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The role of ecosystem services in USA natural resource liability litigation

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ABSTRACT

This paper examines how the United States has valued harm to public resources in natural resource liability laws and practice, an early legal application of the ecosystem-services conceptual framework. Our primary focus is on valuing harm to the difficult-to-value resources and ecological services that provide indirect or passive human uses, for which revealed preference valuation methods (based on observable behavior) are not applicable. We concentrate on the past 25 years of U.S. experience with the innovative, restoration-based framework established in regulations implementing the Oil Pollution Act of 1990. By reframing the damage claims as the cost of both "primary" restoration (to promote recovery of injured resources) and "compensatory" restoration (to account for interim losses pending recovery), the regulations deflected some of the controversy surrounding valuation methods.

The restoration-based compensation framework provides two basic approaches for calculating the scale of compensatory restoration projects. A *service-to-service* approach, which does not require valuation, applies to projects that provide resources and ecosystem services of the same type, quality, and comparable value as those harmed. A *valuation approach*, intended for a broader range of applications, relies on survey-based methods.

For injuries to ecological services, we found trustees have relied almost exclusively on habitat equivalency analysis (HEA), a service-to-service approach, adapting its use to applications where restoration projects make resource and/or ecosystem services substitutions. We explore how the trustees address the challenge of characterizing the equivalency between injury and restoration resources and ecosystem services through the choice of restoration projects and the choice of the ecosystem service metrics. Widely used in the U.S. and EU, the restoration-based measure of damages and the associated HEA methodology may be useful for other countries.

1. Introduction

Traditionally, legal claims for natural resource damages in common law systems required physical injuries to a private property interest and restricted recoveries to financial losses associated with market goods. Both requirements are particularly limiting for cases involving harm to natural resources in the public domain (Lee and Bridgen, 2014; Ward and Duffield, 1992).

Over the past 40 years, a growing number of countries have adopted natural resource liability statutes with innovative provisions that surmount both of these restrictions in order to address environmental harms from oil spills, toxic contamination, illegal development and other sources (Jones et al., 2015; Percival, 2010; UNEP, 2010). One critical innovation has been to establish legal standing for various organizations to file claims for damages to public natural resources. The government agencies that own, manage, or protect the resources are typically designated standing to file claims; in many countries, communities and civil society organizations are also granted standing. Another critical legal innovation has been to value natural resource damages beyond market-based losses and to expand the set of allowable methodologies to include non-market valuation methods.

Driven by the demand created by the enactment of numerous environmental statutes, the past 40 years has witnessed development of a framework and methodologies to value natural resources

Abbreviations: CERCLA, Comprehensive Environmental Response, Compensation and Liability Act; EU, European Union; HEA, habitat equivalency analysis; NOAA, National Oceanic and Atmospheric Administration; NRDA, natural resource damage assessment; PRP, potentially responsible parties; OPA, Oil Pollution Act; US EPA, US Environmental Protection Agency; US DOI, US Department of the Interior.

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as natural capital providing a range of market and non-market service flows (Daily, 1997; Freeman, 1993; Freeman et al., 2014; Gómez-Baggethun et al., 2010; Guerry et al., 2015; Kopp and Smith, 1993; Ward and Duffield, 1992). While natural resource valuation has been used mostly to inform ex ante benefit-cost valuation of proposed policies and projects, it has also been used for ex post valuation of natural resource injuries in order to claim damages for litigation (Kopp and Smith, 1993). As liability statutes for public resource injuries have been adopted worldwide, the language in these statutes and regulations at various points in time reflects the evolution of the natural resource valuation and the complementary ecosystem services and environmental economics literatures.[1] A major challenge in implementing the natural resource liability provisions, however, has been valuing damages to ecological services with indirect and/or passive human uses–including regulating services (e.g., floodwater storage and conveyance, and climate regulation) and habitat services (e.g., nursery services and gene pool protection)–for which valuation methods that rely upon observable behavior are not applicable (ibid.).

In this paper, we focus on the Oil Pollution Act of 1990 (OPA) and the subsequent 25-plus years implementing natural resource liability in the U.S. The 1990 act contains the most complete statement of public (and private) liability provisions, and the 1996 implementing regulations incorporated an innovative restoration-based framework for valuing damage claims that avoided the contentious use of stated preference methods for valuing indirect and/or passive human uses. The restoration-based framework has been widely adopted in the U.S. and EU.

OPA's full compensation approach for damages to public natural resources includes restoring or replacing injured or destroyed resources, compensating for interim losses pending recovery, and recovering the cost of the assessment (33 U.S.C. 2706(d)(1)). The natural resources damages provision complements additional OPA provisions that enable separate claims for private losses to real or personal property, profits and earning capacity, and subsistence use; and for public losses to revenues or increased costs (33 U.S.C. 2702(b)(2)(A)–(F)).

The issue of natural resource valuation for damage claims was very contentious when the National Oceanic and Atmospheric Administration (NOAA) was developing regulations to implement the natural resource damage assessment (NRDA) provisions of OPA (Portney, 1994). Valuation methods in general, and contingent valuation in particular, had also been controversial during the development of NRDA regulations for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (Kopp and Smith, 1993; Ward and Duffield, 1992). But the U.S. Congress enacted OPA after the 1989 Exxon Valdez oil spill, an environmental disaster that despoiled a pristine environment in Alaska. The *Exxon Valdez* natural resource liability litigation, in which contingent valuation was used to value the damage claim, alerted potentially responsible parties to the significance of the valuation issue (Jones, 2000).[2] The central elements of the controversy were (1) whether to include damages for lost ecological services that provide indirect and/or passive human uses and (2) whether to allow the use of stated preference methods (with a focus on contingent valuation at the time) to estimate such uses (ibid.).

NOAA reframed the interim loss component of the damage claim from one of monetary compensation (how much money does the public require to make them whole?) to one of resource compensation (how much compensatory restoration does the public require to make them whole?). The reframing of the measure for interim loss compensation is consistent with the statutory mandate that all recoveries for natural resource damages are to be spent on restoring injured resources and/or acquiring equivalent natural resources (33 U.S.C. § 2706(f)). The regulations formalized an ongoing shift in trustee practice away from monetary valuation of interim losses toward resource valuation. By recovering the costs of restoration as the damage claim rather than interim lost value—and thereby de-emphasizing the role of valuation methods—this framework is recognized by various stakeholders as a less controversial way to litigate damages to ecological services.

The restoration-based compensation framework provides two basic approaches for calculating the scale of compensatory restoration projects. A *service-to-service* approach—a simplified technique analogous to in-kind trading, which does not require valuation—was designed for compensatory restoration projects that provide resources and ecosystem services of the same type and quality, and comparable value, as those injured. Habitat equivalency analysis (HEA) is the predominant method for implementing the service-to-service approach. A *valuation* approach, intended for a broader range of applications, relies on survey-based stated preference methods to value the tradeoffs between environmental losses and prospective compensatory restoration projects.

In this paper, we look back at practices used by U.S. natural resource trustees in implementing the resource compensation measure for harm to ecological services over the 25 years since OPA was promulgated. In Section 2, we provide an overview of the key U.S. statutes with natural resource liability provisions, and then highlight the key OPA provisions pertaining to development of a damage claim. In Sections 3 and 4, we focus on how trustees have implemented the service-to-service and valuation approaches to scaling restoration-based compensation for lost ecological services, with particular attention to the difficulty of characterizing equivalency in ecosystem services at injury and compensatory restoration sites. We concentrate on HEA, the major service-to-service approach and the predominant method used for scaling lost ecological services. In Section 5, we discuss advantages and critiques of resource compensation in general and HEA in particular, as well as impediments to full-scale adoption of the new class of production function-based ecosystem service models. We also consider the use of restoration-based approaches in natural resource liability in other countries. An Appendix provides a case study of a natural resource damage claim for mining contamination impairing protected salmon habitat, including a status report on restoration outcomes.

2. U.S. natural resource liability statutes

2.1. Overview of U.S. statutes

In the U.S. common law system, the body of substantive environmental law includes well-articulated statutes and regulations for determining and measuring natural resource liability. These statutes and regulations have influenced legislation globally (Goldsmith et al., 2014; Percival, 2010). The U.S. statutes containing resource liability provisions typically cover risky activities or protected resources (Lee and Bridgen, 2014; Ward and Duffield, 1992). The Comprehensive Environmental Response, Compensation and Liability Act of 1986 (CERCLA, more commonly known as Superfund), the Federal Clean Water Act (CWA) Amendments of 1977 and the Oil Pollution Act of 1990 (OPA), all focus on oil

[1] In the U.S., the initial implementing regulations for CERCLA (1986, 1987) referred simply to "resources" (40 CFR § 300.3), whereas the implementing regulations for U.S. OPA (1996) refer to resources and their services (15 CFR § 990.10). Explicit references to the Economics of Ecosystems and Biodiversity (TEEB) list of ecosystem services appear in more recent implementing regulations in other countries, including for Indonesia and Brazil (Jones et al., 2015). See further discussion in Section 5.3.

[2] See Carson et al., 2003 for a description of the contingent valuation study commissioned by the State of Alaska. For a description of the natural resource injury and case settlement see: https://www.justice.gov/enrd/us-v-exxon-corporation-et-al-dalaska

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