

ASSESSING RESTORATION USING ECOSYSTEM SERVICE BENEFIT INDICATORS: AN APPROACH FOR DECISION MAKERS

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Ecological restoration can reestablish ecosystem services (ES) that provide important social benefits. Managers with limited funds and resources are forced to prioritize potential restoration sites for implementation, and prioritizing restoration sites based on ecological functioning and expected ES production alone neglects vital information for evaluating tradeoffs; who benefits from the resulting ecosystem services, and by how much. We present an approach for ranking restoration options based on indicators of the magnitude of social benefits from resulting ES, which can be combined with assessments of ecological functions. To assist users, we have produced a step-by-step guide to applying the benefit indicators approach, with an associated spreadsheet-based tool.

The ecosystem service benefit indicators used in this approach are based on economic principles. The framework uses four questions to guide the process of indicator selection and measurement; (1) Is an ecosystem service supplied? (2) How likely is it that the service will continue to be provided over the long run? (3) How many people benefit and (4) By how much do people benefit? These questions are ordered so that answering each question contributes additional information to an ecosystem service benefits assessment. The benefit indicators that answer each of these questions are based on empirically-based factors that contribute to the relative scarcity, and therefore economic value, of ecosystem goods and services.

Decision makers can benefit in several ways by using theoretically-sound and practically relevant ES benefit indicators. Indicators frequently can be more easily compiled than monetary measures, and are amenable to telling a theoretically consistent and understandable story about benefits and costs of policies or actions that affect ES. Indicators can remain disaggregated, thus allowing individual aspects of tradeoffs that may be masked in a single money metric to remain transparent. Indicators can also be useful in systems models where many important aspects of the system must be included, but acceptable money measures are not readily available for all of the important benefits and costs.

Thus, benefit indicators may allow ES benefits to be included in more decisions and can support more complete assessments of those decisions. We intend our approach to be used by a broad range of managers and stakeholders to prioritize projects, to justify restoration budgets by demonstrating benefits gained, to compare proposals when awarding restoration funds for specific projects, to pre-screen projects that require further evaluation, or to serve as a template for discussion when making decisions.

The step-by-step guide focuses on freshwater wetland restoration in urbanizing areas; however, the approach may be adapted to be applied more broadly beyond this context. We present the benefits indicators framework, our guidebook and spreadsheet tool, and discuss how the approach may be generalized to other contexts, including common coastal restoration decisions.

