Natural Resource Restoration

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Public trustees at the state, federal, and tribal level are tasked with ensuring that those responsible for destroying or damaging natural resources sufficiently compensate the public for its loss. Those trustees have the fiduciary duty to maintain and restore the natural resources within the public trust. Since the late 1980s, a consensus has formed around a set of guiding principles and best practices in natural resource damage restoration. Public trustees now agree that in order to fully compensate the public for its loss, restoration of a destroyed or damaged resource is preferable to an award of money damages. Natural resource restoration requires that the injured natural resources be restored to their uncontaminated condition or replaced with equivalent resources, for example when new wetlands are created to replace former wetlands damaged or destroyed by pollution. Public trustees also use certain methodologies, such as resource and habitat equivalency analyses, to determine other components of the public's loss due to the destruction or damage to its natural resources by polluters. Both principles require polluters to compensate the public for its lost resources by providing restored or additional natural resources. Beyond a set of essential public trust principles and best practices, however, public trustees have considerable discretion in carrying out their fiduciary duties and in achieving their mission of conserving, replenishing, and restoring the natural resources in their care. This Article explores these important developments in natural resource restoration law as well as the interplay between public trustees' legal duties and their discretion to determine how best to carry out those duties when conserving and restoring natural resources.

I. INTRODUCTION

All but 20% of the Hudson-Raritan Estuary's historic tidal wetlands has been destroyed by hazardous waste disposal on intertidal wetlands and hazardous sludge traveling down the Hudson, Hackensack, Passaic,

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Rahway, and Raritan Rivers before reaching the Atlantic Ocean.[1] These wetlands provide a range of valuable services: flood control; water purification; shoreline stabilization; erosion control; and habitat support of fish, birds, and other wildlife that benefit fishermen, hunters, and recreational users. When a contaminant is discharged into a marsh, it may destroy generations of organisms, upset the life cycle of grasses and other plants, and, in turn, disrupt the feeding and nesting patterns of species that rely on those destroyed plants. Every day that the pollution prevents wetlands from fully functioning, the public suffers in ways that are only partially quantifiable. The physical and chemical alteration of the Hudson-Raritan Estuary has almost completely eliminated the historically abundant Eastern oyster and destroyed the benthic structure on which many aquatic species depend.[2] The Hudson-Raritan Estuary wetlands were devastated by chronic contamination from smaller environmental insults over decades from various sources.[3] For example, industry in eighteen cites made the Passaic River one of the United States' filthiest rivers[4] through discharges of dioxin, polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane, heavy metals, and polyaromatic hydrocarbons.[5] On the Arthur Kill, a state inspector's

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1. *Hudson-Raritan Estuary Comprehensive Restoration Plan, Draft*, U.S. ARMY CORPS ENGINEERS 8-9 (Mar. 2009), http://www.nan.usace.army.mil/Portals/37/docs/harbor/Harbor%20Program%20Images/CRP%20vol1.pdf (citing *New York-New Jersey Harbor/Urban Core Overview*, U.S. FISH & WILDLIFE SERV., http://nctc.fws.gov/resources/knowledge-resources/pubs5/web_link/text/urb_core.htm (last visited Feb. 19, 2015)); *see Hudson-Raritan Estuary Comprehensive Restoration Plan, Executive Summary*, U.S. ARMY CORPS ENGINEERS 3-4 (Sept. 2014), http://www.nan.usace.army.mil/Portals/37/docs/harbor/CRP%20Planning%20Regions/Exec_Sum_2014_Aug.pdf.

2. *See Hudson-Raritan Estuary Comprehensive Restoration Plan, Draft*, *supra* note 1, at 8-10, 53.

3. Contrast this with headline-grabbing acute natural resource injuries, such as the BP/DEEPWATER HORIZON disaster in the Gulf of Mexico. *See* Mark A. Cohen et al., *Deepwater Drilling: Law, Policy, and Economics of Firm Organizations and Safety*, 64 VAND. L. REV. 1853, 1855 (2011).

4. Michael Gordon & Sal M. Anderton, *Protecting the Passaic: A Call to Citizen Action*, 29 SETON HALL L. REV. 76, 80 (1998) (citing Rudy Larini, *Officials Warn of Tainted-Fish Danger in the Passaic: High Dioxin Levels Found in Sediment from the Riverbed*, STAR-LEDGER, May 18, 1996, at 8). It has been called "New Jersey's biggest crime scene." Ted Sherman, *Massive, $1.7 Billion Environmental Cleanup of Passaic River Proposed by EPA*, NJ.COM (Apr. 11, 2014, 9:17 PM), http://www.nj.com/news/index.ssf/2014/04/massive_17_billion_cleanup_of_passaic_river_proposed_by_epa.html.

5. Press Release, *DEP To Address More Than 4,000 Potential Claims for Natural Resource Damages Statewide: Commissioner Campbell Orders Passaic River Restoration: Parties Responsible for Pollution Must Assess and Restore Natural Resource Injuries*, N.J. DEP'T ENVTL. PROTECTION (Sept. 24, 2003), http://www.nj.gov/dep/newsrel/releases/03_0131.htm; *see also* Ken Stier, *New Jersey Set To Seek Damages To Pay for Reversing Effects of Pollution*, N.Y. TIMES, Sept. 10, 2003, at B5. Also contributing to contamination in the Hudson-Raritan Estuary are facilities along the nearly two hundred miles of the Hudson River from Hudson Falls to the

remark upon visiting an Exxon refinery tells the whole story: "'Here you have a hundred-million-dollar refinery, with up-to-date manufacturing equipment, and yet you only have a floating log to prevent oil from leaving your property into the Arthur Kill.'"[6]

Whether the nation's legacy of ecological destruction in places like the Hudson-Raritan Estuary is rectified lies largely in the hands of state,[7] federal,[8] and Native American[9] natural resource trustees.[10] When a natural resource, such as a salt marsh or estuary, is harmed by an oil spill or discharge of other hazardous substances, the task of assessing the damage and implementing a plan to restore the resource falls to natural resource trustees, or "public trustees," who serve as guardians of the nation's natural resources. Public trustees' duties derive from the public trust doctrine, which requires that the public trustees hold and protect natural resources for future generations.[11] When public trust resources are damaged, whether from an acute event such as the BP/DEEPWATER HORIZON disaster in the Gulf of Mexico or from long-term destructive effects such as industrial pollution in the Hudson-Raritan Estuary, state, federal, and tribal public trustees are tasked with ensuring that the parties responsible for the damage sufficiently compensate the public for its loss.

Two important questions arise with respect to public trustees' guardianship of the public trust: what principles must guide public trustees in their mission to protect and restore the natural resources that

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Atlantic Ocean, otherwise known as "the nation's largest Superfund site." Brendan J. Lyons, *Dredging up the Truth: Records Show GE Was Warned About Health Threats of PCBs Decades Before Anti-Dredging Campaign*, TIMES UNION (Mar. 8, 2014), http://www.timesunion.com/local/article/Dredging-up-the-truth-5294643.php.

6. Plaintiffs' Brief in Support of Motion for Partial Summary Judgment on Common Law at 7, N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., Nos. UNN-L-3026-04, UNN-L-4415-04 (N.J. Super. Ct. Law Div. Aug. 29, 2008) (citation omitted).

7. *See, e.g.*, Howard Kenison, Carolyn L. Buchholz & Shawn P. Mulligan, *State Actions for Natural Resource Damages: Enforcement of the Public Trust*, 17 Envtl. L. Rep. (Envtl. Law Inst.) 10,434 (1987) (discussing Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601-9675).

8. Federally designated natural resource trustees include the National Oceanic & Atmospheric Administration (NOAA), United States Department of the Interior (DOI), United States Department of Agriculture, United States Department of Energy, the United States Department of Defense, and federally recognized tribes.

9. *See* Allan Kanner, *Tribal Sovereignty and Natural Resource Damages*, 25 PUB. LAND & RESOURCES L. REV. 93, 93 (2004) (quoting Worcester v. Georgia, 31 U.S. 515, 561 (1832)).

10. *See* Allan Kanner & Mary E. Ziegler, *Understanding and Protecting Natural Resources*, 17 DUKE ENVTL. L. & POL'Y F. 119, 130 (2006).

11. *See, e.g.*, Allan Kanner, *The Public Trust Doctrine,* Parens Patriae*, and the Attorney General as the Guardian of the State's Natural Resources*, 16 DUKE ENVTL. L. & POL'Y F. 57, 61-62 (2005) (citing Van Ness v. Borough of Deal, 393 A.2d 571, 573 (N.J. 1978); Matthews v. Bay Head Improvement Ass'n, 471 A.2d 355, 358 (N.J. 1984); Borough of Neptune City v. Borough of Avon-by-the-Sea, 294 A.2d 47, 54 (N.J. 1972)).

they are tasked with protecting, and what determinations are delegated to the trustees' expert discretion? Public trustees, like trustees in other areas of law, have fiduciary duties to maintain and grow the trust *res* (i.e., the natural resources, such as plant life, wildlife, and habitats) for the use of present and future beneficiaries (i.e., the public and future generations); to use sound judgment in ensuring that the trust "property" is productive; and to manage trust resources as a prudent guardian.[12] Public trustees also have a fiduciary duty to protect and to make polluters pay to restore the public's natural resources without emptying the public purse.[13]

A consensus has emerged that certain practices are best in assessing natural resource damages (NRDs) and restoring natural resources. In the past, some trustees thought mere monetary compensation, paid into government coffers, to be sufficient compensation to the public for NRDs.[14] However, beginning in 1989 with the United States Court of Appeals for the District of Columbia Circuit's holding in *Ohio v. United States Department of the Interior* that market value is an insufficient measure of natural resource value,[15] accompanied by ensuing regulatory reforms,[16] that assumption has been displaced. Public trustees have now reached a consensus that seeking restoration, reparation, and replacement of natural resources—and not a monetary award paid into government coffers—is the best practice to compensate the public for its losses associated with NRDs. Restoration of the resources that were damaged is known as "primary restoration."[17] In addition to primary restoration, natural resource restoration requires "compensatory restoration," which entails determining the ecological services that would have been provided absent the injury and then compensating the public for this injury by providing the public with additional natural resources.[18] Public trustees have reached a consensus that using certain methodologies, namely, habitat equivalency analysis (HEA) and resource equivalency analysis (REA), is the best practice to assess and value the compensatory restoration required to make the public whole in NRD cases.[19]

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12. *See infra* Part IV.

13. *See* N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 352 (N.J. Super. Ct. App. Div. 2007) (quoting Marsh v. N.J. Dep't of Envtl. Prot., 703 A.2d 927, 930 (N.J. 1997)).

14. Nicholas E. Flores & Jennifer Thacher, *Money, Who Needs It? Natural Resource Damage Assessment*, 20 CONTEMP. ECON. POL'Y 171, 177 (2002).

15. 880 F.2d 432, 438 (D.C. Cir.), *reh'g denied*, 897 F.2d 1151 (D.C. Cir. 1989).

16. *See* 15 C.F.R. § 990.11 (2014); 43 C.F.R. § 11.83 (2013).

17. Kanner & Ziegler, *supra* note 10, at 145.

18. *Id.* at 145-46.

19. Matthew Zafonte & Steve Hampton, *Exploring Welfare Implications of Resource Equivalency Analysis in Natural Resource Damage Assessments*, 61 ECOLOGICAL ECON. 134, 134 (2007).

This set of best practices has emerged not only from the organic statutes governing natural resource damage assessments (NRDAs) but also from public trustees' considerable experience in navigating, negotiating, and litigating NRD matters and in conducting natural resource restoration projects, where they are informed by scientific and policy expertise about their fiduciary duties to maintain the public trust resources for the benefit of the public. Beyond the guidance provided by a trustee's fiduciary obligations to maintain trust resources and a relatively small constellation of best practices, the task of determining how best to compensate the public for the loss of its natural resources falls to a public trustee's sound discretion. The reason for deferring to public trustees' determinations in NRD and restoration matters is twofold. First, public trustees are experts in their field and are legislatively delegated discretion to assess damages and formulate remedial and restoration plans.[20] Second, a measure of discretion and judgment is inherent in the task of NRDA and restoration. Ecosystems are unique, delicate, and infinitely complex, and there are inherent limits on scientists' ability to understand any given ecosystem.[21] Similar to the art of restoring paintings or practicing medicine, natural resource restoration is both an art and a science.[22] Within reasonable scientific and legal parameters, public trustees' duties are inherently discretionary so long as they serve the goal of conserving and restoring the resources held in public trust.[23]

This Article sets out these developments in the field of natural resource restoration and explores the interplay between public trustees' fiduciary obligations and their prerogative to exercise broad discretion in determining how best to restore natural resources in the public trust. This Introduction offers context to the discussion, looking to the example of the Hudson-Raritan Estuary. Part II provides an overview of the essential components of NRD law that work to make the public whole: primary restoration of the damaged and destroyed natural resources and compensatory restoration to account for the public's interim loss of use of

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20. *See infra* notes 148, 178 and accompanying text. Whereas restoration generally aims to return a natural resource back to its predischarge condition, remediation actions have the limited goal of immobilizing pollutants and preventing continued harm to a resource, serving more as a triage function. *See* N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 348 (N.J. Super. Ct. App. Div. 2007). While responsible parties often attempt to conflate restoration and remediation, asking courts and trustees to treat restoration as duplicative of or ancillary to remediation actions, it is well established that restoration and remediation are distinct. *See id.* at 356.

21. *See infra* note 202 and accompanying text.

22. *See infra* note 189 and accompanying text.

23. *See infra* note 191 and accompanying text.

the resources. Part III examines the consensus that has emerged in favor of primary restoration rather than money damages to make the public whole in NRD actions. It then tracks the evolution of public trustees' generally preferred method of determining compensatory restoration: equivalency analysis (HEA or REA). Finally, Part IV explores the interplay between public trustees' fiduciary obligations—e.g., to maintain the natural resources that form the *res* of the public trust for the public today and for future generations; to use sound judgment in ensuring that natural resources are restored and that they remain productive; and to require, to the best of their ability, that polluters, not the public, bear the burden of paying for restoration and remediation—and their prerogative to exercise broad discretion in determining how best to restore natural resources in their care. Beyond laying a theoretical foundation for giving trustees discretion, the discussion in Part IV offers concrete, practical guidance as to how trustees do (and ought to) exercise that discretion in handling NRD cases, returning to the example of the efforts underway in New Jersey to restore the Hudson-Raritan Estuary, among other contemporary restoration projects. A brief conclusion follows.

Because these topics are rapidly developing areas of the law, this Article is intended both to serve as a primer on natural resource restoration, including "primary" and "compensatory" restoration principles and methodologies, as well as the role of public trustees in that process, and to report on the emerging consensus on these topics. Drawing on the author's experience as a natural resource law scholar and practitioner, this Article should be helpful to practitioners, trustees, judges, and scholars facing questions involving natural resource restoration, both in theory and its practical application, and the fiduciary obligations and broad discretion of public trustees in carrying out their duties.

II. PUBLIC TRUST MADE WHOLE

Natural resource damage law seeks to make the public whole.[24] It exists to transform parts of ecological disaster areas like the Hudson-Raritan Estuary and to restore valuable services to the public. NRD claims reflect the realization that we, the public, depend on our limited natural resources for our well-being and quality of life and that natural

24. 15 C.F.R. § 990.53(d) (2014) ("After trustees have identified the types of restoration actions that will be considered, they must determine the scale of those actions that will make the environment and public whole.").

resource restoration is an economic and social imperative.[25] Restoring our natural resources preserves biodiversity and public enjoyment not only for ourselves but for future generations. NRD claims aim to make society whole by restoring natural resources lost as externalities to polluters.[26] Although polluters often plead ignorance of the devastating ecological effects of industrial pollution,[27] deliberate indifference and greed are too often a likelier explanation.[28] By requiring polluters to internalize the costs of their pollution, NRD law seeks to free up public resources to be allocated for other public purposes and incentivize companies to adjust their policies, practices, and procedures to protect the environment in the future and act to address problems that regulators have not explicitly addressed.[29]

The consensus among public trustees today is that restoration, rather than money damages, is the only remedy that may truly make the public whole following an incident that has destroyed or severely damaged a natural resource.[30] NRD remedies are generally known to consist of three broad components.[31] First, there is primary restoration. That component requires restoring damaged habitat and natural resources to their pre-pollution conditions.[32] Restoration of an ecosystem requires rehabilitation of both structure and function.[33] According to the National

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25. *See* Kanner & Ziegler, *supra* note 10, at 120.

26. *Id.* at 121, 123.

27. *See, e.g.*, N.J. Dep't of Envtl. Prot. v. Ventron Corp., 468 A.2d 150, 154 (N.J. 1983). The ignorance has worn thin. For example, many courts have recognized that their states regulated hazardous waste from the early 1900s. *E.g.*, *id.* at 160.

28. The greed argument is that much of this pollution reflects externalities that increase profits at the expense of the public trust as well as competitors. *See generally* Allan Kanner, *Unjust Enrichment in Environmental Litigation*, 20 J. ENVTL. L. & LITIG. 111, 148-49 (2005). Most natural resource laws do not provide a defense or offset for economic benefits resulting from polluting activities. *See infra* note 46 and accompanying text. Indeed, courts routinely reject such claims. *E.g.*, *Ventron*, 468 A.2d at 160 ("[O]ne engaged in the disposing of toxic waste may be performing an activity that is of some use to society. Nonetheless, 'the unavoidable risk of harm that is inherent in it requires that it be carried on at his peril, rather than at the expense of the innocent person who suffers harm as a result of it.'" (quoting RESTATEMENT (SECOND) OF TORTS § 520 cmt. h)).

29. Allan Kanner & Tibor Nagy, *Measuring Loss of Use Damages in Natural Resource Damage Actions*, 30 COLUM. J. ENVTL. L. 417, 420-21, 444-45 (2005).

30. *See* Kanner & Ziegler, *supra* note 10, at 147, 151-52.

31. *See, e.g.*, Oil Pollution Act of 1990 (OPA), 33 U.S.C. § 2706(d)(1) (2012); N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 348 (N.J. Super. Ct. App. Div. 2007); Kanner & Ziegler, *supra* note 10, at 145.

32. *See* 33 U.S.C. § 2706(d)(1)(A).

33. NAT'L RESEARCH COUNCIL, RESTORATION OF AQUATIC ECOSYSTEMS: SCIENCE, TECHNOLOGY, AND PUBLIC POLICY 17-18 (1992) ("Merely recreating a form without the functions, or the functions in an artificial configuration bearing little resemblance to a natural form, does not constitute restoration."); A.D. Bradshaw, *What Do We Mean by Restoration?*, *in* RESTORATION ECOLOGY AND SUSTAINABLE DEVELOPMENT 10 (Krystyna M. Urbanska et al. eds.,

Research Council, "[t]he objective is to emulate a natural, self-regulating system that is integrated ecologically with the landscape in which it occurs."[34] A structural loss of an ecosystem occurs, for example, when species have been exterminated or topsoil is lost by erosion.[35] A functional loss occurs when human and ecological services are not provided by a resource or habitat when they otherwise would be.[36]

Primary restoration compensates the public for injury to natural resources by restoring or repairing that resource, recognizing that in-kind and in-place restoration generally most completely compensates the public.[37] By analogy, if a house is burned down, the best remedy—and often the only realistically acceptable remedy for a bereft homeowner—is to rebuild the house in place. That analogy only takes us so far, however, because as it turns out, natural resources, like salt marshes destroyed by pollution, are substantially more difficult and complex to restore than a family home lost in a fire, even when they are restored in place. Although many of us would expect a new house to be superior to the older house that was burned down (at least in the economic sense, i.e., its market or resale value), the opposite is often true in natural resource damage cases. For example, "[r]estored or created habitats are typically of lesser quality than 'natural' habitats."[38] For wetland mitigation banks, it is estimated that created habitats are between two and ten times less productive than natural habitats, which means that each destroyed acre should be replaced with around two to ten acres of new, man-made wetlands, depending on the circumstances.[39]

One value of primary restoration over a traditional money damages approach is that many habitats and resources do not have a market price, or that any market price we might attribute to them—for example, in a sale to a commercial developer—is a poor metric for making the public

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1997); *see also* RESTORATION ECOLOGY: THE NEW FRONTIER, at xvii (Jelte Van Andel & James Aronson eds., 2d ed. 2012) ("The ultimate goal of ecological restoration is to achieve sustainable, resilient and inter-connected ecosystems, and socio-ecological systems, providing goods and services to humans and habitat and well-being for nonhuman creatures as well.").

34. NAT'L RESEARCH COUNCIL, *supra* note 33, at 18.

35. *See id.* at 31-32.

36. *See id.* at 14-15, 18 box 1.1.

37. *See* 15 C.F.R. § 990.53(d)(1)-(2) (2014).

38. Brian Roach & William W. Wade, *Policy Evaluation of Natural Resource Injuries Using Habitat Equivalency Analysis*, 58 ECOLOGICAL ECON. 421, 429 (2006).

39. *See id.* (citing ENVTL. L. INST., IWR REPORT 94-WMB-6, NATIONAL WETLAND MITIGATION BANKING STUDY: WETLAND MITIGATION BANKING 75 (1994), *available at* http://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/94-WMB-6.pdf).

whole for the often intangible loss of the use of its natural resources.[40] For example, the BP/DEEPWATER HORIZON oil spill in the Gulf of Mexico April 2010 injured sea turtles, which do not have a (legitimate) market price.[41] At the same time, fish eggs, larvae, and baby fish were killed as a result of oil reaching nearshore marsh areas in Louisiana.[42] Although these natural resources may in other contexts be said to have a market value based on, for instance, the amount pescavores are willing to pay for them as a delicacy, taking into account supply and other determinants of market price, this market value does not capture the complete value these natural resources provide society.[43] And even if market value did capture the actual value of fish, merely providing replacement fish will not make the public whole, because reintroduced fish require a suitable habitat.[44] In certain circumstances, damages may only be proven by a fair and reasonable estimate based on the circumstances of a given case.[45] This is not unfamiliar to the law. For example, the same principle has been applied in suits to recover damages for items of intangible personal value following a fire.[46] In that situation,

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40. *E.g.*, Ohio v. U.S. Dep't of the Interior, 880 F.2d 432, 462-63 (D.C. Cir.), *reh'g denied*, 897 F.2d 1151 (D.C. Cir. 1989) (citing Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 628 F.2d 652, 673-74 (1st Cir. 1980), *cert. denied*, 450 U.S. 912 (1981)).

41. *See* Agnese Mancini & Volker Koch, *Sea Turtle Consumption and Black Market Trade in Baja California Sur, Mexico*, 7 ENDANGERED SPECIES RES. 1, 6 (2009).

42. *See* John P. Incardona et al., Deepwater Horizon *Crude Oil Impacts the Developing Hearts of Large Predatory Pelagic Fish*, PNAS.ORG E1515-E1516 (Mar. 24, 2014), http://www.pnas.org/content/111/15/E1510.full.pdf+html.

43. *See, e.g.*, Cecilia M. Holmlund & Monica Hammer, *Ecosystem Services Generated by Fish Populations*, 29 ECOLOGICAL ECON. 253, 254 (1999).

44. *See generally* Andrew R. Bearlin et al., *Identifying the Weakest Link: Simulating Adaptive Management of the Reintroduction of a Threatened Fish*, 59 CAN. J. FISHERIES & AQUATIC SCI. 1709, 1710 (2002).

45. *See, e.g.*, Lane v. Oil Delivery, Inc., 524 A.2d 405, 409 (N.J. Super. Ct. App. Div. 1987).

46. *E.g.*, *id.* In *Lane*, the plaintiffs brought suit against the defendant to recover damages for losses incurred as a result of a fire in their home. The jury assessed the damages sustained by the plaintiffs at $425,985 (which included house reconstruction costs, living expenses during reconstruction, loss of jewelry, and personal replacement costs), and the trial court added $38,477 to the award to account for a mathematical error by the jury. The defendant appealed and challenged the damage award, arguing that the damage verdict exceeded the proofs at trial. *Id.* at 406-07. The New Jersey Superior Court, Appellate Division, ultimately remanded the case back to the trial court, finding that the trial judge's jury instructions and conduct fell short of an appropriate standard for the jury to properly assess the damages. *Id.* at 409. In discussing the measure of damages to be applied, the appellate court noted when the lost items are without an ascertainable market value (e.g., certain household furnishings or apparel), "the better measure of damages and the one we find applicable in this case, is the actual or intrinsic value of the property to the owner, excluding sentimental or fanciful value." *Id.* at 408 (citing DeSpirito v. Bristol Cnty. Water Co., 227 A.2d 782, 784 (R.I. 1967); Holmes v. Freeman, 185 A.2d 88, 91 (Conn. Cir. Ct. 1962)). The court explained:

one court explained: "Proof of damages need not be done with exactitude . . . . It is therefore sufficient that the plaintiff prove damages with such certainty as the nature of the case may permit, laying a foundation which will enable the trier of the facts to make a fair and reasonable estimate."[47]

The second component of NRD remedies is the loss of use of the resource between the time of initial injury and the completion of restoration, repair, or replacement. Recognizing the time value of money, trustees may recover compensatory damages for natural resource injuries, including loss of use, to compensate the public fully.[48] Compensatory restoration makes the public whole for the loss of services otherwise provided by degraded or destroyed natural resources.[49] Compensatory restoration damages are recoverable for loss of active uses, such as recreational uses (e.g., fishing and swimming); consumptive uses (e.g., hunting and oil and gas extraction); and nonconsumptive commercial uses (e.g., using waterways for

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> The rationale for such a rule is consonant with the goal of tort damages to fully compensate the injured party, thereby making it possible to replace the lost property with a comparable substitute. The market value of wearing apparel and household furnishings cannot compensate the owner for their loss. While there may be a second-hand market value, other items of equal value are not interchangeable.

Id. at 409 (citing 4 MARILYN MINZER ET AL., DAMAGES IN TORT ACTIONS § 37.22).

47. *Id.* at 409 (citing *Holmes*, 185 A.2d at 91). The same result is reached in ornamental tree cases. For example, in *Huber v. Serpico*, the plaintiff brought a trespass action against the defendant for cutting down more than fifty trees on lands belonging to the plaintiff. 176 A.2d 805, 806 (N.J. Super. Ct. App. Div. 1962). The plaintiff testified that he used the grove of trees for purposes of enjoyment and recreation, and the plaintiff's tree expert presented evidence "of the utility and value of the trees for shade tree or ornamental purposes." *Id.* at 810. The trial court entered a judgment awarding the plaintiff $6,500. *Id.* at 814. On appeal, the defendant argued that "the jury should not have been allowed to consider any evidence of value which would permit a verdict in excess of the diminution of value of the realty after the cutting." *Id.* at 812. The appellate court disagreed, holding that is was appropriate to instruct the jury to determine "whether the question of damages should be approached from the standpoint that the trees cut down possessed a shade tree or aesthetic value, or only a value for timber." *Id.* at 810. The appellate court reasoned:

> Sound principle and persuasive authority support the allowance to an aggrieved landowner of the fair cost of restoring his land to a reasonable approximation of its former condition, without necessary limitation to the diminution . . . shade or ornamental trees or shrubbery having peculiar value to the owner.

Id. at 813 (citing RESTATEMENT OF TORTS § 929 cmt. b (1939); H.D. Warren, Annotation, *Measure of Damages for Destruction or Injury to Trees and Shrubbery*, 161 A.L.R. 549, 601-02 (1946)).

48. *See, e.g.*, OPA, 33 U.S.C. § 2706(d)(1)(B) (2012); 15 C.F.R. § 990.53(c) (2014); N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 348 (N.J. Super. Ct. App. Div. 2007); Kanner & Ziegler, *supra* note 10, at 145.

49. *See* 33 U.S.C. § 2706(d)(1)(B); 15 C.F.R. § 990.53(c).

transportation).[50] Compensatory restoration damages are also available for the loss of passive uses, such as the vicarious enjoyment of resources that one will never directly experience, and nonuse values, such as the value of preserving resources so that they may be used in the future.[51] This includes the value of unique and irreplaceable resources.[52] If a natural reef is destroyed in an oil spill, many of the services like recreational diving or fishing that were provided by that reef can be provided in some measure by sinking an artificial reef.[53] However, the uniqueness and non-manmade nature of the original reef remains compensable.[54]

Interim or loss of use damages also advance the public policy of encouraging responsible parties to deal with NRD liability sooner rather than later.[55] If an equivalency analysis is used, the remedy will translate into the replacement of even more resources than existed prior to the original injury.[56] The analogy again is to the burned-down house. Most state tort law allows the plaintiff to recover loss of use of (or rent for) the house between its destruction and replacement.[57]

The notion that "damages" are insufficient to make damaged natural resources whole is informed in important ways by tort law. For instance, tort law teaches us that primary damage and loss of use of, e.g., a car, is compensable.[58] In one example, a plaintiff's car was stolen after leaving it in the custody of the defendant for servicing.[59] The thief of the car was in an accident, damaging the plaintiff's car. The car could not be

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50. *See* Kanner & Nagy, *supra* note 29, at 420 (citing Jeffrey C. Dobbins, *The Pain and Suffering of Environmental Loss: Using Contingent Valuation To Estimate Nonuse Damages*, 43 DUKE L.J. 879, 898 (1994); Steven Edwards, *In Defense of Environmental Economics*, 9 ENVTL. ETHICS 73, 79 (1987)); Frank B. Cross, *Natural Resource Damage Valuation*, 42 VAND. L. REV. 269, 281, 285 (1989) (quoting Alaskan National Interests Lands Conservation Act of 1990, 16 U.S.C. § 3101(a) (1982)).

51. Kanner & Nagy, *supra* note 29, at 422 (citing Dobbins, *supra* note 50, at 902).

52. *See, e.g.*, Pila'a 400, LLC v. Bd. of Land & Natural Res., 320 P.3d 912, 932 (Haw. 2014) (distinguishing Haw. Prince Hotel Waikiki Corp. v. City & County of Honolulu, 974 P.2d 21, 32-33 (Haw. 1999)).

53. *Artificial Reef Creation Off the Texas Coast*, NOAA 2 (2013), http://www.gulfspillrestoration.noaa.gov/wp-content/uploads/TX_Art_ReefsFINAL12_1_13.pdf.

54. *See, e.g.*, *Pila'a 400*, 320 P.3d at 932 n.28.

55. N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 351-52 (N.J. Super. Ct. App. Div. 2007) ("The Spill Act was enacted in 1976 as 'a pioneering effort by government to provide monies for a swift and sure response to environmental contamination.'" (quoting Marsh v. N.J. Dep't of Envtl. Prot., 703 A.2d 927, 930 (N.J. 1997))).

56. *E.g.*, Robert E. Unsworth & Richard C. Bishop, *Assessing Natural Resource Damages Using Environmental Annuities*, 11 ECOLOGICAL ECON. 35, 39-40 (1994).

57. *See* 1 STEIN ON PERSONAL INJURY DAMAGES TREATISE § 5:57 (3d ed. 2014).

58. *Id.* (citing RESTATEMENT (SECOND) OF TORTS § 928(b) cmt. b).

59. Camazara v. Bellavia Buick Corp., 523 A.2d 669, 670 (N.J. Super. Ct. App. Div. 1987).

repaired for five months. The plaintiff sued to recover damages for loss of use of the car while it was being repaired. The trial court limited the plaintiff's damages to $250: the deductible on the collision coverage of his insurance policy. The trial court declined to award the plaintiff additional damages for loss of use because the plaintiff did not show any actual expenditures for substitute transportation (i.e., he chose not to rent a car). The New Jersey Superior Court, Appellate Division, reversed and remanded, holding that the plaintiff should not be barred from recovering loss of use simply because he had not rented a substitute vehicle.[60] The court explained: "Although such a plaintiff does not incur pecuniary loss in the form of rental payments for a substitute vehicle, he may suffer substantial personal inconvenience due to the lack of an automobile,"[61] and "such inconveniences caused by the wrongful conduct of a tortfeasor are compensable."[62]

The third component of the measure of NRDs is the cost of doing the NRDA of past injury and the determination of an appropriate remedy.[63] Responsible parties must pay costs associated with assessing a natural resource injury and determining an appropriate remedy.[64] Assessment costs can be direct or indirect.[65] Direct costs include, inter alia, the costs of planning primary restoration, retaining scientists or consultants, purchasing equipment to study the injury, developing plans for assessment, and restoration.[66] "Indirect costs are costs of activities or items that support the selected [restoration activity] but that cannot practically be directly accounted for as costs for the selected [restoration

60. *Id.* at 670-71.

61. *Id.* at 671.

62. *Id.* at 672.

63. *See, e.g.*, OPA, 33 U.S.C. § 2706(d)(1)(C) (2012); Kanner & Ziegler, *supra* note 10, at 146. Assessment costs are recoverable once such costs become incurred and need not await the selection of a remedial action. *See* Confederated Tribes & Bands of the Yakama Nation v. United States, 616 F. Supp. 2d 1094, 1099 (E.D. Wash. 2007) (quoting Natural Resource Damage Assessments, 51 Fed. Reg. 27,674, 27,681 (Aug. 1, 1986) (codified at 43 C.F.R. pt. 11)). Recovery of these costs from polluters is consistent with the principle that "polluters pay" and allows trustees to proceed with restoration activity. *See, e.g.*, N.J. Dep't of Envtl. Prot. v. Ventron Corp., 468 A.2d 150, 160 (N.J. 1983) ("Those who poison the land must pay for its cure.").

64. *See* CERCLA, 42 U.S.C. § 9607(a)(4)(C) (2012) (providing that responsible parties hay be held liable for "damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release"); 33 U.S.C. § 2706(d)(1)(C); *see also* 43 C.F.R. § 11.15(a)(3) (2013) (providing that a trustee may recover "reasonable and necessary costs of the assessment"); Douglas Helton & Toney Penn, *Putting Response and Natural Resource Damage Costs in Perspective*, INT'L OIL SPILL CONF. 6 (1999), http://www.darrp.noaa.gov/library/pdf/costsofs.pdf.

65. 43 C.F.R. § 11.83(b)(1).

66. *Id.* § 11.83(b)(1)(i).

activity]."[67] An example is overhead costs, such as processing invoices associated with the activity.[68]

Together, recovering damages in the form of primary restoration, compensatory restoration and the costs of the NRD assessment work to restore resources lost as a result of releases or discharges of hazardous substances, compensate the public for the loss of use of those resources, and protect the public's fiscal resources by requiring polluters to pay for the entirety of the damages they have caused, including the trustees' work in assessing the injury and determining a remedy, thereby making the public whole.

III. FROM MONETARY DAMAGES TO RESTORATION

There was a time when regulators believed that NRD recovery was limited to the lesser of primary or compensatory restoration, that compensatory restoration was only possible for use values (not nonuse values), and that use values should be measured in terms of "market values."[69] Polluters had also persuaded regulators that the "market price" of natural resources was an appropriate measure of compensating the public for loss of the use of services.[70] Ultimately, in 1989, the D.C. Circuit disabused trustees and the regulated community of these notions in its landmark ruling in *Ohio v. United States Department of the Interior* and invalidated the DOI's NRDA regulations, which adhered to the limited restoration paradigm, on the ground that they subordinated the legislature's intent in enacting the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).[71]

That case arose when, in the 1980s, the DOI promulgated a rule that trustees could recover either primary restoration or compensatory restoration.[72] Not only were trustees limited to one of the two, but they were also required to choose between the "the lesser of" the two.[73] In the name of efficiency, the DOI had also "establish[ed] a 'strong presumption in favor of market price and appraisal methodologies'" over other methods of determining compensatory damages for the loss of use

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67. *Id.* § 11.83(b)(1)(ii).

68. Martin Marietta Energy Sys., Inc., Integrating Natural Resource Damage Assessment and Environmental Restoration Activities at DOE Facilities (Oct. 1993) (unpublished report), *available at* http://www.osti.gov/scitech/servlets/purl/196464.

69. *See* 43 C.F.R. §§ 11.35(b)(2)-(3), 11.83(a), (c)(1) (1987).

70. *See id.* § 11.83(c)(1).

71. Ohio v. U.S. Dep't of the Interior, 880 F.2d 432, 438 (D.C. Cir.), *reh'g denied*, 897 F.2d 1151 (D.C. Cir. 1989) (quoting 43 C.F.R. § 11.35(b)(2) (emphasis added)).

72. *Id.* at 441 (quoting 43 C.F.R. § 11.35(b)(2) (emphasis added)).

73. *Id.* (quoting 43 C.F.R. § 11.35(b)(2) (emphasis added)).

of services while the natural resources were damaged.[74] The DOI did so despite its recognition that "'most government resources, particularly resources for which natural resource damages would be sought[,] may often have no market.'"[75] The DOI promulgated a hierarchy of assessment methods for determining use values and placed market values at its apex. Recovery was limited to market price unless the trustee could prove that the market for the resource's use services was not reasonably competitive.[76] In such a case, the trustee was required to appraise the value of its injuries by applying the "'Uniform Appraisal Standards for Federal Land Acquisition.'"[77] If the appraisal method was also inappropriate, only then would other methods be allowed.[78]

While the regulators and the regulated community were evidently of a mind that these strict limitations were reasonable and appropriate, conservationists and members of the public were concerned that the regulations would produce outcomes that would not fully compensate the public for the damage to its natural resources.[79] In some instances, public interest organizations were able to intervene to challenge the DOI's decisions on a case-by-case basis, but this did not guarantee success. For example, in *In re Acushnet River & New Bedford Harbor: Proceedings Re Alleged PCB Pollution*, a Massachusetts federal district court allowed the National Wildlife Federation (NWF) to permissively join CERCLA litigation between state and federal trustees and a party, AVX Corporation, responsible for releasing PCBs into New Bedford Harbor while owning and operating a capacitor manufacturing plant.[80] The trustees were seeking to recover NRDs only for the lesser of primary restoration or the compensatory restoration for lost-use values. The NWF contended that both must be paid. Accordingly, the NWF objected to the $2 million settlement that the trustees had requested the court approve. While the court allowed the NWF to intervene because the trustees failed to represent the NWF's interest in the matter, the court nevertheless disagreed with the NWF's position and approved the settlement.[81]

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74. *Id.* at 463 (quoting Natural Resource Damage Assessments, 51 Fed. Reg. 27,674, 27,720 (Aug. 1, 1986) (codified at 43 C.F.R. pt. 11)).
75. *Id.* (alteration in original) (citation omitted).
76. *Id.* at 462 (quoting 43 C.F.R. § 11.83(c)(1), (d)).
77. *Id.* (quoting 43 C.F.R. § 11.83(c)(2)).
78. *Id.* (quoting 43 C.F.R. § 11.83(d)).
79. *Id.* at 441.
80. 712 F. Supp. 1019, 1022, 1038 (D. Mass. 1989).
81. *Id.* at 1024 n.7, 1025 & 1031-32.

Then, in *Ohio*, the D.C. Circuit took up the issue.[82] In a landmark opinion, the court overturned limits on the availability of primary restoration and declared market valuation to be an inferior method of compensatory damage valuation. The court held that the DOI's NRDA regulations undermined the purpose of CERCLA, which Congress enacted to promote natural resource restoration.[83] Namely, Congress intended to establish a mechanism that prioritizes natural resource restoration rather than monetary compensation.[84] The court explained that Congress expressed a "distinct preference" for primary restoration cost as the measure of recovery for NRDs.[85] The clear language of CERCLA provides that mere primary restoration is insufficient to compensate the public for its injuries.[86] Moreover, the court reasoned, the DOI's regulations reflected an unreasonable interpretation of CERCLA because market value cannot capture the full range of utility humans derive from a resource, and "Congress intended the damage assessment regulations to capture fully all aspects of loss."[87] The DOI's rule thwarted Congress's intent to "provide trustees 'a choice [among] accurate and credible damage assessment methodologies.'"[88] Market value is an unreliable indicator of actual value, because "[f]rom the bald eagle to the

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82. 880 F.2d at 438.

83. *See id.* (discussing CERCLA, 42 U.S.C. §§ 9601-9675 (2012)). "In 1980, CERCLA was enacted in response to the serious environmental and health risks posed by industrial pollution." United States v. Bestfoods, 524 U.S. 51, 55 (1998) (citing Exxon Corp. v. Hunt, 475 U.S. 355, 358-59 (1986)). CERCLA had two main policy objectives. First, Congress intended to give the federal government the "tools necessary for a prompt and effective response to problems of national magnitude resulting from hazardous waste disposal." United States v. Reilly Tar & Chem. Corp., 546 F. Supp. 1100, 1112 (D. Minn. 1982); *see also* Walls v. Waste Res. Corp., 823 F.2d 977, 980 (6th Cir. 1987) (quoting Walls v. Waste Res. Corp., 761 F.2d 311, 318 (6th Cir. 1985); *Reilly Tar & Chem.*, 546 F. Supp. at 1112)); Dedham Water Co. v. Cumberland Farms Dairy, Inc., 805 F.2d. 1074, 1081 (1st Cir. 1986) (quoting *Reilly Tar & Chem.*, 546 F. Supp. at 1112). Second, Congress intended that the polluters "bear the costs and responsibility for remedying the harmful conditions they created." *Reilly Tar & Chem.*, 546 F. Supp. at 1112. CERCLA must be interpreted liberally so as to accomplish its goal of environmental protection and remediation. *Id.*; *Dedham Water Co.*, 805 F.2d at 1081 ("CERCLA is essentially a remedial statute designed by Congress to protect and preserve public health and the environment. [Courts] are therefore obligated to construe its provisions liberally to avoid frustration of the beneficial legislative purposes." (citing United States v. Mottolo, 605 F. Supp. 898, 902 (D.N.H. 1985); United States v. Conservation Chem. Co., 619 F. Supp. 162, 192 (W.D. Mo. 1985))). Consequently, exceptions from liability under CERCLA are narrowly construed. *Reilly Tar & Chem.*, 546 F. Supp. at 1112; Idaho v. Hanna Mining Co., 882 F.2d 392, 396 (9th Cir. 1989); *see, e.g.*, Ohio v. Dep't of the Interior, 880 F.2d at 438-81.

84. *Ohio*, 880 F.2d at 450.

85. *Id.* at 444 (discussing 42 U.S.C. § 9651(c)(2)).

86. *Id.* at 448 (quoting 42 U.S.C. § 9607(f)(1)).

87. *Id.* at 463.

88. *Id.* (quoting S. REP. NO. 96-848, at 85-86 (1980)).

blue whale and snail darter, natural resources have values that are not fully captured by the market system."[89]

Since 1989, federal trustees have understood that NRD awards require both primary and compensatory restoration. Following *Ohio*, federal agencies, including the DOI and NOAA (the natural resource trustee under the Oil Pollution Act of 1990 (OPA)), instituted significant regulatory reforms that accelerated the trend towards emphasizing natural resource restoration, as have subsequent regulatory revisions.[90] Meanwhile, state legislatures and agencies have enacted regulatory programs with varied success, providing case studies for trustees throughout the country to inform their best practices.[91]

If any doubt remained as to Congress's intent with respect to how to measure NRDs, it was dispelled when it enacted OPA[92] in the wake of the devastating EXXON VALDEZ spill of March 1989. OPA provides for a quick response to the discharge of oil from a vessel or facility, including recovery for injury to natural resources.[93] In enacting OPA, Congress again rejected a "narrow market value and use value based approach to assessing damages," explaining that "forests are more than board feet of lumber, and that seals and sea otters are more than just commodities traded on the market."[94]

Nevertheless, trustees encountered methodological difficulties in measuring nonuse values.[95] At first, these challenges lent legitimacy to the idea advanced by polluters that nonuse values should not be compensated. Initially, economists resorted to an expensive method often used in welfare economics (typically for valuing market commodities), known as the contingent valuation method (CVM).[96] However, the method drew criticism across the board in the fields of ecological economics and environmental law.[97] The CVM framework

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89. *Id.* at 462-63 (citing Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 628 F.2d 652, 673-74 (1st Cir. 1980), *cert. denied*, 450 U.S. 912 (1981)).

90. *See, e.g.*, Natural Resource Damage Assessments, 15 C.F.R. pt. 990 (2014); 43 C.F.R. § 11.83 (2013).

91. *See generally* Patrick E. Tolan, Jr., *Natural Resource Damages Under CERCLA: Failures, Lessons Learned, and Alternatives*, 38 N.M. L. REV. 409, 426-50 (2008).

92. 33 U.S.C. §§ 2701-2761 (2012).

93. *Id.* § 2702(b)(2)(A).

94. S. REP. NO. 101-94, 14-15 (1989).

95. Kanner & Nagy, *supra* note 29, at 437.

96. *Id.* (citing Ohio v. U.S. Dep't of the Interior, 880 F.2d 432, 463 (D.C. Cir.), *reh'g denied*, 897 F.2d 1151 (D.C. Cir. 1989)).

97. *See, e.g.*, Sameer H. Doshi, *Making the Sale on Contingent Valuation*, 21 TUL. ENVTL. L.J. 295, 297, 300 (2008); Roach & Wade, *supra* note 38, at 422 (citing Brian R. Binger, Robert Copple & Elizabeth Hoffman, *Contingent Valuation Methodology in the Natural Resource Damage Regulatory Process: Choice Theory and the Embedding Phenomenon*, 35 NAT.

required economists, first, to measure the value of injured natural resources and the habitat services they provided and then to determine which restoration action would provide equivalent natural resources and habitat services.[98]

The "contingent value" of natural resources is operationalized by gauging the public's "willingness to pay" for restoration of certain natural resources under certain scenarios.[99] For example, when the State of California Water Resources Control Board needed to determine how much water to allocate to Los Angeles from sources flowing into Mono Lake, it conducted a survey.[100] Researchers informed survey participants that biologists believed that increased flows to the lake were necessary to maintain food supplies for nesting and migratory birds and then asked households the open-ended question of how much they were willing to pay for increased water flows into Mono Lake.[101] In addition to being expensive, this method has been criticized for being unreliable because what people say they will pay in CVM interviews diverges significantly from what they are actually willing to pay when actually making decisions, i.e., "under market conditions."[102] The CVM's shortcomings even began to lend legitimacy to industry efforts to limit liability for NRDs to "use values."[103] Furthermore, the entire valuation method of measuring NRDs stems from an anthropocentric view of the world by

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RESOURCES J. 443, 444 (1995)); *see also, e.g.*, V. Kerry Smith, *Lightning Rods, Dart Boards, and Contingent Valuation*, 34 NAT. RESOURCES J. 121, 121 (1994) (citing Ronald G. Cummings & Glenn W. Harrison, *Was the Ohio Court Well Informed in Its Assessment of the Accuracy of the Contingent Valuation Method?*, 34 NAT. RESOURCES J. 1 (1994)); Unsworth & Bishop, *supra* note 56, at 37; Peter A. Diamond & Jerry A. Hausman, *Contingent Valuation: Is Some Number Better Than No Number?*, 8 J. ECON. PERSP. 45, 46 (1994); William H. Desvouges et al., *Measuring Natural Resource Damages with Contingent Valuation: Tests of Validity and Reliability*, *in* CONTINGENT VALUATION: A CRITICAL ASSESSMENT 91 (J.A. Hausman ed., 1993); *see also* Natural Resource Damage Assessments, 43 C.F.R. pt. 11 (2013).

98. *See, e.g.*, Doshi, *supra* note 97, at 297-300.

99. RICHARD T. CARSON ET AL., A CONTINGENT VALUATION STUDY OF LOST PASSIVE USE VALUES RESULTING FROM THE EXXON VALDEZ OIL SPILL: A REPORT TO THE ATTORNEY GENERAL OF ALASKA § 1.3.1 (1992).

100. *Contingent Valuation Method, Case #1—Mono Lake*, ECOSYSTEM VALUATION (2000), http://www.ecosystemvaluation.org/contingent_valuation.htm#case1.

101. *Id.*

102. *See* Cummings & Harrison, *supra* note 97, at 4 (discussing Ohio v. U.S. Dep't of the Interior, 880 F.2d 432, 477-78 (D.C. Cir.), *reh'g denied*, 897 F.2d 1151 (D.C. Cir. 1989)).

103. *See* Dale B. Thompson, *Valuing the Environment: Courts' Struggles with Natural Resource Damages*, 32 ENVTL. L. 57, 87 (2002) ("The . . . *Ohio* decision suggests that NRD cases may need to include nonuse values calculated by CVM as compensable damages. However, difficulties in using specific CVM studies in particular cases and other factors suggests that it might be beneficial to limit the availability of nonuse damages." (discussing *Ohio*, 880 F.2d at 438)).

aiming to maintain a baseline level of human welfare rather than a baseline level of ecological functions.[104]

Ecological economists deftly sidestepped the problems confronting valuation of nonuse values by developing an equivalency method that rejected valuation altogether.[105] Instead of the valuation method, trustees in the 1990s began employing the in-kind method of restoration, removing monetary value from the scaling calculations in favor of focusing on natural resources and their associated services.[106] The theoretical basis for this equivalency analysis was originally published in scientific journals devoted to resource economics.[107] Soon after, government agencies began applying the method. NOAA guidance dating from 1995 recommends restoration-based assessments using equivalency analysis as the best method to quantify damages in claims filed under OPA and CERCLA.[108] NOAA periodically updated and expanded this guidance.[109]

Compensatory restoration requires trustees to select projects that provide an amount of habitat services equivalent to the sum of habitat services lost from the injury.[110] Trustees often determine what amount of resources is required by employing a set of mathematical equations developed by environmental economists, referred to as HEA.[111] Equivalency analysis begins by identifying ecosystem services that are affected.[112] A HEA is a mathematical formula used to estimate NRDs and provide a monetary figure equal to the restoration and replacement

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104. *See* Roach & Wade, *supra* note 38, at 422.

105. Unsworth & Bishop, *supra* note 56, at 37. This approach was also motivated by ecological economists' concern that the expected value of an NRD award was less than the cost required to reliably determine the magnitude of the damage. *See id.* at 36.

106. *See* Zafonte & Hampton, *supra* note 19, at 135 (citing *Habitat Equivalency Analysis: An Overview*, DAMAGE ASSESSMENT & RESTORATION PROGRAM, NOAA § 1.1-.2 (Mar. 21, 1995), http://www.darrp.noaa.gov/library/pdf/heaoverv.pdf).

107. *Id.* (distinguishing Marisa J. Mazzotta, James J. Opaluch & Thomas A. Grigalunas, *Natural Resource Damage Assessment: The Role of Resource Restoration*, 34 NAT. RESOURCES J. 153, 154 (1994)).

108. *Habitat Equivalency Analysis: An Overview*, *supra* note 106, § 1.1; *see also* Deborah P. French et al., *Primary Restoration: Guidance Document for Natural Resource Damage Assessment Under the Oil Pollution Act of 1990*, DAMAGE ASSESSMENT & RESTORATION PROGRAM, NOAA § 1.4.2.2(a) (Aug. 1996), http://www.darrp.noaa.gov/library/pdf/prd.pdf.

109. *Habitat Equivalency Analysis: An Overview*, *supra* note 106 (revising the guidance on October 4, 2000, and May 23, 2006).

110. *See* Roach & Wade, *supra* note 38, at 423.

111. *Id.* Another form of equivalency analysis trustees use is REA. *See* 43 C.F.R. § 11.83(c)(2) (2013). REAs "compare the effects of restoration actions on specifically identified resources that are injured or destroyed." *Id.* Under REAs, losses are expressed in terms of resource units (such as number of impacted fish or acre-feet of water) and are offset by projects that restore equivalent resource units. Zafonte & Hampton, *supra* note 19, at 135.

112. *See* Roach & Wade, *supra* note 38, at 423.

costs necessary to make the public whole.[113] Both the federal government and New Jersey, a national leader in NRD and conservation law, encourage the use of HEA in developing compensatory restoration projects.[114]

There is little dispute over the fact that HEA is a generally accepted and scientifically reliable methodology for NRDAs. Numerous peer-reviewed scientific articles discuss the general acceptance and now common use of HEA in NRDAs. For example, an article by Professors Roach and Wade recognizes that HEA "has been used to determine the appropriate scale of compensatory restoration in several recent NRDA cases."[115] Additionally, an article by Professors Zafonte and Hampton explains:

> NOAA recommended that the calculation of compensation for biological injuries be based upon restoration projects, where the sizes of those projects are "scaled" using habitat equivalency analysis (HEA) and the cost of the projects becomes the measure of damages. At the same time, natural resource agencies were suffering negative experiences using more traditional valuation methods, especially contingent valuation. Since that time, HEA has evolved into the more generic resource equivalency analysis (REA) and has become the primary method for calculating damages from pollution events nationwide.[116]

Zafonte and Hampton observe that "nearly every pollution damages case in the past five years has employed REA as the primary method to quantify damages to wildlife and habitat."[117] Others have also written favorably about HEA in their articles.[118]

Moreover, several courts have recognized HEA as an acceptable methodology, and no court has outright rejected the use of equivalency methodologies.[119] Equivalency analysis gained judicial recognition in

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113. *See id.* at 423-24.

114. *Policy Directive 2003-07*, N.J. DEP'T ENVTL. PROTECTION (Sept. 24, 2003), http://www.state.nj.us/dep/commissioner/policy/pdir2003-07.htm.

115. Roach & Wade, *supra* note 38, at 423.

116. Zafonte & Hampton, *supra* note 19, at 134 (citing Thompson, *supra* note 103, at 60).

117. *Id.* at 135; *see also* P. David Allen II, David J. Chapman & Diana Lane, *Scaling Environmental Restoration to Offset Injury Using Habitat Equivalency Analysis*, *in* ECONOMICS AND ECOLOGICAL RISK ASSESSMENT: APPLICATIONS TO WATERSHED MANAGEMENT 165, 174 (Randall J.F. Bruins & Matthew T. Heberling eds., 2004) (recognizing HEA as a method for determining the amount of restoration needed to compensate for losses of natural resources).

118. *See, e.g.*, Richard W. Dunford, Thomas C. Ginn & William H. Desvousges, *The Use of Habitat Equivalency Analysis in Natural Resource Damage Assessments*, 48 ECOLOGICAL ECON. 49, 51 (2004).

119. United States v. Great Lakes Dredge & Dock Co., 1999 AMC 2511, 2512-13 (S.D. Fla. 1999) (satisfying the factors adopted by the Court in Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593-94 (1993)); United States v. Fisher, 977 F. Supp. 1193, 1201 (S.D. Fla. 1997),

1999 when it survived *Daubert*[120] scrutiny. In *United States v. Great Lakes Dredge & Dock Co.*, the Eleventh Circuit held that the Southern District of Florida did not abuse its discretion when it determined that using HEA was appropriate for measuring NRDs.[121] The district court opinion helpfully set forth the sound rationale for using HEA:

> First, the HEA is not a scientific technique or principle that is subject to testing in the traditional sense. Rather, it is a mathematical equation that works, as any other, subject to the limitations of the data input into the equation. Even Great Lakes' own expert testified that the HEA is a valid methodology.
>
> Second, in spite of Great Lakes' repeated arguments to the contrary, the HEA, as it was used in this case, has been subject to peer review and has been accepted for publication. Although the HEA article has not yet been published, at which time it will be subject to further scrutiny and peer review, it did undergo significant scrutiny prior to its acceptance for publication.
>
> Third, because the HEA is limited by its data, questions about its error rate are not really applicable. In other words, the error rate is determined by errors in the data, not errors with the HEA itself.
>
> Finally, because the HEA is a relatively new scientific model it has not had the necessary time to truly gain general acceptance beyond the government agencies Mr. Julius referred to in his testimony. Nonetheless, the relative "youth" of a scientific technique does not make it any less valid. Furthermore, the Court, as fact finder, will consider the testimony of Great Lakes' experts when evaluating the data put into the HEA. Accordingly, the testimony from Mr. Julius will not be excluded.[122]

Especially damning for the responsible party was the fact that its "own expert testified that the HEA is a valid methodology."[123]

By 2007, "nearly every pollution damages case in the p[revious] five years ha[d] employed [equivalency analysis] as the primary method to quantify damages to wildlife and habitat."[124] By 2008, the DOI and

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aff'd, 174 F.3d 201 (11th Cir. 1999). The *Great Lakes* district court's order accepting HEA as a reliable methodology was affirmed on appeal; in its opinion, the United States Court of Appeals for the Eleventh Circuit noted "that the HEA was peer reviewed and accepted for publication prior to trial." United States v. Great Lakes Dredge & Dock Co., 259 F.3d 1300, 1305 (11th Cir. 2001) (citation omitted).

120. *Great Lakes*, 1999 AMC at 2512-13 (mentioning *Daubert*, 509 U.S. at 593-94).

121. 259 F.3d at 1305-06 (mentioning *Daubert*, 509 U.S. at 593-94).

122. *Great Lakes*, 1999 AMC at 2512-13.

123. *Id.* at 2512.

124. Zafonte & Hampton, *supra* note 19, at 135; *see also Fisher*, 977 F. Supp. at 1198; Transcript of Trial at 135-36, N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., Nos. UNN-L-3026-04, UNN-L-3026-04 (N.J. Super. Ct. Div. July 22, 2014).

NOAA had codified equivalency analysis.[125] A "paradigm shift" had occurred.[126]

In addition to these cases, the REA methodology, similar to the HEA,[127] has been used in two cases in New Jersey: *New Jersey Department of Environmental Protection v. Essex Chemical Corp.*[128] and *New Jersey Department of Environmental Protection v. Union Carbide Corp.*[129] The state's experts in both of those cases employed a REA to estimate NRDs to groundwater, and while the state ultimately lost on the merits in those two cases, neither court rejected the methodology applied by the state's expert.[130] The *Essex* court denied the motion in limine that challenged the admissibility of the state's expert testimony, which used a REA.[131] The *Essex* court further noted its disagreement with various inputs used by the expert in the REA in that case, but the court correctly found that such issues were not relevant to reliability but to weight.[132] Similarly, in *Union Carbide*, the court found potential flaws in the state's expert's calculations that used a REA, but the court did not reject the use of REA as a methodology.[133] Although there can be vigorous disputes about the appropriate inputs in REA or HEA analysis, equivalency analysis itself is a generally accepted method of quantifying compensatory restoration damages.[134]

Equivalency analysis provides several benefits over traditional models. Equivalency analysis is more efficient because it "avoids the double conversion problem of first forcing an initial dollar-value determination of injuries and then later translating the costs recovered for these injuries into a concrete restoration plan."[135] Furthermore, the method produces restoration much faster than the valuation method allows. As Professor Tolan explains: "If forced to put a dollar figure on

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125. *See* 15 C.F.R. § 990.53(d) (2014); 43 C.F.R. § 11.83 (2013).

126. Zafonte & Hampton, *supra* note 19, at 135 (citing Flores & Thatcher, *supra* note 14, at 171).

127. *See id.* at 134.

128. No. MID-L-5685-07 (N.J. Super. Ct. Law Div. July 23, 2010) (citation omitted).

129. No. MID-L-5632-07 (N.J. Super. Ct. Law Div. Mar. 26, 2011).

130. *Essex*, No. MID-L-5685-07, slip op. at 12-15; *Union Carbide*, No. MID-L-5632-07, slip op. at 7-14.

131. No. MID-L-5685-07, slip op. at 12.

132. *See id.* at 12-15.

133. *Union Carbide*, No. MID-L-5632-07, slip op. at 9.

134. *See generally* W. Douglass Shaw & Marta Wlodarz, *Ecosystems, Ecological Restoration, and Economics: Does Habitat or Resource Equivalency Analysis Mean Other Economic Valuation Methods Are Not Needed?*, 42 AMBIO 628, 628–43 (2012).

135. Tolan, *supra* note 91, at 422 ("Therefore, there are two simplification gains-one in the substance of the calculation, and the second in the procedure to complete the actual restoration activity, because the assessment itself already selects the solution.").

the assessment, trustees will not monetize the costs until they have already defined all of the corrective actions. Therefore, planning is 'built-in' and all that remains is the execution of the restoration plan."[136] Perhaps most importantly, equivalency analysis is also much easier for the public to understand.[137]

IV. TRUSTEES' ROLE

Given the consensus in favor of restoration over damages, focus shifts to the trustees who are legislatively delegated broad discretion to assess injuries and determine appropriate restoration remedies.[138] OPA,[139] the National Marine Sanctuaries Act,[140] and CERCLA[141] all require the President and state governors to designate officials to serve as trustees for natural resources on behalf of the public.[142] Public trustees generally have scientific and practical expertise appropriate to execute their scientific and public policy mandate. The goal of trustees is to "make the environment and the public whole"[143] by determining and implementing an appropriate restoration plan.[144] Trustees assess injuries and recover damages to trust resources resulting from a discharge of oil, a release of hazardous substance, or physical damage. Assessments are generally done by the trustee on a site- and fact-specific basis.[145] These assessments are often costly, time-consuming, and complex.[146]

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136. *Id.*

137. *See, e.g.*, Robert Smith, *Pricing the Non-Human Cost of the BP Spill*, NPR (July 30, 2010, 4:00 AM), http://www.npr.org/templates/story/story.php?storyId=128865947 ("[Q.] So when I ask you how much is a pelican worth that died in the BP oil spill. . . [A.] My answer is, that is worth one pelican. . . . And the price for a turtle is a new turtle. A dolphin, a dolphin. There's no need to do the conversion into dollars."). The coverage of valuation methodology in the wake of the BP/DEEPWATER HORIZON disaster demonstrates the intuitive nature of equivalency analyses. *See, e.g.*, *id.* As to the difficulties in asking how to assign a market value to animals and other natural resources, one interviewee explained, "Best of all, . . . this technique skirts that awkward question." *Id.*

138. *E.g.*, OPA, 33 U.S.C. § 2706(c) (2012); N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 354 (N.J. Super. Ct. App. Div. 2007) (citing N.J. STAT. ANN. 58:10-23.11v; *In re* Kimber Petrol. Corp., 539 A.2d 1181, 1183-84 (N.J. 1988); E.I. du Pont de Nemours & Co. v. N.J. Dep't of Envtl. Prot. & Energy, 661 A.2d 1314, 1320 (N.J. Super. Ct. App. Div. 1995)).

139. 33 U.S.C. §§ 2701-2720.

140. 16 U.S.C. §§ 1431 to 1445c-1 (2012).

141. 42 U.S.C. §§ 9601-9675 (2012).

142. 16 U.S.C. § 1443(d); 33 U.S.C. 2706(b)(2); 42 U.S.C. § 9607(f)(1).

143. 15 C.F.R. § 990.53(a)(2) (2014).

144. *Id.* §§ 990.54-.56.

145. For instance, in the trial addressing the New Jersey trustee's efforts to restore the destroyed and damaged wetlands at the Bayway and Bayonne sites, testimony of both parties' witnesses was consistent that NRDAs are site-specific. Transcript of Trial, *supra* note 124, at 135 (testimony of Exxon Mobil's expert witness, Dr. Ginn, on cross-examination, confirming that injuries and damages at each site are unique, and, therefore, each site must be treated in a site-

The subject matter of NRDs is so technical and the analysis is so complex, however, that the public is often unaware of the challenges faced by trustees. In contrast, legislators and regulators generally understand the challenges of appropriately resolving NRD cases, and they have delegated those tasks to public trustees. Imagine an oil spill that damages marsh edge, an important developmental area for young fish. In certain circumstances, a number of appropriate restoration remedies may make sense. However, a number of scientific questions need to be addressed first. For example, how long will it take to create new marsh and how long will it be before that marsh is as productive as the prespill marsh? Ranges and estimates based on the best available evidence and professional judgment will have to be made to answer questions about timing and productivity. Given a lag time and an initially less productive replacement resource, in addition to restoring the marsh edge, does it makes sense to create artificial fish hatcheries to provide the public with more of some of the resources it lost sooner rather than later, even though the hatcheries may not address all of the service losses associated with the oiled habitat?

These questions do not have black-and-white answers and are not susceptible to resolution by a battle of expert witnesses in a courtroom. Rather, state and federal legislators delegated the decision-making responsibility in resolving these difficult science- and policy-laden questions to an appropriate entity with proper knowledge and experience.[147] Resolution of these and other assessment and restoration decisions requires well-informed judgment, familiarity with the relevant

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specific fashion); Transcript of Trial at 21, N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., Nos. UNN-L-3026-04, UNN-L-3026-04 (N.J. Super. Ct. Div. June 9, 2014) (testimony of Exxon Mobil's expert witness Dr. Desvousges on cross-examination, agreeing that site-specific data is important); Transcript of Trial at 37-38, *Exxon Mobil*, Nos. UNN-L-3026-04, UNN-L-3026-04 (Aug. 7, 2014) (direct examination testimony of the state witness, former New Jersey Department of Environmental Protection Commissioner Campbell, that policies relating to interpreting a statute "would be a very case-specific interpretation").

146. *See, e.g.*, Verdict and Settlement Summary, United States v. Cyprus Amax Minerals Co., No. 6:08-CV-01046, 2008 WL 2778780 (D. Kan. Mar. 31, 2008) (providing settlement figures for a settlement that resulted in assessment costs amounting to nearly half the $515,400 awarded in NRDs).

147. Trust responsibilities originated in the common law and public trust law, but have been expanded and provided with new tools by legislation. The trustee is a fiduciary who must protect natural resources, but is vested with a great deal of discretion in deciding how best to make the public whole in any given circumstance. Kanner, *supra* note 11; Allan Kanner & Tibor Nagy, *The Use of Contingent Fees in Natural Resource Damage and Other Parens Patraie Cases*, 19 BNA TOXICS L. REP. 745 (2004); Allan Kanner & Tibor Nagy, *Crocodile Tears: Polluters' Concerns About Contingency Fees in NRD Cases*, ABA ENVTL. LITIG. COMM. NEWSL., Fall/Winter 2004, at 8; WILLIAM H. RODGERS, HORNBOOK ON ENVIRONMENTAL LAW 176 (1977 & Supp. 1984).

ecosystems, and experience in resolving difficult science- and policy-laden issues. State and federal legislators have placed the responsibility of exercising judgment in NRD cases in trustees.[148]

The trustee is required to make difficult restoration choices based on the best available, albeit imperfect, data. Generally, the best available data includes the specific site and facts associated with it.[149] The trustee generally must assess the site's predischarge condition and history and the consequences of subsequent discharges.[150] The specific ecosystems at issue also must factor into a trustee's restoration plan, and close familiarity with the local conditions and features of ecosystems is essential.[151] Additionally, the challenges faced by trustees increase

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148. Kanner, *supra* note 11, at 58-59 (citing WILLIAM H. RODGERS, JR., HANDBOOK ON ENVIRONMENTAL LAW § 2.16 (1977)). Trust responsibilities originated in the common law and public trust law, but have been expanded and provided with new tools by legislation. The trustee is a fiduciary who must protect natural resources but is vested with a great deal of discretion in deciding how best to make the public whole in any given circumstance. *Id.* at 58-59, 76 (citing Ill. Cent. R.R. v. Illinois, 146 U.S. 387, 452-54 (1892); Seth Macinko, *Public or Private?: United States Commercial Fisheries Management and the Public Trust Doctrine, Reciprocal Challenges*, 33 NAT. RESOURCE J. 919, 951 (1993)); *see, e.g.*, Allan Kanner & Tibor Nagy, *The Use of Contingency Fees in Natural Resource Damage and Other Parens Patriae Cases*, 19 TOXICS L. REP. (BNA) 745, 746 (Aug. 12, 2004), http://ezproxy.law.tulane.edu:2076/txin/TXLNWB/split_display.adp?fedfid=8586620&vname=trlnotallissues&jd=txLR_19_7415&split=0 (subscription required) (citing CERCLA, 42 U.S.C. § 9607(f)(1); N.J. Remediation Indus. Network v. N.J. Dep't of Envtl. Prot., No. A-5472-97T3, 2003 WL 22053346 (N.J. Super. Ct. App. Div. Apr. 17, 2000)); Allan Kanner & Tibor Nagy, *Crocodile Tears: Polluters' Concerns About Contingency Fees in NRD Cases*, ENVTL. LITIG. COMM. NEWSLETTER, Aug. 12, 2004, at 8 [hereinafter Kanner & Nagy, *Crocodile Tears*]).

149. Ad-Hoc Indus. Natural Res. Mgmt. Grp., *Natural Resource Damage Assessment and Restoration: Key Principles and General Standards Guiding Practice in the United States*, NRDAR PRAC. EXCHANGE 2 (Dec. 2012), http://www.nrdarpracticeexchange.com/documents/Guiding%20Principles%20for%20Natural%20Resource%20Damage%20Assessment%20and%20Restoration%20%28December%202012%29.pdf.

150. *E.g.*, 15 C.F.R. § 990.51 (2014).

151. NRDs affect a multitude of resources in an ecosystem. For example, damage to intertidal salt marsh in the Hudson-Raritan Estuary is significant given the undisputed importance of these resources. *See, e.g.*, Transcript of Trial at 134-35, *Exxon Mobil*, Nos. UNN-L-3026-04, UNN-L-3026-04 (Mar. 10, 2014) (direct testimony of the state's witness, Dr. Lipton, describing how the interconnectivity of the habitats in the Hudson-Raritan Estuary is crucial to the overall ecological value of the habitats). Dr. Lipton explained:

> [W]hen completing the primary restoration at the Bayway site, you would create another one of these pockets of habitat. . . . And the more of these pockets that are present, the better for the overall function of this environment and you have greater connectivity between these pockets. By connectivity I mean birds can go from area to area. They can do stopovers. There's different opportunities for small fish to go in and hide in the grass, or to spawn. . . . And even though they're surrounded by industrial areas, they remain valuable ecologically and, in some ways, may be even greater value to both preserve and create pockets of functional habitat. And this would be, you know, the primary restoration of these habitat areas would be part of that kind of contribution to overall ecological value.

dramatically as the size and complexity of a restoration site scale up—say, when the site is virtually the entire Gulf of Mexico, as with the ongoing BP/DEEPWATER HORIZON NRD proceedings. The trustee must then balance the scientific uncertainty in assessing hazardous material discharges and predicting their long-term implications (and thus appropriately compensating the public) with the need to move with reasonable dispatch to restore damaged and destroyed resources.[152] Generally, trustees are trusted to understand what it takes to make the public whole in a given fact-specific situation and ecosystem, and accordingly, they enjoy significant deference.[153]

Nevertheless, the contours of public trustees' duties and the scope of their discretion will come to the fore when a trustee's actions are questioned. This may occur in several situations. For example, in the course of NRD litigation, a responsible party may challenge a trustee's NRD analysis or selection and development of a restoration plan,[154] or, in

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Id. More than eighteen million people are within the drainage area of the Hudson-Raritan Estuary, each gaining innumerable benefits from these resources. *See Hudson-Raritan Estuary Comprehensive Restoration Plan, Draft*, *supra* note 1, at 9 (citation omitted). Wetland habitats in this area provide recreational use to millions of neighboring residents, improve water quality, provide flood protection, serve as a home for important species for the commercial fishing industry, and provide habitats for numerous species. Transcript of Trial at 18-21, 23-24, *Exxon Mobil*, Nos. UNN-L-3026-04, UNN-L-3026-04 (Apr. 29, 2014) (direct testimony of the state's witness, John Sacco); Transcript of Trial at 115, *Exxon Mobil*, Nos. UNN-L-3026-04, UNN-L-3026-04 (July 10, 2014) (testimony of Exxon Mobil's expert witness, Dr. Ginn, on cross-examination); Transcript of Trial at 40-41, *Exxon Mobil*, Nos. UNN-L-3026-04, UNN-L-3026-04 (Aug. 4, 2014) (direct testimony of Exxon Mobil's expert witness, Dr. John H. Rodgers, Jr.).

152. *E.g.*, 15 C.F.R. §§ 990.26-.27, 990.40-.66.

153. *E.g.*, *id.* See *supra* notes 148-150 and *infra* notes 178-186 and accompanying text for a more in-depth discussion of the deference given to trustees' determinations. In an effort to resist the notion of deference to trustee determinations, some responsible parties and commentators attempt to impugn the integrity of the NRD process. For example, trustees are sometimes criticized (unsuccessfully) when they try to apply standard oversight and maintenance charges to a proposed restoration project or arrange for representation by outside counsel in the event of litigation. *See* Kanner & Nagy, *Crocodile Tears*, *supra* note 148, at 8. Contrary to these alarmist assertions, trustees do not tend to harbor secondary agendas that might interfere with their mission of making the public whole. Deducting maintenance expenses is standard trustee practice, subject to the limits imposed by the trustee's fiduciary duties. *See, e.g.*, RESTATEMENT (THIRD) OF TRUSTS § 88 & cmt. b (2007) ("A trustee can properly incur and pay expenses that are reasonable in amount and appropriate to the purposes and circumstances of the trust and to the experience, skills, responsibilities, and other circumstances of the trustee. . . . A trustee is not limited to incurring expenses that are 'necessary' or essential, but may incur expenses that, in the exercise of fiduciary judgment (see § 87), are reasonable and appropriate in carrying out the purposes of the trust, serving the interests of the beneficiaries, and generally performing the functions and responsibilities of the trusteeship."). This is in contrast to self-dealing or other conflicts of interest, which would violate the trustee's fiduciary duties. *Id.* § 78(1)-(2).

154. *E.g.*, Pre-Trial Memorandum Pursuant to N.J.Ct. R. 4:25-3 of Defendant Exxon Mobil Corporation at 16-18, N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., No. UNN-L-3026-04 (N.J. Super. Ct. Law Div. filed Nov. 12, 2013).

other cases, members of the public may challenge a trustee's action or inaction as insufficiently protective of the environment.[155] Two paramount questions arise with respect to public trustees' guardianship of the public trust: what principles must guide public trustees in their mission to protect and restore the natural resources they are tasked with protecting, and what determinations are delegated to the trustees' expert discretion?

The answer to the first question may be found in the basic principles of trust law, as adapted to the natural resource and public trust context. As this Article explained at the outset, the public trust doctrine has long required that the public trustees hold and protect natural resources for future generations.[156] All of the necessary elements of a common law trust are present in the public trust context: a trustee, a beneficiary (the public and future generations[157]), and a trust corpus or *res* (the natural resources, such as plant life, wildlife, and habitats).[158] The usual set of trust principles guide public trustees' conservation duties.[159]

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155. *See, e.g.*, Nat'l Audubon Soc'y v. Superior Court of Alpine Cnty., 658 P.2d 709, 712 (Cal. 1983) (en banc), *cert. denied*, 464 U.S. 977 (1986) (permitting members of the public to challenge the City of Los Angeles' Department of Water and Power's grant of water diversion permits affecting Mono Lake in derogation of the agency's public trust obligations); Kelly v. 1250 Oceanside Partners, 140 P.3d 985, 1011 (Haw. 2006) ("'[T]he state may compromise public rights in the resource *pursuant only to a decision made with a level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state.*'" (quoting *In re* Water Use Permit Applications, 9 P.3d 409, 455 (Haw. 2000) (emphasis added))).

156. *See, e.g.*, Kanner, *supra* note 11, at 77-78 (quoting Deborah G. Musiker, *The Public Trust and Parens Patriae Doctrines: Protecting Wildlife in Uncertain Political Times*, 16 PUB. LAND L. REV. 87, 96 (1995)); *see also* Geer v. Connecticut, 161 U.S. 519, 529 (1896) ("[T]he power or control lodged in the State, resulting from this common ownership, is to be exercised, like all other powers of government, as a trust for the benefit of the people [and] the ownership is that of the people in their united sovereignty." (citing Martin v. Waddell, 41 U.S. 367, 411 (1842))); Ill. Cent. R.R. v. Illinois, 146 U.S. 387, 452-55 (1892) ("[T]he decisions are numerous which declare that such property is held by the State, by virtue of its sovereignty, in trust for the public. The ownership of the navigable waters of the harbor and of the lands under them is a subject of public concern to the whole people of the State.")).

157. *See* Ariz. Ctr. for Law in the Pub. Interest v. Hassell, 837 P.2d 158, 169 (Ariz. Ct. App. 1991) ("The beneficiaries of the public trust are not just present generations but those to come. The check and balance of judicial review provides a level of protection against improvident dissipation of an irreplaceable res.").

158. *See id.*; Mary Christina Wood, *Advancing the Sovereign Trust of Government to Safeguard the Environment for Present and Future Generations (Part I): Ecological Realism and the Need for a Paradigm Shift*, 39 ENVTL. L. 43, 78 (2009) ("The natural resources subject to the public trust doctrine make up the 'res' of the people's trust. These are the quantifiable assets in which the citizens hold a property interest, as carried out in trust form through their government officials for the benefit of present and future citizen beneficiaries." (citing Mary Christina Wood, *Atmospheric Trust Litigation*, *in* ADJUDICATING CLIMATE CHANGE: STATE, NATIONAL, AND INTERNATIONAL APPROACHES 99, 99-105 (William C.G. Burns & Hari M. Osofsky eds., 2011))).

159. *See, e.g.*, Kanner, *supra* note 11, at 76 (citing Slocum v. Borough of Belmar, 569 A.2d 312, 317 (N.J. Super. Ct. Law Div. 1989)); Mary Christina Wood, *Advancing the Sovereign Trust*

Public trustees, like trustees in other areas of law, have a core set of fiduciary duties they must fulfill.[160] Public trustees must preserve and maintain trust assets (the natural resources in their care) for the use of the trust's beneficiaries (the public and future generations).[161] Public trustees must use sound judgment in ensuring that trust assets are preserved and productive,[162] and must act in the best interest of the beneficiaries and serve the essential purpose of the trust.[163] Similarly, public trustees must

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of Government To Safeguard the Environment for Present and Future Generations (Part II): Instilling a Fiduciary Obligation in Governance, 39 ENVTL. L. 91, 93 (2009) [hereinafter Wood, *Fiduciary Obligation*]; Mary Christina Wood, Essay, *Nature's Trust: Reclaiming an Environmental Discourse*, 25 VA. ENVTL. L.J. 243, 262-63 (2007); Kevin R. Murray et al., *Natural Resource Damage Trustees: Whose Side Are They Really on?*, 5 ENVTL. LAW. 407, 422-23 & n.70 (1999) ("'The states and the Federal Governments [sic] are trustees for the people, and . . . their trust corpus includes this nation's glorious natural resources. We, as trustees, have an obligation to protect these often irreplaceable resources from harm, and those that harm them have the obligation to restore them for all the people.'" (alteration in original) (quoting *Superfund Reform and Reauthorization: Hearing on S. 8 Before the S. Comm. on Env't & Pub. Works*, 105th Cong. 119 (1998) (alteration in original) (statement of Gordon J. Johnson, Assistant Att'y Gen. of New York State))); *cf., e.g.*, United States v. Mitchell, 463 U.S. 206, 225 (1983) ("[A] fiduciary relationship necessarily arises when the Government assumes such elaborate control over forests and property belonging to Indians. All of the necessary elements of a common-law trust are present: a trustee (the United States), a beneficiary (the Indian allottees), and a trust corpus (Indian timber, lands, and funds)." (citing RESTATEMENT (SECOND) OF THE LAW OF TRUSTS § 2 cmt. h (1959))).

160. *See, e.g.*, N.J. Dep't of Envtl. Prot. v. Jersey Cent. Power & Light Co., 336 A.2d 750, 759 (N.J. Super. Ct. App. Div. 1975) ("'The State has not only the right but also the affirmative fiduciary obligation to ensure that the rights of the public to a viable marine environment are protected, and to seek compensation for any diminution in that trust corpus.'" (quoting N.J. Dep't of Envtl. Prot. v. Jersey Cent. Power & Light Co., 308 A.2d 671, 674 (N.J. Super. Ct. Law Div. 1973), *aff'd*, 336 P.2d 750 (N.J. Super. Ct. App. Div. 1975), *rev'd*, 351 A.2d 337 (N.J. 1976))); Kanner, *supra* note 11, at 75 (citing *Jersey Cent. Power & Light Co.*, 308 A.2d at 674); Wood, *Fiduciary Obligation*, *supra* note 159, at 94.

161. *See, e.g.*, United States v. White Mountain Apache Tribe, 537 U.S. 465, 475 (2003) ("[A]n obligation to preserve the property improvements was incumbent on the United States as trustee. This is so because elementary trust law, after all, confirms the commonsense assumption that a fiduciary actually administering trust property may not allow it to fall into ruin on his watch[, and 'o]ne of the fundamental common-law duties of a trustee is to preserve and maintain trust assets.'" (quoting Cent. States, Se. & Sw. Areas Pension Fund v. Cent. Transp., Inc., 472 U.S. 559, 572 (1985))); Wood, *Fiduciary Obligation*, *supra* note 159, at 94-97.

162. *See* RESTATEMENT (SECOND) OF TRUSTS § 176 (1959) ("The trustee is under a duty to the beneficiary to use reasonable care and skill to preserve the trust property."); RESTATEMENT (THIRD) OF TRUSTS § 90 (2007) (prudent investor rule).

163. *See, e.g.*, Wood, *supra* note 158, at 79 (discussing the notion of a public trust's "essential trust purpose"). Relatedly, public trustees, like other trustees, must not engage in self-dealing to the detriment of the trust assets or the beneficiaries. *See, e.g.*, RESTATEMENT (THIRD) OF TRUSTS § 78(2) ("Except in discrete circumstances, the trustee is strictly prohibited from engaging in transactions that involve self-dealing or that otherwise involve or create a conflict between the trustee's fiduciary duties and personal interests."); *cf.* Murray et al., *supra* note 159, at 422-23; Raleigh Ave. Beach Ass'n v. Atlantis Beach Club, Inc., 851 A.2d 19, 33 (N.J. Super. Ct. App. Div. 2004) ("The notion that lands are to be held in public trust, protected and regulated for

make their best efforts to require that polluters, rather than taxpayers (as the beneficiaries of the trust), bear the burden of restoring natural resources when they are damaged.[164]

Trust law also sheds light on the degree to which public trustees have discretion to carry out their duties. In the ordinary trust context, "[a] trustee generally has discretion (i.e., is to use fiduciary judgment) with respect to the exercise of the powers of the trusteeship. That is, a power is discretionary except to the extent its exercise is directed by the terms of the trust or compelled by the trustee's fiduciary duties."[165] The same is true of public trustees, who have considerable discretion to decide how best to conserve and restore the natural resources in their care, so long as their decisions are informed by their fiduciary duties.[166] Trustees lack discretion to violate their fiduciary duties—for example, by improvidently alienating natural resource assets to private parties or corporations—and courts will not hesitate to invalidate their actions based on the requirements of the public trust doctrine.[167]

Within the bounds of the public trust doctrine, public trustees may develop certain discretionary norms or practices that serve their fiduciary duties of conservation and care. As this Article has detailed, one manifestation of this broad discretion is seen in trustees' preference for restoration[168] and trustees' use of equivalency methodologies (HEA and

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the common use and benefit, is incompatible with the concept of profit."), *aff'd*, 879 A.2d 112 (N.J. 2005).

164. *See, e.g.*, RESTATEMENT (THIRD) OF TRUSTS § 78(1) ("[A] trustee has a duty to administer the trust solely in the interest of the beneficiaries . . . ."); *see also supra* note 63 and accompanying text.

165. RESTATEMENT (THIRD) OF TRUSTS § 87 cmt. a.

166. *See, e.g.*, Kelly v. 1250 Oceanside Partners, 140 P.3d 985, 1011 (Haw. 2006) (quoting Ariz. Ctr. for Law in the Pub. Interest v. Hassel, 837 P.2d 158, 168-69 (Ariz. Ct. App. 1991)) (explaining that while public trustees have considerable discretion to administer the natural resources in the public trust, that discretion is not "absolute" but is cabined by the trustee's legal duties).

167. *See, e.g.*, Ill. Cent. R.R. v. Illinois, 146 U.S. 387, 453 (1892) ("The State can no more abdicate its trust over property in which the whole people are interested, like navigable waters and soils under them, . . . than it can abdicate its police powers in the administration of government and the preservation of the peace."); *Hassell*, 837 P.2d at 169 (collecting authorities holding that "[t]he check and balance of judicial review provides a level of protection against improvident dissipation of an irreplaceable res"); Kootenai Envtl. Alliance, Inc. v. Panhandle Yacht Club, Inc., 671 P.2d 1085, 1092 (Idaho 1983) ("Final determination whether the alienation or impairment of a public trust resource violates the public trust doctrine will be made by the judiciary."); Opinion of the Justices, 437 A.2d 597, 607 (Me. 1981) ("In view of the common law principle that the intertidal and submerged lands are impressed with a public trust, a principle that reflects the unique public value of those lands, we believe that any legislation giving up any such public rights must satisfy a particularly demanding standard of reasonableness.").

168. *See, e.g.*, Tolan, *supra* note 91, at 449 (quoting *Natural Resource Damage Assessment and Restoration Federal Advisory Committee Final Report*, NRDAR PRAC. EXCHANGE 7 (May 1,

REA).[169] Another example is the necessity of deferring to trustees' determinations even when the best available evidence is imperfect as to the precise magnitude of injury at a polluted site and as to the condition of the resource immediately prior to the discharge.[170]

Yet another example is trustees' tendency to handle each NRD case on a site-specific basis (i.e., given all of the facts and circumstances of the unique ecosystem, the volume and type of pollution, and any other relevant considerations), where doing so would be reasonable and practicable.[171] For instance, with respect to the restoration projects at the Bayonne and Bayway sites in the broader Hudson-Raritan Estuary, the New Jersey NRD trustee had to consider how best to restore the former

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2007), http://www.nrdarpracticeexchange.com/documents/Final%20FACA%20Report%20May%202007.pdf. Indeed, in *Ohio v. United States Department of the Interior*, the court invalidated trustee NRD regulations that allowed a responsible party to ignore restoration by paying a less costly damage award. 880 F.2d 432, 438, 459 (D.C. Cir.), *reh'g denied*, 897 F.2d 1151 (D.C. Cir. 1989)); *see supra* Part III.

169. *See supra* Part III.

170. *See* Katharine K. Baker, *Consorting with Forests: Rethinking Our Relationship to Natural Resources and How We Should Value Their Loss*, 22 ECOLOGY L.Q. 677, 710 & n.169 (1995). Baker made the following argument:

> Ultimately, the distinction between restoration and re-creation is a subjective determination, but it is not an unprincipled or arbitrary distinction, and it is a determination properly placed within the scope of administrative expertise. . . . As a nonscientist, I can think of several suggestions. For instance, if more than a certain number of resources were significantly damaged, ecosystem loss could be assumed. . . . Additionally, ecosystemic damage could be assumed if, even with restoration efforts, baseline conditions could not be restored for at least [ten] years. Ten years of disruption may effectively prevent experts from determining what restoration would be, because after a sufficient lapse of time those experts would have no way of knowing what the ecosystem would have looked like 'but for' the release of the hazardous substance or the oil spill.

Id. (citing EDWARD O. WILSON, THE DIVERSITY OF LIFE 181 (1992)).

171. An example of a case in which site-specific treatment might not be practical would include small-scale cases of pollution, which, because their modest potential payout would not justify the expense of a full NRDA, would be better handled pursuant to a predetermined penalty formula. For example, trustees may reasonably use a formula for small groundwater cases and minor fish-kill cases or a price-per-gallon formula for relatively small pollutant discharges in large or heavily trafficked waterways. *See, e.g.*, Office of Natural Res. Restoration, N.J. Dep't of Envtl. Prot., *Sample Ground Water Injury Calculation*, ST. NEW JERSEY, http://www.nj.gov/dep/nrr/nri/gw_injury_calc_200305.pdf. As a practical matter, trustees have limited resources. Many small cases, and even large cases, are difficult to prosecute or must be settled because of the costs and time needed for NRDA. But this is still the exception, in part, because the resulting payment would often undercompensate the public. These cases often are either not brought or compromised at relatively low levels of restoration, unless the state, through the trustee, has put a premium on such resources. Conversely, trustees may very well determine that a fixed formula used for small-scale discharges would be inappropriate and impractical in sites involving extreme levels of contaminants or long-term, historic discharges due to the complexity and magnitude of the damage. Developing such a rule would be akin to the exercise of prosecutorial discretion in criminal matters of varying degrees of severity and complexity.

and degraded wetlands while taking into account the fact that there remained industrial operations in the areas including an active refinery at the Bayway site.[172] Similarly, trustees may exercise their discretion to develop restoration plans with a preference for replenishing and conserving certain types of resources over others if doing so would serve the goal of the public trust. In New Jersey, a trustee may have a strong preference for restoring salt marshes above other types of habitat because salt marshes are by far the most productive and valuable resource in the region.[173] A trustee in Montana, seeking to remedy the consequences of poor mining practices on the environment, may develop a restoration plan with a preference for trout stream restoration, perhaps cognizant of certain trout species' endangered status and of the increased demand given the popularity of trout fishing and the importance of ecotourism in the region.[174] Even if such restoration plans privilege certain natural resources over other potential resources in the area, both would likely be reasonable choices for the trustees to make in the exercise of their discretion.[175]

In sum, when public trustees exercise discretion in carrying out their duties, their determinations are entitled to a great deal of deference,

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172. *See* N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., No. A-0316-09T2, slip op. at 4-5 (N.J. Super. Ct. Law Div. May 31, 2011) (citation omitted).

173. *See supra* note 145 and accompanying text (describing the paramount importance of salt marshes in the Hudson-Raritan Estuary).

174. *See generally Blackfoot River Watershed: The Blackfoot Challenge*, U.S. FISH & WILDLIFE SERV. MTN. PRAIRIE REGION, http://www.fws.gov/mountain-prairie/pfw/montana/mt6.htm (last visited Feb. 24, 2015). Similar discretionary NRD decisions are being made with respect to trout at Coeur d'Alene in the Mountain West, *see* Coeur D'Alene Basin Trustees, *Coeur D'Alene Basin Natural Resource Damage Assessment and Restoration Accomplishments: Restoration Activities 2007-2008*, U.S. FISH & WILDLIFE SERV. MTN. PAC. REGION 4 (Oct. 2009), http://www.fws.gov/pacific/ecoservices/envicon/nrda/pdf/CDAnrdaReport111009.pdf, and salmon in the Pacific Northwest, *see* Portland Harbor Natural Res. Trust Council, *Habitat Restoration Underway in Portland Harbor*, PORTLAND HARBOR COMMUNITY ADVISORY GROUP 4 (Aug. 26, 2014), http://portlandharborcag.info/sites/default/files/PHNRTC%20Alder%20Creek%20Press%20Packet%208.11.14.pdf.

175. There may be valid grounds for faulting a trustee for manifestly unreasonable restoration plans if, for example, a trustee were to propose to construct an oyster bed in a river with insufficient salinity to support oyster life or in a waterway frequently used by the United States Army Corps of Engineers for dredging. In such cases, it is conceivable that the trustee's action would run afoul of its fiduciary obligations, e.g., to preserve trust property. *See* RESTATEMENT (THIRD) OF TRUSTS § 90 (2007) (detailing trustees' duties). By contrast, while responsible parties may object to the cost of a particular project, any such objection would lack merit. Public trustees are guided by the principle that the polluters pay. *See supra* note 63 and accompanying text. They must exercise their discretion in a way that they believe will best serve the purpose of restoration and conservation of natural resources—not simply to select the least-cost alternative. *See supra* notes 69-88 and accompanying text.

absent manifest abuse or procedural improprieties.[176] The reason for deferring to public trustees' determinations in NRD and restoration matters is twofold. First, public trustees are appointed by the state, federal, and tribal governments and are selected for their expertise in the restoration and preservation of local natural resources. The various governing NRDs delegate certain discretion to public trustees to assess damages and formulate remedial and restoration plans.[177] Public trustees are, after all, on-the-ground decision-makers and experts in their field, often with advanced degrees in the natural sciences as well as extensive training as public servants—all factors that traditionally weigh in favor of leaving discretionary actions undisturbed (barring some egregious misstep or abuse of power).[178]

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176. *See, e.g.*, RESTATEMENT (SECOND) OF TRUSTS § 187 (1959) ("Where discretion is conferred upon the trustee with respect to the exercise of a power, its exercise is not subject to control by the court, except to prevent an abuse by the trustee of his discretion."); RESTATEMENT (THIRD) OF TRUSTS § 87 ("When a trustee has discretion with respect to the exercise of a power, its exercise is subject to supervision by a court only to prevent abuse of discretion."). While this Article does not necessarily advocate for an abuse of discretion standard per se, it remains that trustees' reasoned judgment is entitled to broad deference under principles similar to, for instance, those that apply in a chancery court's review of a trustee's selection of trust holdings, such as the diversity of stocks and bonds. The particular makeup of the holdings will receive deference unless it is manifestly contrary to the trustee's duties or the terms and purpose of the trust. 3 CHARLES H. KOCH, ADMINISTRATIVE LAW AND PRACTICE § 9:14 (3d ed. 2010).

177. *See supra* note 148 and accompanying text; *see also* sources cited and discussion *supra* note 20.

178. One familiar example is the broad scope of deference afforded administrative agencies when they act within the scope of their expertise. *See, e.g.*, KOCH, *supra* note 176, § 9:14 ("Where an agency has made a determination within its area of technical or specialized expertise, courts give added deference to such decisions." (citing Cellwave Tel. Servs. L.P. v. FCC, 30 F.3d 1533, 1537 (D.C. Cir. 1994); Rocky Mountain Helicopters, Inc. v. FAA, 971 F.2d 544, 547 (10th Cir. 1992))); *see also id.* § 9:17 ("[A]n administrative decision is an 'institutional decision' and must be understood as the product of a decisionmaking community. Within this community are different personalities, agendas, value systems, types of expertise and experience, etc. This communal decisionmaking is usually present, often by design. Judicial review must be restrained because it tends to be myopic and hence creates a real danger of robbing the decision of its richness and sophistication." (footnotes omitted)). Similar principles hold in the fields of trust law, *see supra* note 176 and accompanying text, and to some extent in the medical field, *see, e.g.*, Philip L. Merkel, *Physicians Policing Physicians: The Development of Medical Staff Peer Review Law at California Hospitals*, 38 U.S.F. L. REV. 301, 307 (2004) ("[J]udges and legislators have been reluctant to second-guess the judgment of medical professionals on substantive medical issues, so the law accords great deference to the judgment of health care professionals in matters involving medical expertise."); United States v. Ecker, 543 F.2d 178, 182 (D.C. Cir. 1976) ("When a district court is asked to review the medical judgment of a hospital staff on a question of internal administration[,] its function does 'resemble[] ours when we review agency action,' and in deference to medical expertise[,] the hospital should be allowed to operate 'within a broad range of discretion.'" (quoting Tribby v. Cameron, 379 F.2d 104, 105 (D.C. Cir. 1967))); Unterthiner v. Desert Hosp. Dist. of Palm Springs, 656 P.2d 554, 563 (Cal. 1983) (en banc) (citing Franz v. Bd. of Med. Quality Assurance, 642 P.2d 792, 799 (Cal. 1982) (en banc); Bixby v. Pierno, 481 P.2d 242, 252 (Cal. 1971) (en banc)).

Deference to institutional expertise is not surprising. By way of analogy, the Clean Air Act (CAA) Amendments of 1990 directed the United States Environmental Protection Agency Administrator to "conduct a comprehensive analysis of the impact of this Chapter on the public health, economy, and environment of the United States" and further required her to consider the effects on "employment, productivity, cost of living, economic growth, and the overall economy of the United States."[179] Such a task lies far beyond the boundaries of the judicial process. As the Supreme Court recognized, "judges lack the scientific, economic, and technological resources" to deal with "issues of this order."[180] In that case, *American Electric Power, Inc. v. Connecticut*, the Court concluded that "expert agencies," rather than individual members of the judiciary, are the entities equipped with the resources and tools needed to accomplish the CAA's regulatory goals:

> It is altogether fitting that Congress designated an expert agency, here, EPA, as best suited to serve as primary regulator . . . . The expert agency is surely better equipped to do the job than individual district judges issuing ad hoc, case-by-case injunctions. Federal judges lack the scientific, economic, and technological resources an agency can utilize in coping with issues of this order.[181]

Since "judges are confined by a record comprising the evidence the parties present,"[182] they cannot broadly assess the impact of their rulings on the overall environment, much less consider the full extent of policy impact their decisions may have on complex issues of investment, employment, and other concerns entrusted to regulatory authorities.[183] For those reasons, the law sensibly entrusts those responsibilities to the state trustees.[184]

Second, it is inherent in the task of NRDA and restoration that public trustees have considerable discretion in assessing NRDs and developing and implementing the restoration plans they deem to be appropriate. Injury assessment and restoration determinations can rarely be computed with mathematical precision.[185] The nature of the subject

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179. 42 U.S.C. § 7612(a), (c) (2012).

180. Am. Elec. Power, Inc. v. Connecticut, 131 S. Ct. 2527, 2539-40 (2011).

181. *Id.* at 2539-40.

182. *Id.* at 2540.

183. *Id.* at 2538-39 (stating that CAA processes provide "informed assessment of competing interests," including "energy needs and the possibility of economic disruption").

184. *See also* North Carolina v. Tenn. Valley Auth., 615 F.3d 291, 305 (4th Cir. 2010) ("[W]e doubt seriously that Congress thought that a judge holding a twelve-day bench trial could evaluate more than a mere fraction of the information that regulatory bodies can consider.").

185. *See* Unsworth & Bishop, *supra* note 56, at 36 (citing Cross, *supra* note 50, at 297).

matter rarely can be reduced to a single number or single restoration remedy or strategy.[186] Each natural resource damages case is as unique as the ecosystem damaged and in need of restoration, with its own complex history and delicate challenges.[187] For those reasons, natural resource restoration has been likened to the art of restoring paintings.[188] Another apt analogy is to the medical field, where a physician's formulation of a plan of care for a patient "is not just a science, but an art."[189] The task of natural resource restoration, too, is part art, part science. A "one size fits all" approach to restoration planning simply does not make sense.

In sum, trustees have broad discretion to achieve public trust goals. They have the prerogative to exercise their expert discretion when resolving how to most efficiently, effectively, and fairly restore destroyed or degraded fish, wildlife, habitat, and public lands to their prepollution condition (or, as the case may be, to what the trustee determines is a reasonably equivalent condition).[190] Within reasonable scientific and legal parameters, public trustees' duties are inherently discretionary so long as they serve the goal of conserving and restoring the resources held in public trust.[191]

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186. *Id.* (citing Cross, *supra* note 50, at 297).

187. *See supra* note 145 and accompanying text.

188. *See* Baker, *supra* note 170, at 709-11 (citing Alastair S. Gunn, *The Restoration of Species and Natural Environments*, 13 ENVTL. ETHICS 291, 293 (1991)).

189. Barbara L. Atwell, *Mainstreaming Complementary and Alternative Medicine in the Face of Uncertainty*, 72 UMKC L. REV. 593, 604 (2004) ("[M]edicine is not just a science, but an art. To try to impose a 'one size fits all' generalized standard undermines the importance of clinical evaluation. Doctors' intuition . . . play[s] a critical role in providing care." (citing Sara Rosenbaum et al., *Who Should Determine When Healthcare Is Medically Necessary?*, 340 NEW ENGL. J. MED. 229, 231 (1999); Kevin Patterson, *What Doctors Don't Know (Almost Everything)*, N.Y. TIMES, May 5, 2002, at 74))); *see also* Mark A. Hall, *Institutional Control of Physician Behavior: Legal Barriers to Health Care Cost Containment*, 137 U. PA. L. REV. 431, 475-76 (1988) ("Most medical practice does not lend itself to lock-step directives from either lay or professional sources because of the intensely judgmental, individualistic, uncertain, and humane nature of health care. . . . 'One cannot practice good medicine by committee or cookbook or computer. A person or group reviewing summaries of information cannot possibly appreciate all the clinical factors that make each situation different—and it is these judgments that make medicine such a complex, demanding profession.'" (quoting E. Haavi Morreim, *The MD and the DRG*, 15 HASTINGS CENTER REP. 30, 34 (June 1985))).

190. *See, e.g.*, N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 349, 357-59 (N.J. Super. Ct. App. Div. 2007) (discussing N.J. STAT ANN. §§ 58:10-23.11f.a(2)(b), 58:10-23.11g.c; *Policy Directive 2003-07*, *supra* note 114).

191. Trustees may also have other duties, such as duties imposed by state or local law, as the case may be. *See, e.g.*, Kelly v. 1250 Oceanside Partners, 140 P.3d 985, 1011 (Haw. 2006) (detailing state laws, regulations, and constitutional provisions to which that the Hawaii State Department of Health must adhere pursuant to its public trust duties); Ariz. Ctr. for Law in the Pub. Interest v. Hassell, 837 P.2d 158, 169 (Ariz. Ct. App. 1991) (discussing the Arizona Constitution and other sources of law comprising Arizona's unique *Framework for Public Trust*

Many responsible parties recognize the legitimacy of the broad discretion afforded NRD trustees and, accordingly, are often perfectly willing to resolve their NRD liability by means of cooperative assessments.[192] In effect, by giving trustees the final say, legislators encourage cooperation, though cooperation takes many forms from complete cooperation to more limited joint information-gathering and sharing.[193] Undoubtedly, cooperation serves the purpose of expeditiously restoring the public's natural resources after a contamination event.

Some responsible parties, however, avoid such cooperative efforts and instead force trustees to litigate their NRD cases, which can carry on for years. In selecting this strategy, responsible parties take the position that trustees should not be permitted to rely on their judgment in the face of difficult, complex, or incomplete facts that are often present in NRD cases.[194] Instead, they contend that trustees must "prove or not prove" each choice they make to a rigorous scientific standard.[195] In essence, polluters urge courts to import *Daubert*-type principles, which require that an expert's scientific testimony be based on scientifically valid reasoning or methodology (i.e., not junk science).[196] The *Daubert* standard is intended to guide the court in its gatekeeping function by setting forth standards for the admissibility of expert testimony; it is not intended to elevate in any way the standard of proof a plaintiff must satisfy for recovery.

Review). The minutiae of such state- and statute-specific obligations are beyond the scope of this Article.

192. Kenneth O. Corley & Ann Al-Bahish, *Understanding Natural Resource Damages*, 59 ROCKY MTN. MIN. L. INST. 2-1, § 2.05 (2013).

193. *See* Dale C. Young & Ass'n of State & Territorial Solid Waste Mgmt. Officials, Natural Res. Damages, *Natural Resource Damages: Perspectives on Cooperative Assessments and Restoration of Natural Resources*, NAT'L ENVTL. ENFORCEMENT J., Apr. 2000, at 3, 8-10. Since the BP/DEEPWATER HORIZON oil spill, for example, trustees and BP have been jointly gathering some data while also gathering data on their own. *Gulf Science Data*, BP, http://gulfsciencedata.bp.com/go/doc/6145/1942258 (last visited Jan. 17, 2015). With respect to the jointly gathered data, the state and federal trustees are reserving their rights to draw their own inferences from the data. *See id.*

194. *E.g.*, Pre-Trial Memorandum Pursuant to N.J.Ct. R. 4:25-3 of Defendant Exxon Mobil Corporation, *supra* note 154, at 6-24.

195. *See, e.g.*, *id.* at 1. A responsible party may urge the court to interpose a burden of proof more akin to that applicable in criminal, rather than civil, cases, demanding near evidentiary perfection. For example, a polluter may protest that the trustee must furnish certain specific documentary evidence, such as exact dates of each discharge, exact volumes of each discharge, specific identification of the source of each discharge, the precise condition of the resources and ecosystems immediately prior to each discharge, or documentation specifically relating each discharge to a specific injury. *See, e.g.*, *id.* at 16. But that level of specificity is not available, obtainable, or practicable in most NRD cases.

196. Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 592-93 (1993).

For the reasons already set forth in this Article, this argument misapprehends the nature of resource restoration, which is both an art and a complex, site-specific science, and fails to give due consideration to the discretion vested in trustees by controlling environmental statutes; basic, longstanding trust principles; and the public trust doctrine. It bears mention, however, because polluters' arguments in this respect may very well have a chilling effect in some cases, at times persuading trustees to reduce or drop claims based on courts' fears of ruling afoul of *Daubert*.

However, fear of *Daubert* makes little sense. Legislators have gone to great pains to streamline proof for the trustee. The provision of strict, joint and several liability in environmental pollution laws is meant to remove impediments to recovery by trustees on behalf of the public.[197] When properly managed, these features should relegate contribution issues to a subsequent proceeding.[198] The use of a "nexus" test instead of a more difficult causation requirement also simplifies trustees' NRD burdens of proof.[199] Polluters' *Daubert*-type arguments would contravene these legislative goals by interposing a nearly impossible standard of proof, i.e., scientific certainty, merely because NRD cases entail

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197. For example, OPA makes responsible parties jointly and severally liable. 33 U.S.C. § 2701(17) (2012) (incorporating the Clean Water Act's definition of "liability," which is strict liability); *see, e.g.*, *In re* Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico on April 20, 2010, 844 F. Supp. 2d 746, 754 (E.D. La. 2012), *aff'd sub nom. In re* Deepwater Horizon, 753 F.3d 570 (5th Cir. 2014) (citing *In re* Settoon Towing LLC, 722 F. Supp. 2d 710, 714 (E.D. La. 2010)); Rice v. Harken Exploration Co., 250 F.3d 264, 266 (5th Cir. 2001) (quoting 33 U.S.C. § 2702(a)). Moreover, OPA imposes "'super strict liability' and recognizes only limited defenses." Robert Force & Jonathan M. Gutoff, *Limitation of Liability in Oil Pollution Cases: In Search of* Concursus *or Procedural Alternatives to* Concursus, 22 TUL. MAR. L.J. 331, 338 (1998) (citing 33 U.S.C. §§ 2702, 2703(a)). OPA's only "[c]omplete defenses" are for discharges "caused solely by—(1) an act of God; (2) an act of war; [or] (3) an act or omission of a third party." 33 U.S.C. § 2703(a). Such defenses are subject to certain limitations. *Id.* § 2703(c). Its only other "partial" defense provides that responsible parties are not liable "to a claimant, to the extent that the incident is caused by the gross negligence or willful misconduct of the claimant." *Id.* § 2703(b).

198. OPA, for example, does not provide for any credits, recoupment, or defenses that would in any measure reduce a state's recovery for natural resource and other compensatory damages authorized by OPA. *See* United States v. Am. Commercial Lines, L.L.C., 759 F.3d 420, 426 (5th Cir. 2014) (quoting *In re Deepwater Horizon*, 745 F.3d at 173). Because OPA imposes joint and several liability on responsible parties, any fault of other parties, including the claimant, is irrelevant so long as the defendant is partly at fault. *See* 33 U.S.C. § 2701(17). In any event, OPA only imposes liability on "responsible part[ies]." *See id.* § 2701(32) (defining "responsible party"); *cf., e.g.*, United States v. M/V COSCO BUSAN, LR/IMO Ship. No. 9231743, 2008 AMC 2744, 2750 (N.D. Cal. 2008) (discussing U.S. CONST. amend. XI; FED. R. CIV. P. 14(c)) (granting motion to strike third-party complaint filed against California under OPA).

199. *See, e.g.*, N.J. Dep't of Envtl. Prot. v. Dimant, 51 A.3d 816, 820 (N.J. 2012). Similarly, OPA uses a "resulting from" approach to causation. *In re* Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico on April 20, 2010, 808 F. Supp. 2d 943, 966 (E.D. La. 2011), *aff'd sub nom. In re* Deepwater Horizon, 745 F.3d 157 (5th Cir. 2014).

scientific evidence.[200] For one thing, requiring near-absolute scientific certainty in environmental pollution cases would dramatically and impermissibly alter the burden of proof generally applicable in civil cases, i.e., the preponderance of the evidence standard, which requires only a more-likely-than-not level of certainty.[201] Moreover, it would create an impossible burden given the inherent uncertainties in natural resource restoration, which is, as already discussed, both an art and an often imprecise science.[202] It is hard to believe that legislators intended,

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200. *See, e.g.*, Rubanick v. Witco Chem. Corp., 593 A.2d 733, 747 (N.J. 1991) (explaining that "demands for near-scientific certainty are unrealistic, if not impossible," and are inappropriate in civil toxic-tort litigation, and noting that some authorities have been criticized for "insisting on a level of scientific proof that was simply not available" (discussing Johnston v. United States, 597 F. Supp. 374 (D. Kan. 1984); Wendy E. Wagner, *Trans-Science in Torts*, 96 YALE L.J. 428, 438 (1986))); Lindquist v. City of Jersey City Fire Dep't, 814 A.2d 1069, 1090 (N.J. 2003) ("'When the possibility of causal connection is accepted, we cannot deny relief in all cases simply because science is unable decisively to dissipate the blur between possibility and probability. In such circumstances judges must do the best they can, with the hope their decisions square with the truth, and with a willingness to consider in succeeding cases whatever contribution scientific advances may offer.' . . . Although we do not relax the requirement that petitioner must prove his case by a preponderance of the evidence, and that his evidence must be scientifically reliable, we must examine the evidence in light of science's inability to provide conclusive answers to every question of causation." (quoting Dwyer v. Ford Motor Co., 178 A.2d 161, 176 (1962) (Weintraub, C.J., concurring))); *cf.* Indianapolis Colts, Inc. v. Metro. Balt. Football Club Ltd. P'ship, 34 F.3d 410, 416 (7th Cir. 1994) ("Trials would be very short if only perfect evidence were admissible.").

201. *See* Neil B. Cohen, *The Gatekeeping Role in Civil Litigation and the Abdication of Legal Values in Favor of Scientific Values*, 33 SETON HALL L. REV. 943, 945 (2003) ("[I]t seems well-accepted that the standard burden of persuasion in civil cases—the 'preponderance of the evidence' standard—can be expressed probabilistically: the plaintiff (or other party bearing the burden of persuasion) must demonstrate that the probability of the facts supporting its case exceeds 0.5. This ability to express the burden of persuasion probabilistically has several implications. For one thing, it promises (but does not always deliver) a conceptual link between legal proof standards and the standards of scientific and technical disciplines that rely on probabilistic reasoning. Second, and perhaps more important, it masks the important differences in the value systems that govern standards of legal proof and parallel standards of scientific and technical inquiry. In particular, the standard of proof in civil litigation, and the value system that lies beneath it, weigh the cost of errors so differently than most scientific disciplines that the fact that a 'mainstream' scientist would not testify as to a particular conclusion does not necessarily mean that the same conclusion is valueless or 'junk science' for the purposes of law.").

202. "Scientists' knowledge of ecosystems cannot be complete." Baker, *supra* note 170, at 710 n.170 (citing WILSON, *supra* note 170, at 180). It is par for the course for restoration plans to carry with them some degree of uncertainty. *See, e.g.*, United States v. Great Lakes Dredge & Dock Co., 1999 AMC 2511, 2513 (S.D. Fla. 1999) ("Great Lakes questions the validity of the work of . . . the engineering expert who designed the project . . . to repair the grounding site of the Captain Joe. Great Lakes makes much of the fact that [he] would not guarantee the success of his design . . . . This lack of a guarantee is irrelevant. The Court realizes that these types of restoration projects are typically rife with uncertainties regarding their success . . . . However, this does not automatically render them scientifically unreliable. These uncertainties are due to both the relative lack of research in the field and the nature of the projects themselves, neither of which is grounds to exclude otherwise reliable and relevant scientific testimony." (citing Kumho Tire Co. v. Carmichael, 526 U.S. 137, 150-51 (1999))). Trustees' preference for habitat and resource

sub silentio, to create impossible burdens of proof on issues where policy and judgment matter more than an abstract scientific question and which, as a practical matter, would leave the public less than fully compensated for its losses.[203]

The best answer is that they did not so intend. Federal and state legislatures have spoken by appointing expert NRD trustees and delegating them discretion to grapple with these very issues. It is proper and consistent with the purpose of NRD and public trust law to afford trustees discretion when carrying out their duties of conservation and restoration.

V. CONCLUSION

Public trustees have long understood that the appropriate remedy for NRDs is restoration of the resources damaged rather monetary compensation and that this remedy involves both primary and compensatory restoration. Public trustees now agree that equivalency analysis is the most effective method of determining the amount of compensatory restoration required to make the public whole. In carrying out their fiduciary duty to make polluters pay to restore the public's natural resources, public trustees have been afforded great discretion, despite efforts by polluters to convince courts that trustees are something less than ecological physicians tasked with resuscitating and restoring natural resources, like the Hudson-Raritan Estuary, when they are injured.

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equivalency methodologies is one way in which they have attempted to compensate for some of these uncertainties. *See supra* Part III.

203. *See* N.J. Dep't of Envtl. Prot. v. Exxon Mobil Corp., 923 A.2d 345, 354 (N.J. Super. Ct. App. Div. 2007) ("[G]iven the obvious remedial purposes of the [Spill Act's] statutory scheme, [the] defendant's insistence on such a strict interpretation, which leaves the public less than whole for its loss, is unwarranted." (citing N.J. STAT. ANN. § 58:10-23.11v)).