisas, L., & Brenner, J. (2016). Using ecosystem services valuation to measure the economic impacts of land-use changes on the Spanish Mediterranean coast (El Maresme, 1850–2010). *Regional Environmental Change*, *16*(4), 1075–1088.

Emery, S. M., Reid, M. L., Bell-Dereske, L., & Gross, K. L. (2017). Soil mycorrhizal and nematode diversity vary in response to bioenergy crop identity and fertilization. *GCB Bioenergy*, *9*(11), 1644–1656.

Enache, A., Kühmaier, M., Visser, R., & Stampfer, K. (2016). Forestry operations in the European mountains: A study of current practices and efficiency gaps. *Scandinavian Journal of Forest Research*, *31*(4), 412–427.

Esteban, E., & Dinar, A. (2016). The role of groundwater-dependent ecosystems in groundwater management. *Natural Resource Modeling*, *29*(1), 98–129.

Estoque, R. C., & Murayama, Y. (2016). Quantifying landscape pattern and ecosystem service value changes in four rapidly urbanizing hill stations of Southeast Asia. *Landscape Ecology*, *31*(7), 1481–1507.

Evans, M. E. K., Falk, D. A., Arizpe, A., Swetnam, T. L., Babst, F., & Holsinger, K. E. (2017). Fusing tree-ring and forest inventory data to infer influences on tree growth. *Ecosphere*, *8*(7), e01889-n/a.

Experton, C., Bellet, V., Gac, A., Laignel, G., & Benoit, M. (2017). Focusing on feed autonomy and complementarity among regions to ensure the profitability of sheep suckler operations and reassure industries. *Fourrages*, *231*, 223–234.

Ezzine-de-Blas, D., Dutilly, C., Lara-Pulido, J.-A., Le Velly, G., & Guevara-Sanginés, A. (2016). Payments for environmental services in a Policymix: Spatial and temporal articulation in Mexico. *PLoS ONE*, *11*(4), e0152514.

Felton, A., Ranius, T., Roberge, J.-M., Öhman, K., Lämås, T., Hynynen, J., … Nordin, A. (2017). Projecting biodiversity and wood production in future forest landscapes: 15 key modeling considerations. *Journal of Environmental Management*, *197*, 404–414.

Fenner, R. (2017). Spatial evaluation of multiple benefits to encourage multi-functional design of sustainable drainage in blue-green cities. *Water*, *9*(12), 953.

Finney, D. M., Kaye, J. P., & Cadotte, M. (2017). Functional diversity in cover crop polycultures increases multifunctionality of an agricultural system. *Journal of Applied Ecology*, *54*(2), 509–517.

Fish, R., Church, A., & Winter, M. (2016). Conceptualising cultural ecosystem services: A novel framework for research and critical engagement. *Ecosystem Services*, *21*, 208–217.

Flint, C. G. (2016). Framing the human dimensions of mountain systems: Integrating social science paradigms for a global network of mountain observatories. *Mountain Research and Development*, *36*(4), 528–536.

Fontana, V., Kohler, M., Niedrist, G., Bahn, M., Tappeiner, U., & Frenck, G. (2017). Decomposing the land-use specific response of plant functional traits along environmental gradients. *Science of the Total Environment*, *599–600*, 750–759.

Foster, A. C., Shuman, J. K., Shugart, H. H., Dwire, K. A., Fornwalt, P. J., Sibold, J., & Negron, J. (2017). Validation and application of a forest gap model to the southern Rocky Mountains. *Ecological Modelling*, *351*, 109–128.

Foster, E., Love, J., Rader, R., Reid, N., Dillon, M., & Drielsma, M. J. (2016). Planning for metapopulation persistence using a multiple-component, cross-scale model of connectivity. *Biological Conservation*, *195*, 177–186.

Fox, J. T., & Alexander, K. A. (2015). Spatiotemporal variation and the role of wildlife in seasonal water quality declines in the Chobe River, Botswana. *PLoS ONE*, *10*(10), e0139936.

Frasier, I., Quiroga, A., & Noellemeyer, E. (2016). Effect of different cover crops on C and N cycling in sorghum NT systems. *Science of the Total Environment*, *562*, 628–639.

Freer-Smith, P. H., & Webber, J. F. (2017). Tree pests and diseases: the threat to biodiversity and the delivery of ecosystem services. *Biodiversity and Conservation*, *26*(13), 3167–3181.

Fu, B., Li, Y., Wang, Y., Zhang, B., Yin, S., Zhu, H., & Xing, Z. (2016). Evaluation of ecosystem service value of riparian zone using land use data from 1986 to 2012. *Ecological Indicators*, *69*, 873–881.

Galafassi, D., Daw, T. M., Munyi, L., Brown, K., Barnaud, C., Fazey, I., … Centre, S. R. (2017). Learning about social-ecological trade-offs. *Ecology and Society*, *22*(1), 2.

Gao, F., Calatayud, V., García-Breijo, F., Reig-Armiñana, J., & Feng, Z. (2016). Effects of elevated ozone on physiological, anatomical and ultrastructural characteristics of four common urban tree species in China. *Ecological Indicators*, *67*, 367–379.

Gbedomon, R. C., Fandohan, A. B., Salako, V. K., Idohou, A. F. R., Kakaï, R. G., & Assogbadjo, A. E. (2015). Factors affecting home gardens ownership, diversity and structure: A case study from Benin. *Journal of Ethnobiology and Ethnomedicine*, *11*(1), 56.

Geange, S. W., Leathwick, J., Linwood, M., Curtis, H., Duffy, C., Funnell, G., & Cooper, S. (2017). Integrating conservation and economic objectives in MPA network planning: A case study from New Zealand. *Biological Conservation*, *210*, 136–144.

Geslin, B., Aizen, M. A., Garcia, N., Pereira, A.-J., Vaissière, B. E., & Garibaldi, L. A. (2017). The impact of honey bee colony quality on crop yield and farmers' profit in apples and pears. *Agriculture, Ecosystems and Environment*, *248*, 153–161.

Ghalandarayeshi, S., Nord-Larsen, T., Johannsen, V. K., & Larsen, J. B. (2017). Spatial patterns of tree species in Suserup Skov – A semi-natural forest in Denmark. *Forest Ecology and Management*, *406*, 391–401.

Ghermandi, A., & Fichtman, E. (2015). Cultural ecosystem services of multifunctional constructed treatment wetlands and waste stabilization ponds: Time to enter the mainstream? *Ecological Engineering*, *84*, 615–623.

Giakoumi, S., Brown, C. J., Katsanevakis, S., Saunders, M. I., & Possingham, H. P. (2015). Using threat maps for cost-effective prioritization of actions to conserve coastal habitats. *Marine Policy*, *61*, 95–102.

Giannico, V., Lafortezza, R., John, R., Sanesi, G., Pesola, L., & Chen, J. (2016). Estimating stand volume and above-ground biomass of urban forests using LiDAR. *Remote Sensing*, *8*(4), 339.

Gill, N. S., & Sangermano, F. (2016). Africanized honeybee habitat suitability: A comparison between models for southern Utah and southern California. *Applied Geography*, *76*, 14–21.

Gill, N. S., Sangermano, F., Buma, B., & Kulakowski, D. (2017). *Populus tremuloides* seedling establishment: An underexplored vector for forest type conversion after multiple disturbances. *Forest Ecology and Management*, *404*, 156–164.

Golden, H. E., Creed, I. F., Ali, G., Basu, N. B., Neff, B. P., Rains, M. C., … Lang, M. (2017). Integrating geographically isolated wetlands into land management decisions. *Frontiers in Ecology and the Environment*, *15*(6), 319–327.

Goldstein, J. H., Tallis, H., Cole, A., Schill, S., Martin, E., Heiner, M., … Nickel, B. (2017). Spatial planning for a green economy: National-level hydrologic ecosystem services priority areas for Gabon. *PLoS ONE*, *12*(6), e0179008.

Gong, W., Wang, H., Wang, X., Fan, W., & Stott, P. (2017). Effect of terrain on landscape patterns and ecological effects by a gradient-based RS and GIS analysis. *Journal of Forestry Research*, *28*(5), 1061–1072.

González, E., Salvo, A., Defagó, M. T., & Valladares, G. (2016). A moveable feast: Insects moving at the forest-crop interface are affected by crop phenology and the amount of forest in the landscape. *PLoS ONE*, *11*(7), e0158836.

Gooding, R. M., & Baulch, H. M. (2017). Small reservoirs as a beneficial management practice for nitrogen removal. *Journal of Environmental Quality*, *46*(1), 96.

Gopal, B. (2016). Should 'wetlands' cover all aquatic ecosystems and do macrophytes make a difference to their ecosystem services? *Folia Geobotanica*, *51*(3), 209–226.

Gopalakrishnan, V., Grubb, G. F., & Bakshi, B. R. (2017). Biosolids management with net-zero CO2 emissions: A techno-ecological synergy design. *Clean Technologies and Environmental Policy*, *19*(8), 2099–2111.

Grand-Clement, E., Anderson, K., Smith, D., Angus, M., Luscombe, D. J., Gatis, N., … Brazier, R. E. (2015). New approaches to the restoration of shallow marginal peatlands. *Journal of Environmental Management*, *161*, 417–430.

Green, R. E., Donázar, J. A., Sánchez-Zapata, J. A., Margalida, A., & Votier, S. (2016). Potential threat to Eurasian griffon vultures in Spain from veterinary use of the drug diclofenac. *Journal of Applied Ecology*, *53*(4), 993–1003.

Greenland-Smith, S., Brazner, J., & Sherren, K. (2016). Farmer perceptions of wetlands and waterbodies: Using social metrics as an alternative to ecosystem service valuation. *Ecological Economics*, *126*, 58–69.

Groffman, P. M., Cadenasso, M. L., Cavender-Bares, J., Childers, D. L., Grimm, N. B., Grove, J. M., … Ruddell, B. L. (2017). Moving towards a new urban systems science. *Ecosystems*, *20*(1), 38–43.

Gross, M. (2016). Can science rescue coral reefs? *Current Biology*, *26*(12), R481–R484.

Guerbois, C., & Fritz, H. (2017). Patterns and perceived sustainability of provisioning ecosystem services on the edge of a protected area in times of crisis. *Ecosystem Services*, *28*, 196–206.

Gutt, J., Alvaro, M. C., Barco, A., Böhmer, A., Bracher, A., David, B., … Teixidó, N. (2016). Macroepibenthic communities at the tip of the Antarctic Peninsula, an ecological survey at different spatial scales. *Polar Biology*, *39*(5), 829–849.

Hagen, B., Pijawka, D., Prakash, M., & Sharma, S. (2017). Longitudinal analysis of ecosystem services' socioeconomic benefits: Wastewater treatment projects in a desert city. *Ecosystem Services*, *23*, 209–217.

Haile, G., Lemenih, M., Senbeta, F., & Itanna, F. (2017). Plant diversity and determinant factors across smallholder agricultural management units in Central Ethiopia. *Agroforestry Systems*, *91*(4), 677–695.

Hanauer, M. M., & Canavire-Bacarreza, G. (2015). Implications of heterogeneous impacts of protected areas on deforestation and poverty. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *370*(1681), 20140272.

Hanson, H. I., Palmu, E., Birkhofer, K., Smith, H. G., & Hedlund, K. (2016). Agricultural land use determines the trait composition of ground beetle communities. *PLoS ONE*, *11*(1), e0146329.

Hao, H., Zhang, J., Li, X., Zhang, H., & Zhang, Q. (2015). Impact of livelihood diversification of rural households on their ecological footprint in agro-pastoral areas of northern China. *Journal of Arid Land*, *7*(5), 653–664.

Harris, T. M., Hottle, T. A., Soratana, K., Klane, J., & Landis, A. E. (2016). Life cycle assessment of sunflower cultivation on abandoned mine land for biodiesel production. *Journal of Cleaner Production*, *112*, 182–195.

Hasani, M., Sakieh, Y., & Khammar, S. (2017). Measuring satisfaction: Analyzing the relationships between sociocultural variables and functionality of urban recreational parks. *Environment, Development and Sustainability*, *19*(6), 2577–2594.

Hatt, S., Lopes, T., Boeraeve, F., Chen, J., & Francis, F. (2017). Pest regulation and support of natural enemies in agriculture: Experimental evidence of within field wildflower strips. *Ecological Engineering*, *98*, 240–245.

Hejnowicz, A., & Rudd, M. (2017). The value landscape in ecosystem services: Value, value wherefore art thou value? *Sustainability*, *9*(5), 850.

Henkel, M. (2017). Mainstreaming payments for ecosystem services in the global water discourse. *Environmental Policy and Governance*, *27*(1), 14–27.

Hernández, H. J., Acuña, T., Reyes, P., Torres, M., & Figueroa, E.(2016). How much carbon is stored in deserts? An approach for the Chilean Atacama Desert using LANDSAT-8 products. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XLI-B8: 879-882.

Herrera, L., Sabatino, M., Gastón, A., & Saura, S. (2017). Grassland connectivity explains entomophilous plant species assemblages in an agricultural landscape of the Pampa Region, Argentina. *Austral Ecology*, *42*(4), 486–496.

Hessle, A., Bertilsson, J., Stenberg, B., Kumm, K.-I., & Sonesson, U. (2017). Combining environmentally and economically sustainable dairy and beef production in Sweden. *Agricultural Systems*, *156*, 105–114.

Hilberg, S., & Eisendle-Flöckner, U. (2016). About faunal life in Austrian aquifers – Historical background and current developments. *Austrian Journal of Earth Sciences*, *109*(1).

Holland, T. G., Coomes, O. T., & Robinson, B. E. (2016). Evolving frontier land markets and the opportunity cost of sparing forests in western Amazonia. *Land Use Policy*, *58*, 456–471.

Holman, I. P., Brown, C., Janes, V., & Sandars, D. (2017). Can we be certain about future land use change in Europe? A multi-scenario, integrated-assessment analysis. *Agricultural Systems*, *151*, 126–135.

Holmström, E., Hjelm, K., Karlsson, M., & Nilsson, U. (2016). Scenario analysis of planting density and pre-commercial thinning: Will the mixed forest have a chance? *European Journal of Forest Research*, *135*(5), 885–895.

Holon, F., Mouquet, N., Boissery, P., Bouchoucha, M., Delaruelle, G., Tribot, A.-S., & Deter, J. (2015). Fine-scale cartography of human impacts along French Mediterranean coasts: A relevant map for the management of marine ecosystems. *PLoS ONE*, *10*(8), e0135473.

Hosaka, T., Sugimoto, K., & Numata, S. (2017). Effects of childhood experience with nature on tolerance of urban residents toward hornets and wild boars in Japan. *PLoS ONE*, *12*(4), e0175243.

Höss, S., Heininger, P., Claus, E., Möhlenkamp, C., Brinke, M., & Traunspurger, W. (2017). Validating the NemaSPEAR [%]-index for assessing sediment quality regarding chemical-induced effects on benthic communities in rivers. *Ecological Indicators*, *73*, 52–60.

Hosseini Bai, S., Trueman, S. J., Nevenimo, T., Hannet, G., Bapiwai, P., Poienou, M., & Wallace, H. M. (2017). Effects of shade-tree species and spacing on soil and leaf nutrient concentrations in cocoa plantations at 8 years after establishment. *Agriculture, Ecosystems and Environment*, *246*, 134–143.

Houet, T., Vacquié, L., & Sheeren, D. (2015). Evaluating the spatial uncertainty of future land abandonment in a mountain valley (Vicdessos, Pyrenees - France): Insights from model parameterization and experiments. *Journal of Mountain Science*, *12*(5), 1095–1112.

Hoyle, H., Jorgensen, A., Warren, P., Dunnett, N., & Evans, K. (2017). 'Not in their front yard' The opportunities and challenges of introducing perennial urban meadows: A local authority stakeholder perspective. *Urban Forestry & Urban Greening*, *25*, 139.

Hunter, M. L., Acuña, V., Bauer, D. M., Bell, K. P., Calhoun, A. J. K., Felipe-Lucia, M. R., … Poschlod, P. (2017). Conserving small natural features with large ecological roles: A synthetic overview. *Biological Conservation*, *211*, 88–95.

Hussain, J., Akhmat, G., Tan, S., & Xiangbo, Z. (2015). The way forward to strengthen human nature entente: An educated human presence at all the interfaces of this relationship. *Quality & Quantity*, *49*(5), 2107–2121.

Ibisch, P. L., Hoffmann, M. T., Kreft, S., Pe'er, G., Kati, V., Biber-Freudenberger, L., … Selva, N. (2016). A global map of roadless areas and their conservation status. *Science*, *354*(6318), 1423–1427.

Iftekhar, M. S., & Latacz-Lohmann, U. (2017). How well do conservation auctions perform in achieving landscape-level outcomes? A comparison of auction formats and bid selection criteria. *Australian Journal of Agricultural and Resource Economics*, *61*(4), 557–575.

Infantes, E., Crouzy, C., & Moksnes, P.-O. (2016). Seed predation by the shore crab *Carcinus maenas*: A positive feedback preventing eelgrass recovery? *PLoS ONE*, *11*(12), e0168128.

Irvine, K. N., O'Brien, L., Ravenscroft, N., Cooper, N., Everard, M., Fazey, I., … Kenter, J. O. (2016). Ecosystem services and the idea of shared values. *Ecosystem Services*, *21*, 184–193.

Isaacs, R., Williams, N., Ellis, J., Pitts-Singer, T. L., Bommarco, R., & Vaughan, M. (2017). Integrated crop pollination: Combining strategies to ensure stable and sustainable yields of pollination-dependent crops. *Basic and Applied Ecology*, *22*, 44–60.

Ishimatsu, K., Ito, K., Mitani, Y., Tanaka, Y., Sugahara, T., & Naka, Y. (2017). Use of rain gardens for stormwater management in urban design and planning. *Landscape and Ecological Engineering*, *13*(1), 205–212.

Jarsky, V. (2017). Alternative financing options for the forestry sector – Results of the analysis among academics. *Reports of Forestry Research-Zpravy Lesnickeho Vyzkumu*, *62*(2), 127–134.

Jochner, M., Bugmann, H., Nötzli, M., & Bigler, C. (2017). Among-tree variability and feedback effects result in different growth responses to climate change at the upper treeline in the Swiss Alps. *Ecology and Evolution*, *7*(19), 7937.

Jonell, M., & Henriksson, P. J. G. (2015). Mangrove-shrimp farms in Vietnam – Comparing organic and conventional systems using life cycle assessment. *Aquaculture*, *447*, 66.

Jones, B. K. (2015). Marshmallows for alligators: Defining ecotourism in Southwest Florida. *Culture, Agriculture, Food and Environment*, *37*(2), 116–123.

Jones, D. K., Mattes, B. M., Hintz, W. D., Schuler, M. S., Stoler, A. B., Lind, L. A., … Relyea, R. A. (2017). Investigation of road salts and biotic stressors on freshwater wetland communities. *Environmental Pollution*, *221*, 159–167.

Jones, S. E., & Lennon, J. T. (2015). A test of the subsidy-stability hypothesis: The effects of terrestrial carbon in aquatic ecosystems. *Ecology*, *96*(6), 1550–1560.

Jorda-Capdevila, D., Rodríguez-Labajos, B., & Bardina, M. (2016). An integrative modelling approach for linking environmental flow management, ecosystem service provision and inter-stakeholder conflict. *Environmental Modelling and Software*, *79*, 22–34.

Kaplan, D. A., Olabarrieta, M., Frederick, P., & Valle-Levinson, A. (2016). Freshwater detention by oyster reefs: Quantifying a keystone ecosystem service. *PLoS ONE*, *11*(12), e0167694.

Kaplan, M., Mooney, T., Partan, J., & Solow, A. (2015). Coral reef species assemblages are associated with ambient soundscapes. *Marine Ecology Progress Series*, *533*, 93–107.

Kaushal, S. S., Gold, A. J., & Mayer, P. M. (2017). Land use, climate, and water resources—Global stages of interaction. *Water*, *9*(815), 1.

Kazakou, E., Fried, G., Richarte, J., Gimenez, O., Violle, C., & Metay, A. (2016). A plant trait-based response-and-effect framework to assess vineyard inter-row soil management. *Botany Letters*, *163*(4), 373–388.

Keller, J. A., Wilson Grimes, K., Reeve, A. S., & Platenberg, R. (2017). Mangroves buffer marine protected area from impacts of Bovoni Landfill, St. Thomas, United States Virgin Islands. *Wetlands Ecology and Management*, *25*(5), 563–582.

Kennedy, C. M., Miteva, D. A., Baumgarten, L., Hawthorne, P. L., Sochi, K., Polasky, S., … Kiesecker, J. (2016). Bigger is better: Improved nature conservation and economic returns from landscape-level mitigation. *Science Advances*, *2*(7), e1501021.

Kepler, R. M., Maul, J. E., & Rehner, S. A. (2017). Managing the plant microbiome for biocontrol fungi: Examples from Hypocreales. *Current Opinion in Microbiology*, *37*, 48–53.

Kernecker, M., Vogl, C. R., & Aguilar Meléndez, A. (2017). Women's local knowledge of water resources and adaptation to landscape change in the mountains of Veracruz, Mexico. *Ecology and Society*, *22*(4), 37.

Kim, G., Miller, P., & Nowak, D. (2016). The value of green infrastructure on vacant and residential land in Roanoke, Virginia. *Sustainability*, *8*(4), 296.

KimDung, N., Bush, S. R., & Mol, A. P. J. (2017). The Vietnamese legal and policy framework for co-management in special-use forests. *Forests*, *8*(7), 262.

Kinzig, A. P., & McShane, T. O. (2015). Conservation in Africa: Exploring the impact of social, economic and political drivers on conservation outcomes. *Environmental Research Letters*, *10*(9), 90201.

Kittinger, J. N., Bambico, T. M., Minton, D., Miller, A., Mejia, M., Kalei, N., … Glazier, E. W. (2016). Restoring ecosystems, restoring community: Socioeconomic and cultural dimensions of a community-based coral reef restoration project. *Regional Environmental Change*, *16*(2), 301–313.

Kong, F., Sun, C., Liu, F., Yin, H., Jiang, F., Pu, Y., … Dronova, I. (2016). Energy saving potential of fragmented green spaces due to their temperature regulating ecosystem services in the summer. *Applied Energy*, *183*, 1428–1440.

Korbeľová, L., & Kohnová, S. (2017). Methods for improvement of the ecosystem services of soil by sustainable land management in the Myjava River Basin. *Slovak Journal of Civil Engineering*, *25*(1), 29–36.

Kovacs, K., West, G., & Xu, Y. (2017). The use of efficiency frontiers to evaluate the optimal land cover and irrigation practices for economic returns and ecosystem services. *Journal of Hydrology*, *547*, 474–488.

Kraemer, B. M., Chandra, S., Dell, A. I., Dix, M., Kuusisto, E., Livingstone, D. M., … McIntyre, P. B. (2017). Global patterns in lake ecosystem responses to warming based on the temperature dependence of metabolism. *Global Change Biology*, *23*(5), 1881–1890.

Krawczyk, M., Bartczak, A., Hanley, N., & Stenger, A. (2016). Buying spatially-coordinated ecosystem services: An experiment on the role of auction format and communication. *Ecological Economics*, *124*, 36–48.

Kross, S. M., Bourbour, R. P., & Martinico, B. L. (2016). Agricultural land use, barn owl diet, and vertebrate pest control implications. *Agriculture, Ecosystems and Environment*, *223*, 167–174.

Kuhfuss, L., Préget, R., Thoyer, S., Hanley, N., Le Coent, P., & Désolé, M. (2016). Nudges, social norms, and permanence in agri-environmental schemes. *Land Economics*, *92*(4), 641–655.

Kusmanoff, A. M., Hardy, M. J., Fidler, F., Maffey, G., Raymond, C. M., Reed, M. S., … Bekessy, S. A. (2016). Framing the private land conservation conversation: Strategic framing of the benefits of conservation participation could increase landholder engagement. *Environmental Science and Policy*, *61*, 124–128.

Lähtinen, K., Guan, Y., Li, N., & Toppinen, A. (2016). Biodiversity and ecosystem services in supply chain management in the global forest industry. *Ecosystem Services*, *21*, 130–140.

Lang, P., Jeschke, M., Wommelsdorf, T., Backes, T., Lv, C., Zhang, X., & Thomas, F. M. (2015). Wood harvest by pollarding exerts long-term effects on *Populus euphratica* stands in riparian forests at the Tarim River, NW China. *Forest Ecology and Management*, *353*, 87–96.

Lansing, D. M. (2017). Understanding smallholder participation in payments for ecosystem services: The case of Costa Rica. *Human Ecology*, *45*(1), 77–87.

Le, T. H. T., Lee, D. K., Kim, Y. S., & Lee, Y. (2016). Public preferences for biodiversity conservation in Vietnam's Tam Dao National Park. *Forest Science and Technology*, *12*(3), 144–152.

Leija-Loredo, E. G., Reyes-Hernandez, H., Reyes-Perez, O., Flores-Flores, J. L., & Sahagun-Sanchez, F. J. (2016). Land use/cover change, and future scenarios in the coastal region of Oaxaca state, Mexico. *Madera Y Bosques*, *22*(1), 125–140.

Lemke, T., & Salguero-Gómez, R. (2016). Land use heterogeneity causes variation in demographic viability of a bioindicator of species-richness in protected fen grasslands. *Population Ecology*, *58*(1), 165–178.

Lennon, M., Scott, M., Collier, M., & Foley, K. (2016). Developing green infrastructure 'thinking': Devising and applying an interactive group-based methodology for practitioners. *Journal of Environmental Planning and Management*, *59*(5), 843–865.

Lerouge, F., Gulinck, H., & Vranken, L. (2017). Valuing ecosystem services to explore scenarios for adaptive spatial planning. *Ecological Indicators*, *81*, 30–40.

Lewis, S. E., Popp, J. S., English, L. A., & Odetola, T. O. (2017). Willingness to pay for riparian zones in an Ozark watershed. *Journal of Water Resources Planning and Management*, *143*(5), 4017006.

Lewis-Jones, K. E. (2016). 'Useful to us in unknown ways': Seed conservation and the quest for novel human-plant relationships for the 21st century. *Journal of Ethnobiology*, *36*(1), 66–84.

Li, C., Zheng, H., Li, S., Chen, X., Li, J., Zeng, W., … Centre, S. R. (2015). Impacts of conservation and human development policy across stakeholders and scales. *Proceedings of the National Academy of Sciences of the United States of America*, *112*, 7396–7401.

Li, F., Zhang, F., Li, X., Wang, P., Liang, J., Mei, Y., … Qian, Y. (2017). Spatiotemporal patterns of the use of urban green spaces and external factors contributing to their use in central Beijing. *International Journal of Environmental Research and Public Health*, *14*(3), 237.

Li, M., Li, C., Jiang, H., Fang, C., Yang, J., Zhu, Z., … Gong, P. (2016). Tracking bamboo dynamics in Zhejiang, China, using time-series of Landsat data from 1990 to 2014. *International Journal of Remote Sensing*, *37*(7), 1714–1729.

Liang, W., Lü, Y., Zhang, W., Li, S., Jin, Z., Ciais, P., … Su, H. (2017). Grassland gross carbon dioxide uptake based on an improved model tree ensemble approach

considering human interventions: global estimation and covariation with climate. *Global Change Biology*, *23*(7), 2720–2742.
Liang, Y., & Liu, L. (2017). An integrated ecosystem service assessment in an artificial desert oasis of northwestern China. *Journal of Land Use Science*, *12*(2–3), 154–167.
Lichtsteiner, S., & Oehen, B. (2015). Beekeeping and farming dependence and contradiction. *Agrarforschung Schweiz*, *6*(6), 278-+.
Lienhoop, N., Bartkowski, B., & Hansjürgens, B. (2015). Informing biodiversity policy: The role of economic valuation, deliberative institutions and deliberative monetary valuation. *Environmental Science and Policy*, *54*, 522–532.
Lima, G., Hackbart, V., Bertolo, L., & Santos, R. (2016). Identifying driving forces of landscape changes: Historical relationships and the availability of ecosystem services in the Atlantic forest. *Ecosystem Services*, *22*, 11–17.
Lin, B., Meyers, J., Beaty, R., & Barnett, G. (2016). Urban green infrastructure impacts on climate regulation services in Sydney, Australia. *Sustainability*, *8*(8), 788.
Lithgow, D., Martínez, M. L., Silva, R., Geneletti, D., Gallego-Fernández, J. B., Cerdán, C. R., … Jermain, A. (2017). Ecosystem services to enhance coastal resilience in Mexico: The gap between the perceptions of decision-makers and academics. *Journal of Coastal Research*, *77*(77), 116–126.
Liu, X., Jiang, M., Dong, G., Zhang, Z., & Wang, X. (2017). Ecosystem service comparison before and after marshland conversion to paddy field in the Sanjiang Plain, Northeast China. *Wetlands*, *37*(3), 593–600.
Liu, Y., Liu, X., Hu, Y., Li, S., Peng, J., & Wang, Y. (2015). Analyzing nonlinear variations in terrestrial vegetation in China during 1982–2012. *Environmental Monitoring and Assessment*, *187*(11), 1–14.
Livesley, S., Escobedo, F., & Morgenroth, J. (2016). The biodiversity of urban and peri-urban forests and the diverse ecosystem services they provide as socio-ecological systems. *Forests*, *7*(12), 291.
Loft, L., Le, D. N., Pham, T. T., Yang, A. L., Tjajadi, J. S., & Wong, G. Y. (2017). Whose equity matters? National to local equity perceptions in Vietnam's payments for forest ecosystem services scheme. *Ecological Economics*, *135*(May), 164–175.
Lombardini, G. (2016). Cultural identity and anthropized environment: The multidimensional definition and measure of the resilience. *Procedia - Social and Behavioral Sciences*, *223*, 634–639.
Lu, M., Caplan, J. S., Barker, J. D., Langley, J. A., Mozdzer, T. J., Drake, B. G., & Megonigal, J. P. (2016). Allometry data and equations for coastal marsh plants. *Ecology*, *97*(12), 3554.
Luederitz, C., Brink, E., Gralla, F., Hermelingmeier, V., Meyer, M., Niven, L., … von Wehrden, H. (2015). A review of urban ecosystem services: Six key challenges for future research. *Ecosystem Services*, *14*, 98–112.
Lueders, T. (2017). The ecology of anaerobic degraders of BTEX hydrocarbons in aquifers. *FEMS Microbiology Ecology*, *93*(1), fiw220.
Lukyanova, O. N., Volvenko, I. V., Ogorodnikova, A. A., & Anferova, E. N. (2016). The economic valuation of biological resources and ecosystem services in the Sea of Okhotsk. *Russian Journal of Marine Biology*, *42*(7), 602–607.
Lunt, J., Reustle, J., & Smee, D. (2017). Wave energy and flow reduce the abundance and size of benthic species on oyster reefs. *Marine Ecology Progress Series*, *569*, 25–36.
Maas, B., Tscharntke, T., Saleh, S., Dwi Putra, D., & Clough, Y. (2015). Avian species identity drives predation success in tropical cacao agroforestry. *Journal of Applied Ecology*, *52*(3), 735–743.
Machac, J., Louda, J., & Dubova, L. (2016). *Green and blue infrastructure: An opportunity for smart cities?* 2016 Smart Cities Symposium Prague (SCSP). Prague: IEEE.
Magrach, A., & Ghazoul, J. (2015). Climate and pest-driven geographic shifts in global coffee production: Implications for forest cover, biodiversity and carbon storage. *PLoS ONE*, *10*(7), e0133071.
Main, R., Mathieu, R., Kleynhans, W., Wessels, K., Naidoo, L., & Asner, G. (2016). Hyper-temporal C-band SAR for baseline woody structural assessments in deciduous savannas. *Remote Sensing*, *8*(8), 661.
Mancini, M. S., Galli, A., Niccolucci, V., Lin, D., Hanscom, L., Wackernagel, M., … Marchettini, N. (2017). Stocks and flows of natural capital: Implications for Ecological Footprint. *Ecological Indicators*, *77*, 123–128.
Martinez-Juarez, P., Chiabai, A., Taylor, T., & Quiroga Gómez, S. (2015). The impact of ecosystems on human health and well-being: A critical review. *Journal of Outdoor Recreation and Tourism*, *10*, 63–69.
Matthies, B. D., D'Amato, D., Berghäll, S., Ekholm, T., Hoen, H. F., Holopainen, J., … Yousefpour, R. (2016). An ecosystem service-dominant logic? – Integrating the ecosystem service approach and the service-dominant logic. *Journal of Cleaner Production*, *124*, 51–64.
Mayer, A. L., Buma, B., Davis, A., Gagné, S. A., Loudermilk, E. L., Scheller, R. M., … Franklin, J. (2016). How landscape ecology informs global land-change science and policy. *BioScience*, *66*(6), 458–469.
McKnight, J. Y., Harden, C. P., & Schaeffer, S. M. (2017). Soil CO_2 flux trends with differences in soil moisture among four types of land use in an Ecuadorian páramo landscape. *Physical Geography*, *38*(1), 51–61.
McPherson, T. Y., & Boyer, M. A. (2016). Designing transboundary conservation: Navigating sovereignty and ecosystem scale in the Guiana Shield. *International Studies Perspectives*, *17*(1), 17–33.
McWilliam, W., Brown, R., Eagles, P., & Seasons, M. (2015). Evaluation of planning policy for protecting green infrastructure from loss and degradation due to residential encroachment. *Land Use Policy*, *47*, 459–467.
Meerow, S., & Newell, J. P. (2017). Spatial planning for multifunctional green infrastructure: Growing resilience in Detroit. *Landscape and Urban Planning*, *159*, 62–75.
Memmah, M.-M., Lescourret, F., Yao, X., & Lavigne, C. (2015). Metaheuristics for agricultural land use optimization. A review. *Agronomy for Sustainable Development*, *35*(3), 975–998.
Menegaki, A., Olsen, S. B., & Tsagarakis, K. P. (2016). Towards a common standard – A reporting checklist for web-based stated preference valuation surveys and a critique for mode surveys. *Journal of Choice Modelling*, *18*, 18–50.
Mertz, O., & Mertens, C. F. (2017). Land sparing and land sharing policies in developing countries–Drivers and linkages to scientific debates. *World Development*, *98*(Oct), 523–535.
Miller, E., Dandois, J., Detto, M., & Hall, J. (2017). Drones as a tool for monoculture plantation assessment in the steepland tropics. *Forests*, *8*(5), 168.
Miller, R., Nielsen, E., & Huang, C.-H. (2017). Ecosystem service valuation through wildfire risk mitigation: Design, governance, and outcomes of the Flagstaff Watershed Protection Project (FWPP). *Forests*, *8*(5), 142.
Mitchell, M. G. E., Bennett, E. M., & Gonzalez, A. (2015). Strong and nonlinear effects of fragmentation on ecosystem service provision at multiple scales. *Environmental Research Letters*, *10*(9), 94014.
Montgomery, J. A., Klimas, C. A., Arcus, J., DeKnock, C., Rico, K., Rodriguez, Y., … Williams, A. (2016). Soil quality assessment is a necessary first step for designing urban green infrastructure. *Journal of Environmental Quality*, *45*(1), 18.
Moran, M. D., Taylor, N. T., Mullins, T. F., Sardar, S. S., & McClung, M. R. (2017). Land-use and ecosystem services costs of unconventional US oil and gas development. *Frontiers in Ecology and the Environment*, *15*(5), 237–242.
Moreno-Casasola, P., Hernández, M. E., & Adolfo Campos, C. (2017). Hydrology, soil carbon sequestration and water retention along a coastal wetland gradient in the Alvarado Lagoon System, Veracruz, Mexico. *Journal of Coastal Research*, *77*(77), 104–115.
Murray, B. C. (2016). Ecosystem service concepts in practice. *Canadian Public Policy/Analyse de Politiques*, *42*(1), S24–S31.
Murtinho, F., & Hayes, T. (2017). Communal participation in payment for environmental services (PES): Unpacking the collective decision to enroll. *Environmental Management*, *59*(6), 939–955.
Musetta-Lambert, J., Muto, E., Kreutzweiser, D., & Sibley, P. (2017). Wildfire in boreal forest catchments influences leaf litter subsidies and consumer communities in streams: Implications for riparian management strategies. *Forest Ecology and Management*, *391*, 29–41.
Mutandwa, E., & Kanyarukiga, R. (2016). Understanding the role of forests in rural household economies: Experiences from the Northern and Western provinces of Rwanda. *Southern Forests: A Journal of Forest Science*, *78*(2), 115–122.
Naeem, S., Chazdon, R., Duffy, J. E., Prager, C., & Worm, B. (2016). Biodiversity and human well-being: An essential link for sustainable development. *Proceedings of the Royal Society B. Biological Sciences*, *283*(1844), 20162091.
Ndebele, T., & Forgie, V. (2017). Estimating the economic benefits of a wetland restoration programme in New Zealand: A contingent valuation approach. *Economic Analysis and Policy*, *55*, 75–89.
Neeson, T. M., Smith, S. D. P., Allan, J. D., & McIntyre, P. B. (2016). Prioritizing ecological restoration among sites in multi-stressor landscapes. *Ecological Applications*, *26*(6), 1785–1796.
Nero, B. F. (2017). Urban green space dynamics and socio-environmental inequity: Multi-resolution and spatiotemporal data analysis of Kumasi, Ghana. *International Journal of Remote Sensing*, *38*(23), 6993–7020.
Nervo, B., Caprio, E., Celi, L., Lonati, M., Lombardi, G., Falsone, G., … Rolando, A. (2017). Ecological functions provided by dung beetles are interlinked across space and time: Evidence from 15N isotope tracing. *Ecology*, *98*(2), 433–446.

Nesbitt, L., Hotte, N., Barron, S., Cowan, J., & Sheppard, S. R. J. (2017). The social and economic value of cultural ecosystem services provided by urban forests in North America: A review and suggestions for future research. *Urban Forestry & Urban Greening*, *25*, 103–111.

Neumann, A., van Beusekom, J. E. E., Holtappels, M., & Emeis, K.-C. (2017). Nitrate consumption in sediments of the German Bight (North Sea). *Journal of Sea Research*, *127*, 26–35.

Nieratka, L. R., Bray, D. B., & Mozumder, P. (2015). Can payments for environmental services strengthen social capital, encourage distributional equity, and reduce poverty? *Conservation and Society*, *13*(4), 345–355.

Noble, T. J., Lortie, C. J., Westphal, M., & Butterfield, H. S. (2016). A picture is worth a thousand data points: An imagery dataset of paired shrub-open microsites within the Carrizo Plain National Monument. *GigaScience*, *5*(1).

Nordström, M. C., Demopoulos, A. W. J., Whitcraft, C. R., Rismondo, A., McMillan, P., Gonzalez, J. P., … Arnott, S. (2015). Food web heterogeneity and succession in created saltmarshes. *Journal of Applied Ecology*, *52*(5), 1343–1354.

Oles, K. M., Weixelman, D. A., Lile, D. F., Tate, K. W., Snell, L. K., & Roche, L. M. (2017). Riparian meadow response to modern conservation grazing management. *Environmental Management*, *60*(3), 383–395.

Ostoić, S. K., & Vuletić, D. (2016). The role of information in understanding forest ecosystem services. *Šumarski List*, *140*(5–6), 215.

Pak, D., Iverson, A. L., Ennis, K. K., Gonthier, D. J., & Vandermeer, J. H. (2015). Parasitoid wasps benefit from shade tree size and landscape complexity in Mexican coffee agroecosystems. *Agriculture, Ecosystems and Environment*, *206*, 21–32.

Palomo, I., Felipe-Lucia, M. R., Bennett, E. M., Martín-López, B., & Pascual, U. (2016). Disentangling the pathways and effects of ecosystem service co-production. *Advances in Ecological Research*, *54*, 245.

Papanikolaou, A. D., Kühn, I., Frenzel, M., Schweiger, O., & Kleijn, D. (2017). Semi-natural habitats mitigate the effects of temperature rise on wild bees. *Journal of Applied Ecology*, *54*(2), 527–536.

Pardon, P., Reubens, B., Reheul, D., Mertens, J., De Frenne, P., Coussement, T., … Verheyen, K. (2017). Trees increase soil organic carbon and nutrient availability in temperate agroforestry systems. *Agriculture, Ecosystems and Environment*, *247*, 98–111.

Parkhurst, G. M., Shogren, J. F., & Crocker, T. (2016). Tradable set-aside requirements (TSARs): Conserving spatially dependent environmental amenities. *Environmental and Resource Economics*, *63*(4), 719–744.

Paul, C., Weber, M., & Knoke, T. (2017). Agroforestry versus farm mosaic systems – Comparing land-use efficiency, economic returns and risks under climate change effects. *Science of the Total Environment*, *587–588*, 22–35.

Payeur-Poirier, J.-L., & Nguyen, T. (2017). The inclusion of forest hydrological services in the sustainable development strategy of South Korea. *Sustainability*, *9*(8), 1470.

Pendleton, L., Mongruel, R., Beaumont, N., Hooper, T., & Charles, M. (2015). A triage approach to improve the relevance of marine ecosystem services assessments. *Marine Ecology Progress Series*, *530*, 183–193.

Perevochtchikova, M., & Rojo Negrete, I. A. (2015). The perceptions about payment schemes for ecosystem services: Study case of the San Miguel and Santo Tomás Ajusco community, Mexico. *Ecosystem Services*, *14*, 27–36.

Pert, P. L., Hill, R., Maclean, K., Dale, A., Rist, P., Schmider, J., … Tawake, L. (2015). Mapping cultural ecosystem services with rainforest aboriginal peoples: Integrating biocultural diversity, governance and social variation. *Ecosystem Services*, *13*, 41–56.

Pervez, M., & Henebry, G. (2016). Differential heating in the Indian Ocean differentially modulates precipitation in the Ganges and Brahmaputra Basins. *Remote Sensing*, *8*(11), 901.

Petrişor, L. E., Petrişor, A.-I., Andronache, I. C., Ciobotaru, A.-M., & Peptenatu, D. (2016). Assessing the fragmentation of the green infrastructure in Romanian cities using fractal models and numerical taxonomy. *Procedia Environmental Sciences*, *32*, 110–123.

Phillips, S., & McGee, B. (2016). Ecosystem service benefits of a cleaner Chesapeake Bay. *Coastal Management*, *44*(3), 241–258.

Piccoli, I., Camarotto, C., Lazzaro, B., Furlan, L., & Morari, F. (2017). Conservation agriculture had a poor impact on the soil porosity of Veneto low-lying plain silty soils after a 5-year transition period. *Land Degradation & Development*, *28*(7), 2039–2050.

Plieninger, T., Hartel, T., Martín-López, B., Beaufoy, G., Bergmeier, E., Kirby, K., … Van Uytvanck, J. (2015). Wood-pastures of Europe: Geographic coverage, social–ecological values, conservation management, and policy implications. *Biological Conservation*, *190*, 70–79.

Popluga, D., & Feldmane, L. (2016). Development of sustainable living environment in the cities through the bioeconomy. *Economic Science for Rural Development Conference Proceedings*. EBSCO.

Portillo-Quintero, C., Sanchez-Azofeifa, A., Calvo-Alvarado, J., Quesada, M., & do Espirito Santo, M. M. (2015). The role of tropical dry forests for biodiversity, carbon and water conservation in the neotropics: Lessons learned and opportunities for its sustainable management. *Regional Environmental Change*, *15*(6), 1039–1049.

Prescott, G. W., Edwards, D. P., & Foster, W. A. (2015). Retaining biodiversity in intensive farmland: Epiphyte removal in oil palm plantations does not affect yield. *Ecology and Evolution*, *5*(10), 1944–1954.

Presnall, C., Lopez-Hoffman, L., & Miller, M. L. (2015). Adding ecosystem services to environmental impact analyses: More sequins on a 'bloated Elvis' or rockin' idea? *Ecological Economics*, *115*, 29.

Providoli, I., Zeleke, G., Kiteme, B., Heinimann, A., & von Dach, S. W. (2017). From fragmented to integrated knowledge for sustainable water and land management and governance in highland–lowland contexts. *Mountain Research and Development*, *37*(3), 377–380.

Qadir, S. U., Raja, V., & Siddiqui, W. A. (2016). Morphological and biochemical changes in *Azadirachta indica* from coal combustion fly ash dumping site from a thermal power plant in Delhi, India. *Ecotoxicology and Environmental Safety*, *129*, 320–328.

Quine, T., Guo, D., Green, S. M., Tu, C., Hartley, I., Zhang, X., … Meersmans, J. (2017). Ecosystem service delivery in Karst landscapes: Anthropogenic perturbation and recovery. *Acta Geochimica*, *36*(3), 416–420.

Quintas-Soriano, C., Castro, A. J., Castro, H., & García-Llorente, M. (2016). Impacts of land use change on ecosystem services and implications for human well-being in Spanish drylands. *Land Use Policy*, *54*, 534–548.

Radu, E., Cirstea, M. D., Curuţiu, C., & Măruţescu, L. (2017). Environmental parameters influencing the development of bacterioplankton communities from Danube Delta lakes. *Romanian Biotechnological Letters*, *22*(3), 12661–12670.

Rambonilaza, T., & Brahic, E. (2016). Non-market values of forest biodiversity and the impact of informing the general public: Insights from generalized multinomial logit estimations. *Environmental Science and Policy*, *64*, 93–100.

Raum, S. (2017). The ecosystem approach, ecosystem services and established forestry policy approaches in the United Kingdom. *Land Use Policy*, *64*, 282–291.

Razgour, O., Rebelo, H., Di Febbraro, M., & Russo, D. (2016). Painting maps with bats: Species distribution modelling in bat research and conservation. *Hystrix*, *27*(1), 1–8.

Renard, D., Rhemtulla, J. M., & Bennett, E. M. (2015). Historical dynamics in ecosystem service bundles. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(43), 13411–13416.

Rhoades, P., Griswold, T., Waits, L., Bosque-Pérez, N. A., Kennedy, C. M., & Eigenbrode, S. D. (2017). Sampling technique affects detection of habitat factors influencing wild bee communities. *Journal of Insect Conservation*, *21*(4), 703–714.

Richards, D. R., Passy, P., & Oh, R. R. Y. (2017). Impacts of population density and wealth on the quantity and structure of urban green space in tropical Southeast Asia. *Landscape and Urban Planning*, *157*, 553–560.

Richardson, L., Loomis, J., Kroeger, T., & Casey, F. (2015). The role of benefit transfer in ecosystem service valuation. *Ecological Economics*, *115*, 51–58.

Riedinger, V., Mitesser, O., Hovestadt, T., Steffan-Dewenter, I., & Holzschuh, A. (2015). Annual dynamics of wild bee densities: Attractiveness and productivity effects of oilseed rape. *Ecology*, *96*(5), 1351–1360.

Risvoll, C., Fedreheim, G. E., & Galafassi, D. (2016). Trade-offs in pastoral governance in Norway: Challenges for biodiversity and adaptation. *Pastoralism*, *6*(1), 1–15.

Robinson, S. J. B., van den Berg, E., Meirelles, G. S., & Ostle, N. (2015). Factors influencing early secondary succession and ecosystem carbon stocks in Brazilian Atlantic Forest. *Biodiversity and Conservation*, *24*(9), 2273–2291.

Rojas, O., Zamorano, M., Saez, K., Rojas, C., Vega, C., Arriagada, L., & Basnou, C. (2017). Social perception of ecosystem services in a coastal wetland post-earthquake: A case study in Chile. *Sustainability*, *9*(11), 1983.

Rossiter, J., Wondie Minale, M., Andarge, W., & Twomlow, S. (2017). A communities Eden – Grazing Exclosure success in Ethiopia. *International Journal of Agricultural Sustainability*, *15*(5), 514–526.

Rova, S., & Pranovi, F. (2017). Analysis and management of multiple ecosystem services within a social-ecological context. *Ecological Indicators*, *72*, 436–443.

Rudd, M. A., Andres, S., & Kilfoil, M. (2016). Non-use economic values for little-known aquatic species at risk: comparing choice experiment results from surveys focused on species, guilds, and ecosystems. *Environmental Management*, *58*(3), 476–490.

Rüdisser, J., Tasser, E., Peham, T., Meyer, E., & Tappeiner, U. (2015). The dark side of biodiversity: Spatial application of the biological soil quality indicator (BSQ). *Ecological Indicators*, *53*, 240–246.
Rumble, H., & Gange, A. C. (2017). Microbial inoculants as a soil remediation tool for extensive green roofs. *Ecological Engineering*, *102*, 188–198.
Sain, G., Loboguerrero, A. M., Corner-Dolloff, C., Lizarazo, M., Nowak, A., Martínez-Barón, D., & Andrieu, N. (2017). Costs and benefits of climate-smart agriculture: The case of the Dry Corridor in Guatemala. *Agricultural Systems*, *151*, 163–173.
Salvati, L., Ranalli, F., Carlucci, M., Ippolito, A., Ferrara, A., & Corona, P. (2017). Forest and the city: A multivariate analysis of peri-urban forest land cover patterns in 283 European metropolitan areas. *Ecological Indicators*, *73*, 369–377.
Sánchez, J. Á. A., & Muñoz, J. F. V. (2016). Valoración de los ecoservicios en los agroecosistemas españoles: un estado de la cuestión [Valuation of ecosystem services in the Spanish agroecosystems: A state of the question]. *Observatorio Medioambiental*, *19*, 165.
Saner, M. A., & Bordt, M. (2016). Building the consensus: The moral space of earth measurement. *Ecological Economics*, *130*, 74–81.
Sango, I., & Nhamo, G. (2015). Climate change trends and environmental impacts in the Makonde Communal Lands, Zimbabwe. *South African Journal of Science*, *111*(7/8), 78.
Santos, F. A. S., Pierangeli, M. A. P., Silva, F. L., Serafim, M. E., & Souza, C. A. D. (2015). Chemical and physical attributes and calcium, magnesium, potassium, and phosphorus in the soil of murundu fields in Brazil. *Acta Amazonica*, *45*(2), 101–110.
Sattler, C., Schröter, B., Jericó-Daminello, C., Sessin-Dilascio, K., Meyer, A., Meyer, C., … Giersch, G. (2015). Understanding governance structures in community management of ecosystems and natural resources: The Marujá case study in Brazil. *Ecosystem Services*, *16*, 182–191.
Sattler, C., Schröter, B., Meyer, A., Giersch, G., Meyer, C., & Matzdorf, B. (2016). Multilevel governance in community-based environmental management: A case study comparison from Latin America. *Ecology and Society*, *21*(4), 24.
Sauerbrei, R., Aue, B., Krippes, C., Diehl, E., & Wolters, V. (2017). Bioenergy and biodiversity: Intensified biomass extraction from hedges impairs habitat conditions for birds. *Journal of Environmental Management*, *187*, 311–319.
Schägner, J. P., Brander, L., Maes, J., Paracchini, M. L., & Hartje, V. (2016). Mapping recreational visits and values of European National Parks by combining statistical modelling and unit value transfer. *Journal for Nature Conservation*, *31*, 71–84.
Schirpke, U., Timmermann, F., Tappeiner, U., & Tasser, E. (2016). Cultural ecosystem services of mountain regions: Modelling the aesthetic value. *Ecological Indicators*, *69*, 78–90.
Schulz, K., Voigt, K., Beusch, C., Almeida-Cortez, J. S., Kowarik, I., Walz, A., & Cierjacks, A. (2016). Grazing deteriorates the soil carbon stocks of Caatinga forest ecosystems in Brazil. *Forest Ecology and Management*, *367*, 62–70.
Scognamiglio, A. (2016). 'Photovoltaic landscapes': Design and assessment. A critical review for a new transdisciplinary design vision. *Renewable and Sustainable Energy Reviews*, *55*, 629–661.
Scoones, I. (2016). The politics of sustainability and development. *Annual Review of Environment and Resources*, *41*(1), 293–319.
Selonen, S., & Setälä, H. (2017). Nutrient leaching, soil pH and changes in microbial community increase with time in lead-contaminated boreal forest soil at a shooting range area. *Environmental Science and Pollution Research*, *24*(6), 5415–5425.
Sengupta, A., & Dick, W. A. (2015). Bacterial community diversity in soil under two tillage practices as determined by pyrosequencing. *Microbial Ecology*, *70*(3), 853–859.
Shanafelt, D. W., Dieckmann, U., Jonas, M., Franklin, O., Loreau, M., & Perrings, C. (2015). Biodiversity, productivity, and the spatial insurance hypothesis revisited. *Journal of Theoretical Biology*, *380*, 426–435.
Sharma, L. N., & Vetaas, O. R. (2015). Does agroforestry conserve trees? A comparison of tree species diversity between farmland and forest in mid-hills of central Himalaya. *Biodiversity and Conservation*, *24*(8), 2047–2061.
Sherren, K., Parkins, J. R., Smit, M., Holmlund, M., & Chen, Y. (2017). Digital archives, big data and image-based culturomics for social impact assessment: Opportunities and challenges. *Environmental Impact Assessment Review*, *67*, 23–30.
Siew, T. F., Aenis, T., Spangenberg, J. H., Nauditt, A., Döll, P., Frank, S. K., … Wang, J. (2016). Transdisciplinary research in support of land and water management in China and Southeast Asia: Evaluation of four research projects. *Sustainability Science*, *11*(5), 813–829.
Simončič, T., & Bončina, A. (2015). Are forest functions a useful tool for multi-objective forest management planning? Experiences from Slovenia. *Croatian Journal of Forest Engineering*, *36*(2), 293–305.
Sistla, S. A., Roddy, A. B., Williams, N. E., Kramer, D. B., Stevens, K., & Allison, S. D. (2016). Agroforestry practices promote biodiversity and natural resource diversity in Atlantic Nicaragua. *PLoS ONE*, *11*(9), e0162529.
Smith, C. S., Gittman, R. K., Neylan, I. P., Scyphers, S. B., Morton, J. P., Joel Fodrie, F., … Peterson, C. H. (2017). Hurricane damage along natural and hardened estuarine shorelines: Using homeowner experiences to promote nature-based coastal protection. *Marine Policy*, *81*, 350–358.
Stanturf, J. A. (2015). Future landscapes: Opportunities and challenges. *New Forests*, *46*(5), 615–644.
Stern, M. J., Ardoin, N. M., & Powell, R. B. (2017). Exploring the effectiveness of outreach strategies in conservation projects: The case of the Audubon Toyota TogetherGreen program. *Society & Natural Resources*, *30*(1), 95–111.
Sterner, R. W., Ostrom, P., Ostrom, N. E., Klump, J. V., Steinman, A. D., Dreelin, E. A., … Fisk, A. T. (2017). Grand challenges for research in the Laurentian Great Lakes. *Limnology and Oceanography*, *62*(6), 2510–2523.
Sun, P., Xu, Y., Yu, Z., Liu, Q., Xie, B., & Liu, J. (2016). Scenario simulation and landscape pattern dynamic changes of land use in the Poverty Belt around Beijing and Tianjin: A case study of Zhangjiakou city, Hebei Province. *Journal of Geographical Sciences*, *26*(3), 272–296.
Takahashi, S., & Liang, L. (2016). Roles of forests in food security based on case studies in Yunnan, China. *International Forestry Review*, *18*(1), 123–132.
Tammi, I., Mustajärvi, K., & Rasinmäki, J. (2017). Integrating spatial valuation of ecosystem services into regional planning and development. *Ecosystem Services*, *26*, 329–344.
Tanhuanpää, T., Kankare, V., Setälä, H., Yli-Pelkonen, V., Vastaranta, M., Niemi, M. T., … Holopainen, M. (2017). Assessing above-ground biomass of open-grown urban trees: A comparison between existing models and a volume-based approach. *Urban Forestry & Urban Greening*, *21*, 239–246.
Taylor, G. C., Weyl, O. L. F., Hill, J. M., Peel, R. A., & Hay, C. J. (2017). Comparing the fish assemblages and food-web structures of large floodplain rivers. *Freshwater Biology*, *62*(11), 1891–1907.
Thiffault, E., Webster, K., Lafleur, B., Wilson, S., & Mansuy, N. (2017). Biophysical indicators based on spatial hierarchy for informing land reclamation: The case of the Lower Athabasca River (Alberta, Canada). *Ecological Indicators*, *72*, 173–184.
Thomas, J. A., White, J. D., & Murray, D. B. (2016). Tree species influence woodland canopy characteristics and crown fire potential. *Forest Ecology and Management*, *362*, 169–176.
Thompson, S. D., Nelson, T. A., Coops, N. C., Wulder, M. A., & Lantz, T. C. (2017). Global spatial–temporal variability in terrestrial productivity and phenology regimes between 2000 and 2012. *Annals of the American Association of Geographers*, *107*(6), 1519–1537.
Tikhonova, T. (2017). Environmental and economic assessment of water regulation function of rural territories in the Republic of Komi. *Economic and Social Changes: Facts, Trends, Forecast*, *10*(3), 209–226.
Timpane-Padgham, B. L., Beechie, T., & Klinger, T. (2017). A systematic review of ecological attributes that confer resilience to climate change in environmental restoration. *PLoS ONE*, *12*(3), e0173812.
Tolimieri, N., Shelton, A. O., Feist, B. E., & Simon, V. (2015). Can we increase our confidence about the locations of biodiversity 'hotspots' by using multiple diversity indices? *Ecosphere*, *6*(12), art290.
Tougeron, K., & Abram, P. K. (2017). An ecological perspective on sleep disruption. *The American Naturalist*, *190*(3), E55–E66.
Tsai, W.-L., Floyd, M. F., Leung, Y.-F., McHale, M. R., & Reich, B. J. (2016). Urban vegetative cover fragmentation in the US: Associations with physical activity and BMI. *American Journal of Preventive Medicine*, *50*(4), 509–517.
Turcato, C., Paoli, C., Scopesi, C., Montagnani, C., Mariotti, M. G., & Vassallo, P. (2015). Matsucoccus bast scale in *Pinus pinaster* forests: A comparison of two systems by means of emergy analysis. *Journal of Cleaner Production*, *96*(1 Jun), 539–548.
Turnbull, L. A., Isbell, F., Purves, D. W., Loreau, M., & Hector, A. (2016). Understanding the value of plant diversity for ecosystem functioning through niche theory. *Proceedings of the Royal Society B. Biological Sciences*, *283*(1844), 20160536.
Turner, D. P., Conklin, D. R., & Bolte, J. P. (2015). Projected climate change impacts on forest land cover and land use over the Willamette River Basin, Oregon, USA. *Climatic Change*, *133*(2), 335–348.
Uda, S. K., Hein, L., & Sumarga, E. (2017). Towards sustainable management of Indonesian tropical peatlands. *Wetlands Ecology and Management*, *25*(6), 683–701.

Uehara, T., Nagase, Y., & Wakeland, W. (2016). Integrating economics and system dynamics approaches for modelling an ecological–economic system. *Systems Research and Behavioral Science*, *33*(4), 515–531.

Ureta, J. U., Evangelista, K. P. A., Habito, C. M. D., & Lasco, R. D. (2016). Exploring gender preferences in farming system and tree species selection: Perspectives of smallholder farmers in Southern Philippines. *Journal of Environmental Science and Management(1)*.

van den Belt, M., & Stevens, S. M. (2016). Transformative agenda, or lost in the translation? A review of top-cited articles in the first four years of Ecosystem Services. *Ecosystem Services*, *22*, 60–72.

Van den Broeck, M., Waterkeyn, A., Rhazi, L., Grillas, P., & Brendonck, L. (2015). Assessing the ecological integrity of endorheic wetlands, with focus on Mediterranean temporary ponds. *Ecological Indicators*, *54*, 1–11.

Van der Stocken, T., & Menemenlis, D. (2017). Modelling mangrove propagule dispersal trajectories using high-resolution estimates of ocean surface winds and currents. *Biotropica*, *49*(4), 472–481.

Van Noordwijk, M., Tanika, L., & Lusiana, B. (2017). Flood risk reduction and flow buffering as ecosystem services – Part 2: Land use and rainfall intensity effects in Southeast Asia. *Hydrology and Earth System Sciences*, *21*(5), 2341–2360.

Van Wilgen, N. J., & McGeoch, M. A. (2015). Balancing effective conservation with sustainable resource use in protected areas: Precluded by knowledge gaps. *Environmental Conservation*, *42*(3), 246–255.

Vargas, L., Hein, L., & Remme, R. P. (2016). Accounting for ecosystem assets using remote sensing in the Colombian Orinoco River basin lowlands. *Earth Resources and Environmental Remote Sensing/GIS Applications VII: International Society for Optics and Photonics*.

Vaudo, A. D., Tooker, J. F., Grozinger, C. M., & Patch, H. M. (2015). Bee nutrition and floral resource restoration. *Current Opinion in Insect Science*, *10*, 133–141.

Vergnes, A., Blouin, M., Muratet, A., Lerch, T. Z., Mendez-Millan, M., Rouelle-Castrec, M., & Dubs, F. (2017). Initial conditions during Technosol implementation shape earthworms and ants diversity. *Landscape and Urban Planning*, *159*, 32–41.

Veron, S., Davies, T. J., Cadotte, M. W., Clergeau, P., & Pavoine, S. (2017). Predicting loss of evolutionary history: Where are we? *Biological Reviews*, *92*(1), 271–291.

Vetter, D., Storch, I., & Bissonette, J. A. (2016). Advancing landscape ecology as a science: The need for consistent reporting guidelines. *Landscape Ecology*, *31*(3), 469–479.

Victoria-Salazar, I., Hernández-Arana, H. A., Meave, J. A., Ruiz-Zárate, M. A., Vega-Zepeda, A., Carricart-Ganivet, J. P., & López-Adame, H. (2017). Did the community structure of a coral reef patch affected by a ship grounding recover after 15 years? Merging historical and recent data sets. *Ocean and Coastal Management*, *144*, 59–70.

Villegas-Palacio, C., Berrouet, L., López, C., Ruiz, A., & Upegui, A. (2016). Lessons from the integrated valuation of ecosystem services in a developing country: Three case studies on ecological, socio-cultural and economic valuation. *Ecosystem Services*, *22*, 297–308.

Vojinovic, Z., Keerakamolchai, W., Weesakul, S., Pudar, R., Medina, N., & Alves, A. (2016). Combining ecosystem services with cost-benefit analysis for selection of green and grey infrastructure for flood protection in a cultural setting. *Environments*, *4*(1), 3.

Vollstädt, M. G. R., Ferger, S. W., Hemp, A., Howell, K. M., Töpfer, T., Böhning-Gaese, K., … Moles, A. (2017). Direct and indirect effects of climate, human disturbance and plant traits on avian functional diversity. *Global Ecology and Biogeography*, *26*(8), 963–972.

Vološčuk, I., Škodová, M., Sabo, P., & Švajda, J. (2016). Recreational potential of Malá Fatra National Park by vegetation zones. *Public Recreation and Landscape Protection, Křtiny, Czech Society of Landscape Engineers*.

Vrebos, D., Bampa, F., Creamer, R., Gardi, C., Ghaley, B., Jones, A., … Meire, P. (2017). The impact of policy instruments on soil multifunctionality in the European Union. *Sustainability*, *9*(3), 407.

Walalite, T., Dekker, S. C., Keizer, F. M., Kardel, I., Schot, P. P., deJong, S. M., & Wassen, M. J. (2016). Flood water hydrochemistry patterns suggest floodplain sink function for dissolved solids from the Songkhram Monsoon River (Thailand). *Wetlands*, *36*(6), 995–1008.

Wang, C., Wang, Q., Meire, D., Ma, W., Wu, C., Meng, Z., … Temmerman, S. (2016). Biogeomorphic feedback between plant growth and flooding causes alternative stable states in an experimental floodplain. *Advances in Water Resources*, *93*, 223–235.

Wang, Z., Mao, D., Li, L., Jia, M., Dong, Z., Miao, Z., … Song, C. (2015). Quantifying changes in multiple ecosystem services during 1992–2012 in the Sanjiang Plain of China. *Science of the Total Environment*, *514*, 119–130.

Warner, R., Kaidonis, M., Dun, O., Rogers, K., Shi, Y., Nguyen, T. T. X., & Woodroffe, C. D. (2016). Opportunities and challenges for mangrove carbon sequestration in the Mekong River Delta in Vietnam. *Sustainability Science*, *11*(4), 661–677.

Weber, M. A., Caplan, S., Ringold, P., & Blocksom, K. (2017). Rivers and streams in the media: A content analysis of ecosystem services. *Ecology and Society*, *22*(3), 15.

Weckel, M., & Wincorn, A. (2016). Urban conservation: The northeastern coyote as a flagship species. *Landscape and Urban Planning*, *150*, 10–15.

Weisner, S. E. B., Johannesson, K., Thiere, G., Svengren, H., Ehde, P. M., & Tonderski, K. (2016). National large-scale wetland creation in agricultural areas—Potential versus realized effects on nutrient transports. *Water*, *8*(11), 544.

Welle, P. D., Medellin-Azuara, J., Viers, J. H., & Mauter, M. S. (2017). Economic and policy drivers of agricultural water desalination in California's central valley. *Agricultural Water Management*, *194*, 192.

Whitten, S. M., Wünscher, T., & Shogren, J. F. (2017). Conservation tenders in developed and developing countries – Status quo, challenges and prospects. *Land Use Policy*, *63*, 552–560.

Wilske, B., Eccard, J. A., Zistl-Schlingmann, M., Hohmann, M., Methler, A., Herde, A., … Breuer, L. (2015). Effects of short term bioturbation by common voles on biogeochemical soil variables. *PLoS ONE*, *10*(5), e0126011.

Woodcock, B. A., Bullock, J. M., McCracken, M., Chapman, R. E., Ball, S. L., Edwards, M. E., … Pywell, R. F. (2016). Spill-over of pest control and pollination services into arable crops. *Agriculture, Ecosystems and Environment*, *231*, 15–23.

Wu, G., & Liu, Y. (2017). Assessment of the hydro-ecological impacts of the Three Gorges Dam on China's largest freshwater lake. *Remote Sensing*, *9*(10), 1069.

Xiong, K., & Kong, F. (2017). The analysis of farmers' willingness to accept and its influencing factors for ecological compensation of Poyang Lake wetland. *Procedia Engineering*, *174*, 835–842.

Xu, S., Mingzhu, L., Bu, N., & Pan, S. (2017). Regulatory frameworks for ecotourism: An application of Total Relationship Flow Management Theorems. *Tourism Management*, *61*, 321–330.

Yadav, R., Bisht, J., & Bhatt, J. (2017). Biomass, carbon stock under different production systems in the mid hills of Indian Himalaya. *Tropical Ecology*, *58*(1), 15–21.

Yan, S., Wang, X., Cai, Y., Li, C., Yang, Z., & Yi, Y. (2017). Investigation of the spatio-temporal dynamics in landscape variations in a shallow lake based on a new Tendency-Pattern-Service conceptual framework. *Journal of Cleaner Production*, *161*, 1074–1084.

Yang, J. Q., Chung, H., & Nepf, H. M. (2016). The onset of sediment transport in vegetated channels predicted by turbulent kinetic energy. *Geophysical Research Letters*, *43*(21), 11,261–211,268.

Yang, L., Elbakidze, L., Marsh, T., & McIntosh, C. (2016). Primary and secondary pest management in agriculture: Balancing pesticides and natural enemies in potato production. *Agricultural Economics*, *47*(6), 609–619.

Yang, W., Hyndman, D. W., Winkler, J. A., Viña, A., Deines, J. M., Lupi, F., … Liu, J. (2016). Urban water sustainability: Framework and application. *Ecology and Society*, *21*(4), 4.

Yao, F., Wang, C., Dong, D., Luo, J., Shen, Z., & Yang, K. (2015). High-resolution mapping of urban surface water using ZY-3 multi-spectral imagery. *Remote Sensing*, *7*(9), 12336–12355.

Yessoufou, K., Mearns, K., Elansary, H. O., & Hendrik Stoffberg, G. (2016). Assessing the phylogenetic dimension of Australian Acacia species introduced outside their native ranges. *Botany Letters*, *163*(1), 33–39.

Yi, H., Güneralp, I., Güneralp, B., Filippi, A. M., & Kreuter, U. P. (2017). Impacts of land change on ecosystem services in the San Antonio River Basin, Texas, from 1984 to 2010. *Ecological Economics*, *135*(May), 125–135.

Yildirimer, S., & Demirci, U. (2017). Applicability of payments for ecosystem services mechanism in water resources protection in Turkey. *International Journal of Ecosystems and Ecology Science-IJEES*, *7*(2), 251–262.

Yimam, Y. T., Ochsner, T. E., & Kakani, V. G. (2015). Evapotranspiration partitioning and water use efficiency of switchgrass and biomass sorghum managed for biofuel. *Agricultural Water Management*, *155*, 40–47.

Yoshioka, A., Mishima, Y., & Fukasawa, K. (2015). Pollinators and other flying insects inside and outside the Fukushima evacuation zone. *PLoS ONE*, *10*(11), e0140957.

Zaitsev, A. S., Gongalsky, K. B., Korobushkin, D. I., Butenko, K. O., Gorshkova, I. A., Rakhleeva, A. A., … Yazrikova, T. E. (2017). Reduced functionality of soil food webs in burnt boreal forests: A case study in Central Russia. *Contemporary Problems of Ecology*, *10*(3), 277–285.

Zarnetske, P. L., Ruggiero, P., Seabloom, E. W., & Hacker, S. D. (2015). Coastal foredune evolution: The relative influence of vegetation and sand supply in the US Pacific Northwest. *Journal of the Royal Society, Interface*, *12*(106), 20150017.

Zhang, K., Li, Y. P., Huang, G. H., You, L., & Jin, S. W. (2015). Modeling for regional ecosystem sustainable development under uncertainty — A case study of Dongying, China. *Science of the Total Environment*, *533*, 462–475.

Zhang, M., Wang, K., Liu, H., Zhang, C., Wang, J., Yue, Y., & Qi, X. (2015). How ecological restoration alters ecosystem services: An analysis of vegetation carbon sequestration in the karst area of northwest Guangxi, China. *Environmental Earth Sciences*, *74*(6), 5307–5317.

Zhang, Q., Zhang, Y., Zhang, K., & Song, C. (2017). Natural disasters and economic development drive forest dynamics and transition in China. *Forest Policy and Economics*, *76*, 56–64.

Zhao, Z.-H., Reddy, G. V. P., Hui, C., & Li, B.-L. (2016). Approaches and mechanisms for ecologically based pest management across multiple scales. *Agriculture, Ecosystems and Environment*, *230*, 199–209.

Zhu, L., Fu, B., Zhu, H., Wang, C., Jiao, L., & Zhou, J. (2017). Trait choice profoundly affected the ecological conclusions drawn from functional diversity measures. *Scientific Reports*, *7*(1), 3643.

Zimonick, B. J., Simard, S. W., & Roach, W. J. (2017). Selective removal of paper birch increases growth of juvenile Douglas-fir while minimizing impacts on the plant community. *Scandinavian Journal of Forest Research*, *32*(8), 708–716.

How to cite this article: Chan KMA, Satterfield T. The maturation of ecosystem services: Social and policy research expands, but whither biophysically informed valuation? *People Nat*. 2020;2:1021–1060. https://doi.org/10.1002/pan3.10137