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Natural Resource Damage Assessments for Oil Spills: Policy Considerations Underlying the Evolution of the Department of the Interior's Regulations

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Comments

NATURAL RESOURCE DAMAGE ASSESSMENTS FOR OIL SPILLS: POLICY CONSIDERATIONS UNDERLYING THE EVOLUTION OF THE DEPARTMENT OF THE INTERIOR'S REGULATIONS

TABLE OF CONTENTS

I.	INTRODUCTION	492
II.	BACKGROUND	496
	A. Common Law and State Legislation	496
	B. Clean Water Act and Other Federal Legislation	497
	C. CERCLA	499
	1. Section 107: Liability	499
	2. Section 111: Uses of Superfund	500
	3. Section 301: Damage Assessment Regulations	501
III.	NATURAL RESOURCE VALUATION.....	502
	A. Value and Cost Contrasted.....	502
	B. Market Value and Open Access Value Compared	503
	C. Three Different Types of Natural Resource Value	504
	1. Use Value	504
	2. Existence Value	506
	3. Intrinsic Value	508
	D. Anthropocentric and Biocentric Valuation	510
	E. Ecological Economics: Systemic Values	512
IV.	NATURAL RESOURCE DAMAGE ASSESSMENT METHODS	513
	A. Restoration and Replacement Costs	514
	B. Market Valuation	515
	C. Behavioral Use Valuation	517
	D. Contingent Valuation	518
V.	ECONOMICS AND ENVIRONMENTAL POLICY CONCERNS	519

A.	Economic Incentives and Polluter Decision-Making	519
B.	Economic Cost-Benefit Analysis	521
C.	Optimal Enforcement Policy and Systems Theory	522
VI.	SUPERFUND AND THE DEPARTMENT OF INTERIOR REGULATIONS	522
VII.	APPROACH OF THE D.C. CIRCUIT COURT OF APPEALS	525
A.	<i>Colorado v. United States Dep't of Interior</i>	526
B.	<i>Ohio v. United States Dep't of Interior</i>	527
1.	Standard of Review	528
2.	The "Lesser Of" Rule	528
3.	The Public Ownership Rule	529
4.	The "Committed Use" Requirement	530
5.	The Hierarchy of Assessment Methods	530
6.	Ten Percent Discount Rate	531
7.	Allegedly Preferential Treatment of PRPs ...	531
8.	Reasonable Assessment Costs Limitation ...	532
9.	Acceptance Criteria	532
10.	Audit Requirements	533
11.	Punitive Damages	533
12.	Contingent Valuation	533
VIII.	CONCLUSION	534

I. INTRODUCTION

Recently, the District of Columbia Circuit Court of Appeals decided a pair of consolidated cases, *Colorado v. United States Dep't of Interior*¹ and *Ohio v. United States Dep't of Interior*,² in which successful challenges were brought against the Department of Interior Type A and Type B regulations³ governing assessment of natural resources damages under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).⁴ Because of the relatively short time that the regulations have been in effect, there is a paucity of case law on the

1. 880 F.2d 481 (D.C. Cir. 1989).

2. 880 F.2d 432 (D.C. Cir. 1989).

3. 43 C.F.R. §§ 11.10-11.93 (1987).

4. 42 U.S.C. §§ 9601-9675 (1982 & Supp. V 1987), amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. No. 99-499, 100 Stat. 1617 (codified as amended in scattered sections of U.S.C.). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) serves as the statutory authority mandating the promulgation of natural

question of appropriate valuation methods for assessing damages to natural resources caused by oil spills.⁵ As the recent Alaskan oil spill by Exxon demonstrates, the importance of correctly estimating the monetary effects of oil spill damage to wildlife cannot be stressed too highly.⁶ The companion D.C. Circuit cases represent the first major challenge to the Department of Interior's interpretation of the natural resource damage provisions of CERCLA.⁷ Essentially, the court found that regulations limiting natural resource damage assessments to the "lesser of" restoration or replacement costs or lost use value of the resources were not a reasonable interpretation of the statutory language and legislative history of CERCLA's natural resource damage provisions.⁸ Additionally, the court invalidated Type B regulations'

resource damage assessment regulations. 42 U.S.C. § 9651(c). Section 301(c)(1) of CERCLA clearly states as follows:

The President, acting through Federal officials designated by the National Contingency Plan published under section 9605 of this title, . . . shall promulgate regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or a hazardous substance for the purposes of this chapter and section 1321(f)(4) and (5) of Title 33.

42 U.S.C. § 9651(c)(1).

5. See, e.g., *Puerto Rico v. SS Zoe Colocotroni*, 628 F.2d 652 (1st Cir. 1980) (oil tanker, owner, and insurance underwriter held liable for cleanup costs and environmental harm from oil spill), *cert. denied*, 450 U.S. 912 (1981); *Burgess v. M/V Tamano*, 564 F.2d 964 (1st Cir. 1977) (owners of Norwegian supertanker held liable for government's cleanup costs associated with oil spill). Although the Superfund legislation went into effect December 11, 1980, the Department of Interior to whom the responsibility for formulating natural resource damage regulations was delegated did not publish a final rule containing these assessment provisions until August 1, 1986. 43 C.F.R. §§ 11.10-11.93 (1987).

6. See, *Two Environmental Groups Sue Exxon Seeking Better Cleanup, Restoration Fund*, 20 Env't Rep. (BNA) 744, 744-45 (Sept. 1, 1989) (discussing pending lawsuits against Exxon for recent Alaskan oil spill; *Prince William Sound Conservation Alliance v. Exxon Corp.*, No. A89-095 (D.C. Alaska) and *NWF v. Exxon Corp.*, No. 3AN-89-6957 (Alaska Super. Ct.); *Alaska Sues Exxon, Pipeline Consortium for Oil Spill Damages, Restoration Order*, 20 Env't Rep. (BNA) 691 (Aug. 15, 1989) (discussing suit by state of Alaska against Exxon for Valdez incident; *Alaska v. Exxon Corp.*, No. 89-6852 (Alaska Super. Ct.)).

7. This is hardly surprising since the regulations themselves were only codified in the last two years. 43 C.F.R. §§ 11.10-11.93 (1987). In *Colorado v. United States Dep't of Interior*, state and environmental groups challenged the validity of the Department of Interior's Type A rules for simplified assessments of natural resource damages. 880 F.2d 481, 482 (D.C. Cir. 1989). *Ohio v. United States Dep't of Interior* was a parallel case in which state and environmental groups, a chemical industry trade association, a manufacturer, and a public utility company brought various challenges to the Department of Interior's Type B rules governing the recovery of money damages for damage to natural resources by releases of hazardous substances including oil spills. 880 F.2d 432, 438 (D.C. Cir. 1989).

8. *Ohio v. United States Dep't of Interior*, 880 F.2d 432, 442 (D.C. Cir. 1989). The state and environmental parties argued that limiting recovery of

hierarchy of methodologies for measuring lost use values which focused exclusively on available market values before examining other alternatives.⁹

This Comment will first examine the historical background of government recovery for natural resource damages through the development of the common law¹⁰ and state legislation,¹¹ the Clean Water Act¹² and other federal legislation,¹³ and CERCLA.¹⁴ Next, this Comment will deal with a range of issues associated with natural resource valuation, including a discussion of different types of natural resource value (i.e., use value, existence value, and intrinsic value).¹⁵ The tension between economic and ecological views of natural resources will be examined in connection with a discussion of systemic values.¹⁶ This will be followed by a section delineating natural resource damage assessment methods used to determine the extent of responsible party liabil-

damages to the "lesser of: restoration or replacement costs; or diminution of use values" would too often result in insufficient funds available for restoring or replacing the damaged resources to the equivalent state that existed before the hazardous substance release or oil spill. *Id.* at 441 (quoting 43 C.F.R. § 11.35(b)(2) (1987)).

9. *Id.* at 464. The environmental groups in this case argued that the Department of Interior regulations unreasonably focused on market value in determining the extent of natural resource damage recovery liability. *Id.* at 462.

10. At common law the states were permitted to recover for damages to publicly held natural resources. Cross, *Natural Resource Damage Valuation*, 42 VAND. L. REV. 269, 277 (1989). This notion of the right of states to exercise authority over their natural resources can be traced to United States Supreme Court Justice Oliver Wendell Holmes' opinion in *Georgia v. Tennessee Copper Co.*, where he wrote "the state has an interest independent of and behind the titles of its citizens, in all the earth and air within its domain. It has the last word as to whether its mountains shall be stripped of their forests and its inhabitants shall breathe pure air." 206 U.S. 230, 237 (1907). For a discussion of the development of the public trust doctrine, see Kenison, Buchholz, and Mulligan, *State Actions For Natural Resource Damages: Enforcement of the Public Trust*, 17 ENVTL. L. REP. (ENVTL. L. INST.) 10434, 10435-36 (Nov. 1987); Carlson, *Making CERCLA Natural Damage Regulations Work: The Use of the Public Trust Doctrine and Other State Remedies*, 18 ENVTL. L. REP. (ENVTL. L. INST.) 10299, 10302 (Aug. 1988).

11. See, e.g., ALASKA STAT. § 46.03.758 (1987); CAL. HARB. & NAV. CODE § 293 (West Supp. 1989); MINN. STAT. ANN. § 115B.14 (West 1985); ME. REV. STAT. ANN. tit. 38, § 551 (1978); N.Y. ENVTL. CONSERV. LAW § 71-2723 (McKinney 1981). For a discussion of state Superfund legislation, see Comment, *State Hazardous Waste Superfunds and CERCLA: Conflict or Complement?*, 13 ENVTL. L. REP. (ENVTL. L. INST.) 10348 (Nov. 1983).

12. Clean Water Act § 311, 33 U.S.C. § 1321 (1982).

13. E.g., Deepwater Port Act of 1974, 33 U.S.C. §§ 1501-1524 (1982); Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1301-1356 (1982); Trans-Alaska Pipeline Authorization Act, 43 U.S.C. §§ 1651-1655 (1982).

14. 42 U.S.C. §§ 9601-9675.

15. See Cross, *supra* note 10, at 280-97.

16. See *infra* notes 99-111 and accompanying text.

ity and the societal cost of lost resources.¹⁷ Following this section, a brief discussion of economics and environmental enforcement policy concerns will attempt to apply fundamental economic cost/benefit analysis to liability assessment methods.¹⁸ This Comment will then examine the structure of CERCLA and the Type A & B regulations to determine the appropriate factors and methodologies for natural resource damage assessments.¹⁹ Finally, this Comment will analyze the approach of the D.C. Cir-

17. 42 U.S.C. § 9607(a)(4). Section 107(a)(4) of CERCLA describes the liability of responsible parties to include as follows:

(A) all costs of removal or remedial action incurred by the United States Government or a State or an Indian tribe not inconsistent with the national contingency plan;

(B) any other necessary costs of response incurred by any other person consistent with the national contingency plan;

(C) 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; and

(D) the costs of any health assessment or health effects study carried out under section 9604(i).

The amounts recoverable in an action under this section shall include interest on the amounts recoverable under subparagraphs (A) through (D).

Id.

Responsible parties are defined under section 107(a) of Superfund to include in pertinent part:

(1) the owner and operator of a vessel or a facility,

(2) any person who at the time of disposal of any hazardous substance owned or operated any facility at which such hazardous substances were disposed of,

(3) any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person, by any other party or entity, at any facility or incineration vessel owned or operated by another party or entity and containing such hazardous substances, and

(4) any person who accepts or accepted any hazardous substances for transport to disposal or treatment facilities, incineration vessels or sites selected by such person, from which there is a release, or a threatened release which causes the incurrence of response costs, of a hazardous substance

Id. § 9607(a).

18. For an in-depth discussion of optimal enforcement policy, see Cohen, *Optimal Enforcement Strategy to Prevent Oil Spills: An Application of a Principal-Agent Model with Moral Hazard*, 30 J.L. & ECON. 23 (1987); see also, Grigalunas and Opaluch, *Assessing Liability for Damages Under CERCLA: A New Approach for Providing Incentives for Pollution Avoidance?*, 28 NAT. RESOURCES J. 509 (1988).

19. For a discussion of the language and history of Superfund and the natural resource damage regulations, see Cross, *supra* note 10; Habicht, *The Expanding Role of Natural Resource Damage Claims Under Superfund*, 7 VA. J. NAT. RESOURCES L. 1 (1987); Note, *Defining the Appropriate Scope of Superfund Natural Resource Damage Claims: How Great an Expansion of Liability?*, 5 VA. J. NAT. RESOURCES L. 197, 217-19 (1985).

cuit Court of Appeals and attempt to discern the direction of the application of Superfund natural damage assessments to the extent of the liability of responsible parties.²⁰

II. BACKGROUND

A. Common Law and State Legislation

Under traditional common law, states are permitted to recover for damages to publicly held natural resources.²¹ Both case law precedent²² and state legislation²³ support the traditional principle that state governments have a legitimate, enforceable interest in public natural resources. One basis for state intervention, though rarely invoked, is the doctrine of *parens patriae* authority whereby the state gains the right to sue where no individual state citizen has standing to bring a cause of action.²⁴ In effect, the state sues on behalf of the individual citizen as representative of her interests.²⁵ Alternatively, the public trust doctrine is sometimes used to support state recovery of natural resource damage claims on the theory that the government holds public resources in trust for its citizens in a fiduciary relationship for the public benefit.²⁶

20. For a discussion of the approach of the D.C. Circuit Court of Appeals, see *infra* notes 170-226 and accompanying text.

21. For a discussion of common law state recovery, see Cross, *supra* note 10, at 278 and accompanying text.

22. See, e.g., *Toomer v. Witsell*, 334 U.S. 385, 408 (1948) (Frankfurter, J., concurring) (recognizing state's right to conserve or utilize its natural resources); *Geer v. Connecticut*, 161 U.S. 519, 534 (1896) (discussing the theory of state ownership of wildlife within the state as a basis for regulation), *overruled by Hughes v. Oklahoma*, 441 U.S. 322, 335 (1979) (overruling theory of state ownership of wildlife as basis for regulation and subjecting wildlife to same principles of state regulation as applied to other natural resources).

23. Thirty-six states have enacted state superfund laws to deal with the problem of hazardous substance releases. For a discussion and listing of state superfund laws, see Comment, *supra* note 11, at 10352-60.

24. See *Hawaii v. Standard Oil Co.*, 405 U.S. 251, 257-60 (1972) (discussing history of *parens patriae* authority) and cases cited therein; see also Cross, *supra* note 10, at 278; Halter and Thomas, *Recovery of Damages by States for Fish and Wildlife Losses Caused by Pollution*, 10 *ECOLOGY L.Q.* 5, 9-10 (1982).

25. 405 U.S. at 258 (1972). For a discussion of limitations on *parens patriae* authority, see Note, *supra* note 19, at 201-02 n.39. Cf. Hodas, *Private Actions for Public Nuisance: Common Law Citizen Suits for Relief from Environmental Harm*, 16 *ECOLOGY L.Q.* 883 (1989) (private claims for public nuisance under common law may sometimes be brought for natural resource damages).

26. For a discussion of the public trust doctrine in the context of natural resource damages, see Carlson, *supra* note 10, at 10302; Kenison, Buchholz, and Mulligan, *supra* note 10, at 10434-40; see also, Johnson, *Water Pollution and the Public Trust Doctrine*, 19 *ENVTL. L.* 485 (1989) (discussion of application of public trust doctrine to nonpoint sources of water pollution). See generally, Wilkinson,

State and common law remedies remain vital in the area of recovery for natural resource damages since state laws governing liability for hazardous substance releases are not preempted by CERCLA.²⁷ This would seem to indicate that states have the option of suing under state or federal law.²⁸ Uncertainty may exist in this area due to a line of cases holding that the Federal Water Pollution Control Act (now known as the Clean Water Act or CWA) is the federal government's exclusive remedy for damages to the water environment and collection of oil spill liability costs.²⁹ Additionally, despite the continuing validity of state recovery actions, Superfund was enacted to provide a unifying standard for natural resource damage recovery in the midst of diverging state approaches and as a response to congressional dissatisfaction with state common law remedies.³⁰ State statutory approaches to natural resource damage assessments vary considerably in terms of breadth of coverage, although most permit at least some recovery of restoration costs for fish and wildlife.³¹

B. Clean Water Act and Other Federal Legislation

The Clean Water Act (CWA) is one of a variety of federal

The Headwaters of the Public Trust: Some Thoughts on the Source and Scope of the Traditional Doctrine, 19 ENVTL. L. 425 (1989) (analysis of development and fundamental legitimacy of public trust doctrine).

27. Superfund explicitly states that "[n]othing in this chapter shall be construed or interpreted as preempting any State from imposing any additional liability or requirements with respect to the release of hazardous substances within such State." CERCLA § 114(a), 42 U.S.C. § 9614(a).

28. See Cross, *supra* note 10, at 277; see generally, Funk, *Federal and State Superfunds: Cooperative Federalism or Federal Preemption*, 16 ENVTL. L. 1 (1985); Comment, *supra* note 11. But see CERCLA § 107(f)(1), 42 U.S.C. § 9607(f)(1) (prohibiting double recovery for natural resource damages under Superfund).

29. See generally, Duncan, *Liability of Third Parties for Oil Spill Cleanup Costs Under the Federal Water Pollution Control Act and Under General Maritime Law*, 10 MAR. LAWYER 25 (1985); Guss, *Interaction of the Federal Water Pollution Control Act with the Limitation of Liability Act and the General Maritime Law*, 6 MAR. LAWYER 199 (1981); Comment, *Cleanup Cost Liability for Oil Spills: Whether the FWPCA Precludes Alternative Remedies for Recovery of Cleanup Expenses*, 2 J. LAND USE & ENVTL. L. 51 (1986); Note, *The Federal Water Pollution Control Act: Is It Really an Exclusive Remedy?*, 21 WILLAMETTE L. REV. 107 (1985); Note, *Federal Water Pollution Control Act—The Exclusive Remedy for Recovery by the United States of Oil Spill Cleanup Costs—United States v. Dixie Carriers, Inc.*, 5 MAR. LAWYER 296 (1980); Comment, *Federal Water Pollution Control Act—The Federal Government's Exclusive Remedy for Recoupment of Oil Spill Cleanup Costs*, 53 TUL. L. REV. 1421 (1979).

30. *Ohio v. United States Dep't of Interior*, 880 F.2d at 455. The court of appeals questioned the Department of Interior's reliance on the common law standards in light of the legislative history of Superfund which clearly indicated the inadequacy of the common law remedies. *Id.*

31. See Cross, *supra* note 10, at 278-79; Comment, *supra* note 11, at 10352-56.

environmental statutes dealing with recovery for natural resource damages.³² Other federal statutes include, inter alia, the Deepwater Port Act of 1974,³³ the Outer Continental Shelf Lands Act (OCSLA),³⁴ and the Trans-Alaska Pipeline Authorization Act.³⁵ For the purposes of this Comment, the most important provision of the Clean Water Act is section 311 which addresses liability for the discharge of oil or hazardous substances into United States navigable waters or near coastal shoreline.³⁶ Liable parties under the CWA include owners and operators of vessels or on-shore/off-shore facilities that release oil with four narrowly construed limited defenses for the following: act of God, act of war, United States government negligence, and third party act or omission.³⁷ The other three federal acts mentioned above are limited in coverage and lack specific provisions relating to appropriate methodologies for assessing natural resource damages.³⁸ The text of the CWA, however, specifically designates the use of restoration or replacement costs for natural resource damages.³⁹

32. 33 U.S.C. § 1251-1387 (1982 & Supp. V 1989). Oil and hazardous substance liability is provided for in section 311 of the Clean Water Act. *Id.* § 1321.

33. 33 U.S.C. § 1501-1524.

34. 43 U.S.C. § 1301-1356.

35. 43 U.S.C. § 1651-1655.

36. Section 311 of the Clean Water Act states as follows:

[The] owner or operator of any vessel from which oil or a hazardous substance is discharged in violation of subsection (b)(3) of this section shall, notwithstanding any other provision of law, be liable to the United States Government for the actual costs incurred under subsection (c) of this section for the removal of such oil or substance by the United States Government in an amount not to exceed, in the case of an inland oil barge \$125 per gross ton of such barge, or \$125,000, whichever is greater, and in the case of any other vessel, \$150 per gross ton of such vessel (or, for a vessel carrying oil or hazardous substances as cargo, \$250,000), whichever is greater, except that where the United States can show that such discharge was the result of willful negligence or willful misconduct within the privity and knowledge of the owner, such owner or operator shall be liable to the United States Government for the full amount of such costs.

33 U.S.C. § 1321(f)(1).

For an example of a pre-Superfund case finding liability for an oil spill, see *Burgess v. M/V Tamano*, 564 F.2d 964 (1st Cir. 1977) (holding owner of supertanker liable for government cleanup costs for oil spill).

37. CWA § 311(f), 33 U.S.C. § 1321(f). Liability for owners or operators of vessels, onshore facilities, and offshore facilities is provided for in subsections (f)(1), (2), and (3), respectively, in virtually identical language subject to the same four exceptions. 33 U.S.C. §§ 1321(f)(1), (2), & (3).

38. See *Cross*, *supra* note 10, at 277.

39. 33 U.S.C. § 1321(f)(5). Section 311(f)(5) of CWA states that "[t]he President, or the authorized representative of any State, shall act on the behalf of the public as trustee of the natural resources to recover for the costs of replacing or restoring such resources." 33 U.S.C. § 1321(f)(5) (emphasis added).

C. CERCLA

In 1980, Congress enacted CERCLA which provides for government recovery for almost any damage to natural resources on government lands.⁴⁰ Basically, Superfund operates as a two-step process. First, designated officials assess natural resource damages.⁴¹ Second, if necessary, claims are brought against responsible parties⁴² as defined by section 107, subject to several limited statutory defenses.⁴³

1. Section 107: Liability

Section 107 designates responsible parties from whom the government can recover costs for "injury to, destruction of, or loss of natural resources" from hazardous substance releases.⁴⁴ Liability damages include reasonable assessment costs as well as

40. 42 U.S.C. § 9607. Section 107(f)(1) of CERCLA states as follows:

In the case of an injury to, destruction of, or loss of natural resources under subparagraph (C) of subsection (a) . . . liability shall be to the United States Government and to any State for natural resources within the State or belonging to, managed by, controlled by, or appertaining to such State

Id. § 9607(f)(1).

41. CERCLA § 107(f)(2), 42 U.S.C. § 9607(f)(2). Superfund provides for assessment of natural resource damages by selected officials: "Such officials shall assess damages for injury to, destruction of, or loss of natural resources for purposes of this chapter and such section 1321 of Title 33 for those resources under their trusteeship" *Id.*

42. *See supra* note 17.

43. 42 U.S.C. § 9607(b). Section 107(b) of CERCLA provides for four statutory exceptions to liability parallel to those in section 311 of the Clean Water Act:

There shall be no liability under subsection (a) of this section for a person otherwise liable who can establish by a preponderance of the evidence that the release or threat of release of a hazardous substance and the damages resulting therefrom were caused solely by—

(1) an act of God;

(2) an act of war;

(3) an act or omission of a third party other than an employee or agent of the defendant, or than one whose act or omission occurs in connection with a contractual relationship, existing directly or indirectly, with the defendant . . . if the defendant establishes by a preponderance of the evidence that (a) he exercised due care with respect to the hazardous substance concerned, taking into consideration the characteristics of such hazardous substance, in light of all relevant facts and circumstances, and (b) he took precautions against foreseeable acts or omissions of any such third party and the consequences that could foreseeably result from such acts or omissions; or

(4) any combination of the foregoing paragraphs.

Id. § 9607(b)(1)-(4).

44. CERCLA § 107(f)(1), 42 U.S.C. § 9607(f)(1).

actual damage to resources.⁴⁵ The statute provides that funds collected from responsible parties must be made available for restoration or replacement of the damaged resources.⁴⁶ CERCLA further indicates that “[t]he measure of damages . . . shall not be limited by the sums which can be used to restore or replace such resources.”⁴⁷

2. Section 111: Uses of Superfund

Under section 111, CERCLA funds are available for natural resource damage claims and federal assessments of damage.⁴⁸ Funds, however, are only available for expected restoration/replacement costs pursuant to an approved agency recovery plan.⁴⁹

45. For the text of section 107(a), see *supra* note 17. For cases dealing with Superfund’s liability standards, see, e.g., *Ohio v. United States Dep’t of Interior*, 880 F.2d 432, 471-72 (D.C. Cir. 1989) (upholding Department of Interior’s interpretation of Superfund’s use of traditional causation standards for relating substance releases and biological injuries); *New York v. Shore Realty Corp.*, 759 F.2d 1032, 1042 (2nd Cir. 1985) (upholding award of State’s response costs under section 107(a)(4)(A) for hazardous substance release).

46. 42 U.S.C. § 9607(f)(1). Section 107(f)(1) of CERCLA provides: “[s]ums recovered . . . under this subsection shall be retained by the trustee, . . . for use only to restore, replace, or acquire the equivalent of such natural resources.” *Id.*

47. *Id.* Section 107(f)(1) of CERCLA also precludes the possibility of double recovery for the same natural resource damages. “There shall be no double recovery under this chapter for natural resource damages, including the costs of damage assessment or restoration, rehabilitation, or acquisition for the same release and natural resource.” *Id.* See also, CERCLA § 114(b), 42 U.S.C. § 9614(b) (precluding compensated party from recovering under other State or Federal law).

48. 42 U.S.C. § 9611. Section 111(b)(1) of CERCLA provides as follows:

Claims asserted and compensable but unsatisfied under provisions of section 1321 of Title 33, which are modified by section 304 of this Act may be asserted against the Fund under this subchapter; and other claims resulting from a release or threat of release of a hazardous substance from a vessel or a facility may be asserted against the Fund under this subchapter for injury to, or destruction or loss of, natural resources, including cost for damage assessment

Id. § 9611(b)(1).

A list of enumerated uses of the Fund is set forth under section 111(c) of CERCLA. 42 U.S.C. § 9611(c)(1)-(6).

49. 42 U.S.C. § 9611(i). Section 111(i) of CERCLA requires in pertinent part:

Except in a situation requiring action to avoid an irreversible loss of natural resources or to prevent or reduce any continuing danger to natural resources or similar need for emergency action, funds may not be used under this chapter for the restoration, rehabilitation, or replacement or acquisition of the equivalent of any natural resources until a plan for the use of such funds for such purposes has been developed and adopted by affected Federal agencies

Id.

3. Section 301: Damage Assessment Regulations

Section 301(c) requires the establishment of regulations for natural resource damage assessment.⁵⁰ This responsibility was delegated by the President to the Department of the Interior which promulgated a two-tiered system of Type A and Type B regulations.⁵¹ Type A regulations govern "standard procedures for simplified assessments requiring minimal field observation, including establishing measures of damages based on units of discharge or release or units of affected area."⁵² The Department of Interior has incorporated the use of a Natural Resource Damage Assessment Model for Coastal and Marine Environments (NRDAM/CME) in order to make the Type A assessments.⁵³

Type B regulations cover "alternative protocols for conducting assessments in individual cases to determine the type and extent of short- and long-term injury, destruction, or loss"⁵⁴ including on-site field inspection for major releases of hazardous substances.⁵⁵ Section 301 requires the "best available" damage assessment procedures, "including both direct and indirect injury, destruction, or loss,"⁵⁶ and provides that factors considered in the assessment of damages should include "but [are] not limited to, replacement value, use value, and the ability of the ecosystem or resource to recover."⁵⁷ Under Superfund, the Department of Interior's assessments enjoy the status of rebuttable presumption as measures of natural resource damages for lia-

50. 42 U.S.C. § 9651(c)(1). Section 301(c) of CERCLA states as follows:

The President, acting through Federal officials . . . shall study and . . . shall promulgate regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or a hazardous substance for the purposes of this chapter and section 1321(f)(4) and (5) of Title 33.

Id.

51. *Id.*

52. CERCLA § 301(c)(2)(A), 42 U.S.C. § 9651(c)(2)(A).

53. See 43 C.F.R. § 11.41 (1988) (general summary of the NRDAM/CME computer model); Cross, *supra* note 10, at 323-26 (brief discussion of the model); Grigalunas and Opaluch, *supra* note 18, at 518-28 (discussion of the NRDAM/CME Type A assessments). See *infra* notes 178-81 and accompanying text (discussing NRDAM/CME computer submodels).

54. CERCLA § 301(c)(2)(B), 42 U.S.C. § 9651(c)(2)(B).

55. 43 C.F.R. § 11.60 (1989). For detailed discussion of the D.C. Circuit's approach to the Department of Interior's Type B rules for natural resource damage assessment, see *infra* notes 183-226 and accompanying text.

56. CERCLA § 301(c)(2), 42 U.S.C. § 9651(c)(2).

57. *Id.* See discussion *infra* note 164 and accompanying text.

bility purposes.⁵⁸

III. NATURAL RESOURCE VALUATION

A. Value and Cost Contrasted

In the context of determining the worth of natural resources it is necessary to distinguish value from cost as used in connection with natural resource damages. Value denotes worth to society, the qualitative and quantitative benefit to society of the natural resources.⁵⁹ Cost is concerned with the expense of replacing or restoring the damaged resources.⁶⁰ Problems may arise since value and cost measurements do not always or necessarily result in the same amount of damages for a given natural resource.⁶¹ It may be helpful to conceive of the value and cost of natural resources as reflecting, respectively, ecological and economic perspectives on the inherent worth of natural resources.⁶²

58. 42 U.S.C. § 9607(f)(2)(C). Section 107(f)(2)(C) of CERCLA provides the following:

Any determination or assessment of damages to natural resources for the purposes of this chapter and section 1321 of Title 33 made by a Federal or State trustee in accordance with the regulations promulgated under section 9651(c) of this title shall have the force and effect of a rebuttable presumption on behalf of the trustee in any administrative or judicial proceeding under this chapter or section 1321 of Title 33.

Id.

59. See Note, *supra* note 19, at 204. Simply stated, value represents man's judgement of the societal benefit associated with the use of natural resources. It must be noted, however, that natural resource value is not limited to man's consumptive uses of nature. "Our inquiry is about natural value of the kind met in unlabored contexts, as in pure rather than applied science, in contemplative outdoor recreation rather than in industry, in ecology rather than in economics, in thinking of nature as a source past its being a resource." H. ROLSTON, ENVIRONMENTAL ETHICS, 201-02 (1988).

60. See Note, *supra* note 19, at 204. It may be helpful to think of cost simply as what society must pay in order to get back the damaged resources or the equivalent.

61. For a discussion of the relative merits of using cost or value measures for assessments of natural resource damages, see Yang, *Valuing Natural Resource Damages: Economics for CERCLA Lawyers*, 14 *Envtl. L. Rep.* (Envtl. L. Inst.) 10311, 10314-15 (Aug. 1984); see also Note, *supra* note 19, at 204.

62. For a discussion of the debate between environmental values and economic cost efficiency, see Farber, *From Plastic Trees to Arrow's Theorem*, 1986 U. ILL. L. REV. 337, 337-60 (1986). Holmes Rolston III expresses the situation quite eloquently: "Humans in culture will often capture and transform natural values — organismic, specific, ecosystemic. This is both permissible and required, but it requires justification proportionately to value loss in the natural world as this is traded for value gain in culture." ROLSTON, *supra* note 59, at 224.

B. Market Value and Open Access Value Compared

Perhaps the most intuitively obvious method of determining the worth of natural resources is to consider the lost market value, i.e., the measure of the assessed damages to natural resources based on market prices for the damaged commodity.⁶³ Market valuation includes such factors as lost profits, decreased property values, decreased rental values of land, lost business opportunities, and replacement value.⁶⁴ Because of the convenience of performing this kind of economic analysis where market values are readily ascertainable, the use of market values to approximate the amount of natural resource damages is a very attractive alternative.⁶⁵

At the other end of the spectrum in terms of ease of measurement is the concept of open-access value.⁶⁶ Open-access value of natural resources takes cognizance of the fact that not all damages to natural resources are reflected as commodities in the open market for goods.⁶⁷ For example, though some endangered species are not valued in the economic marketplace, our society has determined that the continued existence of these forms of life possesses a value of sufficient importance to warrant strong pro-

63. See Cross, *supra* note 10, at 302; Note, *supra* note 19, at 205. Market value is generated by the allocation of resources through the competition (supply and demand) of buyers and sellers (utility-maximizing individuals and profit-maximizing firms) who are assumed to act rationally in seeking optimal exchange conditions (prices). For a discussion of the market economy and the difficulty in strictly applying the economic model to the evaluation of pollution of natural resources, see ROSS, OIL POLLUTION AS AN INTERNATIONAL PROBLEM: A STUDY OF PUGET SOUND AND THE STRAIT OF GEORGIA, 35-37 (1973). Public goods, however, such as natural resources which are not privately owned, undercut the market economy rationale for assigning values to things since these goods are normally not traded in the competitive exchange environment. See also, Nance, *Natural Resource Pricing Policies and the International Trading System*, 30 HARV. INT'L L.J. 65 (1989) (discussing issues associated with natural resource pricing policies by national governments within international trading system).

64. See Note, *supra* note 19, at 205. Consider that in the context of government requisitioning of private goods, market value has been limited to a non-competitive market price. See, e.g., *United States v. Commodities Trading Corp.*, 339 U.S. 121 (1950) (denying claim for compensation for requisitioned goods above ceiling price set by federal agency); *United States v. Cors*, 337 U.S. 325 (1949) (limiting fair market value just compensation for requisitioned tug boat to deny recovery of enhancement of value under federal statute).

65. See Cross, *supra* note 10, at 302.

66. See Note, *supra* note 19, at 205-07. Because a relevant market for the particular damaged resource may not even exist, open-access value is extremely difficult to quantify. *Id.* at 206.

67. Yang, *supra* note 61, at 10312; Halter and Thomas, *supra* note 24, at 18. An example of open-access value is the existence of certain endangered species which have no commercial uses for human purposes.

tective measures.⁶⁸

Several methods for approximating open-access resource values are available.⁶⁹ For example, money damages may be assessed by computing the value of individual organisms in terms of replacement cost per species individual.⁷⁰ Fish value tables, widely used at the state level, use values associated with growing fish stocking programs.⁷¹ Another alternative is the cost of restoring or rehabilitating the resource to its original undamaged condition.⁷² Finally, ad hoc determinations on a case-by-case basis may be used to arrive at open-access values of natural resources.⁷³ Because of the need to incorporate open-access values into a model of natural resource values, lost market values alone are insufficient.⁷⁴

C. Three Different Types of Natural Resource Value

As discussed in the preceding subsection, valuation of natural resources is more complicated than it would appear at first glance. More specifically, three distinct types of natural resource value may be delineated for analysis: use value, existence value, and intrinsic value.⁷⁵

1. Use Value

Simply defined, use value represents the worth of natural resources associated with the instrumental application or material consumption of resources in achieving practical individual and

68. The Endangered Species Act, 16 U.S.C. §§ 1531-1543 (1988).

69. See Note, *supra* note 19, at 207.

70. See Halter and Thomas, *supra* note 24, at 19.

71. See Note, *supra* note 25, at 207-08; see, e.g., State Dep't of Pollution Control v. Int'l Paper Co., 329 So. 2d 5, 8 (Fla. 1976) (fish value tables authorized by statute were relevant and proper to assessment of damages from effluent discharge).

72. Puerto Rico v. SS Zoe Colocotroni, 628 F.2d 652, 675 (1st Cir. 1980) (primary standard for measurement of natural resource damages caused by oil spill was reasonable cost for rehabilitating environment).

73. E.g., Parsons v. City of Sioux Falls, 272 N.W. 288, 292 (S.D. 1937) (imprecise nature of damage from sewer discharge necessitated ad hoc determination by court in order to provide relief).

74. See Yang, *supra* note 61, at 10312. Since many natural resources are necessarily common property of the citizenry at large, there is no market incentive to trade in the resources in order to fix a market price. *Id.* Also, many resources are indivisible and therefore not susceptible to precise valuation of any particular portion of overall resources. *Id.*

75. See Cross, *supra* note 10, at 280-97. Cf. ROLSTON, *supra* note 59, at 186-88 (discussing instrumental value, intrinsic value, and systemic value).

societal goals.⁷⁶ Traditionally, the reasons for relying upon value as a natural resource damage measure stem from historical precedent and economics.⁷⁷ Also, public use value underlies the state *parens patriae* authority to recover for natural resource damages.⁷⁸ The strongest argument in favor of use value is that it is highly relevant, more precise, and less speculative than other valuation methods in that it serves as behavioral evidence of natural resource values by measuring the actual behavior of consumers in purchasing the use of resources and not merely attitudinal preferences.⁷⁹

Use value is, however, subject to certain limitations. Most importantly, exclusive measurement of use value ignores the fact that natural resources may have value beyond direct human uses which cannot be captured in economic terms.⁸⁰ User fees at national parks, for example, are not set in terms of what the market

76. Cross, *supra* note 10, at 281. Use value consists of both consumptive and non-consumptive uses. *Id.* Consumptive uses are those uses of natural resources such as fishing or hunting in which humans actually diminish the resources in using them. *Id.* Non-consumptive uses differ in that humans use and enjoy the resources without depleting them in any way such as, for example, visiting national parks. *Id.*

77. Cross, *supra* note 10, at 282-83. A long tradition of United States law supports the historical reliance on use values, in which the common law has upheld state regulation of public natural resources using use values. *Id.* Proponents of use value point to the fact that it serves as a measure of actual human behavior and is therefore more reliable than non-behavioral measurements. *Id.* at 282. Insofar as use value approximates market value for private resources, market value reflects human freedom of choice in determining the worth of a given resource. *Id.* Note, however, that the outcome of economic valuation of resources is contingent on the underlying assumptions of human value which lead to the conclusion that market prices most accurately represent the worth of natural resources to humans. For example, the mere fact that in using a particular resource a certain market price is paid does not account for the possibility that the human user of the resource might indeed be willing to pay a higher price if the current market value were not the sole determinant of the value of the use of the resource.

78. For a discussion of *parens patriae* authority, see note 24 *supra* and accompanying text.

79. See *supra* note 77 and accompanying text. *But see*, Saliba, Bush, Martin, & Brown, *Do Water Market Prices Appropriately Measure Water Values?*, 27 NAT. RESOURCES J. 617 (1987) (discussing possible distortions in market prices which do not accurately reflect resource values). As applied to the Department of Interior's Natural Resource Damage Assessment regulations, the D.C. Circuit recently recognized the limited relevance of market values in determining use values. "While it is not irrational to look to market price as *one* factor in determining the use value of a resource, it is unreasonable to view market price as the *exclusive* factor, or even the predominant one." *Ohio v. United States Dep't of Interior*, 880 F.2d 432, 462 (D.C. Cir. 1989).

80. The major problem with use value is that it fails to take into account the open-access value of natural resources. See *supra* notes 66-68 and accompanying text.

will bear, but are in fact subsidized by the federal government in order to attract people to come to enjoy the natural beauty enshrined in some of the few remaining wilderness areas.⁸¹ Indeed, greater public use may diminish the use value of natural resources through congestion, quality deterioration, and sub-optimal use.⁸² As a result, use value is a useful measure of natural resource worth but fails to adequately express much of the value of natural resources.

2. Existence Value

Existence value reflects the view that natural resources have benefits beyond actual use value based merely on the existence of the resources.⁸³ Adoption of existence value policy is evidenced in legislation such as the Endangered Species Act,⁸⁴ the Wilderness Act of 1964,⁸⁵ and the Alaskan National Interests Lands Conservation Act of 1980.⁸⁶ Arguably, existence values should be included in natural resource damage assessments because they represent damages to resources not otherwise reflected in market values for resources. Some studies suggest that existence values

81. 880 F.2d at 463. The D.C. Circuit opined that the rationale underlying subsidization of entrance fees at national parks reflected a legislative acknowledgement that "parks are priceless national treasures" which should be made available to all regardless of one's economic status. *Id.*

82. Cross, *supra* note 10, at 284.

83. Cross, *supra* note 10, at 285. Existence values may be subdivided into constituent subparts as follows: option value, vicarious value, and intertemporal value. *Id.* Option value takes into account the option of future use, i.e., that humans not currently using the resource may desire to use it someday. *Id.* The quantifiable nature of an option value can be shown by analogy to commodities options which are acknowledged to have demonstrable economic value although the goods are not presently being consumed. *Id.* at 286. Vicarious value is slightly different in that preservation is valued, not for future use, but for the value of knowing that the resources are there. *Id.* In other words, merely because an individual does not personally use the particular resource does not mean that the individual does not value its continued existence. *Id.* at 287. Intertemporal value reflects the worth of bequeathing natural resources to future generations. *Id.* at 288. In this way, wasteful current consumption can be viewed as reducing the overall value of natural resources presently and in the future.

84. 16 U.S.C. §§ 1531-1543 (1988).

85. 16 U.S.C. §§ 1131-1136 (1988). The Act set up federally owned wilderness areas "where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain." *Id.* § 1131(c).

86. 16 U.S.C. §§ 3101-3233 (1988). The Act's purpose is to "preserve for the benefit, use, education, and inspiration of present and future generations certain lands and waters in the State of Alaska that contain nationally significant natural, scenic, historic, archaeological, geological, scientific, wilderness, cultural, recreational, and wildlife values." *Id.* § 3101(a).

may yield higher assessments than use values.⁸⁷

Despite the efficacy of existence values in encapsulating facets of natural resource value beyond use values, there are several problems associated with existence values. First, the lack of good behavioral tests for existence value reflects the difficulty in quantifying values that are attitudinal and not behavioral.⁸⁸ Second, the use of anthropocentric valuation for use and existence values embodies the "criminal conceit that nature is primarily a source of raw materials and energy for human purposes."⁸⁹ Finally, since

87. Cross, *supra* note 10, at 289.

88. *Id.*

89. *Id.* at 290 (quoting H. ROLSTON, *PHILOSOPHY GONE WILD: ESSAYS IN ENVIRONMENTAL ETHICS* 22 (1986)). Systems theory provides a healthy response to challenges to Man's view that the world is centered around his existence. "Seeing himself as a connecting link in a complex natural hierarchy cancels man's anthropocentrism, but seeing the hierarchy itself as an expression of self-ordering and self-creating nature bolsters his self-esteem and encourages his humanism." LASZLO, *THE SYSTEMS VIEW OF THE WORLD*, 118 (1972).

Several environmentalists have taken the challenge to anthropocentric valuation even further. One commentator writes as follows:

[T]he legal system has reflected the general view that wildlife are an economic resource that is worth protecting only to assure society that the "free" resource would always be available for exploitation. It was presumed that the only interest reflected in the legal system was a human one and that all values were derived from calculations concerning usefulness to humans. It is now time to recognize that wildlife have their own interests and that they should have equal access to the legal system to protect and promote those interests.

Favre, *Wildlife Rights: The Ever-Widening Circle*, 9 ENVTL. L. 241, 259 (1979). Christopher Stone provided a strong argument for the legal rights of natural objects in his famous *Trees* article. See Stone, *Should Trees Have Standing?—Toward Legal Rights For Natural Objects*, 45 S. CAL. L. REV. 450 (1972). Indeed, Justice Brennan approved the *Trees* argument in his dissent in *Sierra Club v. Morton* where he stated the following:

The critical question of "standing" would be simplified and also put neatly into focus if we fashioned a federal rule that allowed environmental issues to be litigated before federal agencies or federal courts in the name of the inanimate object about to be despoiled, defaced, or invaded by roads and bulldozers and where injury is the subject of public outrage. Contemporary public concern for protecting nature's ecological equilibrium should lead to the conferral of standing upon environmental objects to sue for their own preservation.

405 U.S. 727, 741-42 (1972) (Brennan, J., dissenting).

But see Elder, *Legal Rights for Nature—The Wrong Answer to the Right(s) Question*, 22 OSOODE HALL L.J. 285 (1984). For an example of an unusual case conferring standing to sue on an endangered species, see, e.g., *Palila v. Hawaii Dep't of Land and Nat. Resources*, 639 F.2d 495 (9th Cir. 1981) (action for declaratory and injunctive relief brought on behalf of rare bird under Endangered Species Act).

Aldo Leopold, the seminal environmental thinker, described the conflicting views of industry and environmentalists in colorful terms. "In all of these cleavages, we see repeated the same basic paradoxes: man the conqueror *versus* man the biotic citizen; science the sharpener of his sword *versus* science the search-

existence values depend on public attitudes about natural resources, the very application of existence values provides an incentive to keep the public ignorant of natural resources, resulting in lower existence and use values.⁹⁰

3. Intrinsic Value

Intrinsic value goes beyond use or existence values to consider the needs and wants of nature itself.⁹¹ The strongest proponents of intrinsic value may be found in the "deep ecology" movement which supports the view that all living things have inherent value and independent moral significance apart from human existence.⁹² Resistance to the adoption of intrinsic values

light on his universe; land the slave and servant *versus* land the collective organism." A. LEOPOLD, *A SAND COUNTY ALMANAC* 238 (1966).

90. Cross, *supra* note 10, at 291. This argument supposes that efforts to reduce possible liability for damages to natural resources may lead to a strong interest, on the part of potential environmental despoilers, in keeping the public ignorant or at least minimally aware of resource uses and the existence and importance of certain endangered species. *Id.* For a classic discussion of the ethical dangers of this approach, see Tribe, *Ways Not to Think About Plastic Trees: New Foundations for Environmental Law*, 83 *YALE L.J.* 1315 (1974). Professor Tribe provides a strong appeal to our "ethical impulse toward nature" which he believes is violated "when we use 'nature surrogates' (i.e., plastic trees) to conceal the wounds we inflict on the natural order, thereby anesthetizing our aesthetic and ecological sensibilities." *Id.* at 1347.

91. See Cross, *supra* note 10, at 292-93. Intrinsic value is part of a holistic view which considers the totality of living systems in the valuation process of individual resources. "Every intrinsic value has leading and trailing *ends* pointing to value from which it comes and toward which it moves. . . . Intrinsic value is a part in a whole, not to be fragmented by valuing it in isolation." H. ROLSTON, *ENVIRONMENTAL ETHICS*, 217 (1988). Current scientific thinking is consonant with the recognition of intrinsic value, as evidenced by the emergence of the Gaia theory of the biosphere as a "self-regulating entity with the capacity to keep our planet healthy by controlling the chemical and physical environment." J.E. LOVELOCK, *GAIA: A NEW LOOK AT LIFE ON EARTH*, ix (1979).

92. Elder, *supra* note 89, at 286. Deep ecologists follow a deconstructionist model which "treat[s] environmental problems as symptoms of a much deeper problem in the relationship between people and nature. . . . question[ing] the very premises of modern society and call[ing] for major transformations in values and forms of social organization." Pollack, *Reimagining NEPA: Choices for Environmentalists*, 9 *HARV. ENVTL. L. REV.* 359, 401 (1985). Despite the philosophical complexity of deep or deconstructionist ecology, in 1949 Aldo Leopold summarized the ethic quite succinctly: "A Thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." A. LEOPOLD, *A SAND COUNTY ALMANAC* 240 (1966) (quoted in Pollack, *Reimagining NEPA: Choices for Environmentalists*, 9 *HARV. ENVTL. L. REV.* 359, 401 (1985)). Leopold anticipated criticisms about the lack of economic value of some natural resources:

One basic weakness in a conservation system based wholly on economic motives is that most members of the land community have no economic value. . . . Of the 22,000 higher plants and animals native to Wisconsin, it is doubtful whether more than 5 per cent can be sold, fed,

for natural resources can be found in mainstream philosophical traditions.⁹³ Even so, recognition of the relevance of intrinsic value is evidenced by the policy of the Endangered Species Act which seeks to promote the continued existence of embattled forms of wildlife regardless of human consumptive concerns.⁹⁴ Another example of the relevance of intrinsic value is the ecological concern that continued defoliation of South American rain forests and loss of trees through drought, fire, and cutting for timber without replacement may adversely affect the balance of ecosystems.⁹⁵

eaten, or otherwise put to economic use. Yet these creatures are members of the biotic community, and if (as I believe) its stability depends on its integrity, they are entitled to continuance.

LEOPOLD, *supra* note 89, at 225.

Note, however, that economists might become skeptical if ecologists ascribed overly-inflated values to so-called "worthless" resources.

93. For a discussion of philosophical opponents of intrinsic value applied to natural resources, see Cross, *supra*, note 10, at 294-95. Philosophers sharing the view of nature created primarily for the needs of man include such notables as: Aristotle, Bacon, St. Augustine, St. Thomas Aquinas, and Kant. *Id.* See also, M'Gonigle, *The Tribune and the Tribe: Toward A Natural Law of the Market/Legal State*, 13 *ECOLOGY L.Q.* 233 (1986) (in-depth analysis of development of competing philosophical paradigms in context of environmental issues).

94. The Endangered Species Act of 1973, 16 U.S.C. § 1531 (1988). Section 1531(b) states that the purposes of the Act are "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate." *Id.* § 1531(b). For an example of a case demonstrating the high priority accorded by Congress to the Endangered Species Act, see, e.g., *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978) (protection of snail darter under Endangered Species Act prohibits impoundment of habitat by dam project).

95. The destruction of huge rain forests reduces the amount of oxygen produced and released into the air through photosynthesis, thus disturbing the oxygen-content of the atmosphere which may eventually adversely affect Man. Barry Commoner eloquently expressed the delicate balance maintained within ecosystems thusly:

The amount of stress which an ecosystem can absorb before it is driven to collapse is also a result of its various interconnections and their relative speeds of response. The more complex the ecosystem, the more successfully it can resist stress. . . . Like a net, in which each knot is connected to others by several strands, such a fabric can resist collapse better than a simple unbranched circle of threads — which if cut anywhere breaks down as a whole. Environmental pollution is often a sign that ecological links have been cut and that the ecosystem has been artificially simplified.

C.W. MORSE, *ENVIRONMENTAL CONSULTATION*, 23-24 (1984) (quoting B. COMMONER, *THE CLOSING CIRCLE*, 38 (1972)).

As developed by the American physiologist Walter Cannon, the term "homeostasis" may be conveniently understood as "[t]he maintenance of relatively constant conditions by active control." J.E. LOVELOCK, *supra* note 91, at 11. For a discussion of the relation of ecological homeostasis to natural resource damages, see Cross, *supra* note 10, at 332-34. For a general discussion of ecological

As a practical matter, a methodological problem may arise because some "deep ecologists" loathe to assign monetary values to natural resources, so not surprisingly, intrinsic values are difficult to quantify.⁹⁶ Furthermore, intrinsic values suffer from a lack of popular support due to the prevailing view of Man's dominion over Nature and the role of enlightened human preference in valuing natural resources.⁹⁷

D. Anthropocentric and Biocentric Valuation

The three types of natural resource value which have been discussed so far (use value, existence value, and intrinsic value) can be understood as occupying relative positions on a continuum between anthropocentric and biocentric valuation.⁹⁸

ANTHROPOCENTRIC-BIOCENTRIC CONTINUUM

MAN	NATURE	
use value	existence value	intrinsic value
economics	shallow ecology	deep ecology

At the risk of oversimplification, the anthropocentric preference for use values is generally the economist's view⁹⁹ and the biocentric preference for recognition of natural resource intrinsic value is essentially the ecologist's view.¹⁰⁰ The roots of the anthropo-

homeostasis and the interconnectedness of various members of the biotic community, see LEOPOLD, *supra* note 89, at 230-36.

96. Cross, *supra* note 10, at 293-94.

97. See Cross, *supra*, note 10, at 295-96. Dissatisfaction with the existing state of affairs and what they perceive to be the collective apathy of the masses has led the deep ecologists to "reject the ethic of individualistic self governance in favor of one reflecting the interconnectedness between people and between people and nature." Pollack, *supra* note 92, at 410.

98. For a discussion of an alternative ethical paradigm for the environment, see Callicott, *Non-Anthropocentric Value Theory and Environmental Ethics*, 21 AM. PHIL. Q. 299 (1984) (study of non-anthropocentric value theory expands recognition of intrinsic value to non-human beings).

99. For a humorous treatment of economic analysis and economists, see Leijonhufvud, *Life Among the Econ*, 11 W. ECON. J. 327 (1973) (facetious anthropological study of "culture" of economists).

100. See Devall, *The Deep Ecology Movement*, 20 NAT. RESOURCES J. 299 (1980) (distinguishing two distinct versions of environmentalism in contrast to dominant social paradigm favoring economic growth over ecological concerns); Naess, *The Shallow and the Deep, Long-Range Ecology Movement: A Summary*, 16 INQUIRY 95 (1973) (seminal work on anthropocentric and non-anthropocentric ecology focusing on characteristics of deep ecology movement); see also, Karp, *Aldo Leopold's Land Ethic: Is An Ecological Conscience Evolving In Land Development Law?*, 19 ENVTL. L. 737, 739 (1989) (tracing development of shallow and deep ecology from views of Pinchot and Muir, respectively). Shallow ecologists or reformist environmentalists are concerned with pollution prevention and resource depletion because of the threat to human interests. Devall, *supra*, at 302;

centric view can be found in the mainstream Western philosophical tradition.¹⁰¹

The emerging biocentric view may represent a paradigmatic shift in contemporary understanding of Man's place in the Earth's ecology.¹⁰² The difference in the two views is one of dialectical

Karp, *supra*, at 739; Naess, *supra*, at 95. See, e.g., Carlson, *NEPA and the Conservation of Biological Diversity*, 19 ENVTL. L. 15, 19 (1988) (stressing that organisms without instrumental use value "play roles in ecological systems that are essential to civilization"). Deep ecologists believe in recognizing the intrinsic value of natural resources and ecosystems apart from man's existence. Karp, *supra*, at 739.

Devall cites a number of sources of the deep ecology movement: Eastern spiritual traditions, Native American traditions, "minority tradition" of Western religion and philosophy, science of ecology, and naturalist artists. Devall, *supra*, at 304-08. The distinctive feature of the deep ecology movement is the ecophilosophical emphasis on transforming normative values and current forms of social organization. See *Id.* at 303; Naess, *supra*, at 98-99.

101. See ROLSTON, *supra* note 91, at 45 (traditional philosophies of Aristotle and Bentham support view that nature's purpose is service of human needs). Different sources of the dominant anthropocentric social paradigm are variously believed to include the Judeo-Christian tradition, excesses of capitalism and industrial progress and archaic Lockean notions of "property," and Western technological "scientism." Devall, *supra* note 100, at 301. In fact the traditional view of human dominion over nature can be traced to sources as diverse as the Book of Genesis, the writings of Immanuel Kant, and modern philosophers and scientists such as Michael Polanyi (philosopher of science), G.G. Simpson (anthropologist), and W.H. Murdy (biologist). ROLSTON, *supra* note 91, at 62-63.

Even so, the philosophy of David Hume provides a strong argument that anthropocentric valuation is inherently subjective since it depends on human sentiments concerning value, grounded in human feelings. Callicott, *supra* note 98, at 305. The Humean subjectivist approach to moral psychology was adopted by Charles Darwin in the theory of biological evolution and Aldo Leopold's evolving land ethic. *Id.* at 304-05. This cognitive thread leads to a position of non-anthropocentric humanism which recognizes the intrinsic value of plants and animals from the perspective of human value judgements. *Id.* at 305.

Rolston expands on the unique and superior position of Man within the biospheric realm, recognizing the necessity of human activity for the smooth functioning of the ecosystem itself. ROLSTON, *supra* note 91, at 72-73. "All value does not 'center' on humans, though some of it does. . . . Nevertheless, humans are of the utmost value in the sense that they are the ecosystem's most sophisticated product. They have the highest per capita intrinsic value of any life form supported by the system." *Id.* at 73; see also, Halligan, *The Environmental Policy of Saint Thomas Aquinas*, 19 ENVTL. L. 767, 780 (1989) (asserting Thomistic belief in unique higher status of human beings over animals and plants in God's creation).

102. For example, modern science has not seen definitive proof of the "anthropic" explanation for the evolution of the universe. See, e.g., Carr and Rees, *The Anthropic Principle and the Structure of the Physical World*, 278 NATURE 605, 612 (1979). For a discussion of Thomas Kuhn's model of the shifting of scientific paradigms, see Devall, *supra* note 100, at 301-02.

See Callicott, *supra* note 98, at 300 (environmental ethics represents paradigmatic shift in contemporary moral philosophy). Non-anthropocentric philosophical ethical systems include the "animal liberation" movement, classic utilitarian ethical hedonism (exemplified by expansion of Bentham's hedonic calculus to include pain and pleasure of animals), and biocentric ethical conativ-

valuation through objectification of nature from a human subjectivist perspective versus holistic integrative valuation by participation in nature.¹⁰³ In some ways the two views parallel the distinction between the traditional dualistic cause and effect model and the current unified field theory of interrelatedness of cause-effect as an event.¹⁰⁴

E. Ecological Economics: Systemic Values

Although the dialectical model of natural resource values on the continuum between anthropocentrism and biocentrism explains the tension between the economic and ecological positions, a third alternative is a systemic view that integrates both perspectives within a hierarchical model.¹⁰⁵ Systemic values necessarily

ism (as represented by the Schweitzerian reverence-for-life ethic). *Id.* at 300-02. For a discussion of non-economic based laws and cases incorporating a greater emphasis on biocentric concerns, see Karp, *supra* note 100, at 747-55.

103. See ROLSTON, *supra* note 91, at 203-08 (presenting model contrasting traditional dialectical and ecological participative value perspectives).

104. *Id.* (ecological valuation reflects holistic view of observer/valuer participating within natural field during valuation process in contrast to traditional self-reflective dualistic view). Deep ecology rejects the subject-object model in favor of a relational, unified-field model which conceives of "organisms as knots in the biospherical net or field of intrinsic relations. . . ." The model holds that the "intrinsic relation between two things *A* and *B* is such "that the relation belongs to the definitions or basic constitutions of *A* and *B*, so that without the relation, *A* and *B* are no longer the same thing." Naess, *supra* note 100, at 95.

For a lengthy discussion of similarities between Eastern spiritual traditions and the new scientific paradigm of theoretical physics, see F. CAPRA, *THE TAO OF PHYSICS*, (1975).

105. The dialectical interaction between dual structures, in this case economic and ecological valuation criteria, can be transformed into a cooperative integrated process through a triadic structure of economic, ecological, and systemic values. The necessity of a third element or catalytic agent within a closed (valuation) system finds support in the work of Claude Levi-Strauss:

Concentric dualism is a mediator between diametric dualism and triadism, since it is through the agency of the former that the transition takes place between the other two. . . . There is thus a profound difference between diametric and concentric dualism. Diametric dualism is static, that is, it cannot transcend its own limitations But concentric dualism is dynamic and contains an implicit triadism.

C. LEVI-STRAUSS, *STRUCTURAL ANTHROPOLOGY*, 151 (1963).

The systemic view is the result of attempts to find a complete biological model of the biosphere analogous to the search for a TOE (theory of everything) in theoretical physics. See Callicott, *supra* note 98, at 303 (rational holistic model of biosphere containing "biomes, biocoenoses, and micro-ecosystems, species and their populations"). Several theoretical models have been proposed by diverse individuals. See, e.g., CAMPBELL, *FISHERMAN'S GUIDE: A SYSTEMS APPROACH TO CREATIVITY AND ORGANIZATION*, 217, fig. 35 (1985) (petroleum engineer's integrative theoretical model for hierarchies inherent within biosphere and without relation to cosmological phenomena); LOVELOCK, *supra* note 91 (presenting Gaia hypothesis of Earth as integrated living system); ROLSTON,

recognize human subjective values and objective biological values of natural resources.¹⁰⁶ Intrinsic values are interwoven into instrumental relationships as part of an integrated system of interdependent parts within a structural whole.¹⁰⁷ Essentially, the challenge is to expand the economists' concept of economic value of natural resources while contracting the ecologists' concern for nature within limits which ensure the healthy continuation of the ecosystem.¹⁰⁸

One of the emerging ethical paradigms for environmentalists is Rene Dubos' concept of human stewardship over natural resources.¹⁰⁹ The direction of recognition of systemic values may range from Thomistic theocentrism to the deep ecologists' recognition of the long-range impact of present environmental decisions on the continued well-being of Mother Earth.¹¹⁰

IV. NATURAL RESOURCE DAMAGE ASSESSMENT METHODS

For the purposes of this Comment, four different types of natural resource damage assessment methods will be discussed: restoration and replacement costs, market valuation, behavioral

supra note 91, at 216, fig. 6.6 (hierarchical model of intrinsic, instrumental, and systemic value in projective nature).

106. See ROLSTON, *supra* note 91, at 190-91. Rolston compares the objectivity of the systemic view with the inherent subjectivity of anthropocentric valuation. *Id.* at 190. See *supra* note 101 (concerning Humean view of inherent subjectivity of human value judgments).

107. ROLSTON, *supra* note 91, at 187-88. Rolston rather eloquently expresses the interrelationship of instrumental and intrinsic values:

Intrinsic value exists embedded in instrumental value. No organism is a mere instrument, for each has its integral intrinsic value. But each can also be sacrificed in behalf of another life course; then its intrinsic value collapses, becomes extinct, and is in part instrumentally transported to another organism.

Id. at 222.

108. See Karp, *supra* note 100, at 743 (Leopold's land ethic necessitates decision-making expanded beyond economics to include aesthetics and environmental ecological ethics). Rolston makes the point that differences in metaphysics between various religious and philosophical views need not impede agreement on an environmental ethics of suitable responsible human behavior. ROLSTON, *supra* note 91, at 230.

109. See LOVELOCK, *supra* note 91, at 123. "There is, for example, a fresh awareness of the concept of Christian stewardship, whereby man, while still allowed dominion over the fish and the fowl and every living thing, is accountable to God for the good management of the Earth." *Id.* at 145.

110. See Halligan, *supra* note 101 (discussion of Thomistic environmental policy). *Cf.* Devall, *supra* note 100 (discussion of deep ecology movement); Naess, *supra* note 100 (seminal article on deep ecology).

use valuation, and contingent valuation.¹¹¹ In passing it should be noted that a separate set of issues is associated with the appropriate time to conduct natural resource damage procedures.¹¹²

A. Restoration and Replacement Costs

Although at first glance restoration and replacement costs may appear to be equivalent measurement techniques, on closer examination these methods are distinguishable. Restoration costs attempt to determine the economic expense of returning the damaged natural resource to its former, undamaged condition.¹¹³ Replacement costs, on the other hand, represent the economic expense of acquiring other equivalent resources to substitute for the lost resources.¹¹⁴

Restoration and replacement costs share certain attributes that justify considering them together.¹¹⁵ Most importantly, res-

111. See Cross, *supra* note 10, at 297. Of these four assessment methodologies, market valuation and behavioral use valuation correlate with measurement of use values as discussed *supra* at notes 76-82 and accompanying text. Restoration and replacement costs, on the other hand may take into account existence values of natural resources as discussed *supra* at notes 83-90 and accompanying text.

112. For a discussion of the timing of natural resource damage assessment procedures, see Note, *supra* note 19 at 209-15 and accompanying text. See also, Yang, *supra* note 61 at 10311, 10313-14. The issues concern the appropriateness of damage assessments at the point of discharge, the resource level, or at the user level.

113. Cross, *supra* note 10, at 298; Yang, *supra* note 61 at 10315. For a discussion of the estimation of restoration costs, see Breen, *CERCLA's Natural Resource Damage Provisions: What Do We Know So Far?*, 14 *Env'tl. L. Rep.* (Env'tl. L. Inst.) 10304, 10310 (1984). Compare the application of restoration cost measures for common law property damage, see, e.g., *Trinity Church v. John Hancock Mut. Life Ins. Co.*, 399 Mass. 43, 50, 502 N.E.2d 532, 536 (1987) (restoration cost appropriate measure for excavation damage to church building); *Weld County Bd. of Comm'rs v. Slovek*, 723 P.2d 1309, 1317 (Colo. 1986) (use of restoration costs within court's discretion for negligence and trespass property damages).

114. Yang, *supra* note 61, at 10314; see also, Cross, *supra* note 10, at 301-02. An example of the use of replacement values would be the use of fish value tables in determining the cost of replacing the damaged wildlife in the water environment. Yang, *supra* note 61, at 10314. For an example of the use of replacement costs in an action involving damage to natural resources, see *United States v. Board of Trustees of Fla. Keys Comm. College*, 531 F. Supp. 267 (S.D. Fla. 1981) (finding that replacement of damaged resources through alternate site mitigation project was viable alternative to requiring assessment of restoration costs on injuring party); *But see*, *Puerto Rico v. SS Zoe Colocotroni*, 628 F.2d 652, 677 (1st Cir. 1980) (striking down award of over five million dollars for replacement of destroyed animals with no commercial value when such animals would replace themselves in natural course of events).

115. For example, both restoration and replacement cost methods affect the supply side of the equation of natural resource uses to the exclusion of the demand side considerations captured by use values.

toration and replacement costs are widely agreed upon, serving as the presumptive damage measure under the Clean Water Act provisions.¹¹⁶ Restoration and replacement costs are often easily determinable, although at times extremely expensive, even greatly exceeding the value of the natural resources under another valuation technique.¹¹⁷ A distinction between restoration and replacement costs can be seen in the effect of each method on the different types of natural resource value discussed in the previous section.¹¹⁸

B. Market Valuation

Commercial industry strongly favors market valuation as an assessment method for natural resource damages.¹¹⁹ The market valuation method uses such indicia as market prices for resources where available, considering reduction in land or property values as assessment criteria.¹²⁰

Market valuation possesses a number of advantageous features as a natural resource damage assessment method. First, as a

116. Cross, *supra* note 10, at 298. Section 311(f)(4) of the Clean Water Act provides as follows:

The costs of removal of oil or a hazardous substance for which the owner or operator of a vessel or onshore or offshore facility is liable under subsection (f) of this section shall include any costs or expenses incurred by the Federal Government or any State government in the restoration or replacement of natural resources damaged or destroyed as a result of a discharge of oil or a hazardous substance in violation of subsection (b) of this section.

33 U.S.C. § 1321(f)(4) (emphasis added).

117. See Cross, *supra* note 10, at 298. See, e.g., *Puerto Rico v. SS Zoe Colocotroni*, 628 F.2d 652, 675 (1st Cir. 1980) (dicta recognizing possibility that restoration may be unreasonable remedy if "either physically impossible or . . . disproportionately expensive").

118. Cross, *supra* note 10, at 298-302. Effective restoration of damaged resources may cure impaired use value, existence value, and intrinsic value by returning the environment to the status quo ante. *Id.* at 298. Replacement of damaged natural resources, however, may protect lost use value, though not lost existence and intrinsic values, since new resources have been substituted for the injured resources. *Id.* at 302.

119. Cross, *supra* note 10, at 302. This is hardly surprising insofar as limiting natural resources damages to the market cost of the damaged resources allows firms to engage in cost-benefit analysis planning in determining marginal costs of increasing levels of safety expenditures. For a discussion of economic cost-benefit and marginal cost analysis, see *infra* notes 145-51 and accompanying text.

120. Cross, *supra* note 10, at 302. See, e.g., 880 F.2d at 442 (calculating hypothetical lost use value of seals and seabird habitat using market prices of fur pelts plus selling price per acre of spoiled land). See also, 43 C.F.R. § 11.83(c)(1) & (2) (1989) (providing for market price and appraisal methodologies for damages to marketed resources).

practical matter, market values are usually easily measurable.¹²¹ Second, market values contain an indicia of reliability as a damage measure since they reflect actual behavior of buyers and sellers in the marketplace.¹²² Third, insofar as market valuation increases societal benefit through accurate representation of societal costs associated with natural resource damage, this method is economically efficient.¹²³

Despite the aforementioned advantages of market valuation methods, a number of disadvantages are associated with the dependence on market prices to represent natural resource damages. First, the common law does not compel market valuation of natural resources damages.¹²⁴ Second, although market value may overstate true natural resource damage, it is more likely to understate true natural resource damage.¹²⁵ Third, market value generally fails to reflect existence or intrinsic values of natural re-

121. Cross, *supra* note 10, at 303. Market prices for resources that are traded in a market economy should be readily ascertainable for the purpose of assessing damages to those resources. The market price can be determined by examining current market sale prices. *But see*, 880 F.2d at 463 (quoting *United States v. Commodities Trading Corp.*, 339 U.S. 121, 123 (1950) that market prices are inappropriate value measures "when the market value has been too difficult to find, or when its application would result in manifest injustice to owner or public"); *see also*, Ross, *supra* note 63 (difficulty of assessing economic impact of natural resource damages).

122. Cross, *supra* note 10, at 303. This feature of market valuation, which reflects the values ascribed to the resource by actual market transactions trading in the resource provides an objective measurable standard by which to judge the value of the damaged resources. *Cf.* 880 F.2d at 475 (contingent valuation methodology utilizes subjective "individually-expressed values for different levels of quality of resources, and dollar values of individuals' changes in well-being").

123. Cross, *supra* note 10, at 304. The economic principle of the Law of Supply and Demand governs the determination of prices for various goods available in a free market economy. Economists argue that societal benefit is maximized through the competition of buyers and sellers in reaching an equilibrium point where supply and demand for the market good are equalized at an economically efficient price. Consequently, the use of market valuation results in consistency between valuations of public and private natural resources. *See* Cross, *supra* note 10, at 304-05.

124. Cross, *supra* note 10, at 305. *See also*, Anderson, *Natural Resource Damages, Superfund, and the Courts*, 16 B.C. ENVTL. AFF. L. REV. 405, 449-50 (1989) (Superfund's natural resource damage provisions expand common law damage recovery approach).

125. Cross, *supra* note 10, at 307. Overstated damages might occur in situations where the market prices for the resource are highly inflated and bear no relation to the true value of the resource. Speculative frenzies such as the tulip bulb craze in Holland constitute situations where the price of goods bears no rational relation to the good itself. B. MALKIEL, *A RANDOM WALK DOWN WALL STREET*, 29-32 (1985). A more common example of possibly overstated market pricing is the existence of overvalued stock prices for companies as evidenced by excessive price-earnings ratios (i.e., when the earnings of the company are unable to justify the market price). *But cf.* 880 F.2d at 478 (danger of overstated

sources.¹²⁶ Fourth, the problem of market extinction exists when the use of market values provides a free market incentive to destroy endangered species.¹²⁷ Finally, government ownership of natural resources may distort free market values since user fees charged by governments may be heavily subsidized to encourage use of natural parks and other resources.¹²⁸

C. Behavioral Use Valuation

Behavioral use valuation is a natural resource damage assessment method that attempts to measure damages on the demand side of the economic equation.¹²⁹ The most common method of estimating demand is the use of travel cost studies of human consumptive behavior patterns.¹³⁰ Travel cost studies operate on the assumption that visitors to natural sites value resources at the cost of the expense incurred to travel to sites plus opportunity cost.¹³¹

damages from contingent valuation methodology can be reduced by more sophisticated questioning).

Understated damages are more common, however, as exemplified by cases of open-access resources whose value is not reflected in market prices for the resources. See, e.g., *Congressmen, Environmentalists Protest Rule Setting Value of Resource Damage From Spills*, 20 Env't Rep. (BNA) 485 (June 30, 1989) (sixty-two congressmen and leaders of 12 national environmental groups protest unsatisfactory natural resource damage estimates based on market "use" values in connection with *Exxon Valdez* spill in Prince William Sound). For a discussion of the interplay of market value and open-access value, see *supra* notes 63-74 and accompanying text.

126. Cross, *supra* note 10, at 309.

127. See *supra*, note 90, and accompanying text.

128. See *supra* note 81, and accompanying text.

129. See generally, Cross, *supra* note 10, at 309-15. Behavioral use valuation should be compared with restoration and replacement cost and market valuation methods which measure the supply side of natural resources. For a general discussion of use values, see *supra* notes 76-81 and accompanying text.

130. See Cross, *supra* note 10, at 310. Travel cost studies are not the only method of behavioral use valuation. See, e.g., D. GIBBONS, *THE ECONOMIC VALUE OF WATER*, 66 (1986) (comparing travel cost studies with consumer surveys for valuing water resources).

Hedonic price valuation attempts to relate the value of non-marketed commodities such as air and water to the value of marketed commodities such as property values. Cross, *supra* note 10, at 313. In other words, the value of a natural resource may be measured indirectly through the effect of the hazardous substance release on property values. *Id.* The difficulty with hedonic price valuation is that very few natural resources necessarily impact, even indirectly, independently marketed commodities such as property values so as to reflect the value of the damaged resource itself. *Id.*

131. Note, *supra* note 19, at 214. Consider the effect of subsidization of user fees at natural resource sites on the behavioral use values obtained from travel cost studies. When user fees are partially or fully subsidized by the government the resulting behavioral use values (measuring actual human spending behavior) derived from travel cost studies do not reflect the total costs associated with use

The major advantage of travel cost studies is reliability because verifiable human behavior serves as the basis for assessment figures.¹³²

Disadvantages of travel cost studies and other behavioral use valuation methods must also be presented to understand the limitations of this approach. First, travel time and opportunity costs are difficult to quantify.¹³³ Second, travel cost studies may not be sensitive enough to reflect relatively small changes in the availability of natural resources.¹³⁴ Third, some resources are not contained in national and state parks and thus are inappropriate for travel cost estimates.¹³⁵ Finally, this approach ignores existence and intrinsic values that may be associated with natural resources.¹³⁶

D. Contingent Valuation

The most common form of contingent valuation methods is the use of public response surveys in which people are questioned about the values they place on various natural resources.¹³⁷ One

of the resource. For a discussion of the advantages and disadvantages of the travel cost study methodology, see Cross, *supra* note 10, at 310-15.

132. See Cross, *supra* note 10, at 310. Another advantage of travel cost studies is that this assessment methodology is considered fairly accurate at roughly approximating use values. *Id.* at 313. For a discussion of the reliability of use values, see *supra* note 79 and accompanying text.

133. See Cross, *supra* note 10, at 311-12. Factors such as the relative accessibility of the resources and the wage rate or income-generating ability of the user will affect the resource value as determined by the travel cost study. *Id.* For a discussion of the effect of government subsidization of user fees, see *supra* note 131.

134. Cross, *supra* note 10, at 311. Consider that the destruction of an isolated section of forest area may have negligible impact on the general availability of forest land for potential park visitors in terms of impacting decisions to use or not to use the resource. In economic terms, the concept of elasticity correlates the change in the demand for a good with a change in the supply of the good, and vice versa. Unfortunately, travel and opportunity costs may not reflect any change in the availability of the resource despite the very real damage incurred due to the relative inelasticity of travel costs to resource availability.

135. This is especially true in cases of hazardous substance release or oil spill where the environmental damage affects areas under government control which are not the object of tourist travel. The most obvious example is the incidence of oil spills in the open ocean, although beaches may eventually be affected.

136. Cross, *supra* note 10, at 313. For a discussion of the open-access values that underlie non-economic existence and intrinsic values, see *supra* notes 66-68 and accompanying text.

137. Cross, *supra* note 10, at 315. Essentially, contingent valuation surveys take the form of posing hypothetical situations to respondents in which they are asked to put dollar values on various natural resources. *Id.* Several approaches are used in contingent valuation, including direct questioning, bidding formats,

of the advantages of contingent valuation is its convenience as a technique for direct measurement of internal consistency and replicability which roughly correlates with actual market transactions.¹³⁸ Contingent valuation has been found to be roughly consistent with behavioral use methods as a damage assessment measurement technique.¹³⁹ Of the various methods discussed so far, only contingent valuation measures existence values.¹⁴⁰

Unfortunately, contingent valuation is considered a controversial assessment method because of the hypothetical nature of the data analyzed.¹⁴¹ A number of problems have been raised concerning contingent valuation such as the possibility of skewed responses, the fact that attitudes may not correlate with behaviors, and a concern that respondents may be making decisions based on insufficient information.¹⁴² Another argument asserts that contingent valuation violates the common law prohibition of speculative damages.¹⁴³

V. ECONOMICS AND ENVIRONMENTAL POLICY CONCERNS

A. Economic Incentives and Polluter Decision-Making

Although not directly addressed by the statutory language of

and a "take or leave it" decisional format. 880 F.2d at 475; *see also*, 43 C.F.R. § 11.83(d)(5)(i) (1989) (contingent valuation "includes all techniques that set up hypothetical markets to elicit individual's economic valuation of a natural resource"). In this way, an approximation is made of the actual value of damaged natural resources.

138. Cross, *supra* note 10, at 317.

139. *Id.*

140. *Id.* at 320. *See* 43 C.F.R. § 11.83(d)(5)(i) (contingent valuation can explicitly determine existence values). For a discussion of existence values, *see supra* notes 83-90 and accompanying text.

141. Cross, *supra* note 10, at 315. Essentially, critics of contingent valuation techniques question the reliability and objectivity of this methodology.

142. *See* Cross, *supra* note 10, at 315-17. Basically, these objections criticize the necessarily subjective nature of contingent valuation judgments made by respondents to the surveys. Of particular interest is the observed variance of answers depending on whether respondents were asked to ascribe values to their willingness to buy or their willingness to sell certain natural resources. *Id.* at 318. This raises a potential problem regarding the accuracy of the derived values of particular natural resources where those values are a function of whether the respondent is evaluating the hypothetical transaction from the viewpoint of a buyer or a seller.

143. *See, e.g.*, *Ohio v. United States Dep't of Interior*, 880 F.2d 432, 476 (D.C. Cir. 1989) (industry petitioners argued unsuccessfully that contingent valuation methods violated common law proscription of speculative damages). For a discussion of the D.C. Circuit's treatment of contingent valuation, *see infra* notes 223-26 and accompanying text.

the natural resource damage provisions of Superfund, economic considerations may influence environmental policy with respect to the amounts responsible parties may be required to pay for damaged resources.¹⁴⁴ Simply stated, this means that some sort of economic incentive should be built into the liability provisions in order to promote firm behavior which seeks to decrease the probability of accidents occurring.¹⁴⁵ The use of economic incentives attacks the pollution problem from a different angle than the traditional approach of command-and-control regulations.¹⁴⁶

144. For a thorough discussion of optimal policy concerns in the context of oil spill liability, see Cohen, *supra* note 18. Cohen's article attempts to provide a convenient framework for understanding in simple form some of the competing factors that influence decision-making on the part of potential polluters. *See also*, Grigalunas and Opaluch, *supra* note 18; Carson and Navarro, *Fundamental Issues in Natural Resource Damage Assessment*, 28 NAT. RESOURCES J. 815 (1988). As an example of an alternative approach, note that it has been suggested that the availability of Superfund monies should be expanded to include reduction of any environmental health risks, not just oil spills and hazardous waste releases. Portney, *Reforming Environmental Regulation: Three Modest Proposals*, 13 COLUM. J. ENVTL. L. 201, 211 (1988) (expansion of scope of Superfund appropriate due to EPA's view of relatively low risk of Superfund sites).

145. *See* Cohen, *supra* note 18, at 34; Stewart, *Controlling Environmental Risks Through Economic Incentives*, 13 COLUM. J. ENVTL. L. 153 (1988) (arguing that economic incentives represent more effective method of achieving environmental safety than traditional forms of government regulation); *see also*, Ackerman and Stewart, *Reforming Environmental Law: The Democratic Case for Market Incentives*, 13 COLUM. J. ENVTL. L. 171 (1988) (calling for reform of existing environmental regulations to incorporate market incentives to encourage firm compliance with environmental standards). The emerging emphasis on incorporation of economic incentives into environmental policy and regulation is reflected by the Project 88 report to the President. Stavins, *Harnessing Market Forces to Protect the Environment*, 31 ENV'T 5 (1989) (discussion of interdisciplinary report to President urging increased use of economic incentives in combatting current high-profile environmental problems).

146. *See* C.W. MORSE, *supra* note 95, at 97-107 (discussing alternatives to command-and-control regulations such as pollution pricing, offset trading, mediation, and policy dialogues); Grigalunas and Opaluch, *supra* note 18, at 509-10 (contrasting use of economic incentives with command-and-control regulations). *See also*, F. ANDERSON, A. KNEESE, P. REED, R. STEVENSON & S. TAYLOR, *ENVIRONMENTAL IMPROVEMENT THROUGH ECONOMIC INCENTIVES* (1977) (advocating use of economic charges for pollution externalities). *Cf.* Shavell, *Liability for Harm Versus Regulation of Safety*, 13 J. LEGAL STUD. 357 (1984) (comparing tort liability and safety regulation methods of controlling activities that create risks of harm to others).

Drawbacks of command-and-control regulations include excessive bureaucratic centralization, rigidity, costs, litigation, and delays. Stewart, *supra* note 145, at 153. Advantages of economic incentives over command-and-control regulations include large cost savings, freeing up government administrators for other tasks, encouraging flexibility in control technologies, not penalizing new products and plants, ongoing R&D incentives for improved safety, enhancing democratic accountability of environmental policy decisions, and increased government revenues. *Id.* at 159-60. Obstacles to the increased use of economic incentives include the predominant role of lawyers in society, the moral predi-

The economists' approach attempts to internalize an external cost to the firm, i.e., to charge the polluting firm for the external damage to the environment.¹⁴⁷

B. Economic Cost-Benefit Analysis

Firms often engage in some form of cost-benefit analysis in order to determine the appropriate actions and policies in the absence of explicit legislation or agency regulations forcing them to take precautionary measures to avoid negative social consequences.¹⁴⁸ In economic terms, this means that the marginal cost of compliance with safety standards which reduce hazardous substance releases must be less than the marginal cost of liability exposure for failing to adhere to standards of hazardous substance release prevention.¹⁴⁹

lection for prohibition, the depreciation of environmental integrity, claims of favoring the wealthy, and various political consequences. *Id.* at 162-64.

147. Grigalunas and Opaluch, *supra* note 18, at 509-10. In this way the natural resource damage provisions of CERCLA create a virtual Pigouvian tax on hazardous substance releases by assessing liability for natural resource damages to the parties responsible for the injury. *Id.* at 512.

The Department of Interior regulations attempt to eliminate or control the external effects or "externalities" of polluting parties through the statutory sanctions of Superfund. See CERCLA § 107(c), 42 U.S.C. § 9607(c) (providing for determination of liability amounts ranging up to complete cleanup and environmental damage costs in case of willful misconduct/negligence and possible treble punitive damages for failure to take appropriate remedial action). "[T]he decision to control or eliminate specific externalities will rest on the relative values of the costs produced by the externalities and the benefits of eliminating them." C.W. MORSE, *supra* note 95, at 45. Note that although economic incentives may not be appropriate in all pollution situations, market incentives work most effectively in reducing overall hazardous risks or pollution levels. Stewart, *supra* note 145, at 161.

148. The Cohen article analyzes the problem of formulating effective regulatory standards and penalties for oil spill liability through analogizing the interrelation of government and the private sector to a principal-agent model with moral hazard considerations. Cohen, *supra* note 18, at 25. The use of the principal-agent model is an attempt to analyze government regulatory agency efforts to modify the behavior of stochastically polluting firms (i.e., firms polluting through random discharge occurrences as opposed to continuous discharge). *Id.* The moral hazard considerations relate to the fact that pollution can be avoided by firms through the application of costly although unobtrusive safety precautions which reduce the likelihood or extent of a pollution incident. *Id.* The Cohen article also discusses the Coast Guard's oil spill prevention program, cited as a real-world example of a stochastic pollution situation. *Id.* at 34-45.

149. See Note, *Oil Spills and Cleanup Bills: Federal Recovery of Oil Spill Cleanup Costs*, 93 HARV. L. REV. 1761, 1784 (1980). Marginal cost analysis measures the incremental effect of various economic changes on the firm's costs. Essentially, if the marginal (or additional) cost of instituting appropriate safety measures is less than the marginal (increased expected) cost of liability for pollution (taking into account relative probabilities, expected values, and risk preferences), then the rational firm should seek to maximize economic benefit and reduce eco-

C. Optimal Enforcement Policy and Systems Theory

Systems theory may have some relevance to formulation of an optimal enforcement policy since the regulatory environment exhibits dynamics associated with systems.¹⁵⁰ Since the policy of Superfund attempts to encourage and enforce efforts to preserve natural resources on the part of potentially responsible parties, optimal enforcement policy concerns might help to further the statutory goals.

VI. SUPERFUND AND THE DEPARTMENT OF INTERIOR REGULATIONS

CERCLA mandates the promulgation of regulations governing the assessment of natural resource damages under section 301(c).¹⁵¹ Superfund explicitly requires the formulation of two distinct types of regulations: Type A "standard procedures for simplified assessments"¹⁵² and Type B "alternative protocols for . . . individual cases."¹⁵³ Despite some delay in the promulgation

conomic cost by adopting and implementing the requisite safety measures. See Cohen, *supra* note 18, at 26. Factors affecting marginal costs in the framework of natural resource damage assessments will include the perceived likelihood of the imposition of liability, the extent of damage assessments, and the possibilities for settlement with the Department of Interior for damages caused by oil spills. See CERCLA § 122, 42 U.S.C. § 9622 (providing for settlement procedures for hazardous substance releases).

150. Herbert Simon has helped to make systems theory comprehensible to the layman, noting the following:

[Systems theory] is a set of attitudes and a frame of mind rather than a definite and explicit theory. At its vaguest, it means looking at the whole problem . . . , hardly a novel idea, and not always a very helpful one. Somewhat more concretely, it means designing the components of a system and making individual decisions within it in the light of the implication of these decisions for the system as a whole.

H. SIMON, *THE NEW SCIENCE OF MANAGEMENT DECISION*, 15 (1960).

For a discussion of a formulation of an environmental compliance system incorporating both open and closed systems theory, see J.F. DiMENTO, *ENVIRONMENTAL LAW AND AMERICAN BUSINESS: DILEMMAS OF COMPLIANCE*, 67-71 (1986). Cf. C. RUSSELL, W. HARRINGTON & W. VAUGHAN, *ENFORCING POLLUTION CONTROL LAWS 105-21* (1986) (delineating a simple and complex model of a voluntary compliance system for stochastic ("random") discharges).

151. 42 U.S.C. § 9651(c). Section 301(c) states in pertinent part: "The President . . . shall promulgate regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or a hazardous substance. . . ." *Id.*

152. 42 U.S.C. § 9651(c)(2). For the complete text of section 301(c)(2)(A), see *supra* note 52 and accompanying text.

153. 42 U.S.C. § 9651(c)(2)(B). Section 301(c)(2)(B) of CERCLA also provides "[s]uch regulations shall identify the best available procedures to determine such damages, including both direct and indirect injury, destruction, or loss and shall take into consideration factors including, but not limited to, re-

of the Department of Interior regulations,¹⁵⁴ authorized officials are now empowered to assess natural resource damages in the capacity of trustees of natural resources under section 107(f)(2)(A)¹⁵⁵ of CERCLA and section 311(f)(4) and (5) of the Clean Water Act.¹⁵⁶

There has been wide disagreement between the Department of Interior and the states concerning whether restoration costs represent a floor or ceiling on damages or are appropriate only when restoration cost assessment results in a figure less than that obtained from market valuation methods.¹⁵⁷ Essentially, this is a conflict between economic and ecological losses. The economic position is that a societal cost-benefit analysis indicates that imposing liability on responsible parties at a cost greater than the actual market value of the resources is overly burdensome.¹⁵⁸ The ecological position contends that restoration costs are favored by the strong policy of CERCLA and the Clean Water Act

placement value, use value, and ability of the ecosystem or resource to recover.”
Id.

154. See 880 F.2d at 440.

155. CERCLA § 107(f)(2)(A), 42 U.S.C. § 9607(f)(2)(A). This section provides as follows:

Such officials shall assess damages for injury to, destruction of, or loss of natural resources for purposes of this chapter and such section 1321 of Title 33 for those resources under their trusteeship and may, upon request of and reimbursement from a State and at the Federal officials' discretion, assess damages for those natural resources under the State's trusteeship.

Id.

156. 33 U.S.C. § 1321(f)(4) & (5).

157. See, e.g., *Ohio v. United States Dep't. of Interior*, 880 F.2d at 441. For arguments supporting the use of restoration and replacement costs regardless of a comparison to market valuation figures, see Cross, *supra* note 10, at 327-34. *But see*, Note, *supra* note 19, at 219-225.

158. See, Note, *supra* note 19, at 219-25. The economic position argues that natural resource damage assessments should be primarily concerned with achieving fairness and efficiency through standardization of assessment methodologies. *Id.* at 220. For an example of a case assessing natural resource damages at the lesser of restoration or replacement costs or diminution of use values, see, e.g., *Idaho v. Bunker Hill Co.*, 635 F. Supp. 665, 676 (D. Idaho 1986) (holding that appropriate measure of damages to natural resources is lesser of value-based or cost-of-restoration basis). *But cf.* *Denoyer v. Lamb*, 22 Ohio App. 3d 136, 138, 490 N.E.2d 615, 618 (1984) (holding reasonable restoration costs were appropriate measure for property damages to private recreational or residential resources, so long as expenditures are not grossly disproportionate to diminution in market value); *Heninger v. Dunn*, 101 Cal. App. 3d 858, 865-66, 162 Cal. Rptr. 104, 109 (1980) (allowing restoration costs for damage to trees and vegetation based on owners' personal reasons for wanting to restore property, so long as not unreasonable compared to damage inflicted and diminution in market value).

for preservation of natural resources.¹⁵⁹

The Department of Interior regulations primarily focus on use value and consider market value when measurable. The regulations rarely consider option and existence values or contingent valuation and favor restoration costs only when their use yields a lower natural resource damage estimate of lost use value than market value measurement techniques.¹⁶⁰

The statutory language of Superfund and the Clean Water Act provides support for both interpretations (economic and ecological) regarding treatment of restoration costs, although there is no indication of limiting damages to market value economic losses.¹⁶¹ Examination of the legislative history of Superfund also reveals some support for both the economic and ecological positions.¹⁶²

Section 107(f)(1) of CERCLA states that amounts recovered by states and the federal government are collected "for use only to restore, replace, or acquire the equivalent of such (damaged) natural resources."¹⁶³ This appears to support the ecological view favoring restoration costs although opponents argue that the language merely describes the use to which funds will be put, not the method of determining the amount of damages.¹⁶⁴ Further statutory language in section 107(f)(1) favoring restoration costs states that damage measures "*shall not be limited by the sums which can be used to restore or replace such resources.*"¹⁶⁵ Section

159. See Cross, *supra* note 10, at 327. Perhaps the strongest evidence of the congressional intent to favor preservation of natural resources through use of restoration and replacement costs can be found in the language of Superfund itself. Section 107(f)(1) provides "damages . . . *shall not be limited by the sums which can be used to restore or replace such resources.*" 42 U.S.C. § 9607(f)(1) (emphasis added).

160. 43 C.F.R. § 11.83(d)(5)(ii) (1989) (providing that "use of contingent valuation methodology to explicitly estimate option and existence values should be used only if the authorized official determines that no use values can be determined").

161. See Cross, *supra* note 10, at 327-34; but see Note, *supra* note 19, at 218-222.

162. Cf. Cross, *supra* note 10, at 325 (citing legislative support for use of restoration damages) with Note, *supra* note 19, at 218-19 (citing legislative support for limiting natural resource damage recoveries). See also Breen, *supra* note 100, at 10307-09.

163. CERCLA § 107(f)(1), 42 U.S.C. § 9607(f)(1).

164. 880 F.2d at 447 (industry parties unsuccessfully argued that "shall not be limited by" language merely prescribed the uses to which recovered natural resource damages must be put); Cf. Note, *supra* note 19, at 220.

165. 42 U.S.C. § 9607(f)(1) (emphasis added). This language, "shall not be limited to" has been construed as implicitly favoring the use of restoration costs in most instances. 880 F.2d at 445-46.

301(c)(2) contains language relating to natural resource damage assessment regulations calling for "the best available procedures to determine such damages, including both direct and indirect injury, destruction, or loss and *shall take into consideration* factors including, but not limited to, replacement value, use value, and ability of the ecosystem or resources to recover."¹⁶⁶

In the interim period after the passage of Superfund and before the promulgation of the Department of Interior regulations, several federal courts examined issues in connection with liability for natural resource damages.¹⁶⁷ For example, prior to the enactment of CERCLA, the Court of Appeals for the First Circuit decided a case dealing with an oil spill from a tanker off the coastline of Puerto Rico.¹⁶⁸ The court of appeals held, inter alia, that damages were not limited to the diminution of market value of affected property.¹⁶⁹

VII. APPROACH OF THE D.C. CIRCUIT COURT OF APPEALS

Two consolidated cases, both decided on July 14, 1989, recognized the inadequacy of the existing Department of Interior regulations relating to oil spill damage and hazardous substance release liability.¹⁷⁰ Interested parties in the two cases included the Department of Interior, state and environmental groups, and industry intervenors.¹⁷¹ Both cases favored the ecological ap-

166. CERCLA § 301(c)(2), 42 U.S.C. § 9651(c)(2).

167. *E.g.*, United States v. Cumberland Farms of Connecticut, Inc., 826 F.2d 1151, 1164 (1st Cir. 1987) (upholding restoration order for wildlife habitat following dredging and filling of freshwater wetland by Army Corps. of Engineers); United States v. Robinson, 570 F. Supp. 1157, 1164 (M.D. Fla. 1983) (upholding restoration plan as remedy for federal violations of Rivers and Harbors Appropriation Act and Clean Water Act); United States v. Reilly Tar & Chemical Corp., 546 F. Supp. 1100 (D. Minn. 1982) (court was willing to interpret natural resource damages provisions despite fact that regulations had not yet been promulgated); United States v. Bd. of Trustees of Fla. Keys Comm. College, 531 F. Supp. 267 (S.D. Fla. 1981) (finding that replacement costs for alternate site mitigation were appropriate natural resource damage measure). *Cf.* United States v. Moretti, 526 F.2d 1307, 1310 (5th Cir. 1976) (upholding order of restoration of topography damaged by dredging of canals).

168. Puerto Rico v. SS Zoe Colocotroni, 628 F.2d 652 (1st Cir. 1980).

169. *Id.* at 675-76.

170. Colorado v. United States Dep't of Interior, 880 F.2d 481 (1st Cir. 1989); Ohio v. United States Dep't of Interior, 880 F.2d 432 (1st Cir. 1989). For a brief summary of these cases, see *D.C. Circuit Remands Interior Regulations, Says They Undervalue Natural Resource Losses*, 20 Env't Rep. (BNA) 558 (July 21, 1989). The Department of Interior's Natural Resource Damage Assessment regulations can be found at 43 C.F.R. § 11.10-.93 (1988).

171. Colorado v. United States Dep't of Interior, 880 F.2d 481, 482 (1st

proach involving consideration of restoration and replacement costs over the economic approach of the Department of Interior's interpretation of the CERCLA natural resource damage provisions.¹⁷²

A. *COLORADO V. UNITED STATES DEP'T OF INTERIOR*

In *Colorado v. United States Dep't of Interior*,¹⁷³ state and environmental groups sought judicial review of the Department of Interior's Type A natural resource damage assessment regulations.¹⁷⁴ The D.C. Circuit Court of Appeals held that the Department of Interior reasonably limited the scope of the Type A regulations to minor spills in coastal and marine environments.¹⁷⁵ The court of appeals remanded the case to allow the Department of Interior to bring the regulations into compliance with the guidelines set forth by the same court in *Ohio v. United States Dep't of Interior*,¹⁷⁶ taking into consideration replacement value as well as lost use value.¹⁷⁷

The Department of Interior's Type A assessment rules require the use of a computer model termed the Natural Resource Damage Assessment Model for Coastal and Marine Environments (NRDAM/CME).¹⁷⁸ The NRDAM/CME computer model contains three integrated submodels to make the necessary calcula-

Cir. 1989) (state of Colorado and three environmental groups sought review of natural resource damage assessment regulations relating to Type A simplified assessments); *Ohio v. United States Dep't of Interior*, 880 F.2d 432, 438 (1st Cir. 1989) (Ten states, three environmental groups, chemical industry trade association, manufacturing company, and public utility company sought review of natural resource damage regulations relating to Type B assessments for major spills of hazardous substances and oil).

172. *Colorado v. United States Dep't of Interior*, 880 F.2d 481, 491 (remanding Department of Interior's Type A regulations to incorporate standards set forth in *Ohio v. United States Dep't of Interior* regarding use of restoration costs as damage measure); 880 F.2d at 457 (emphasizing primacy of restoration of natural resources as reflecting values beyond use or market values).

173. 880 F.2d 481 (1st Cir. 1989).

174. *Id.* at 482.

175. *Id.* at 489.

176. 880 F.2d 432 (1st Cir. 1989).

177. *Colorado v. United States Dep't of Interior*, 880 F.2d at 491.

178. *Id.* at 484. Summary treatment of the NRDAM/CME can be found at 43 C.F.R. § 11.41(a)(1) (1989). For an example of the application of the NRDAM/CME, see Cross, *supra* note 10, at 325-26. See also Grigalunas and Opaluch, *supra* note 18, at 518-28.

tions: a "physical fates"¹⁷⁹ submodel, a "biological effects"¹⁸⁰ submodel, and an "economic damages"¹⁸¹ submodel. The NRDAM/CME assessment methodology goes through four phases, similar to those of the Type B assessments: (1) assessment plan, (2) injury determination, (3) quantification, and (4) damage determination.¹⁸²

B. *OHIO V. UNITED STATES DEP'T. OF INTERIOR*

The companion case to *Colorado v. United States Dep't of Interior*¹⁸³ involved ten states, three environmental groups, a chemical industry trade association, a manufacturing firm, and a public utility company challenging the Department of Interior's natural resource damage assessment regulations promulgated pursuant to CERCLA section 301(c)(1)-(3).¹⁸⁴ Essentially, the case focused on two separate conflicting views concerning the natural resource damage regulations: (1) the allegations of the state and environmental parties that the Department of Interior's regulations understated damages to natural resources due to hazardous materials spills and (2) the industry arguments that overstated damages would result from the assessment rules.¹⁸⁵

The D.C. Circuit Court of Appeals held that the Department of Interior's Type B regulations limiting government recovery of natural resource damages to the "lesser of" restoration cost or lost use value were directly contrary to legislative intent and

179. The "physical fates" submodel determines the pathway of the contamination during the injury determination phase of the NRDAM/CME model. 880 F.2d at 484. For a discussion of the "physical fates" submodel, see Grigalunas and Opaluch, *supra* note 18, at 518-20.

180. Determination of the extent of the injury to the natural resources takes place within the "biological effects" submodel. 880 F.2d at 484. For an analysis of the "biological effects" submodel, see Grigalunas and Opaluch, *supra* note 18, at 520-22.

181. The "economic damages" submodel incorporates the data from the other submodels to calculate the monetary value of the economic harm to the damaged coastal and marine environment. 880 F.2d at 484. For a discussion of the "economic damages" submodel, see Grigalunas and Opaluch, *supra* note 18, at 522-25.

182. 880 F.2d at 484. *Cf.* *Ohio v. United States Dep't of Interior*, 880 F.2d 432 at 440 (Type B regulations broken into four phases: "preassessment phase," "assessment plan phase," "assessment phase," and "post-assessment phase").

183. 880 F.2d 481 (D.C. Cir. 1989).

184. *Ohio v. United States Dep't of Interior*, 880 F.2d 432 at 438. For the statutory language of Section 301(c)(1)-(3) of Superfund governing natural resource damage assessments, see *supra* notes 151-53 and accompanying text.

185. *Ohio v. United States Dep't of Interior*, 880 F.2d at 438.

therefore invalid.¹⁸⁶ The court of appeals further held that the Type B regulations' hierarchy of methodologies for measuring lost use value focusing exclusively on market values was not a reasonable statutory interpretation and therefore was disallowed.¹⁸⁷ Finally, the case was remanded to the Department of Interior for clarification of Type A and Type B regulations enforcing the CERCLA natural resource damage provisions as applied to privately owned land.¹⁸⁸

1. Standard of Review

The standard of review for a federal agency's interpretation of a statutory provision follows the two-step analysis set forth by the Supreme Court in *Chevron United States Am. Inc. v. Natural Resources Defense Council, Inc.*¹⁸⁹ The analysis involves an initial determination of "whether Congress has directly spoken to the precise question at issue."¹⁹⁰ In the event that Congress has clearly expressed its intent on a specific issue, the courts must give effect to the intended Congressional interpretation.¹⁹¹ When Congress is silent on a given issue or its intent is ambiguous, the courts are obliged to give deference to the agency's reasonable interpretation of the statute in question.¹⁹²

2. The "Lesser Of" Rule

The major issue in *Ohio v. United States Dep't of Interior* concerned the "lesser of" rule which provided that the appropriate damages measure for natural resources should be "the lesser of: restoration or replacement costs; or diminution of use values."¹⁹³ The various state and environmental parties argued successfully

186. *Id.* at 442. For a discussion of the court of appeals' reasoning concerning the "lesser of" rule, see *infra* notes 193-98 and accompanying text.

187. *Id.* at 464. For a discussion of the court's analysis of the hierarchy of assessment methods, see *infra* notes 205-08 and accompanying text.

188. *Id.* at 461. For a discussion of the public ownership rule, see *infra* notes 199-201 and accompanying text.

189. 467 U.S. 837, 842 (1984).

190. *Id.* at 842.

191. *Id.* at 842-43.

192. *Id.* at 844-45.

193. 880 F.2d at 441. The Department of Interior regulations at § 11.35(b)(2) & (3) state the following:

(2) The authorized official shall select *the lesser of*: restoration or replacement costs; or diminution of use values as the measure of damages, except as specified in paragraph (b)(3) of this section.

(3) When restoration or replacement of the injured resource is not technically feasible, as that phrase is used in this part, the diminution in use values, as determined by using the methodologies listed in § 11.83

that the "lesser of" rule would often result in damage assessments insufficient to cover restoration, replacement, or acquisition of the equivalent of the damaged resources and that the purpose of CERCLA was to provide for restoration of damaged natural resources where possible.¹⁹⁴

In examining the Department of Interior regulations in light of the statutory language of CERCLA and the legislative history of CERCLA and the Superfund Amendments and Reauthorization Act of 1986 (SARA),¹⁹⁵ the D.C. Circuit concluded that Congress had clearly expressed a distinct preference for measuring damages by restoration cost and that the "lesser of" rule was therefore an impermissible interpretation of Congress' unambiguous intent.¹⁹⁶ Perhaps the strongest supporting language in CERCLA is contained in section 107(f)(1), stating that the measure of damages "shall not be limited by" restoration costs.¹⁹⁷ The court of appeals understood the CERCLA natural resource damage assessment provisions to reflect a strong policy concern favoring preservation of natural resources which took precedence over traditional cost-benefit analysis.¹⁹⁸

3. The Public Ownership Rule

The state and environmental groups in *Ohio v. United States Dep't of Interior* raised a number of other issues concerning the Department of Interior's damage assessment regulations.¹⁹⁹ Petitioners challenged the public ownership rule which limited the availability of natural resource damages to cases where the resources were owned by governmental entities, rather than by private parties.²⁰⁰ The court of appeals upheld the public ownership

of this part, or other methodologies that meet the acceptance criteria in § 11.83 of this part, shall constitute the measure of damages.

43 C.F.R. § 11.35(b)(2) & (3) (1989) (emphasis added).

194. *Ohio v. United States Dep't of Interior*, 880 F.2d at 441.

195. CERCLA § 111, 42 U.S.C. § 9611.

196. 880 F.2d at 444.

197. 42 U.S.C. § 9607(f)(1). In pertinent part, section 107(f)(1) states "[t]he measure of damages in any action under subparagraph (C) of subsection (a) of this section shall not be limited by the sums which can be used to restore or replace such resources." *Id.* (emphasis added).

198. 880 F.2d at 457.

199. See *infra* notes 200-26 and accompanying text.

200. 880 F.2d at 459. Section 107 of Superfund can be interpreted to limit recovery of natural resources damages to government lands. 42 U.S.C. § 9607. The statute defines "natural resources" as "resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States . . . , any State or local government, any foreign government, any Indian tribe, or . . . any member of any Indian tribe." *Id.* § 101(16), 42 U.S.C. § 9601(16).

rule after examining the statutory language of CERCLA and the surrounding legislative history, but remanded the record to the Department of Interior for clarification of its interpretation of its own regulations concerning the extent to which coverage might be available for resources not owned by the government.²⁰¹

4. The "Committed Use" Requirement

The state and environmental groups objected to the "committed use" requirement limiting the measurement of use values for the damaged resources.²⁰² The D.C. Circuit upheld the "committed use" standard because of the reasonableness of avoiding highly speculative use estimates.²⁰³ The court of appeals justified the limitation on use estimates because of the possibility of restoration or replacement cost estimates serving as the damage measure, regardless of a showing of a "committed use."²⁰⁴

5. The Hierarchy of Assessment Methods

The environmental organizations had somewhat more success in challenging the hierarchy of assessment methods which limited use valuation to market values in the absence of a finding that the "market for the resource is not reasonably competitive."²⁰⁵ The court of appeals recognized the inability of market

201. 880 F.2d at 461.

202. 43 C.F.R. § 11.84(b)(2) (1989). The Department of Interior's regulations provided that "[o]nly committed uses . . . of the resources or services over the recovery period will be used to measure the change from the baseline resulting from injury to a resource." 43 C.F.R. § 11.84(b)(2) (1989). The Department of Interior defined "committed uses" in the regulations as "either: a current public use; or a planned public use of a natural resource for which there is a documented legal, administrative, budgetary, or financial commitment established before the discharge of oil or release of a hazardous substance is detected." 43 C.F.R. § 11.14(h) (1989).

203. 880 F.2d at 462. This justification for the "committed use" requirement can be found in the regulations, which state, "[t]he baseline uses must be reasonably probable, not just in the realm of possibility. Purely speculative uses of the injured resource are precluded from consideration in the estimation of damages." 43 C.F.R. § 11.84(b)(2).

204. 880 F.2d at 462.

205. 880 F.2d at 462 (citing 43 C.F.R. § 11.83(c)(1)). The Department of Interior regulations provided the following:

(c)(2) When the authorized official determines that the market price methodology is not appropriate, the appraisal methodology shall be used if sufficient information exists.

(d)(1) Only when the authorized official has determined that neither the market price nor the appraisal methodology is appropriate shall the methodologies listed in this section or those that meet the

prices to capture open-access values of natural resources: "From the bald eagle to the blue whale and snail darter, natural resources have values that are not fully captured by the market system."²⁰⁶ The D.C. Circuit applied Step Two of the *Chevron* analysis in concluding that the Department of Interior regulations which overemphasized market value represented an unreasonable statutory interpretation.²⁰⁷ The court of appeals noted the necessity of considering option and existence values which are not adequately reflected in market prices for resources.²⁰⁸

6. Ten Percent Discount Rate

The next challenge brought by the state and environmental parties concerned the use by the Department of Interior of a ten percent discount rate for calculating the present value of expected future injury to resources.²⁰⁹ The court of appeals dismissed arguments that the use of present value analysis would systematically undervalue natural resource damages.²¹⁰

7. Allegedly Preferential Treatment of PRPs

State and environmental parties alleged that the Department of Interior regulations provided preferential treatment for "potentially responsible parties (PRPs)."²¹¹ The contested issues

acceptance criteria in paragraph (d)(7) of this section be used to estimate a diminution of use value for the purposes of this part.

43 C.F.R. § 11.83(c)(2) & (d)(1) (1989).

Subsections (d)(2)-(7) provided for other valuation methodologies such as travel cost studies (*see supra* notes 131-37 and accompanying text) and contingent valuation (*see supra* notes 137-43 and accompanying text). *Id.* § 11.83(d)(2)-(7) (1989).

206. 880 F.2d at 462-63. For a discussion of open-access values, see *supra* notes 66-74 and accompanying text.

207. *Id.* at 462.

208. *Id.* at 464. For a discussion of option and existence values, see *supra* notes 83-90 and accompanying text.

209. *Id.* at 464-65. The Department of Interior regulations stated that "[w]here possible, damages should be estimated in the form of an expected present value dollar amount. In order to perform this calculation, a discount rate (specified by the Office of Management and Budget) must be selected." 43 C.F.R. § 11.84(e)(1) & (2) (1989).

210. 880 F.2d at 465. Present value calculation is a tool of financial analysis which determines the necessary amount of money received today that would be equivalent to some future amount or stream of payments. The difference reflects the estimated returns on interim investments. Essentially, the court of appeals reasoned that if estimation of the projected future costs of restoring the resources was reasonably accurate, then a discounted present value figure should not undervalue the resource to be restored. *Id.*

211. *Id.* at 465. "Potentially responsible parties" are parties who may be responsible for hazardous substance releases or oil spills and therefore may be

concerned the authorization for and delegation of assessment tasks to PRPs and the public notice and comment provisions.²¹² The court of appeals refused to find that participation of PRPs in the assessment process or the right to public notice and comment during the preassessment and assessment plan phases was unreasonable or contrary to the intent of CERCLA.²¹³

8. Reasonable Assessment Costs Limitation

The D.C. Circuit declined to overturn the Department of Interior's rule limiting recovery of "reasonable costs of assessing" natural resources to situations where "the anticipated cost of the assessment is expected to be less than the anticipated damage amount."²¹⁴ The court of appeals found rational justification for a regulation designed to avoid the waste of spending more on determining the amount of damage than on the damage itself.²¹⁵

9. Acceptance Criteria

The court of appeals upheld the Department of Interior regulations which established a set of "acceptance criteria" for determining the necessary element of causation in natural resource damages due to oil or hazardous substance releases.²¹⁶ The court

liable to pay damages. *Id.* Although petroleum products are generally excluded from the list of hazardous substances under Superfund, oil spill releases are covered under section 311(b)(2)(A) of the Clean Water Act, explicitly incorporated by reference into Superfund. 42 U.S.C. § 9601(14).

212. 880 F.2d at 466-68. Basically, the first objection concerned the fact that some PRPs were involved in the assessment process and thus conceivably could influence the objectivity of the assessments. *Id.* at 466. The court of appeals found that the Department of Interior was empowered to delegate assessment tasks to PRPs with the lead authorized official determining the delegated assessment tasks to be performed "under the direction, guidance, and monitoring of the authorized official." *Id.* (quoting 43 C.F.R. § 11.32(d)). The second contention argued that PRPs were permitted notice and comment on the assessment process which was denied to the general public and other government agencies with an interest in the assessments. *Id.* at 467.

213. *Id.* at 467-68.

214. *Id.* at 468.

215. *Id.*

216. 880 F.2d at 472-73. The Department of Interior regulations delineate a set of four acceptance criteria for determining injury to a biological resource:

(i) The biological response is often the result of exposure to oil or hazardous substances. . . .

(ii) Exposure to oil or hazardous substances is known to cause this biological response in free-ranging organisms. . . .

(iii) Exposure to oil or hazardous substances is known to cause this biological response in controlled experiments. . . .

(iv) The biological response measurement is practical to perform and produces scientifically valid results.

of appeals found that statutory ambiguity existed on this issue and therefore, under step two of the *Chevron* analysis, deference is to be given to the Department of Interior's reasonable interpretation of the statute which permitted adoption of traditional standards of causation.²¹⁷

10. Audit Requirements

The court of appeals approved the Department of Interior's promulgation of audit requirements for accounting and planning purposes as within their statutory rulemaking authority under section 301(c) of CERCLA.²¹⁸ The audit requirements were found to be reasonably related to the assessment of natural resource damages and consistent with the goals of Superfund in ensuring statutory compliance.²¹⁹

11. Punitive Damages

The state and environmental groups unsuccessfully argued that the Department of Interior regulations should have provided for punitive damages against responsible parties.²²⁰ The court of appeals interpreted the "best available procedures" language relating to the determination of compensatory damages to indicate the statutory intent to eliminate the possibility of punitive damages.²²¹

12. Contingent Valuation

The final set of issues examined by the D.C. Circuit concerned the use of contingent valuation techniques in assessing natural resource damages.²²² The court of appeals disagreed with arguments of the industry parties attempting to undercut the

43 C.F.R. § 11.62(f)(2)(i)-(iv) (1989).

217. *Ohio v. United States Dep't of Interior*, 880 F.2d at 473. For a discussion of the *Chevron* standard of review analysis, see *supra* notes 189-92 and accompanying text.

218. 880 F.2d at 474. For the text of Section 301(c) of CERCLA containing the statutory authority to promulgate regulations, see *supra* note 151.

219. 880 F.2d at 474.

220. *Id.*

221. *Id.* The court of appeals reasoned that if Congress had intended punitive damages to be made available, there would have been no need for Superfund to require such precise determination of compensatory damages by the "best available procedures", since recovery would not be limited to compensatory damages. CERCLA § 301(c)(2), 42 U.S.C. § 9651(c)(2).

222. 880 F.2d at 474-81.

legitimacy of contingent valuation methods.²²³ After reviewing the Department of Interior's investigations of contingent valuation methods, the court of appeals found that these methodologies were consistent with the statutory requirement to use the "best available procedures."²²⁴ The industry parties in *Ohio v. United States Dep't of Interior* unsuccessfully challenged the extension of the rebuttable presumption of validity to encompass contingent valuation assessments as well as restoration cost assessments.²²⁵ The D.C. Circuit accordingly approved the adoption of contingent valuation methodology in the assessment of natural resource damages.²²⁶

VII. CONCLUSION

Examination of the different types of natural resource values such as use value, existence value, and intrinsic value and of the relative merits of the various methodologies for evaluating the worth of natural resources supports the conclusion that the current Department of Interior regulations understate true natural resource damages because of their exclusive dependency on use value and market valuation. The growing recognition and acceptance of ecological concerns may be aided by economic analysis through firm compliance incentives. The recent decisions of the D.C. Circuit Court of Appeals strongly suggest that restoration costs should be used as the presumptive method of natural resource damages. If restoration costs prove to be disproportionately expensive in a given situation or if restoration is impossible

223. *Id.* at 476. For a general discussion of contingent valuation, see *supra* notes 137-43 and accompanying text.

224. *Id.* at 478. The use of contingent valuation was considered by the Department of Interior in promulgating the natural resource damage assessment regulations and was discussed in section 11.83(d)(5):

(5)(i) The contingent valuation methodology includes all techniques that set up hypothetical markets to elicit an individual's economic valuation of a natural resource. This methodology can determine use values and explicitly determine option and existence values.

(ii) The use of the contingent valuation methodology to explicitly estimate option and existence values should be used only if the authorized official determines that no use values can be determined.

43 C.F.R. § 11.83(d)(5)(i) & (ii) (1989).

225. 880 F.2d at 480. The industry parties in *Ohio* focused on the possibility of bias infecting the validity of contingent valuation assessments. *Id.* at 477. The court of appeals disagreed with the contention that contingent valuation could not qualify as a "best available procedure" based on the Department of Interior's thorough investigation of such assessments and refused to disallow its use as a damage assessment measure. *Id.*

226. *Id.* at 480.

or highly impractical, then other valuation methodologies such as contingent valuation offer a viable assessment alternative. Policy considerations in Superfund and related environmental legislation evidence support for favoring the preservation of natural resources over the concerns of polluters in the fairness analysis.

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