THE IRRATIONALITY OF ECONOMIC RATIONALITY IN THE RESTORATION OF NATURAL RESOURCES

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I. INTRODUCTION

A small oil spill from a barge is alleged to have destroyed the southernmost breeding colony of common murres off the coast of California, thus reducing their breeding range. The government brings an action against the owner of the barge, seeking restoration of the murre colony. The defendant argues that restoration is unwarranted because no one makes any use of the murres, and he hires an economist to evaluate the government's restoration plan. The economist testifies that the cost of the restoration plan is grossly disproportionate to the value of the birds. The following interchange occurs at his deposition:[1]

> Q: I think in your report, you indicate that a reasonable way of approaching the grossly disproportional factor[2] for selecting restoration proposals is to determine whether a restoration proposal is within three times the lost use value from an injury to a natural resource. Is that an accurate statement of your position?
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> A: That the relationship of cost [to] benefits should be within a factor of three, that's right.
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> Q: Well, if the lost use value associated with the injury to common murres is zero, doesn't that imply that a penny spent on restoring [common] murres is too much?

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1. This passage is adapted from a deposition taken by the Author.

2. *See* Ohio v. United States Dep't of the Interior, 880 F.2d 432, 443–44 n.7 (D.C. Cir. 1989).

A: It could. It would mean that it would likely fail the restoration—any restoration option might fail the test, that's right.

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Q: But you really think the lost use value is zero?

A: I think it's zero or very close to it. I have seen no evidence to the contrary.

Q: Three times zero, I think we can agree, is zero.

A: It's true. If you use a value of zero for use, then you couldn't justify any of the restoration programs, that's true.

Q: You couldn't justify spending a penny.

A: That's true.

Q: You couldn't justify the time we just spent talking about this stuff.

A: None of the restoration plans would be justified....

This analysis is troubling, to say the least. Federal natural resource damage law is designed to provide for restoration of injured natural resources from oil spills or releases of hazardous substances. The view that restoration of a seabird colony cannot be justified economically because no one "uses" it seems contrary to the very purpose of the law. Yet it is characteristic of a point of view that considers natural resources as commodities and can justify their protection only on an economic basis.

This Article argues that a narrow economic perspective on restoration of natural resources is deeply flawed, both on theoretical and legal grounds. The use of economic value to determine the scope of restoration is not only inconsistent with the applicable statutes, but also is fundamentally irrational. The scope of restoration is essentially a scientific and legal decision—to reduce it to a mechanical comparison of economic values and costs misconstrues the nature of restoration and results in absurd conclusions like those reached by the oil spill economist above.

II. STATUTORY AND REGULATORY BACKGROUND

Federal claims for natural resource damages are based primarily on the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"),[3] the Oil Pollution Act ("OPA"),[4] section 311 of the Clean Water Act,[5] the National Marine Sanctuaries Act ("Sanctuaries Act"),[6] and the Park

3. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9601–9675 (1994 & Supp. III 1997).

4. Oil Pollution Act of 1990, 33 U.S.C. §§ 2701–2761 (1994 & Supp. III 1997).

5. Clean Water Act § 311, 33 U.S.C. § 1321 (1994 & Supp. III 1997).

System Resource Protection Act.[7] CERCLA establishes a claim for natural resource damages arising out of releases of hazardous substances.[8] OPA provides for natural resource damage claims arising out of oil spills.[9] The Clean Water Act provides an additional basis for recovery of natural resource damages for discharges of hazardous substances from vessels, onshore facilities, or offshore facilities.[10] The Sanctuaries Act creates remedies for injury to resources in national marine sanctuaries.[11] The Park System Resource Protection Act provides for damage claims for injury to resources in national parks.[12]

The provisions of these statutes relating to restoration of injured natural resources are similar. CERCLA, for example, creates a claim for "damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss" resulting from release of a hazardous substance.[13] CERCLA provides that the United States, states, or Indian Tribes may act on behalf of the public as trustees for injured resources "belonging to, managed by, controlled by, or appertaining to" these governments.[14] Natural resource damage recoveries may be used only "to restore, replace, or acquire the equivalent of" injured natural resources.[15] To provide a framework for assessing damages, CERCLA requires the federal government to promulgate regulations for damage assessment.[16]

In a series of rulemakings, the Department of the Interior ("DOI") has promulgated damage assessment regulations.[17] DOI's initial rules were challenged by states, environmental organizations, and industry trade associations. This challenge resulted in *Ohio v. United States Department of the Interior*,[18] which is the most extensive judicial examination of restoration under federal natural resource damage statutes.

In accord with its interpretation of orthodox economic theory, DOI's initial rules provided that natural resource damages would be limited to the lesser of restoration costs or diminution of economic use values.[19] The D.C. Circuit

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6. National Marine Sanctuaries Act of 1972, 16 U.S.C. §§ 1431–1445 (1994 & Supp. IV 1998).
7. Park System Resource Protection Act of 1990, 16 U.S.C. §§ 19jj–19jj-4 (1994 & Supp. IV 1998).
8. *See* 42 U.S.C. § 9607(a).
9. *See* 33 U.S.C. § 2702(b).
10. *See id.* § 1321(f).
11. *See* 16 U.S.C. § 1443(a).
12. *See id.* § 19jj–1(a).
13. 42 U.S.C. § 9607(a)(4)(C).
14. *Id.* § 9607(f)(1).
15. *See id.*
16. *See id.* § 9651(c).
17. *See* 43 C.F.R. pt. 11 (1999).
18. 880 F.2d 432 (D.C. Cir. 1989).
19. *See id.* at 441.

rejected this view. The court found that Congress intended restoration to be the "basic measure of recovery."[20] Indeed, the court noted that the statute did not create a choice between restoration costs and lost economic use value, but authorized recovery of both.[21] While DOI could establish some class of cases where recovery of restoration costs was not required due to technical infeasibility or grossly disproportionate costs, it could not tie restoration rigidly to use value.[22]

In response to the *Ohio* decision, DOI amended its damage assessment regulations. The purpose of restoration under the revised DOI regulations is to return services from injured resources to baseline, that is, "the condition or conditions that would have existed at the assessment area had the discharge of oil or release of the hazardous substance under investigation not occurred."[23] The regulations now provide that trustees should develop a Restoration and Compensation Determination Plan.[24] This plan may include both restoration of injured resources, and "compensable value," that is, compensation for loss of services between the time of injury and the resources' recovery or restoration.[25]

Selection of restoration measures involves the development of a reasonable number of restoration alternatives and estimation of the costs of those alternatives.[26] Among the alternatives must be the option to use "natural recovery with minimal management actions."[27] The trustee selects one of the alternatives using the following factors: (1) "technical feasibility;" (2) the "relationship of the expected costs of the proposed actions to the expected benefits...;" (3) "cost-effectiveness;" (4) the "results of any actual or planned response actions;" (5) the "potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the injured resources or other resources;" (6) the "natural recovery period...;" (7) the "ability of the resources to recover with or without alternative actions;" (8) the "potential effects of the action on human health and safety;" (9) "[c]onsistency with relevant Federal, State, and tribal policies;" and (10) "[c]ompliance with applicable Federal, State and tribal laws."[28] The relative weight of these factors is left to the discretion of the trustee.[29] Once an alternative is selected, the trustee then publishes the Restoration and Compensation Determination Plan for public review and comment.[30] Depending upon the nature

20. *Id.* at 450.
21. *Id.* at 448 (citing 42 U.S.C. § 9607(f)(1)).
22. *See id.* at 459.
23. *See* 43 C.F.R. § 11.14(e).
24. *See id.* § 11.80(c).
25. *Id.* § 11.80(b).
26. *See id.* § 11.82(a).
27. *See id.* § 11.82(c)(2).
28. *Id.* § 11.82(d). Cost-effectiveness "means that when two or more activities provide the same or a similar level of benefits, the least costly activity providing that level of benefits will be selected." *Id.* § 11.14(j).
29. *See* Natural Resource Damage Assessments, 59 Fed. Reg. 14,262, 14,264 (1994) (codified at 43 C.F.R. pt. 11 (1999)).
30. *See* 43 C.F.R. § 11.80(c).

of public comment, the trustee may then use the plan to determine the restoration costs that he will claim as part of the natural resource damage case.[31]

In the *Ohio* decision the D.C. Circuit suggested that DOI had authority to create a class of cases in which restoration would be limited on the basis of cost.[32] DOI decided instead to allow the trustee to balance restoration costs against the value of the resources, with the option of choosing less expensive restoration or acquisition alternatives if the cost of a particular restoration action is excessive in relation to its benefits.[33] The D.C. Circuit has upheld this approach.[34]

The natural resource damage provisions of OPA are similar to those of CERCLA. OPA provides for recovery of damages for injury to natural resources resulting from oil spills.[35] Damages include the costs of restoring, rehabilitating, replacing, or acquiring the equivalent of the injured natural resources.[36] They can also include the diminution in value of those resources pending restoration, as well as the cost of assessing damages.[37] OPA requires the National Oceanic and Atmospheric Administration ("NOAA") to promulgate damage assessment regulations.[38] Like CERCLA, OPA requires that damage awards be used to restore, rehabilitate, replace, or acquire the equivalent of injured resources.[39]

The goal of the NOAA regulations is "the return of the injured natural resources and services to baseline and compensation for interim losses of such natural resources and services from the date of the incident until recovery."[40] The regulations distinguish between primary restoration, which is designed to restore injured resources and services to baseline, and compensatory restoration, which is designed to compensate for interim loss of services between injury and return to baseline.[41] In selecting restoration actions, the trustees must consider: (1) "[t]he cost to carry out the alternative;" (2) "[t]he extent to which each alternative is expected to meet the trustees' goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses;" (3) "[t]he likelihood of success of each alternative;" (4) "[t]he extent to which each alternative will prevent future injury as a result of the incident, and avoid collateral injury as a result of implementing the alternative;" (5) "[t]he extent to which each alternative benefits more than one natural resource and/or service;" and (6) "[t]he

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31. *See id.*
32. *See* Ohio v. United States Dep't of the Interior, 880 F.2d 432, 443–44 n.7, 459 (1989).
33. *See* 59 Fed. Reg. at 14,271.
34. *See* Kennecott Utah Copper Corp. v. United States Dep't of the Interior, 88 F.3d 1191, 1218 (D.C. Cir. 1996).
35. *See* 33 U.S.C. § 2702 (1994).
36. *See id.* § 2706(d)(1).
37. *See id.*
38. *See id.* § 2706(e).
39. *See id.* § 2706(c), (f).
40. 15 C.F.R. § 990.10 (1999).
41. *See id.* § 990.30.

effect of each alternative on public health and safety."[42] Trustees may consider only those alternatives that are "technically feasible and in accordance with applicable laws...."[43] Where two alternatives are equally preferable, the trustees must select the most cost-effective approach.[44]

Thus, DOI's and NOAA's damage assessment regulations provide a process by which natural resource trustees balance the numerous scientific, technical, and economic factors involved in selecting restoration activities. Yet, defendants still seek to use economic value as a limit on restoration. In particular, defendants take solace from the D.C. Circuit's suggestion that restoration may not be justified in cases where its costs are grossly disproportionate to the value of the resources affected. Like the oil spill economist, they argue that this test requires consideration only of the economic use value of the resource.[45]

This approach is fundamentally flawed because it fails to recognize the inadequacy of economic analysis in determining the value of natural resources. Natural resource damage claims include both the costs of primary restoration and an element of compensation for loss of services from resources between the time of injury and restoration or recovery. Economic analysis may be appropriate for measuring some aspects of the second component. But decisions on the scope of primary restoration should be made, as DOI's and NOAA's regulations provide, on the ecological and technical merits of restoration. While the cost of restoration is a relevant factor, cost must be considered in light of the *ecological* value of resources, as well as their *economic* value. This precludes the trustees and the courts from determining the scope of restoration by simply comparing restoration costs to the economic value of injured resources. But, as argued below, a narrow economic analysis is superficial and irrational.

III. ECONOMIC VALUE

To understand why orthodox economic valuation can produce such strange results in the context of restoration, one must delve more deeply into the nature of economic value. Economists view natural resources as assets that provide services to human beings.[46] The value of these services is based on their effect on individuals' well-being.[47]

To measure the effect of changes in environmental services on individuals' well-being, economists rely on the same theory that governs the measurement of the economic value of ordinary consumer goods and services

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42. *See id.* § 990.54(a).

43. *Id.* § 990.53(a)(2).

44. *See id.* § 990.54(b).

45. *See, e.g.*, Kennecott Utah Copper Corp. v. United States Dep't of the Interior, 88 F.3d 1191, 1220 (D.C. Cir. 1996).

46. *See* A. MYRICK FREEMAN III, THE MEASUREMENT OF ENVIRONMENTAL AND RESOURCE VALUES: THEORY AND METHODS 5 (1993).

47. *See id.* at 7.

purchased in markets.[48] The basis of this theory is the notion of preferences.[49] Economists assume that people have well-defined preferences among sets, or bundles, of goods, and that different bundles can be traded off against one another.[50] In other words, a reduction in the quantity of one type of good in a bundle can be traded for another bundle with a greater quantity of another type of good, leaving the individual with the same level of well-being. Economists refer to this as the property of substitutability.[51] This property is said to be "at the core of the economist's concept of value because substitutability establishes trade-off ratios" between goods.[52]

Economic value is revealed by the trade-offs people make as they choose among goods and services.[53] The monetary price of a good is simply its trade-off ratio against money.[54] The economic value of a good can be measured in terms of an individual's "willingness to pay" for the good, which is defined as "the maximum sum of money the individual would be willing to pay rather than do without an increase in some good...."[55]

In a market economy, market transactions determine the production and distribution of goods. In theory, the interaction between consumers' willingness to pay and producers' costs generates price signals that result in efficient allocation of scarce resources to production of the goods that result in the greatest well-being of consumers.[56]

While in theory markets can provide adequate signals for production of consumer goods, they cannot provide adequate signals for production of goods that are not traded.[57] For instance, markets do not lead to proper allocation of public goods. Public goods are goods whose benefits are shared in common; a frequently used example of a public good is a lighthouse.[58] The cost of building a lighthouse is substantial, but once built, individuals cannot be excluded from the benefits it provides. Therefore, there is an incentive for people to "free ride" on the provision of a lighthouse by someone else.[59] As a result, it is unlikely that a private

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48. *See id.*

49. *See* A. MYRICK FREEMAN III, THE BENEFITS OF ENVIRONMENTAL IMPROVEMENT: THEORY AND PRACTICE 3 (1979).

50. *See* FREEMAN, *supra* note 46, at 7.

51. *See id.*

52. *See id.*

53. *See id.*

54. *See id.*

55. *Id.* at 8.

56. *See* A. MYRICK FREEMAN III ET AL., THE ECONOMICS OF ENVIRONMENTAL POLICY 64–65 (1973); PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, ECONOMICS 38–53, 136–41 (15th ed. 1995).

57. *See* FREEMAN ET AL., *supra* note 56, at 65.

58. *See id.* at 76; EBAN S. GOODSTEIN, ECONOMICS AND THE ENVIRONMENT 39 (2d ed. 1999); SAMUELSON & NORDHAUS, *supra* note 56, at 32 n.3.

59. *See* GOODSTEIN, *supra* note 58, at 39.

party seeking to operate a lighthouse will be able to recapture the cost of providing it by charging fees in a free market. So a private party is unlikely to build a lighthouse. Economists treat more abstract aspects of public policy as public goods, such as environmental quality,[60] national defense, and public health.[61]

While public goods are not traded in markets, economists apply the same theory of value to them that they apply to ordinary commodities.[62] Economists assume that the demand for public goods can be thought of in a manner similar to commodities, and that the value of public goods is similarly defined by the sum of the "willingness to pay" of those who benefit from them.[63] Where possible, economists will attempt to infer the value of public goods from prices in private markets for similar goods.[64] Where this is not possible, "shadow prices" may be developed using other economic techniques.[65] Economists may seek to measure the value of services from public goods that are included in private goods. For example, they may analyze differences in housing prices between areas with good environmental quality and areas with poor environmental quality.[66] Or they may try to measure willingness to pay directly by asking people in surveys what they would pay for a public good.[67]

The economic approach to valuation has important implications for public policy. Because economists measure the desirability of public policy choices by the same standard they use to evaluate market transactions in consumer goods, they evaluate public policy in terms of its effect on individuals' welfare.[68] Individuals' welfare, as noted above, is defined in terms of their preferences for the goods and services they consume.[69] Therefore, the value of a public good is the sum of individuals' private values, or willingness to pay, for the good.[70]

Thus, it is perhaps not too surprising that the oil spill economist concluded that a penny was too much to spend on restoration of the seabird colony. Since no one travels offshore to watch the birds, no one "uses" the resource. Their contribution to the overall ecosystem is diffuse and hard to

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60. *See* FREEMAN, *supra* note 49, at 4; GOODSTEIN, *supra* note 58, at 25, 41.

61. *See* SAMUELSON & NORDHAUS, *supra* note 56, at 32, 280, 291.

62. *See* ROBERT H. HAVEMAN, THE ECONOMICS OF THE PUBLIC SECTOR 49, 55 (2d ed. 1976).

63. *See id.* at 55; FREEMAN, *supra* note 49, at 3.

64. *See* FREEMAN, *supra* note 49, at 4–5; HAVEMAN, *supra* note 62, at 160.

65. *See* HAVEMAN, *supra* note 62, at 167 n.24.

66. *See* FREEMAN, *supra* note 46, at 367; GOODSTEIN, *supra* note 58, at 140.

67. *See* FREEMAN, *supra* note 46, at 165.

68. *See* FREEMAN, *supra* note 46, at 7. *See also* DANIEL M. HAUSMAN & MICHAEL S. MCPHERSON, ECONOMIC ANALYSIS AND MORAL PHILOSOPHY 69 (1996); Amartya Sen, *Personal Utilities and Public Judgements: or What's Wrong with Welfare Economics*, *in* AMARTYA SEN, CHOICE, WELFARE AND MEASUREMENT 327, 327–28 (1982).

69. *See* FREEMAN ET AL., *supra* note 56, at 80–81; HAVEMAN, *supra* note 62, at 82.

70. *See* FREEMAN ET AL., *supra* note 56, at 76; FREEMAN, *supra* note 49, at 3.

measure. The oil spill economist felt that one more or one less seabird colony did not matter, since viewing one bird was as good as another and birds were thus substitutes for one another.

> Q: What's your opinion based on?
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> A: (a) That there are a large number of sites; (b) that there's a large population so—you see them flying up and down the coast; and (c) I got the same kind of satisfaction from virtually all of these places.

Then again, for him the degree of substitutability of one bird for another, or in economic terminology his elasticity of substitution, did seem rather high.

> Q: Can you tell the difference between a cormorant and a murre?
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> A: I know what a cormorant looks like. I'm not sure if I saw a murre.... There were many birds, shore birds, birds on rocks, birds in the distance, birds floating.

Obviously, if use value is to be the test, there will be little restoration of anything that is not commercially exploitable. It was to redress this imbalance in conventional economics that the concept of nonuse, or passive-use, value was developed. Nonuse values are economic values that arise independently of use of a resource.[71] For example, people may obtain utility from the knowledge that certain resources exist, regardless of whether they have any intention of actually using them.[72] The fact that people contribute large sums to environmental organizations to preserve wilderness areas that they may never visit is evidence of nonuse value.[73]

The only method of measuring nonuse values is the contingent valuation method, which is essentially a survey designed to elicit people's willingness to pay for natural resources.[74] The contingent valuation method is the subject of intense controversy,[75] and a discussion of this controversy is beyond the scope of this Article. It is worth noting, however, that in the *Ohio* decision, the D.C. Circuit held that nonuse values "reflect utility derived by humans from a resource, and thus, *prima facie*, ought to be included in a damage assessment."[76] The *Ohio* court rejected an industry challenge to the contingent valuation method of measuring

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71. *See* FREEMAN, *supra* note 46, at 141.

72. *See id.*

73. *See id.* at 159.

74. *See id.* at 159–60.

75. *See, e.g.*, Jeffrey C. Dobbins, *The Pain and Suffering of Environmental Loss: Using Contingent Valuation to Estimate Nonuse Damages*, 43 DUKE L.J. 879, 882–83 (1994); Miriam Montesinos, *It May Be Silly, But It's an Answer: The Need to Accept Contingent Valuation Methodology in Natural Resource Damage Assessments*, 26 ECOLOGY L.Q. 48, 49–50 (1999); Note, *"Ask a Silly Question...": Contingent Valuation of Natural Resource Damages*, 105 HARV. L. REV. 1981, 1984–96 (1992).

76. Ohio v. United States Dep't of the Interior, 880 F.2d 432, 464 (D.C. Cir. 1989).

those values.[77] In response to the continuing controversy over contingent valuation, NOAA convened a panel of distinguished economists to consider its validity.[78] This panel concluded that, subject to certain stringent requirements, contingent valuation "can produce estimates reliable enough to be the starting point of a judicial process of damage assessment, including lost passive-use values."[79] The D.C. Circuit relied on the panel report in rejecting a challenge to NOAA's refusal to bar use of contingent valuation.[80] Some economists have questioned the need for all of the panel's requirements;[81] others continue to question whether the method should be used under any conditions.[82] In any event, NOAA damage assessment regulations allow its use for determining the scope of compensatory restoration.[83] DOI is still in the process of revising its rules on contingent valuation.[84]

One curious aspect of the economic theory of value is the blurring of the distinction between positive economics, which is the description of how people actually behave, and normative economics, which is intended to provide policy prescriptions for economic problems. Because the theory of value is presented as a theory of rational choice in the service of societal welfare, there is a tendency to treat observed departures from the theory as irrational and deviant behavior.[85] Accordingly, some economists, like the oil spill economist described above, may view people's fervent and non-economic attachment to particular places or sense of loss over dead seabirds as irrational behavior that interferes with the ordered progress towards overall social welfare.

Many economists recognize that social policy ultimately depends on factors other than economic value. As A. Myrick Freeman has stated, "most current resource and environmental policy is not based solely or even primarily on the efficiency criterion."[86] Nevertheless, a narrower economic world view is

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77. *See id.* at 478, 480.

78. *See* Natural Resource Damage Assessments Under the Oil Pollution Act of 1990; Advance Notice of Proposed Rulemaking, Extension of Comment Period, and Release of Contingent Valuation Methodology Report, 58 Fed. Reg. 4601 (1993) (discussing a report by NOAA's Contingent Valuation Panel).

79. *Id.* at 4610.

80. General Elec. Co. v. United States Dep't of Commerce, 128 F.3d 767, 773–74, 778 (D.C. Cir. 1997).

81. *See, e.g.*, Alan Randall, *The NOAA Panel Report: A New Beginning or the End of an Era?*, 79 AM. J. AGRIC. ECON. 1489, 1492–93 (1997).

82. *See, e.g.*, Peter A. Diamond & Jerry A. Hausman, *Contingent Valuation: Is Some Number Better than No Number?*, 8 J. ECON. PERSP. 45, 46, 62–63 (1994).

83. *See* Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. 440, 486 (1996) (codified at 15 C.F.R. pt. 990 (1999)).

84. *See, e.g.*, Natural Resource Damage Assessments, Proposed Rule, Extension of Comment Period, 59 Fed. Reg. 32,175 (1994).

85. *See* DANIEL M. HAUSMAN, THE INEXACT AND SEPARATE SCIENCE OF ECONOMICS 13, 274 (1992).

86. FREEMAN, *supra* note 46, at 9. *See also* FREEMAN, *supra* note 49, at 5–6.

deeply pervasive, as the frequent attempts to impose cost-benefit analysis on social regulation demonstrate. Indeed, some economists apparently view their role as "partisan advocate" for an economic "ideology" in the resolution of issues of social policy.[87] This is particularly true in litigation, where there tends to be a Gresham's law of experts; extreme positions drive out less dogmatic points of view.

IV. THE PROBLEM OF PREFERENCE

As noted above, the notion of preference underlies the economic approach to value. Ultimately, it is consumers' preferences, as expressed by their willingness to pay, that determines the economic value of goods and services. But there are fundamental reasons for questioning the applicability of this reasoning in determining the scope of primary restoration of natural resources. By basing the notion of economic value ultimately on individual preference, and equating public policy decisions with market transactions over consumer goods, economic analysis can lead to essentially irrational approaches to restoration. While economic values may be a legitimate component of some elements of natural resource damages, they do not provide an adequate basis to determine the scope of primary restoration.

The first problem with preferences is the assumption that human welfare is based on consumption of goods and services. Once basic needs are satisfied, the lack of connection between riches and happiness is, as they say, proverbial.[88] The assumption that consumer choices in the marketplace necessarily add to consumer welfare is incorrect in many cases, and there may be basic psychological reasons why consumer behavior leads to decreasing satisfaction with increasing economic wealth.[89] Thus, satisfaction of consumption preferences may be a poor guide to public policy.

Another problem with preferences is that economic theory takes them as given. Preferences may be based on coercion, manipulation, or ignorance; they may even be sadistic or racist.[90] In the environmental field, the dollar votes of those who cause pollution are weighted equally with its victims.[91] Furthermore, many preferences expressed in the market simply may be adaptations to the

87. *See* Donald H. Rosenthal & Robert H. Nelson, *Why Existence Value Should Not Be Used in Cost-Benefit Analysis*, 11 J. POL'Y ANALYSIS & MGMT. 116, 121 (1992).

88. "Remove far from me vanity and lies: give me neither poverty nor riches...." *Proverbs* 30:8.

89. *See* MARK SAGOFF, THE ECONOMY OF THE EARTH 104–07 (1988). *See generally* TIBOR SCITOVSKY, THE JOYLESS ECONOMY (1976).

90. *See* HAUSAM & MCPHERSON, *supra* note 68, at 78–80 (1996); SAGOFF, *supra* note 89, at 102–04; Cass R. Sunstein, *Preferences and Politics*, 20 PHIL. & PUB. AFF. 3, 10–11 (1991).

91. *See* FREEMAN ET AL., *supra* note 56, at 87.

existing institutions and might differ significantly if people had experience with other alternatives.[92]

More fundamentally, the assumptions underlying the economic theory of preferences are problematic when it comes to public decisions about public goods. Largely as a result of its historical development, economic theory tends to be based on a narrow view of human motivation and behavior.[93] Individual well-being is based on satisfaction of preferences, and it is common to view people's preferences as motivated solely by the pursuit of more goods and services.[94] Moral or altruistic preferences tend to be downplayed by this assumption that the object of human activity is the consumption of goods and services.[95] Because of the blurring of positive and normative economics, this premise tends to validate self-interest at the expense of other motivations.[96]

The strength of economics lies in the analysis of phenomena where its narrow picture of human motivation is reasonably accurate.[97] Thus, in describing and predicting behavior in markets for securities or consumer goods, economics can be a powerful tool. But in the case of public goods, the unthinking application of standard economic theory can become descriptively inaccurate and normatively pernicious.

It is clear that "economic agents are not always self-interested and that self-interest is not always material."[98] Amartya Sen, winner of the Nobel Prize in economics in 1998, has argued that in orthodox economic theory, "the exclusion of any consideration other than self-interest seems to impose a wholly arbitrary limitation on the notion of rationality."[99] He describes the economic man of traditional theory as a "social moron" or "rational fool."[100]

Insularity has permitted this theory to remain in vogue, despite conspicuous failure to account for many types of human behavior, e.g., why people vote in large elections, why people are ready to fight for and even die for a cause, or why so many seem convinced that they do many things out of a sense of commitment rather than pure pursuit of self interest.[101]

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92. *See* Cass R. Sunstein, *Endogenous Preferences, Environmental Law*, 22 J. LEGAL STUD. 217, 246–47 (1993).

93. *See* Amartya Sen, *Rational Fools: A Critique of the Behavioural Foundations of Economic Theory*, *in* SEN, *supra* note 68, at 84, 85–88.

94. *See* HAUSMAN, *supra* note 85, at 66.

95. *See* HAUSMAN & MCPHERSON, *supra* note 90, at 52.

96. *See id.* at 49, 219.

97. *See* HAUSMAN, *supra* note 85, at 95; Sen, *supra* note 93, at 85.

98. HAUSMAN & MCPHERSON, *supra* note 90, at 62.

99. Sen, *supra* note 93, at 104.

100. *Id.* at 99.

101. *See* Amartya Sen, *Description as Choice*, *in* SEN, *supra* note 68, at 442.

Sen has coined the term "commitment" to refer to motivations that lead individuals to make choices that decrease their personal welfare.[102] "[C]ommitment does involve, in a very real sense, counterpreferential choice, destroying the crucial assumption that a chosen alternative must be better than (or at least as good as) the others for the person choosing it, and this would certainly require that models be formulated in an essentially different way."[103] Commitment "drives a wedge between personal choice and personal welfare, and much of traditional economic theory relies on the identity of the two."[104]

The phenomenon of commitment is particularly important in the context of public goods or public policy, such as protection of the environment.[105] Indeed, the enormous dichotomy between private values expressed in the marketplace and public values expressed in other contexts will seem uncontroversial, indeed obvious, to anyone who has not become completely intoxicated by the heady vapors of economic theory.

Take public transportation, for example. I hate public transportation. Like most good westerners, I will stay in my car until I die, no matter how bad traffic congestion becomes, no matter what the effect on the environment. My willingness to pay for public transportation, as reflected in my dollar votes in the marketplace, is zero. If someone were to ask me in a survey my value for public transportation *in terms of my personal welfare*, it would be negative. Yet if the City of Seattle were to hold a referendum on making everyone get out of their cars and onto public transportation, I would vote for it. After all, I can see where this obsession with cars is leading in terms of congestion, urban sprawl, and air quality. And if everyone else agrees to make some sacrifices for the community, I'm willing to do my share. But not until.

Like most people, I express personal preferences in the marketplace that differ significantly from the views on public policy I express in the voting booth.[106] This might lead one to question the very logic behind the treatment of

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102. *See* Sen, *supra* note 93, at 92.

103. *Id.* at 93.

104. *Id.* at 94.

105. *See id.* at 94–95.

106. *See* SAGOFF, *supra* note 89, at 53–56, 114–18. *See also* Richard H. Pildes & Elizabeth S. Anderson, *Slinging Arrows at Democracy: Social Choice Theory, Value Pluralism, and Democratic Politics*, 90 COLUM. L. REV. 2121, 2146–67, 2175–79 (1990); Richard B. Stewart, *Regulation in a Liberal State: The Role of Non-Commodity Values*, 92 YALE L.J. 1537, 1550, 1569 (1983); Sunstein, *supra* note 92, at 243–45; Douglas R. Williams, *Valuing Natural Environments: Compensation, Market Norms, and the Idea of Public Goods*, 27 CONN. L. REV. 365, 388–89, 404, 473, 484–85 (1995). *Cf.* Daphna Lewinsohn-Zamir, *Consumer Preferences, Citizen Preferences, and the Provision of Public Goods*, 108 YALE L.J. 377, 399–402 (1998) (arguing that the difference between consumer and voter attitudes is explained by the more altruistic preferences elicited by public goods, not by a rigid distinction between preferences expressed as a consumer and preferences expressed as a voter).

public goods. It may be appropriate to treat the services derived from a lighthouse on the same basis as services derived from a private good. But less clear is the justification for treating decisions on more abstract issues of public policy like market transactions involving commodities.[107].

Take human rights. Does anyone really think we should determine public policy on racial discrimination by measuring everyone's willingness to pay for equality or, depending on one's point of view, for the "preference" for discrimination? Perhaps equality would win out today, but suppose we were asking the question in the early 1950s. Or the 1850s. Preferences can be significantly modified by changes in law and society.[108] Taking preferences as given and ignoring the moral and preference-changing aspects of public policy would produce some disturbing results.

Or consider defense policy. What is my willingness to pay for another aircraft carrier? I'm not sure how to approach that one. I assume that somewhere in the Pentagon there are analysts trying to figure out the trends in air and naval strength of our potential enemies, and the state of the technological battle between anti-ship missiles and electronic defense systems. I don't think we'll improve much on their work by doing surveys at shopping malls to find out how much people would like to pay for another carrier battle group, or by having economists try to figure out how much more people pay for housing in countries with more powerful navies.[109]

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107. The philosopher Ludwig Wittgenstein believed that most philosophical problems result from misuse of language. In particular, Wittgenstein warned against the tendency to treat abstract concepts as embracing a greater scope than what they derive from the original human practice from which they took their meaning. *See* LUDWIG WITTGENSTEIN, PHILOSOPHICAL INVESTIGATIONS § 116 (G.E.M. Anscombe trans., 2d ed. 1967); Robert J. Fogelin, *Wittgenstein's Critique of Philosophy*, *in* THE CAMBRIDGE COMPANION TO WITTGENSTEIN 53 (1996). This can lead to the creation of abstract, metaphysical entities whose internal contradictions pose unending and insoluble philosophical difficulties. The tendency to create illusory and internally problematic entities seems to be at work in the economic concept of value. As noted above, economic value arises out of the practice of exchange. Yet by defining social objectives and policies, which are not exchanged in markets, as "public goods," economists are led to seek the "value" of these "goods" in the same way that they determine the value of commodities. For the argument that attributing economic value to public policy choices is a "category mistake," and involves assigning attributes to one logical category that make sense only with respect to a different logical category, compare SAGOFF, *supra* note 89, at 92–95, with Daniel A. Farber, *Environmentalism, Economics, and the Public Interest*, 41 STAN. L. REV. 1021, 1024–26 (1989).

108. *See* Stewart, *supra* note 106, at 156; Sunstein, *supra* note 92, at 217, 223–25, 234–35 (1993).

109. This suggestion, while obviously absurd, is not entirely fanciful. One of the standard techniques for determining the economic value of environmental quality is to attempt to measure differences in housing prices in areas with high environmental quality environments as opposed to areas with low quality. *See* FREEMAN, *supra* note 46, at 367.

Maybe the problem is that some economists think that the environment is less like defense policy or human rights and more like laundry soap or breakfast cereal. But even in the case of consumer durables such as automobiles, many people form their willingness to pay in the process of educating themselves about the products. They read *Consumer Reports*. They comparison shop. They take test drives. So even in the case of some consumer goods, preferences frequently are not givens, but constructed in the process of evaluation. Indeed, there is evidence that preferences are not some pre-existing set of attitudes, but are "constructed in the process of making a choice or judgment."[110]

Restoration policy deserves at least as much attention to its merits as buying a car. My utility function for environmental restoration, for example, depends on the strength of the various legal, ecological, and economic arguments pro and con.[111] My individual welfare hardly enters into it. In fact, its variables rather resemble the factors set forth in DOI's or NOAA's damage assessment regulations. How important are the injured resources, e.g., what are their ecological services? Will a proposed restoration plan really work? Is it cost-effective? Will it do more environmental harm than good? How much will it cost? Whether economists and mathematicians can ever model this function is questionable, but I don't think it bears much resemblance to the functions I see in the current economics textbooks. When I look within myself, I don't see boxes of breakfast cereal, tubes of toothpaste, or rows of shiny new sport-utility vehicles, against which I compare a restoration plan. Maybe they're there, and the economists are such subtle psychologists that they can discern my true subconscious motivations. I leave it to the reader to judge.

The problem is not that my "preferences" for the environment cannot be taken into account. In theory, one could add "preferences" for birds, humanity, or Buddhist metaphysics into my utility function, and contingent valuation could measure my willingness to pay for them. Similarly, one could try to measure the "preference" for human rights or national defense. Whether one could reduce the complexities of these issues into a comprehensible survey format that would pose realistic trade-offs is questionable.[112] But even if one could, the problem consists precisely in treating one's positions on these matters as a "preference" and

110. Amos Tversky & Richard H. Thaler, *Preference Reversals*, 4 J. ECON. PERSP. 201, 210 (1990). *See also* Paul Slovic, *The Construction of Preference*, 50 AM. PSYCHOLOGIST 364, 369 (1995); Cass R. Sunstein, *Behavioral Analysis of Law*, 64 U. CHI. L. REV. 1175, 1176 (1997).

111. *See* HAUSMAN & MCPHERSON, *supra* note 90, at 98 (stating that choices with respect to public goods are based on arguments, not preferences).

112. For the argument that translating scientific and moral issues into economically useful variables tends to obscure those issues, see Williams, *supra* note 106, at 466–78.

substituting measurement of willingness to pay for deliberation over the merits of the relevant scientific, economic, and moral issues.[113]

Now perhaps I'm not a very good example. Maybe most people don't care about the various ecological factors that would lead me to favor or reject a given restoration plan. Maybe they do treat the environment like breakfast cereal, relying on fixed, pre-existing preferences (e.g., ill-informed prejudices to determine their attitude to environmental protection), and lacking any interest in educating themselves about the real issues. Based on my limited experience with focus groups and juries, I doubt it. But even if they did, we should not make the mistake of blurring positive and normative principles. Even if people do in fact treat the environment like consumer goods, is that a rational basis on which to make public policy? Would it be a rational basis for a human rights policy? For a defense policy?

Most people, of course, never will have the opportunity to become fully informed on the merits of a restoration plan. Indeed, scientists who have spent their careers studying environmental problems may have legitimate differences of opinion over the feasibility or consequences of some aspect of a plan. How are we then to resolve these complex issues?

We resolve these issues the same way we resolve complex issues regarding defense policy, airline safety, or design of the next space shuttle. I know little about defense policy, less about airline safety, and nothing about space shuttle design. I pay taxes to hire people who do. If great policy issues arise, I vote for representatives who share my views and are likely to establish legislative standards that implement those policies. And I depend on the courts to police the process of balancing the relevant technological, economic, and policy variables.[114] In the field of restoration, that is precisely what Congress did when it entrusted the development of restoration plans to DOI and NOAA.[115]

These agencies, along with the courts, have rejected attempts to limit the scope of restoration to economic value. In the *Ohio* case, the D.C. Circuit explicitly rejected a rigid cost-benefit approach to restoration, precisely because "it assumes that natural resources are fungible goods, just like any other, and that the value to society generated by a particular resource can be accurately measured in every case—assumptions that Congress apparently rejected."[116] The court held, "Congress' refusal to view use value and restoration cost as having equal

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113. *See* HAUSMAN & MCPHERSON, *supra* note 90, at 98; SAGOFF, *supra* note 89, at 37–39, 43–46, 70, 80–81.

114. For a critique of the courts' attempts to supervise the balancing of economic and non-economic values, see Stewart, *supra* note 106, at 1585–87.

115. *See* Williams, *supra* note 106, at 474–75 (arguing that people's "preference" with respect to natural resource damages is that public agencies use their superior scientific expertise to act as the public's representatives to restore injured natural environments).

116. Ohio v. United States Dep't of the Interior, 880 F.2d 432, 456 (D.C. Cir. 1989).

presumptive legitimacy merely recognizes that natural resources have value that is not readily measured by traditional means."[117] DOI has made it clear in its subsequent changes to the regulations that in weighing the costs and benefits of restoration, ecological services, as well as economic value, are relevant when determining the extent of restoration.[118] DOI has repeatedly stated that in selecting restoration actions, ecological services may be *more* important than human services.[119] NOAA has likewise rejected a cost-benefit approach to restoration.[120] Reintroducing economic valuation as a measure of the scope of restoration is simply an attempt to bring back the approach the D.C. Circuit, DOI, and NOAA have appropriately rejected.

Thus, the fundamental problem with the unthinking application of economic valuation to determine the scope of primary restoration is that the theory of economic value treats social objectives like commodities and expects public policy to serve as a transmission belt for relatively uninformed and unreflective consumer preferences. Rather than treat complex scientific and policy issues on their merits, it ignores them in favor of a mathematically impressive, but ultimately irrational and arbitrary method of decisionmaking. It is a method of decisionmaking that would be regarded as madness in most areas of public policy we consider important. Unless one believes that the environment should be treated as a consumer good on a par with laundry soap or breakfast cereal, it is no more rational here.

V. DETERMINING THE SCOPE OF PRIMARY RESTORATION

How should the scope of primary restoration be determined? The DOI and NOAA regulations provide that in developing a restoration plan, trustees should consider both the ecological and human services provided by the injured resources.[121] In addition, trustees are required to consider both cost-effectiveness and the relationship between the costs and benefits of restoration alternatives.[122] Services should not be considered "as an abstract economic unit or activity that may be restored independently of the natural resources from which the service flows."[123] Nevertheless, trustees are expected to use a holistic approach to restoration, and can choose to acquire the equivalent of an injured resource if that

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117. *Id.* at 457 (footnotes omitted).

118. *See* Natural Resource Damage Assessments, 59 Fed. Reg. 14,262, 14,273 (1994) (codified at 43 C.F.R. pt. 11 (1999)).

119. *See id.* (quoting Natural Resource Damage Assessments, 51 Fed. Reg. 27,674, 27,687 (1986).

120. *See* Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. 440, 454, 490 (1996) (codified at 15 C.F.R. pt. 990 (1999)).

121. *See* Natural Resource Damage Assessments, 59 Fed. Reg. at 14,272–73; Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. at 448.

122. *See* 43 C.F.R. § 11.82(d)(2), (3) (1999).

123. Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. at 452.

would be a better way of achieving the goals of restoration than direct, on-site restoration or rehabilitation of the resource.[124]

Compensatory restoration under NOAA's OPA rules provides an interesting contrast. As noted above, compensatory restoration seeks to compensate for interim losses between the injury to natural resources and their return to baseline.[125] In the NOAA regulations, the scope of compensatory restoration may be measured either in terms of resources, ecological services, or economic value.[126] The first alternative involves the replacement of an injured resource by the equivalent amount of the same or similar type of resource.[127] The second alternative involves deriving measures of ecological services and comparing the services provided by a proposed restoration measure to the services impaired by the oil spill or release of hazardous substances.[128] NOAA has used this approach, known as "Habitat Equivalency Analysis," in determining the extent of compensatory restoration available under the Sanctuaries Act.[129] Where it is not feasible to use a resource or ecological service-based approach, economic valuation may be used to measure lost services.[130]

Thus, trustees are not required to singlemindedly demand restoration of injured resources to their exact pre-release condition regardless of cost, but can develop a restoration plan that restores the relevant resources and their ecological and human services in a cost-effective manner.[131] The factors provided in the damage assessment regulations are designed to "ensure that preferred actions are commensurate with the value of natural resource losses."[132] In appropriate cases, trustees may choose to acquire resources that provide services to the affected ecosystem similar to the services previously provided by the injured resource

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124. *See* Kennecott Utah Copper Corp. v. U.S. Dep't of the Interior, 88 F.3d 1191, 1231 (D.C. Cir. 1996).

125. *See* 15 C.F.R. § 990.30 (1999).

126. *Id.* § 990.53(d).

127. *See* Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. at 453. *See also* Robert E. Unsworth & Richard C. Bishop, *Assessing Natural Resource Damages Using Environmental Annuities*, 11 ECOLOGICAL ECON. 35 (1994).

128. *See* 15 C.F.R. § 990.53(d)(2); Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. at 453, 475. *See also* Mark S. Fonseca et al., *Integrating Biology and Economics in Seagrass Restoration: How Much Is Enough and Why?*, ECOLOGICAL ENG'G (forthcoming 2000).

129. *See* United States v. Fisher, 977 F. Supp. 1193, 1201 (S.D. Fla. 1997), *aff'd*, 174 F.3d 201 (11th Cir. 1999) (mem.), *cert. denied*, 120 S. Ct. 533 (1999). *See also* Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. at 453, 498.

130. *See* Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. at 453.

131. *See* Natural Resource Damage Assessments, 59 Fed. Reg. 14,262, 14,271 (1994) (codified at 43 C.F.R. pt. 11 (1999)); Natural Resource Damage Assessments, Proposed Rule, Reopening of Comment Period, 58 Fed. Reg. 39,328, 39,334 (1993).

132. Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. at 490. *See also* Natural Resource Damage Assessments, 59 Fed. Reg. at 14,271.

rather than direct, on-site restoration.[133] Accordingly, the D.C. Circuit has held that DOI's regulations provide adequate safeguards to "ensure that trustees do not select options that are excessively costly."[134]

Weighing costs and benefits should not be a mechanical comparison of arbitrary economic values with costs. Instead, it should involve consideration of the regional ecosystem, and the benefits to the ecosystem and to humans that the injured resources provided. To reject a mechanical application of economic value is not to reject consideration of costs. A rational evaluation of the benefits and costs of restoration does not require that both be reduced to a single monetary measure.[135] Consideration of the scope of any public policy requires evaluation of costs, yet few would advocate measuring the scope of human rights or defense policy simply on the basis of economic value. That this sometimes requires hard decisions and the exercise of judgment is obvious. Yet to attempt to avoid the need for judgment by interposing arbitrary economic calculation is unlikely to lead to an effective restoration strategy.

VI. RESOLVING SCIENTIFIC AND PUBLIC POLICY ISSUES ON THEIR MERITS

Thus, the economic analysis of restoration proposed by the oil spill economist, to take one example, appears to be less a rational approach to allocation of public resources than a rationalization for unrestricted destruction of public resources. The notion of economic value, whatever its merits in describing and predicting behavior in markets for commodities, fails to provide a reasonable method of determining the scale of primary restoration of natural resources. Because it ties value to individual willingness to pay, it cannot provide a substitute for a careful consideration of the numerous scientific, technical, and cost issues that a reasonable person would consider important in evaluating a restoration plan. These factors are best addressed by dealing with them directly, not by pretending that they are somehow embodied in such abstractions as willingness to pay.

A narrow approach to economic valuation of natural resources, like a narrow approach to cost-benefit analysis generally, provides the superficial appeal of a single metric by which all the refractory issues of human society can be reduced to mathematics. Life, unfortunately, is more complicated. Clinging to a simplistic and arbitrary method of decisionmaking, and ignoring the real environmental issues, or the real human rights or defense issues, is the most pernicious form of irrationality.

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133. *See* 59 Fed. Reg. at 14,271; Kennecott Utah Copper Corp. v. United States Dep't of the Interior, 88 F.3d 1191, 1231 (D.C. Cir. 1996).

134. *Kennecott Utah Copper*, 88 F.3d at 1218.

135. *See* Cass R. Sunstein, *Incommensurability and Valuation in Law*, 92 MICH. L. REV. 779, 798, 810–12 (1994). *See also* SAGOFF, *supra* note 89, at 12–14, 220–24; Stewart, *supra* note 106, at 1575.