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Contributed Paper

Evaluating Perceived Benefits of Ecoregional Assessments

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Abstract: *The outcomes of systematic conservation planning (process of assessing, implementing, and managing conservation areas) are rarely reported or measured formally. A lack of consistent or rigorous evaluation in conservation planning has fueled debate about the extent to which conservation assessment (identification, design, and prioritization of potential conservation areas) ultimately influences actions on the ground. We interviewed staff members of a nongovernmental organization, who were involved in 5 ecoregional assessments across North and South America and the Asia-Pacific region. We conducted 17 semistructured interviews with open and closed questions about the perceived purpose, outputs, and outcomes of the ecoregional assessments in which respondents were involved. Using qualitative data collected from those interviews, we investigated the types and frequency of benefits perceived to have emerged from the ecoregional assessments and explored factors that might facilitate or constrain the flow of benefits. Some benefits reflected the intended purpose of ecoregional assessments. Other benefits included improvements in social interactions, attitudes, and institutional knowledge. Our results suggest the latter types of benefits enable ultimate benefits of assessments, such as guiding investments by institutional partners. Our results also showed a clear divergence between the respondents' expectations and perceived outcomes of implementation of conservation actions arising from ecoregional assessments. Our findings suggest the need for both a broader perspective on the contribution of assessments to planning goals and further evaluation of conservation assessments.*

Keywords: conservation assessment, effectiveness, evaluation, monitoring, outcomes, spatial prioritization, systematic conservation planning

Evaluación de los Beneficios Percibidos de las Evaluaciones Ecorregionales

Resumen: *Los resultados de la planificación sistemática de la conservación (proceso de evaluación, implementación y manejo de áreas de conservación) raramente son registradas o medidas formalmente. La falta de evaluación consistente o rigurosa de la planificación de la conservación ha alimentado el debate sobre la extensión en la que la evaluación de la conservación (identificación, diseño y priorización de las potenciales áreas de conservación) influye en acciones reales. Entrevistamos a miembros del personal de una organización no gubernamental involucrados en 5 evaluaciones ecorregionales en América del Norte y del Sur y en la región Asia-Pacífico. Aplicamos 17 cuestionarios semiestructurados con preguntas abiertas y cerradas sobre las percepciones respecto al objetivo, insumos y resultados de la evaluaciones ecorregionales en que estaban involucrados los encuestados. Utilizando los datos cualitativos recolectados en las entrevistas, investigamos los tipos y frecuencia de beneficios percibidos que emergieron de las evaluaciones ecorregionales y exploramos los factores que pueden facilitar o limitar el flujo de beneficios. Algunos beneficios*

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reflejaron el propósito deseado de las evaluaciones ecorregionales. Otros beneficios incluyeron mejoras en las interacciones, actitudes y conocimiento institucional de la sociedad. Nuestros resultados sugieren que este tipo de beneficios posibilita los beneficios finales de las evaluaciones, como la orientación de inversiones de los socios institucionales. Nuestros resultados también mostraron una clara divergencia entre las expectativas de los encuestados y los resultados percibidos de la implementación de acciones de conservación derivadas de las evaluaciones ecorregionales. Nuestros resultados sugieren la necesidad tanto de una mayor perspectiva de la contribución de las evaluaciones a las metas planeadas como de una evaluación posterior de las evaluaciones de conservación.

Palabras Clave: efectividad, evaluación, evaluación de la conservación, monitoreo, planificación sistemática de la conservación, priorización espacial, resultados

Introduction

Over the past 20 years, the application of systematic conservation planning (process of assessing and implementing conservation areas on the basis of clearly specified goals [Margules & Pressey 2000; Pressey & Bottrill 2009]) has expanded rapidly. Goals of conservation planning include minimizing threats to biological diversity and natural areas (Margules & Pressey 2000) and improving the allocation of conservation resources to maximize benefits from limited budgets. Widespread belief in the value of conservation planning is indicated by a substantial commitment of funds to the process (Knight et al. 2008) and the abundance of guidelines, frameworks, software, and publications (Pressey et al. 2007) on the topic. However, whether regional-scale planning exercises meet their objectives is rarely reported or measured explicitly, even though the costs of planning exercises can be high (Groves et al. 2002; Pressey & Bottrill 2009). One component of the planning process, conservation assessment (Cowling et al. 2004; Knight et al. 2006*b*), has been the focus of significant time and resources. Conservation assessment involves the identification, design, and prioritization of potential conservation areas and may inform the allocation of resources to particular features and the location and type of conservation actions (Cowling et al. 2004; Knight et al. 2006*a*). However, little evidence demonstrates that assessments ultimately affect implementation of conservation actions as new frameworks for conservation planning suggest they should (Knight et al. 2008). Rigorous evaluation of conservation assessment is important for determining its effects and cost-effectiveness (Pressey & Bottrill 2009) and for adapting and improving frameworks for assessment (Grantham et al. 2010).

Conservation assessment continues to evolve. Research institutions, government agencies, and nongovernmental organizations (NGOs) have contributed to this evolution by developing and applying different approaches to new locations and contexts (e.g., developed vs. developing countries) (Pressey & Bottrill 2009). The substantial funds and numerous publications and tools dedicated to the art and science of conservation assessment suggest that there are significant benefits to conducting assessments (Moilanen et al. 2009) that have not been comprehensively documented. Some researchers have attempted to measure the potential value of assessments in terms of conservation of biological diversity, relative to ad hoc decisions, by evaluating representation of biological diversity in and selection efficiency (which aims to minimize area required to achieve conservation goals) of proposed conservation areas (Pressey & Tully 1994; Pressey & Taffs 2001; Hansen et al. 2011). In addition, the international NGO community, through organizations such as the Conservation Measures Partnership (www.conservationmeasures.org) and the U.S. Agency for International Development Global Conservation Program, has begun to share lessons from planning experiences (Bottrill et al. 2006; Pressey & Bottrill 2009; Muir 2010). These efforts to measure the contribution of conservation assessment to broader conservation goals are limited in 2 critical ways. First, studies focused solely on achievement of objectives in notional conservation areas do not address outcomes or demonstrable changes to social or ecological systems. Second, without standardized measures that link outcomes of conservation assessments to broader planning goals, outcomes of planning exercises applied by different conservation organizations following different methods cannot be compared and differences in outcomes cannot be explained.

Following the principles of systematic conservation planning (Margules & Pressey 2000), The Nature Conservancy (TNC) has completed over 100 ecoregional assessments across North, Central, and South America and the Asia-Pacific region (Fig. 1). Ecoregional assessments conducted by TNC follow 7 steps, which are part of the Conservation by Design framework (TNC 2005, 2011*a*): (1) identify biological features of regional, national, or international conservation significance, such as species, ecological communities, ecosystems, or surrogates for these (e.g., biophysical or geophysical units) (i.e., conservation targets), (2) collate spatially explicit data on conservation targets, (3) identify quantitative goals for each conservation target to ensure representation and persistence of biological features (e.g., 50% of the area currently occupied by a plant community), (4) assess the extent to which goals are achieved in existing conservation areas, (5) evaluate ecological integrity of biological features in the planning region to determine whether and where conditions are suitable for targets to persist,

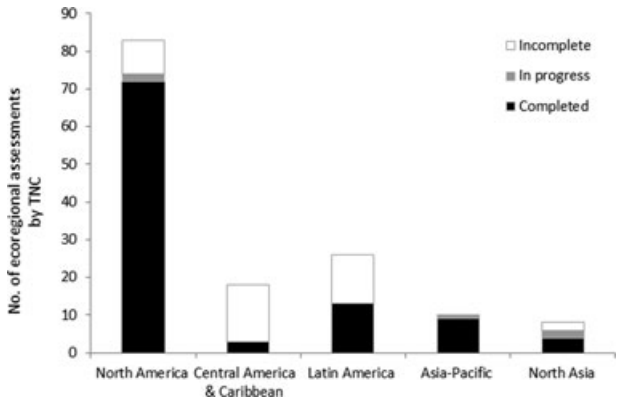

Figure 1. Distribution of ecoregional assessments by region delineated by TNC (TNC 2011a) (completed assessments identified a portfolio of priority conservation areas and produced a final report; in progress, assessments underway at the time of data compilation; incomplete assessments terminated without identification of a portfolio of priority sites or production of a final report) (TNC 2011a).

(6) use a decision support system to assemble alternative portfolios of potential conservation areas, and (7) identify the final portfolio of priority conservation areas. The steps are broadly equivalent to Pressey and Bottrill's (2009) stages 1–9.

Ecoregional assessments bring together biological, social, and economic data and expert opinion to identify portfolios of sites that represent the biological diversity of ecoregions. The assessments help TNC and its partners focus on their conservation efforts (Groves et al. 2000; Groves et al. 2002). Within the sites identified as priorities by ecoregional assessments, the Conservation Action Planning process is intended to move assessment beyond identification of conservation areas toward design of conservation strategies, implementation of strategies, and management of sites (TNC 2005). TNC has shared lessons learned during ecoregional assessments through a series of ecoregional peer-review workshops (Unnasch & Higgins 2007). In recent years, TNC has made progress in monitoring and evaluating the achievement of ecoregional goals (e.g., in the northeastern United States [Anderson & Sheldon 2011]) and the extent to which ecoregional assessments have influenced land purchase and easement efforts (e.g., in North America [J. Fisher, personal communication]). Formal measurement of outcomes has tended to focus on ecological criteria, and social or institutional outcomes have been noted only informally between planning teams. To date, the full range of benefits of the organization's ecoregional assessments has not been measured systematically.

Here, we sought to more extensively explore the range of perceived benefits emerging from TNC's ecoregional assessments. For the purpose of this study, we define *benefits* as outputs or outcomes resulting from ecoregional assessment that contribute positively, directly or indirectly, to the overall goal of the assessment. We focused on desired human, social, ecological, financial, or institutional outputs and outcomes of assessments and on the attributes, processes, or events that improved or facilitated desired outcomes of assessments. We used available documentation and qualitative data collected from interviews with TNC staff members to examine 5 ecoregional assessments in detail. Our objectives were to identify types of benefits (intended and unintended); assess the frequency of benefits across different ecoregional assessments; gauge the extent to which benefits achieved by ecoregional assessments corresponded to their overarching purposes; and identify factors that facilitated or constrained the flow of benefits.

Methods

Selection of Case Studies

We used 5 criteria to identify a diverse, yet comparable, subset of TNC's ecoregional assessments. First, the ecoregional assessment must have been completed prior to 2006, which we assumed would allow time for medium-term outcomes to emerge. Second, assessments had to have similar overarching goals. Third, as a group the assessments had to be representative of different environmental realms (marine, freshwater, and terrestrial) and of diverse social, economic, and political contexts (e.g., North America and International programs). Fourth, sufficient documentation and reports on assessments had to be available. Finally, staff members involved in developing or implementing assessments and staff members currently working in the selected ecoregions but not involved directly in the assessments had to be available for interviews.

Seventy-two ecoregional assessments were completed prior to 2006. Of these, 54 had available documentation (TNC 2011*a*). The majority of assessments were conducted in the United States (76%). Fewer assessments were conducted in transboundary ecoregions spanning 2 countries in North America (17%) and outside North America (7%). We investigated 5 ecoregional assessments in detail (Table 1). Two of the assessments were in binational ecoregions (Canadian Rockies and Sonoran Desert). Two were conducted by TNC outside the United States: one in Mexico (Mexico program, Gulf of California) and one in Micronesia (Asia-Pacific program, Federated States of Micronesia Conservation Blueprint). One was within the continental United States (Chesapeake Bay Lowlands). The Gulf of California assessment was applied solely to marine ecosystems. The Federated States of Micronesia assessment covered nearshore marine, freshwater, and terrestrial ecosystems. The 3 other

Table 1. Overview of 5 ecoregional assessments (ERAs) completed by TNC and evaluated in this study.

Ecoregional assessment	*Realms*	*Country*	*Impetus for ecoregional assessment*	*References*
Chesapeake Bay lowlands	terrestrial, freshwater	United States	TNC-wide initiative started in 1996 to develop ERAs across U.S. state chapters; TNC Northeast regional office responsible for guiding ERA processes across all northeastern TNC chapters; Maryland chapter led planning team	TNC 2002
Ecological analyses of conservation priorities in the Sonoran Desert	terrestrial, freshwater	United States, Mexico	public funding provided to Arizona chapter of TNC to implement an ecological analysis of conservation priorities; effort led by the Arizona chapter with support from the Sonoran Institute, which led bi-national outreach strategy and stakeholder consultation	Marshall et al. 2000
Canadian rocky mountains	terrestrial	United States, Canada	identification of priorities of TNC and external partners in British Columbia, Canada; technical teams had representatives from 3 U.S. states and 2 Canadian provinces	TNC 2004
Gulf of California and the occidental coast of Baja California Sur	marine	United States, Mexico	identification of priority conservation areas and guidance on investments provided by TNC (led by TNC and Comunidad y Biodiversidad)	Ulloa et al. 2006
Federated States of Micronesia	terrestrial, freshwater, marine	Federated States of Micronesia	country director initiated identification of strategies to motivate in-country partners to engage in local conservation; development of ERA occurred simultaneous with development of the National Biodiversity Strategy and Action Plan (NBSAP) for the Federated States of Micronesia, as required by signatories of the convention on biological diversity	TNC 2003

assessments were applied to both terrestrial and freshwater ecosystems. Types of features (e.g., wide-ranging species vs. ecological processes) on which the assessments were based varied across the case studies.

We evaluated whether the assessments changed values of social variables, such as attitudes, perceptions, and relationships, and, if applied in practice, might change ecological variables, such as abundances of species and extent of land-cover types. We collected qualitative evidence from documents on the ecoregional assessments and conducted semistructured interviews via telephone with TNC staff members. The interviews included themed questions that were conversational and flexible (Mason 2002). For each ecoregional assessment, we interviewed 2 members of the original assessment team and either 1 or 2 current staff members who did not participate in the assessment but are working in the region. We identified participants by examining planning documents and through a snowball approach. In snowball sampling, identified interviewees are used to identify other appropriate participants (Lewis-Beck et al. 2004). Such an approach was useful for our study when members of planning teams were not listed as authors of documentation of the ecoregional assessment, but had key roles in development of the assessment. Individuals involved in assessments were selected on the basis of their role in the assessment (e.g., planning team leader, senior planner, or staff member heavily involved throughout the planning process). Individuals we interviewed who did not participate in the assessments had levels of responsibility for planning and priority setting in the region similar to people involved in assessments. We requested interviews with 21 people. Of these, 17 responded and were willing to participate. A source of potential bias was that 93% of staff members who worked on the assessments were still working for TNC when interviewed. These people may have been less critical than those now employed elsewhere.

Evaluation Design

The 3 authors who were not employed by TNC conducted the evaluation to ensure objectivity. The 2 authors from TNC helped frame the scope of the evaluation, provided key background information about ecoregional assessments, facilitated access to interview subjects, and helped interpret results. Involvement of an organization that is a subject of an evaluation in the design and execution of the evaluation is an important step in facilitating informed and meaningful research questions and promoting uptake of evaluation recommendations (Patton 2008; Jacobson et al. 2011).

The interview instrument included a mixture of open and closed questions (Supporting Information). Interviewees were asked about the purposes of ecoregional assessments. The purposes identified by respondents were likely to shape their expectations about the benefits that planning is intended to achieve. To identify benefits that were perceived by respondents to have emerged during and after the ecoregional assessment (these numbers are too far apart to use this type of presentation), we asked an open question about the benefits of the identified ecoregional assessments. We analyzed qualitative data from responses with a content analysis of the interview transcript (Mason 2002). We used content analysis of keywords to distinguish between benefits that were fully or partially achieved as perceived by respondents. We classified all benefits discussed in the interviews (Table 2). To directly measure respondents' perceptions of benefits, we asked them to rank on a Likert scale the extent to which a list of 12 benefits (Table 2) was achieved (Lewis-Beck et al. 2004). We generated this a priori list of benefits from Pressey and Bottrill (2009).

We classified benefits as types of capital: natural, financial, social, human, and institutional (Table 2) (Scoones 1998). This classification has been applied in the evaluation of other conservation strategies, such as integrated conservation and development projects (ICDPs) (Garnett et al. 2007). Interviewees were also asked to identify factors that facilitated or constrained the occurrence of benefits. Factors either increased (i.e., enabled) the probability of the assessment achieving its objectives (e.g., good leadership) or decreased (i.e., constrained) the probability of the assessment achieving its objectives (e.g., a long planning process that leads to fatigue of planning team or loss of momentum to complete the assessment). Enabling and constraining factors were not identified a priori and emerged from answers to open questions.

Results

Purposes of Ecoregional Assessments

Most (82%) respondents said that the primary purpose of assessments was identification of TNC priorities. Priorities were based either on where important biological features were located or where money or resources could have the greatest effect. Over half the respondents (53%) expected conservation actions to be implemented following the ecoregional assessments. For example, one respondent said,

> The whole reason for doing [an assessment] was to put in place a framework that would support actual actions on the ground, changes in policy and practice. It makes little sense in doing [an assessment] if . . .it doesn't get implemented or contribute to on-the-ground change in policy or behavior.

Other purposes of ecoregional assessments identified by respondents included extending conservation efforts to areas larger than individual sites or properties (53% of respondents) and influencing the conservation priorities of external organizations and partners (31%). For example, influencing external partners was a key motivation for the ecoregional assessment in the Federated States of Micronesia, where the assessment process informed development of a National Biodiversity Strategy Action Plan (www.cbd.int/nbsap).

Benefits from Ecoregional Assessments

Respondents identified 2 types of benefits from ecoregional assessments (Table 2 and Fig. 2): proximate and ultimate benefits. Proximate benefits generally emerged during the assessment process itself (e.g., improved knowledge of ecological systems) and were related indirectly to longer term outcomes. Ultimate benefits were longer term (e.g., reduction in threats to biological diversity) and contributed directly to achievement of broader conservation goals. Proximate benefits were commonly associated with social and human capital, whereas ultimate benefits were more strongly associated with natural, financial, and institutional capital (Table 2).

The benefits most frequently cited related to improvements in human and institutional systems (Table 2 and Fig. 2a). Respondents highlighted changes in institutional knowledge, in terms of new information acquired about the spatial extent of conservation areas required to meet conservation goals (47%), and influence on location and type of conservation priorities of TNC (42%) as benefits of assessments. When prompted to discuss the occurrence of particular benefits, all respondents highlighted at least one benefit related to human capital (Fig. 2a). To directly measure respondents' perceptions of benefits, we asked them to rank the extent to which a list of 12 benefits (Table 2) was achieved. Benefits related to natural capital, such as persistence of or reduction in threats to biological diversity, were not perceived as resulting from the assessment (Fig. 2b). In an open question, one-third of respondents mentioned that subsequent implementation of

Table 2. Potential benefits[a] from ecoregional assessments (ERAs) by TNC classified on the basis of 5 types of capital.

Type of capital	*Subtype of capital*	*Definition of benefit relative to capital*	*Expression of benefit by respondents*
Natural		increases or maintains the diversity of species and land-cover types or flow of ecosystem goods or services	persistence of biological diversity, reduction in threatening processes, implementation of actions by TNC or partners,
Financial		gains or savings of cash, property, or goods that represent the wealth or economic value of an individual or institution	leverage of additional funding,[b] efficiency of operations,[b]
Social	reciprocity and exchanges	produces simultaneous exchanges of items of roughly equal value or maintains a continuing relationship between individuals or groups that at any given time may be unrequited (Pretty & Ward 2001)	cooperation across jurisdictional boundaries by partners,[c] coordination of efforts between agencies,[b,c] collaboration between agencies,[b,c]
	norms and rules	improves or maintains mutually agreed upon norms of behavior that place group interests above those of individuals, giving individuals the confidence to invest in collective or group activities (Pretty & Ward 2001)	shared vision for future conservation of biological diversity,[b,c]
	connectedness	improves or maintains connections or relationships among social groups and networks (Pretty & Ward 2001)	sharing of data among agencies,[c] bringing together multiple stakeholders,[c]
	trust	manifests or reinforces belief in individuals or institutions (Pretty & Ward 2001)	trust by partners in outputs of era produced by TNC,[c]
Human	attitudes	improves or maintains an individual's disposition or feelings toward a person, institution, or thing	pride in natural or cultural values of ecoregion,[c] ownership of results by partners,[c] attitude toward biological diversity conservation actions,[c] commitment to conservation, acceptance of plan by stakeholders,[c]
	knowledge	improves or maintains an individual's understanding or awareness of a particular topic or issue acquired through education, training, or experience	raised awareness of biological diversity and conservation actions,[c] syntheses of data on ecological, social, and cultural values,[c] baseline information for future evaluations,[c] collection of new knowledge on ecological or social values,[b,c] learning and testing of new tools and concepts,[c] revised thinking on spatial extent of actions and magnitude of challenge to implement actions in all sites,[c] connectivity of biological diversity in conservation area design,[b,c] representation of biological diversity in conservation area design,[b,c]
	skills	improves or maintains an individual's ability to conduct a particular activity acquired through education, training, or experience	personal learning applied in future planning,[b,c] institutional learning applied in future planning,[c] expertise of partners in conservation planning,[c]
Institutional	internal	improves or maintains the capacity, structure, or functioning within a formal institution	rigorous and standardized process of planning,[c] validation of existing actions,[c] credibility of TNC with partners, identification of portfolio of sites used by TNC to guide investment, creation of mapping products for TNC use, influence on conservation planning, strategies, and actions of TNC, supporting evidence on important sites used for assessing opportunities for future investment,
	external	improves or maintains the capacity, structure, or functioning of formal or informal partner institutions	identification of portfolio of sites used by partners to guide investment products used by partners,[b] influence on conservation planning, strategies, actions by partners[b] international commitments met, provision of scientific evidence for decision making.

[a] *Benefits without footnotes are those identified without prompting by respondents and are ultimate benefits or those related directly to overall goals of ecoregional assessments.*
[b] *Respondents were prompted to discuss whether these benefits occurred during or after the ecoregional assessments.*
[c] *Proximate benefits that facilitate achievement of longer term goals of assessments.*

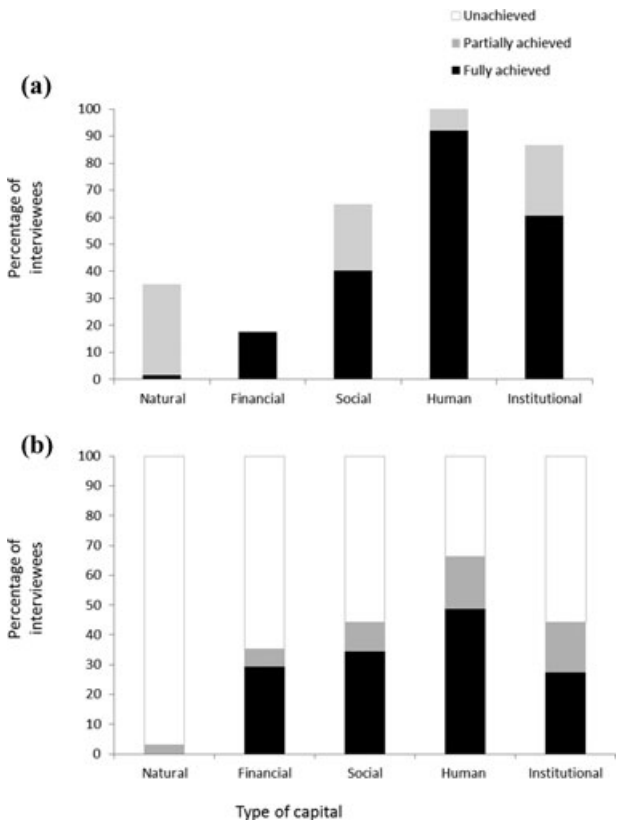

Figure 2. Percentage of respondents identifying benefits of ecoregional assessment on the basis of 5 forms of capital as fully achieved, partially achieved, or unachieved in 5 ecoregional assessments: (a) unprompted benefits (response to open questions) and (b) prompted benefits (response to closed questions).

conservation actions was influenced by the ecoregional assessments.

A number of proximate benefits identified by respondents related to increases in their knowledge, including new information on biological features, such as a rare species, and synthesis of data that highlighted spatial congruence among key features of biological diversity (e.g., populations, important land cover types). In addition, several respondents mentioned that ecoregional assessments validated conservation actions already taken. One respondent explained, "It showed us what we already knew--that we were working in the right places." For example, the Maryland chapter of TNC was already active in managing a number of sites identified by the Chesapeake Bay Lowlands ecoregional assessment, and the assessment helped confirm that these sites, previously selected in a nonsystematic way, did, in fact, represent areas important for biological diversity.

Among both those involved and uninvolved in the ecoregional assessments, the most frequently cited benefit was influence on conservation investments by TNC (classified as institutional capital) (Table 2). Those involved in conducting the assessments tended to focus on benefits gained through the planning process itself, including bringing stakeholders together, providing rigorous procedures for decision making, and synthesizing data. In contrast, those not involved in the assessments focused on knowledge gained from outputs of assessments, including revised thinking on the spatial extent of conservation actions needed to achieve goals and scientific evidence for informing decisions by TNC and other organizations.

Factors Enabling or Constraining Occurrence of Benefits

Respondents identified 25 enabling or constraining factors (Fig. 3 & Supporting Information) that we classified into 3 broadly related aspects of the ecoregional assessments: process, the design of the planning process (e.g., rigor and transparency of the planning framework); input, quality and availability of data, funding, and capacity of the planning team; and context, social and political characteristics of the ecoregion and regional stakeholders' attitudes about planning.

All 3 aspects played a role in both enabling and constraining the occurrence of benefits from the assessments. The most frequently cited constraining factors identified by the 17 interviewees were the social and political characteristics of the ecoregion (59%), shifts in institutional priorities away from implementation of actions in priority areas identified by the assessment (35%), and difficulty of implementing conservation actions in all the sites identified in the ecoregional assessment (i.e., too many sites) (35%). In the Sonoran Desert, for example, politics associated with drug interdiction and immigration limited action on the basis of the assessment's recommendations along the border of the United States and Mexico in the state of New Mexico. The most common enabling factors were more varied and were associated with the design of the process (53%), inputs of good leadership and funding (both 41%), and timing of the assessment coinciding with parallel efforts by government agencies (41%). Positive aspects of process design included the transparency of a structured process and stakeholder engagement through which TNC and stakeholders might build a shared vision of areas of conservation priority.

Among the 11 respondents who mentioned the influence of process-related factors on outcomes of the assessment, two-thirds thought that they were enabling. Half the respondents thought that input factors were enabling. Three-quarters of respondents cited factors related to context as constraining the occurrence of benefits. Half the factors identified were also interchangeable with proximate benefits (Fig. S4 & Supporting Information) identified by respondents (e.g., increased trust between TNC and stakeholders was a benefit and a factor affecting the occurrence of other benefits).

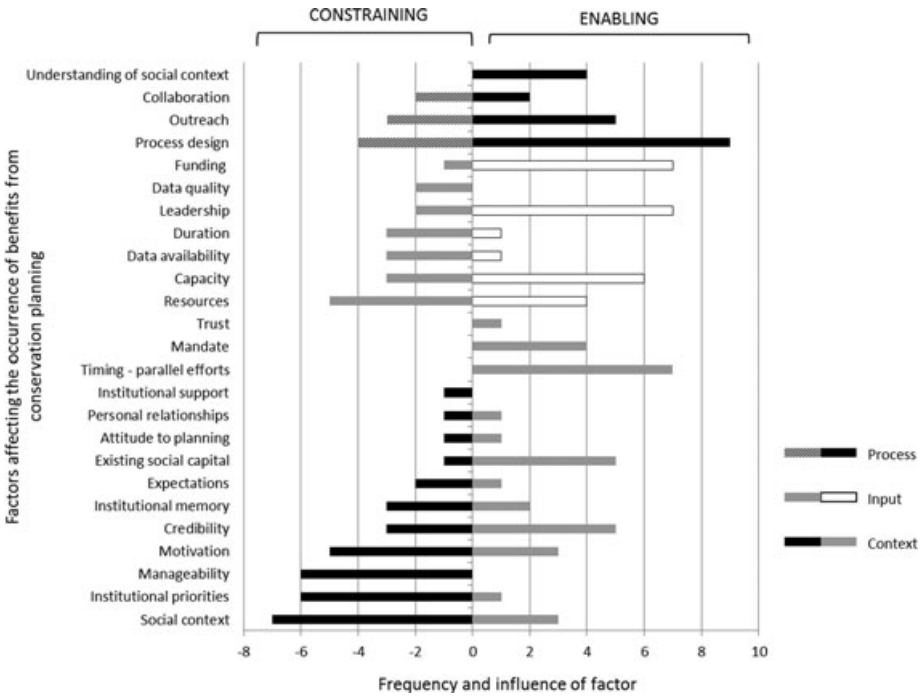

Figure 3. Frequency (number of 17 respondents citing occurrence) of factors affecting benefits from ecoregional assessments and influence of those factors (whether the factors constrain or enable occurrence of benefits). Detailed descriptions of factors are provided in Supporting Information. Factors are classified by aspects of assessment: process (design, duration, or interactions of activities in the ecoregional assessment), input (resources invested in the ecoregional assessment), and context (social, political, or institutional characteristics of the region).

Discussion

Diverse and numerous benefits emerged, or were expected to emerge, from ecoregional assessments developed by TNC. Benefits identified by respondents were linked to the intended purpose of ecoregional assessments—identification and design of priority conservation areas—but were also associated with improvements in social interactions and improved knowledge of TNC staff members and in institutional knowledge. The benefits of conservation assessments over other approaches to selecting conservation areas are often assumed and measured primarily in terms of potential outputs (e.g., Rebelo & Siegfried 1992; Pressey & Tully 1994). However, the limitations of systematic assessments alone in facilitating implementation of actions have been noted (Knight et al. 2006*a*; Knight et al. 2008). Our results help place these differing results in perspective. Comparative studies (e.g., Rebelo et al. 1992; Pressey & Tully 1994; Hansen et al. 2011), although useful, have focused on potential conservation areas as outputs, assuming that these translate smoothly to outcomes on the ground, which in several documented cases they do not (Knight et al. 2008). Also, although measuring effectiveness of assessments in terms of those conservation areas in which actions are implemented is appropriate, we think that evaluations should also consider measures of financial, social, human, and institutional capital, including the many potential benefits we documented here. Therefore, our results suggest that measurements of effective conservation assessments should consider potential social and institutional benefits of planning, including collaborations across TNC programs and their partners, development and sharing of new social and ecological data sets for planning, and development and testing of new planning methods and tools.

Our reliance on qualitative data and the size of our samples (17 interviewees, 5 case studies) constrained the interpretation of results in 2 ways. First, qualitative data are generally subjective and vulnerable to individual biases. Second, the number and selection of case studies and interviewees could bias the perspectives represented. Our sample size was not sufficient to reduce potential biases and test hypotheses related to specific outcomes. We aimed to address potential biases by interviewing both those involved and not involved in assessments and by avoiding making our own judgments about outcomes in any particular ecoregion. With potential biases in mind, we were cautious not to overinterpret variation in the frequencies of responses reporting particular benefits or factors and thereby mistakenly drawing inferences about the relative importance of specific factors. Because our intention was to explore intended and unintended benefits of assessments, our data were adequate for characterizing the diversity of perceived benefits. Our results have the potential to guide selection of hypotheses (e.g., active engagement in ecoregional assessments leads external stakeholders to work in priority areas) as part of further evaluations. These analyses might examine, for example, location of stakeholder activities before and after assessment and consequent convergence of these activities with priority areas identified by an ecoregional assessment.

The effects of the ecoregional assessment process itself were reflected in types of benefits identified by respondents, especially those actively involved in developing

the assessments. Respondents indicated that a rigorous and transparent planning process was closely associated with achievement of ultimate benefits. They thought that the process increased participation by staff members and stakeholders in the planning process, promoted belief in the quality of the process by stakeholders, and enhanced the quality of outputs. This perspective suggests that ecoregional assessments can be viewed not just as decision support aids, but also as strategic and social processes. The contribution of process to facilitating achievement of longer term planning goals also suggests that monitoring of proximate benefits emerging from the process may assist tracking progress toward ultimate benefits that might be more difficult to observe and monitor in the short term.

An array of factors related to social, political, and institutional characteristics of regions in which assessments were conducted affected the occurrence of benefits. Many of these factors were equivalent to proximate benefits. For example, existing social capital facilitated reciprocity and exchanges between the planning teams and stakeholders in sharing data on biological features (a proximate benefit). This benefit, in turn, fostered other proximate benefits such as an increase in human capital (e.g., through the transfer of knowledge and skills) and ultimate benefits such as external institutional capital (e.g., encouraging the use of planning outputs) or natural capital (e.g., implementation of conservation actions on the basis of priorities identified in the assessment). Proximate benefits of the assessments (e.g., strong collaboration) therefore facilitated ultimate benefits (e.g., implementation). On the basis of this, we believe that the assessment process should aim to promote these types of outputs and outcomes to facilitate occurrence of ultimate benefits.

Our results highlight areas of divergence between the intended purposes or expectations of assessments among respondents and actual outcomes. Recognizing that it was unlikely that TNC could work across all sites identified as priorities, ecoregional assessments are intended to influence and support conservation strategies by partners (Groves et al. 2002). TNC then plays the role of facilitator rather than implementer. In 3 case studies, ecoregional assessments were, however, either conducted as internal exercises or were perceived to lack outreach strategies to involve partner organizations. One respondent explained:

> We tried to remind ourselves that it wasn't just an agenda for the Conservancy, but when you do it primarily in-house and you don't have a program to actively take them out and share and talk other people into using them, it's kind of a false objective.

In other case studies, however (e.g., Sonoran Desert ecoregional assessment), where outreach and public engagement were explicit and supported by adequate funding, benefits such as stakeholder acceptance and influence on priorities and activities conducted by regional partners, such as state and federal government, were achieved. One respondent explained, "Our outreach strategy was a public relations component to the plan and it really proved beneficial... we had very positive feedback." Our results suggest that assessments without explicit outreach would be less likely to meet their goal of influencing priorities of other organizations working in the region.

Our results also highlight a mismatch between expectations and outcomes relative to the extent of implementation resulting from assessments. Over half of our respondents expected that implementation would follow from assessments, yet only a third of participants cited implementation of actions resulted from the assessments. This outcome is not surprising, given that conservation action on the ground is not an explicit purpose of ecoregional assessment; rather, assessment is one step in a process of priority setting, implementation, and action. It was unclear from responses, however, to what extent assessments influenced subsequent finer resolution prioritization and implementation of actions on the ground. Improved knowledge of biological features and greater collaboration between stakeholders as a result of ecoregional assessments might be desirable, but only if these lead ultimately to progress toward broader planning goals such as improved persistence of biological diversity.

Multiple factors may affect the translation of assessments into implementation of conservation actions. One respondent explained, "We've had no organized commitment or system or authority or accountability to do anything that represents implementation." In several case studies, connections between ecoregional assessments and site-level action planning were not strongly connected (e.g., Conservation Action Planning). One respondent explained:

> The Nature Conservancy has this 2-scale process for conservation planning: the site conservation plan [an older term for Conservation Action Planning] at the finest scale where you are actually creating management actions, and... ecoregional assessments. What we found in the [ecoregional assessment] was a huge disconnect between the 2 of them. The [ecoregional assessment] didn't give us enough information to then jump right down to the site-level conservation planning. We needed an intermediate step.

In several cases, assessments were either not followed up with implementation plans at the level of portfolio sites or the ecoregional assessment had little influence on the direction of implementation at the site level. We believe that ecoregional assessments, as one component of the broader Conservation by Design framework (TNC 2005), need to be integrated with decisions about

conservation strategies and their implementation. This recommendation is consistent with current pursuits of TNC (2011*b*) in which the integration of spatial prioritization (ecoregional assessment) and strategic planning (Conservation Action Planning) under a single planning process is seen as an important step in improving the implementation of conservation plans.

Uncertainty persists about the contribution of conservation assessment to broader conservation goals. Yet, considerable investment of time and effort indicates a belief in the value of conducting assessments. Empirical evidence is not available to support the belief in the benefits of planning. With limited monitoring or reporting of outputs or outcomes from conservation assessments, it is unclear how effectiveness of different processes might be measured. Our study is a first step in understanding the diversity of intended and unintended benefits of conservation assessments. We found that ecoregional assessments conducted by TNC were more than prioritization exercises and believe that they have the potential to yield additional social and institutional outcomes that enable long-term conservation goals to be achieved. With greater knowledge of the types of benefits emerging from assessments, further evaluations may pursue more objective and quantitative approaches to track ultimate effects of assessments on species' status, test key hypotheses about the contribution of different steps of planning in achieving conservation goals, and identify factors that influence effective assessments. Evaluation of costs from planning is also needed to more completely evaluate the contribution of assessments to conservation goals.

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Supporting Information

Details of the interview transcript (Appendix S1) and detailed description of factors influencing occurrence of benefits (Appendix S2) are available online. The authors are solely responsible for the content and functionality of these materials. Queries (other than absence of the material) should be directed to the corresponding author.

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