



Environmental Law
Winter 2002

Article

***57 VALUING THE ENVIRONMENT: COURTS' STRUGGLES WITH NATURAL RESOURCE DAMAGES**

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Valuing the environment is an extremely difficult and contentious issue. Courts have struggled with this issue in determining natural resource damages (NRD) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Oil Pollution Act of 1990 (OPA). Beginning with the D.C. Circuit opinion in *Ohio v. Department of Interior*, courts and legal scholars have engaged in an extensive debate about the proper techniques for calculating NRD. However, to a great extent, this debate has taken place on a general and abstract level. Instead of examining the theory of natural resource damages, this Article analyzes how courts have handled the problem of calculating NRD in practice. It examines all of the cases where a court has ruled on the validity of specific economic evidence for calculating natural resource damages in the twelve years following the Exxon Valdez disaster and the Ohio decision. It focuses on two principles of calculating natural resource damages that were identified by the Ohio court: the principle that damages should be calculated on the basis of restoration costs, and the principle that the contingent valuation method (CVM) should be used to calculate nonuse values. This Article finds that courts have been more receptive and better prepared to evaluate evidence based on restoration costs than evidence based on valuation studies. It also finds that we have encountered significant difficulties in using CVM studies for NRD cases. *58 Based on this experience, this Article suggests a simplified, alternative structure for determining which economic technique to apply in NRD claims. Under this structure, emphasis on the valuation of the environment is replaced by an emphasis on restoring damaged resources.

I. Introduction 58

II. *Ohio v. United States Department of Interior* 61

III. The Debate Among Legal Scholars About the Ohio Court's Conclusions 62

IV. NRD Regulations Issued by DOI and NOAA and the Appellate Challenges to Them 65

V. Post- *Ohio* Decisions on NRD Assessment 70

 A. Valuation Versus Restoration: An Explanation of Differences 70

 B. Valuation Versus Restoration: Which One Works? 76

C. The Validity of CVM Studies in NRD Cases
78

D. Analysis of Cases Relying on CVM Studies
84

VI. Conclusion
87

I. Introduction

How much is a dead seal worth? How much is a day at the beach worth? How much is the Grand Canyon worth? These are questions that courts have faced, or might face in the future, in efforts to protect natural resources. Many people, however, have raised significant moral and ethical objections to valuing the environment in this manner. Furthermore, courts seem ill-prepared to satisfactorily answer these questions.

In the late 1980s, new economic techniques [FN1] seemed to offer the means to answer these questions. The shining star of these new techniques was the contingent valuation method (CVM). [FN2] Initially used in the early 1960s, CVM became the subject of significant research in the mid- to late- 1980s, because it seemed to offer the only means for calculating what is called "nonuse values" [FN3] for natural resources.

*59 In the midst of the advancement of these techniques came perhaps the most significant case addressing natural resource damages (NRD), [FN4] *Ohio v. United States Department of Interior* (Ohio). [FN5] In this case, Ohio and other states challenged the regulations written by the Department of the Interior (Interior or DOI) to specify techniques for estimating natural resource damages claimed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). [FN6] In overturning these regulations, the Court of Appeals for the District of Columbia Circuit laid out two general principles: 1) The principal purpose of natural resource damages is to restore the resource, and thus, damages should be based primarily on "restoration costs" [FN7] rather than on "use values;" and 2) "nonuse value" damages should be compensated, using the contingent valuation method.

After the Ohio court announced its support for contingent valuation, a study using the CVM technique to calculate nonuse values estimated that possible damages in the Exxon Valdez case were approximately nine billion dollars. [FN8] In Southern California, a CVM study in *United States v. Montrose Chemical Corp.* [FN9] estimated that damages were over half of a billion dollars. [FN10]

The Ohio decision opened the door to potentially enormous damage claims and generated significant debate among legal scholars. [FN11] Furthermore, the National Oceanic and Atmospheric Administration (NOAA), charged with drafting regulations under the Oil Pollution Act of 1990 (OPA), [FN12] assembled a "blue ribbon panel," including two Nobel Prize winners in economics, to determine whether it would be possible to implement this decision. [FN13] However, this debate and the panel's analysis have been general and abstract. Now, twelve years after Ohio, there is the *60 opportunity to examine how these principles have held up in practice.

Implementation of these principles requires introducing economic evidence in litigation to prove natural resource damages. Natural resource damages present a significant challenge for the legal system because in most cases they are non-market commodities. [FN14] As such, widely-accepted, traditional methods of valuation that rely on market prices are frequently not applicable. Instead, litigators will need to employ other economic techniques for determining monetary damages in NRD cases.

A problem arises in applying these economic techniques in a legal forum. The legal system requires evidence to possess a certain level of certainty and concreteness. [FN15] While market-based methods of valuation are widely accepted, non-market techniques may not be able to achieve these levels of certainty and concreteness. "Unfortunately, in the frenzy of litigation pressure, these often unrefined or experimental [non-market] valuation

methods have been pushed beyond their methodological parameters and have resulted in damage claims of highly questionable validity." [\[FN16\]](#) Thus, courts will grapple with the validity of economic evidence in NRD cases.

This Article presents all of the cases after the Ohio decision [\[FN17\]](#) where a court has ruled on the validity of economic evidence offered to support claims for natural resource damages. In examining how courts have handled economic evidence in these cases, it determines whether emphasis on restoration costs rather than use values has been workable in specific court settings. In particular, it compares the use and acceptability of economic evidence in specific cases to support damages based on restoration costs, versus evidence based on valuation techniques. It likewise analyzes the practicality of calculating nonuse values through CVM by examining how courts have dealt with CVM studies in particular cases.

This Article finds that courts have accepted economic evidence used to support restoration costs. In fact, disputes over economic evidence concerning use values of non-market commodities [\[FN18\]](#) suggest that courts will be more comfortable with restoration evidence. On the other hand, despite support for CVM in general, [\[FN19\]](#) the usefulness of this method in specific cases has been disappointing. The only two courts that have ruled on the validity of specific CVM studies in NRD cases have rejected these studies for *61 calculating damages in each particular case. [\[FN20\]](#) This Article examines the reasons for rejecting these studies, and draws implications for the future use of CVM in NRD cases.

Part II examines the Ohio decision itself. Part III discusses reactions to this decision by legal scholars. Part IV examines agency regulations and appellate challenges to these regulations. With this background, Part V then analyzes subsequent application of the two principles outlined in Ohio. The Article concludes with support for the first principle's emphasis on restoration costs and with suggestions to limit the application of nonuse values and CVM in NRD cases.

II. Ohio v. United States Department of Interior

In Ohio, the D.C. Circuit reviewed "Type B" [\[FN21\]](#) NRD assessment regulations [\[FN22\]](#) promulgated by Interior under CERCLA and the Superfund Amendments and Reauthorization Act of 1986 (SARA). [\[FN23\]](#) These regulations specified preferred techniques for conducting assessments of natural resource damages. [\[FN24\]](#) Under CERCLA, studies conducted by natural resource trustees using these preferred techniques were entitled to a rebuttable presumption. [\[FN25\]](#)

In drafting the NRD assessment regulations, Interior decided that damages should be limited by the "lesser of" the costs of restoring a damaged resource or the lost use value of the resource. [\[FN26\]](#) Interior also developed a hierarchy of techniques for estimating use values, giving strong preference to techniques that depended on market valuations over non-market techniques such as CVM. [\[FN27\]](#) Interior did, however, include CVM as a possible technique for calculating natural resource damages, [\[FN28\]](#) further concluding that "estimation of option and existence values [i.e., nonuse values] shall be used only if . . . no use values can be determined." [\[FN29\]](#)

In its decision, the D.C. Circuit held that the "lesser of" rule was "contrary to the clearly expressed intent of Congress and therefore *62 invalid." [\[FN30\]](#) It concluded that "Congress established a distinct preference for restoration costs as the measure of recovery in natural resource damage cases." [\[FN31\]](#) However, the court did allow that in some cases restoration costs may be "grossly disproportionate" to use values, and use values would therefore be the appropriate measure of damages. [\[FN32\]](#)

The D.C. Circuit also held that the hierarchy of use values over nonuse values was an unreasonable interpretation of the statute, and that nonuse values "ought to be included in a damage assessment." [\[FN33\]](#) Finally, the court held that "DOI erred by establishing 'a strong presumption in favor of market price and appraisal methodologies,' " [\[FN34\]](#) over non-market techniques such as CVM.

While overturning these portions of the DOI regulations, the court upheld DOI's finding that CVM was a valid technique in theory for reliably calculating NRD. [\[FN35\]](#) In conjunction with its holding supporting nonuse values, and the lack of methods other than CVM for calculating such values, the court's decision implied that CVM would

gain prominence in natural resource damage assessments as the primary technique for calculating nonuse values.

III. The Debate Among Legal Scholars About the Ohio Court's Conclusions

The controversy presented by these regulations and the D.C. Circuit's decision generated a considerable debate among legal scholars, which began shortly before the court announced its decision. In the spring of 1989, two legal articles were presented on the valuation of natural resource damages. [FN36] In *Natural Resource Damages, Superfund, and the Courts*, [FN37] Frederick R. Anderson argued that the "overall congressional purpose in enacting Superfund [was the] restoration of contaminated sites as near as possible to their prior condition." [FN38] He therefore urged that NRD assessments should focus on restoration costs, not lost use values. [FN39] In so urging, he noted that "restoration and replacement are much easier to estimate than diminution of use values." [FN40]

In *Natural Resource Damage Valuation*, [FN41] Frank B. Cross argued that natural resource damages are necessary to protect the public interest in *63 these resources in order to ensure that responsible parties "bear the costs of their actions." [FN42] This approach is justified by the economic theory of managing "externalities." [FN43] However, to achieve this goal, society must be able to calculate the value of natural resources. Cross then argued that the appropriate measure of this value should be restoration costs, [FN44] except in cases where restoration costs are "grossly disproportionate to the actual damages." [FN45]

Cross suggested that, for these exceptions, we should turn to contingent valuation to measure the value of natural resource damages, because in these cases, "contingent valuation offers the most complete approach for monetization of natural resource damages." [FN46] Although he conceded that CVM estimates might "overstate the true value of damages," [FN47] Cross argued that this method should be used to provide upper limits for damages because "it is safest to err in the direction of environmental protection. Better that too many sites be restored than too few." [FN48] However, after the Ohio decision led to greater use of CVM, Cross himself argued that its use be limited, because "contingent valuation has serious shortcomings that counsel against its widespread use." [FN49]

After the Ohio decision, this debate continued, but focused on the court's support for CVM. At a CVM symposium in 1992, a number of prominent economists presented experiments using CVM that demonstrated the technique was substantially biased and unreliable. [FN50] Shortly afterwards, the *Harvard Law Review* published "Ask a Silly Question . . ." *Contingent Valuation of Natural Resource Damages*, [FN51] which argued that the CVM technique is "so speculative that the costs of using CV to assess damages to natural resources almost always outweigh the benefits." [FN52] The note concluded that it should therefore not be used in regulation nor in *64 litigation. [FN53]

The following year, NOAA's blue ribbon panel issued its report on CVM. This panel included two Nobel laureates. Although recognizing the validity of much CVM criticism, the panel concluded that it is possible for CVM studies to "produce estimates reliable enough to be the starting point of a judicial process of damage assessment, including lost passive-use [nonuse] values." [FN54] To accomplish this, the panel recommended that CVM studies follow a number of restrictive suggestions concerning survey design and administration. [FN55]

Despite the support for CVM from the Ohio court and the NOAA panel, the controversy over CVM continued. In 1994, the *Natural Resources Journal* [FN56] devoted an issue to the Ohio decision and this debate. [FN57] Ronald G. Cummings and Glenn W. Harrison began that issue, arguing that Ohio failed to consider information "regarding the risk that CVM values may substantially overestimate real economic commitments on the part of subjects." [FN58] Because of this potential for gross overestimation, they argued that courts must carefully consider whether to permit CVM studies as evidence in CERCLA litigation. [FN59] Peter Bohm's article followed, arguing that responses to hypothetical questions cannot be relied upon when used for actual decision making, and that CVM is not the best available procedure for valuing natural resources. [FN60]

David Brookshire and Michael McKee responded in support of CVM, arguing that while estimates from CVM may have considerable variance, courts have dealt with similar degrees of variance in other settings, and can be expected to do likewise with CVM studies. [FN61] They consequently concluded that, because "CVM values provide meaningful results, [they] should be used to determine compensable damages." [FN62] K.E. McConnell

likewise argued that the Ohio decision, along with continual refinement of CVM by economists, has "establishe [d] contingent valuation as an acceptable method of measuring damages." [\[FN63\]](#)

The following year, this debate raged on. In *The Use of Contingent *65 Valuation Methodology in Natural Resource Damage Assessments: Legal Fact and Economic Fiction*, Brian R. Binger, Robert F. Copple, and Elizabeth Hoffman considered the inconsistency and yet necessity of using the legal system to assign values to natural resource damages. [\[FN64\]](#) They conclude:

[T]he irrefutable conclusion is that CVM is still a largely experimental valuation method that is the subject of great debate in both the academic and legal communities. Without question, the method is poorly understood, based on still untested hypotheses, and subject to fatal flaws, biases, and inaccuracies in application. Considering CVM's incipient stage of development, it can hardly be considered sufficiently trustworthy to serve, by itself or in conjunction with other methods, as a reasonable basis for imposing multimillion dollar damage claims on defendants in natural resource damage actions. [\[FN65\]](#)

Because of these problems, they recommend "[f]urther methodological studies exploring the inherent validity or inaccuracy of CVM." [\[FN66\]](#) They also suggest that "regulators and scholars need to focus their research efforts on developing other valuation techniques to capture and quantify actual damages to the public." [\[FN67\]](#)

On the other hand, Katherine K. Baker made an argument supporting the continued use of CVM. She explained, "CV surveys afford unique opportunities for citizen education and participation, and they produce data that is essential to shaping environmental policy." [\[FN68\]](#)

This debate has clarified many of the issues involved in the comparison between restoration costs and use values, and in the applicability of CVM studies for NRD assessments. However, much of this debate has been at a general or abstract level. [\[FN69\]](#) Part V of this Article extends this debate by analyzing how courts have handled NRD assessment studies.

IV. NRD Regulations Issued by DOI and NOAA and the Appellate Challenges to Them

While this debate was raging among legal scholars, the agencies in charge of drafting natural resource damage assessment (NRDA) regulations, *66 DOI and NOAA, continued their work. After proposing new regulations in 1991, DOI under the Bush administration attempted to publish final NRDA regulations. On the final full day of the Bush administration in 1993, the Office of the Federal Register received a copy of final regulations from DOI. [\[FN70\]](#) This document significantly restricted the use of CVM techniques. [\[FN71\]](#) However, two days later, the new Clinton administration withdrew this document before publication. [\[FN72\]](#) DOI later issued its final regulation for Type B NRD assessments in March of 1994. [\[FN73\]](#)

DOI's final NRDA regulation was reasonably similar to the 1986 regulation, with the exception of a number of places where the rule was altered in response to the Ohio decision. [\[FN74\]](#) Among these responses was the elimination of the hierarchy of methodologies. Under the new regulation, there are no restrictions on when trustees can apply non-market-based valuation techniques such as CVM. [\[FN75\]](#) Furthermore, this regulation offered no guidance in the application of CVM. [\[FN76\]](#)

NOAA took a different approach to NRD assessments. In its first proposed rule in 1994, NOAA defined compensable damages as the sum of use and nonuse values lost from a resource between when it was damaged by the responsible party, and when it was restored. [\[FN77\]](#) To calculate these values, NOAA "explicitly authorized trustees to employ contingent valuation and provided detailed standards for using it." [\[FN78\]](#)

However, in the next year, NOAA completely changed its approach to NRD assessments. It proposed a new rule that reflected "a fundamental restructuring of the rule to provide even greater emphasis upon restoration." [\[FN79\]](#) Its final rule likewise took this approach. [\[FN80\]](#) As described by the D.C. Circuit in *General Electric v. United States Department of Commerce (General Electric)*, [\[FN81\]](#) "[t]he final rule reflects NOAA's determination to accomplish the OPA's goals through a restoration-based approach, focusing not merely on assessing environmental damages--the approach taken by CERCLA--but on developing and implementing plans for restoring and

rehabilitating damaged resources or services." [\[FN82\]](#)

***67** Rather than focusing on calculating compensable interim loss values, the new approach focuses on "developing a compensatory restoration plan to replace forgone services with equivalent service gains." [\[FN83\]](#) In constructing these plans, trustees must "scale" (i.e., adjust the size or scope of the project) the compensatory project to ensure that the public gains from the project equal the public losses caused by the accident. [\[FN84\]](#)

In scaling restoration projects, NOAA offers two approaches: "service-to-service" (or "resource-to-resource") and "valuation." [\[FN85\]](#) With a service-to-service approach, the trustee determines the appropriate scale by designing the restoration project to provide new services that are equivalent to the services that were lost due to the damage of the resource. The new services simply replace the lost services. This approach can also apply to resources. For example, an oil spill that damages ten acres of wetlands can be remedied if the responsible party pays for the creation of a new wetland of the same area, ten acres. [\[FN86\]](#) In order for this approach to be applicable, the new services must be "of the same type and quality" as the services that were lost. [\[FN87\]](#)

When replacement services are not sufficiently similar to lost services, trustees must use the valuation approach to scaling restoration projects. The valuation approach itself can be conducted either through a "value-to-value" technique, or through a "value-to-cost" technique. Value-to-value is NOAA's "preferred version of the valuation approach." [\[FN88\]](#) Using this technique, the trustee conducts valuation assessments not only of lost services, but also of services provided under the restoration plan. Trustees achieve the correct scale when the value of services lost equals the value of new services provided under the restoration plan. [\[FN89\]](#)

NOAA recommends that use of the value-to-cost technique be reserved to "limited circumstances (generally small spills with limited damages)." [\[FN90\]](#) These limited circumstances arise when "the valuation of the lost services is practicable, but valuation of the replacement natural resources and/or services cannot be performed within a reasonable time frame or at a ***68** reasonable cost." [\[FN91\]](#) In such cases, the appropriate scale of the restoration project is simply one that costs as much as the value of the lost services.

NOAA offers three sets of criteria for determining which approach to select under section 990.27 of its regulations. [\[FN92\]](#) These include the applicability of the approach in the specific context, the reasonableness of the incremental costs of more refined approaches, and the validity and reliability of the approach. [\[FN93\]](#) These criteria offer trustees considerable discretion in choosing a scaling approach.

The focus of this new methodology on restoration of services had an interesting impact on the role of CVM in the final regulation. As noted above, the first proposed NOAA regulation specifically authorized the use of CVM and contained detailed recommendations for its application. However, NOAA received "extensive comments . . . about the reliability of various valuation methods, most notably the use of contingent valuation to measure the losses in nonuse values." [\[FN94\]](#) Consequently, although the final regulation "authorizes recovery of what are known as nonuse or 'passive' losses, . . . NOAA omitted all references to contingent valuation [in the text of the regulation itself], instead authorizing trustees to choose any assessment techniques, subject to section 990.27's requirements." [\[FN95\]](#) Contingent valuation appears only as one of many techniques available to trustees in appendix B to the preamble of the final regulation. [\[FN96\]](#)

Both of these regulations were challenged in the courts shortly after they were published. The D.C. Circuit reviewed DOI's Type B NRDA regulation first, in *Kennecott Utah Copper v. United States Department of Interior* (Kennecott). [\[FN97\]](#) Kennecott brought a number of procedural challenges based on the submission--but not publication--of the final NRDA regulation document in 1993. However, the court found that withdrawal of the 1993 document was a reasonable action by DOI, [\[FN98\]](#) and hence the 1993 unpublished document did not achieve the status of a regulation. [\[FN99\]](#) As a consequence, the procedural challenges all failed. [\[FN100\]](#)

Kennecott also brought a number of substantive challenges to DOI's regulation. Perhaps the most significant of these challenges was the contention that DOI did not provide a protocol on the selection and use of ***69** NRDA techniques. [\[FN101\]](#) Kennecott argued that DOI offered a number of "relevant considerations" for selecting restoration options, but failed to "establish any threshold standards [or] . . . a hierarchy among the listed factors." [\[FN102\]](#) DOI instead permitted "trustees to consider any factor they deem [ed] 'relevant.'" [\[FN103\]](#) Leaving this

discretion to individual trustees was "inconsistent with Interior's statutory mandate to specify 'protocols.'" ' [\[FN104\]](#) If the court agreed with Kennecott, DOI would need to include more specific rules on the application of valuation techniques, which could include restrictions on the use of CVM.

However, the court held that "Interior's decision to leave some discretion to trustees . . . [was] a permissible reading of the word 'protocols.'" ' [\[FN105\]](#) Thus, it allowed the application of CVM to estimate nonuse values, without any specific guidance on the selection or use of the method from DOI's regulation. Additionally, in almost all other aspects, the court upheld DOI's NRDA regulation. [\[FN106\]](#)

The following year, in *General Electric*, the D.C. Circuit again reviewed a challenge to an NRDA regulation. This case presented a number of arguments against the NOAA regulation, including an argument that NOAA acted arbitrarily and capriciously by including CVM as an acceptable technique for conducting NRD assessments. [\[FN107\]](#) Additionally, *General Electric* and others argued that the NOAA Panel had warned that "contingent valuation studies must be conducted subject to stringent standards." [\[FN108\]](#) They argued that by not including any standards of use, NOAA had ignored this warning, thus acting arbitrarily and capriciously. [\[FN109\]](#)

However, the court held that the lack of specific standards in the regulation did not mean that NOAA had ignored its Panel's warning. Instead, it allowed trustees to have discretion over the use of CVM, subject to the general standards of section 990.27. These general standards "adequately ensure that trustees do not abuse their discretion." [\[FN110\]](#) The court further held that inclusion of CVM as an acceptable technique was neither arbitrary nor capricious, citing both its prior holding in *Ohio*, and the conclusion of the NOAA Panel, that "if performed correctly, contingent valuation can produce both useful and reliable results." [\[FN111\]](#)

General Electric also argued that by including passive-use values as compensable damages, the regulation violated the OPA because the "OPA *70 does not authorize recovery of passive-use values." [\[FN112\]](#) The court strongly dismissed this contention: "We disagree. Nothing in the plain language of sections 1002 or 1006 excludes passive-use values . . . Congress, however, clearly intended to authorize trustees to recover passive-use values." [\[FN113\]](#)

Thus, these regulations and the D.C. Circuit decisions support the use of CVM to estimate nonuse values in NRD assessments. However, the regulations only offer general standards in determining the applicability of CVM and fail to provide any specific guidance on what constitutes an acceptable CVM study. Likewise, the appellate cases are all based upon the use of this technique in general.

V. Post- Ohio Decisions on NRD Assessment

While much of this debate has focused on the NRD assessment process in general, this Article will now examine how courts have handled NRD assessments in the twelve years after the *Ohio* decision. While some authors have looked at individual cases, [\[FN114\]](#) this Article presents a comprehensive look at cases in which courts ruled on the admissibility and utility of specific NRD assessments. Surprisingly, the number of cases in which this has happened is very small because almost all NRD cases are settled. This Part begins by analyzing cases that relied on techniques other than CVM, and then analyzes the only two cases containing final rulings on the applicability of a specific CVM study.

A. Valuation Versus Restoration: An Explanation of Differences

This section will contrast cases relying on techniques that attempted to determine the values of damaged natural resources with cases relying on techniques that focus on restoration of the services provided by damaged natural resources.

The *Exxon Valdez* litigation began as several cases involving different plaintiffs; these cases were later consolidated. [\[FN115\]](#) Two sets of plaintiffs went to trial over natural resource damages. [\[FN116\]](#) One was a group of commercial fishermen, and the other was a group of Alaskan natives seeking damages *71 for lost subsistence use.

The fishermen sought \$895 million in a combination of fifteen claims, based on reduced harvests and prices at different places and times. [\[FN117\]](#) While litigants frequently must rely on non-market techniques in NRD cases because most natural resources are not sold in markets, the commercial fishermen in this case were able to use market-based valuation techniques. [\[FN118\]](#) Consequently, the admissibility of these market-based assessments "was not a major issue." [\[FN119\]](#) However, disputes over the extent of the reduction in harvest and the impact of the spill on price reductions ensued. [\[FN120\]](#) In the end, the jury awarded damages for ten of the fifteen claims, totaling \$286.8 million. [\[FN121\]](#) Interestingly, "for the more straightforward claims . . . the jury awards often [were] exact averages of the plaintiff and defendant positions." [\[FN122\]](#)

In the native subsistence case, the admissibility of the NRD assessment studies was much more controversial. [\[FN123\]](#) In this case, replacement cost estimates for the fish species lost by the Alaskan natives were available from market prices in Anchorage. [\[FN124\]](#) However, prices were unavailable for markets local to these Alaskan natives. [\[FN125\]](#) For various reasons, these plaintiffs decided that Anchorage market prices would inadequately compensate them, so they attempted to develop assessment studies based on non-market valuation techniques that would lead to higher levels of compensation. [\[FN126\]](#) Non-market techniques led to estimated damages of \$80 to \$100 million, [\[FN127\]](#) while replacement cost techniques led to damages of only \$20 million. [\[FN128\]](#)

When the plaintiffs attempted to introduce these non-market-based studies, "Exxon request[ed] that the court exclude [the plaintiff's expert witness's] testimony except for that part of the testimony which relates to [the market-based] replacement cost of subsistence harvest." [\[FN129\]](#) The court had earlier ruled, "What the Alaska Natives seek is a recovery which is not founded upon any legal theory currently recognized by maritime law. They assert that theirs is a non-market economy, and that their damages should not be measured by market economy standards." [\[FN130\]](#) Based on this ruling, the *72 court granted Exxon's motion and excluded the portions of the assessment studies that were based upon non-market valuation techniques. [\[FN131\]](#) Three weeks after this order was issued, Exxon and the native Alaskan class settled for \$20 million, [\[FN132\]](#) which was exactly the amount estimated using the market-based replacement cost technique.

In *California v. BP America (American Trader)*, [\[FN133\]](#) trustees sought damages based on lost recreational use due to the beach closures when the American Trader spilled approximately 300,000 gallons of oil into the ocean near Huntington Beach, California, on February 7, 1990. The critical issue in this case: What was the value of a day at the beach? [\[FN134\]](#) In particular, what was the average value of a day at one of the specific beaches in Southern California that was closed during this particular winter period?

Rather than developing an original study to determine the value at these particular beaches in Southern California during this time period, the trustees developed an assessment that was based on an estimate from a study of the value of visits to Florida beaches by residents of Florida, [\[FN135\]](#) published by Frederick Bell and Vernon Leeworthy in 1986. [\[FN136\]](#) Using a "travel-cost" approach, [\[FN137\]](#) Bell and Leeworthy calculated that a day at a Florida beach was worth \$13.19 (in 1990 dollars) to a Florida resident. [\[FN138\]](#)

Economic experts for the defendants objected that visitors to the beaches and the characteristics of the beaches themselves differed significantly from Florida to this part of Southern California. [\[FN139\]](#) They also pointed out that the Bell and Leeworthy estimate of a day at the beach was for a day during the summer, while these beaches were closed during the winter. These differences meant that the value of a Florida beach day estimated by Bell and Leeworthy could be significantly different from the value of a Southern California beach day applicable in this case.

Additionally, one of the coauthors of the previous study, Vernon Leeworthy, had recently collected a significant amount of survey data for beach users in Southern California, as part of the Public Area Recreation *73 Visitors Survey (PARVS). [\[FN140\]](#) These surveys included information useful in constructing travel-cost estimates of the value of these beach days. [\[FN141\]](#) Leeworthy used this data to construct an average value for a day at a Southern California beach of \$23. [\[FN142\]](#)

The economic experts for both the trustees and the defendants used this data to calculate their own estimates of the value of a day at a Southern California beach. Using a non-parametric estimation technique, the economic experts for the trustees estimated that the average value of a day at a Southern California beach was between \$20 and \$25.

[FN143] The economic experts for the defendants used three different estimation techniques, [FN144] and found average values between \$5 and \$9. [FN145]

Consequently, although they used the Bell and Leeworthy estimate of the value of a day at a Florida beach as a starting point, the trustees also presented evidence constructed using data from Southern California beach users that the value of a day at these Southern California beaches was higher than the amount estimated by Bell and Leeworthy. [FN146] Similarly, using the exact same data, the defendants presented evidence to explain why the value of a day at the beach for these Southern California beaches was lower than the amount estimated by Bell and Leeworthy. [FN147] After being presented with these conflicting estimates of the value of a beach day, the jury decided that the value of a beach day at these Southern California beaches was \$13.19, [FN148] exactly the value of the Bell and Leeworthy estimate. [FN149]

While these two cases relied on the valuation approach to determine natural resource damages, two later cases have relied on the restoration approach. Both of these later cases involved damages (by different parties) to the Florida Keys National Marine Sanctuary (Sanctuary). In the first case, the federal government sued a treasure-hunting family and their company for damages to the Sanctuary caused by their treasure-hunting operations. [FN150]

In 1992, Kane Fisher, son of Mel Fisher, conducted treasure salvage operations in the Sanctuary for his family's company, Salvors, Inc. [FN151] To blow away sand and reveal possible treasure beneath, Fisher used a special *74 device to redirect his boat's propeller wash towards the "fragile seabed" in Coffins Patch, "a unique reef area" in the Sanctuary. [FN152] Unfortunately, in the process, Fisher also blew approximately 100 craters into the ocean floor, from "20 to 30 feet in diameter and 3 to 10 feet deep." [FN153] Twenty-seven of these were "more than 30 feet across and more than 80 feet deep." [FN154] In creating these craters, Fisher "wiped out large sections of sea grass, an important component of the ecology of the Florida Keys coral reef system, [and] also coral sea fans, sponges and other types of sea life." [FN155] These sea grasses are "required to stabilize the sea bottom and preserve water quality." [FN156]

After being sued by the government, Mel Fisher felt that the government was attempting to prevent him from continuing his treasure salvage operations: "The government has tried on many occasions through the years to take control of the artifacts and treasures, and they use a different fraud each time." [FN157] He further explained that, as a "devoted marine biologist," he was creating "a new ecosystem"; he said, "I am not destroying the sea grass, I am just transplanting it." [FN158]

Despite these arguments, on July 23, 1992, the court granted the government's preliminary injunction, ordering Fisher and Salvors to cease the use of this salvage technique in the Sanctuary. [FN159] Furthermore, after trial, the court enjoined the Fishers and their company from using this technique in the Sanctuary and also from "removing artifacts" from the Sanctuary. [FN160]

In addition to seeking an injunction preventing further damage to the Sanctuary, the government also sought recovery of natural resource damages. To determine its claim for NRD, the government developed an NRD assessment based on the 1996 NOAA Regulations. As described in Part IV of this Article, these regulations focused on restoration of the services provided by the natural resources, rather than attempting to determine the value of lost natural resources. Unfortunately, due to certain conditions, restoration of the areas of Coffins Patch damaged by the Fishers was impractical. [FN161] Consequently, NOAA tried to locate other "potential seagrass restoration projects in the Keys Sanctuary that would be similar in scale and nature to the seagrass injuries in Coffins Patch." [FN162] They determined that the best alternative "project would be to transplant seagrass into boat impacted areas which had later become no-motor zones (Prop Scar Restoration Project)." [FN163]

*75 NOAA then constructed an assessment to determine the appropriate scale of this alternative project to compensate for the damage caused in Coffins Patch. To construct this assessment, NOAA applied the economic technique known as Habitat Equivalency Analysis (HEA). HEA can be applied to scale restoration projects under the service-to-service approach. Under HEA, the correct scale of a compensatory restoration project is one where the "total resource services gained through restoration equals total resource services lost due to the injury." [FN164] In this case, using HEA, NOAA calculated that restoration of "1.55 acres of seagrass habitat . . . under the Prop Scar

Restoration Project" would compensate for the "1.63 acres of damaged seagrass in Coffins Patch" that had been caused by the Fishers. [\[FN165\]](#) NOAA further calculated that this restoration project would cost \$351,648. [\[FN166\]](#)

The court found that under the NOAA Regulations, use of HEA is appropriate when:

- (1) the primary category of lost on-site services pertains to the ecological/biological function of an area;
- (2) feasible restoration projects are available that provide services of the same type, quality, and comparable value to those that were lost; and
- (3) sufficient data on the required HEA input parameters exist and are cost effective to collect. [\[FN167\]](#)

The court held that because "these three criteria were met in this case, the HEA is the most technically appropriate and cost-effective method to quantify the natural resource damage." [\[FN168\]](#) As a result, the court awarded \$351,648 as natural resources damages to pay for the compensatory restoration project. [\[FN169\]](#) This was the exact amount calculated by NOAA. This decision was later affirmed by the Eleventh Circuit in 1999. [\[FN170\]](#)

The other Sanctuary case [\[FN171\]](#) was brought by the government to recover damages that occurred when a tugboat ran aground in a seagrass area, and another tugboat "in the same convoy . . . dragged a 200-foot dredge pipe along the seafloor for thirteen miles." [\[FN172\]](#) To determine the extent of the *76 natural resource damages, NOAA once again followed its regulations that emphasized restoration of the services provided by natural resources. As in the first Sanctuary case, NOAA determined that an appropriate compensatory project would be to replace seagrass under the Prop Scar Restoration Project. [\[FN173\]](#) Again applying HEA, NOAA calculated that restoration of 2.19 acres of seagrass habitat would compensate for the "6.36 acres of seagrass destroyed at the Pipe Scar and Grounding Site." [\[FN174\]](#)

The court held that this project would "provide seagrass services equivalent to those lost due to the injuries caused by Great Lakes." [\[FN175\]](#) It therefore upheld the use of HEA to calculate the natural resource damages award to pay for this compensatory restoration project. [\[FN176\]](#) However, the court ordered the government to recalculate the amount of this award because it had misapplied a technical ratio in its analysis. [\[FN177\]](#)

B. Valuation Versus Restoration: Which One Works?

These cases suggest that, for most natural resource damage claims, studies constructed using the restoration approach will be more helpful to courts than studies using the valuation approach. This conclusion is consistent with the first principle of the Ohio decision.

Market-based valuation techniques are generally accepted, as in the Exxon Valdez case for both the commercial fishermen and for native subsistence. [\[FN178\]](#) However, application of this market-based technique will be limited to resources such as fish that are sold in a number of markets, thereby providing the necessary market prices. In almost all other NRD cases, another technique will be necessary.

Non-market approaches to valuation frequently run into problems in a court setting. In some cases, such as the Exxon Valdez case for native subsistence, courts will not accept studies based on this technique. In others, non-market valuation studies may be accepted, but courts will experience significant difficulties in judging their validity.

Non-market valuation studies present opportunities for significant theoretical disagreements between economists for plaintiffs and those for defendants. One area of disagreement in both *American Trader* and *Idaho v. Southern Refrigerated Transport, Inc.* (*Southern Refrigerated*), is the effect on damages due to the availability of substitutes. [\[FN179\]](#) *American Trader* also *77 involved technical disputes about estimation techniques and about the effects of demand curve shifts. [\[FN180\]](#) Other possible areas of disagreement exist as well. [\[FN181\]](#)

Evaluating opposing arguments in these areas of disagreement over non-market valuation techniques presents significant challenges to courts. After examining conflicting studies done by plaintiffs and defendants in *Colorado v. Gulf & Western Industries (Eagle Mine)* [\[FN182\]](#) and *Colorado v. Idarado Mining Co. (Idarado)*, [\[FN183\]](#) Raymond Kopp and V. Kerry Smith, two of the leading economists in the field of valuing natural resources, noted that disagreements over assumptions generate differences in damage estimates. [\[FN184\]](#) They concluded that these

challenges "suggest that the level of economic expertise available to judges to evaluate the 'facts' of each side's evidentiary claims probably needs to exceed what many analysts of judicial behavior have argued can be expected." [\[FN185\]](#)

Indeed, in the American Trader case, the jury seems to have decided that the plaintiffs' arguments that the true estimate should be higher than the estimate from the original study were counterbalanced by the defendants' arguments that the true estimate was lower. After these two arguments canceled each other out, the jury reverted to the original estimate as the basis for the damage award.

While the conflicting arguments were based on estimates that used data from Southern California beaches, the original estimate was based on data from Florida beaches. The differences between the beaches damaged by the American Trader and the Florida beaches in the original study suggest that this value of \$13.19 was inappropriate in this context. Yet this was the value arrived at by the finder of fact. This finding suggests that the legal system may not be the most appropriate forum to decide disputes over non-market valuation techniques.

In contrast, presentation and evaluation of economic evidence based on techniques that emphasize restoration of natural resources seems to be more straightforward. With service-to-service techniques such as HEA, the courts first need to confirm that the services provided by a proposed restoration project are of the same type and quality as the services that have been damaged. The court then needs to confirm that the scaling of the restoration project has been done appropriately. Courts seem to be better prepared to make these judgments.

Cases since Ohio show that courts have been more receptive and better ***78** prepared to evaluate restoration evidence than valuation evidence. This suggests that implementation of the first principle of the Ohio decision, which emphasized restoration rather than valuation, has improved the handling of NRD cases.

C. The Validity of CVM Studies in NRD Cases

This section examines decisions on the validity of a particular study based on the contingent valuation method. CVM studies have been prepared for a number of cases, including the Exxon Valdez litigation, [\[FN186\]](#) a number of NRD lawsuits in Colorado, [\[FN187\]](#) and the NRD case addressing pollution of the Ascushnet River and New Bedford Harbor. [\[FN188\]](#) However, in each case, the court never ruled on the validity of the CVM study because the parties settled. [\[FN189\]](#) Early on in Kelly ex rel. Michigan v. Kysor Industrial Corp., [\[FN190\]](#) the defendants requested that the court grant summary judgment against NRD claims based upon a CVM study. However, the court ruled that "[w]hile I agree with defendants that the CVM and benefits transfer method advanced by plaintiffs both may be too speculative, I have not been provided with sufficient factual information on the method to make a final factual determination." [\[FN191\]](#) This case later settled before the court made any further ruling on the validity of the CVM study. [\[FN192\]](#) After this case, Michigan changed its law on NRD to exclude non-use values. [\[FN193\]](#)

As a result, to the author's knowledge, in only two cases has a court ruled on the validity of a CVM study for a specific case: Southern Refrigerated and United States v. Montrose Chemical Corp. (Montrose). [\[FN194\]](#)

In Southern Refrigerated, the state sought recovery for NRD that occurred when a truck carrying a hazardous agricultural fungicide overturned, spilling into the nearby Little Salmon River in December 1987. [\[FN195\]](#) ***79** The state claimed that this "spill killed 90% to 100% of the [steelhead] fish in the Little Salmon River." [\[FN196\]](#) In this case, the state "determined that the cost of a restoration program for the wild/natural fish killed by [the spill] would be excessive compared to the value of the fish." [\[FN197\]](#) It consequently decided not to seek restoration costs as NRD. [\[FN198\]](#)

Instead, Idaho attempted to recover NRD for the fish that were killed, based on three different theories: commercial value, recreation value, and existence value. [\[FN199\]](#) Idaho also attempted to recover NRD for lost recreational value due to the resultant closure of the fishing season in the two months following the spill. [\[FN200\]](#) The court relied on a survey of commercial prices to calculate commercial value. [\[FN201\]](#) The court also relied on a travel-cost study done previously by the United States Forest Service for a completely different purpose, to calculate recreation value of lost fish. [\[FN202\]](#) However, the court awarded no damages for lost recreation from closure of

the fishing season, because the court held that a nearby site "offered comparable fishing experiences, that is, they are substitutes." [\[FN203\]](#)

To calculate existence value, one of the components of nonuse value, Idaho introduced a study based on CVM. [\[FN204\]](#) This study had been conducted by consultants for the Northwest Power Planning Council to determine "operational changes in the Northwest hydropower system." [\[FN205\]](#) The consultants surveyed individuals across the entire Pacific Northwest to assess how much they would be willing to pay to double the runs of steelhead and salmon in the entire Columbia River Basin, of which the Little Salmon River was a very small component. [\[FN206\]](#) Doubling these runs would have increased the number of fish from 2.5 million to 5 million. [\[FN207\]](#) The authors of this survey had calculated an existence value of \$16.97 for a single fish, based on this doubling. [\[FN208\]](#) Consequently, Idaho requested \$16.97 as existence value NRD for each of the approximately two thousand fish lost due to this accident. [\[FN209\]](#)

Defense counsel pointed out that the prior study included both salmon and steelhead, whereas only steelhead were killed by this accident. [\[FN210\]](#) *80 Additionally, the Columbia River Basin includes a number of areas that are very different from the Little Salmon River subbasin. [\[FN211\]](#) Finally, the magnitude of the fish increase in the Northwest Power survey was three orders of magnitude larger than the magnitude of fish killed by the accident: 2,500,000 versus 1644. [\[FN212\]](#)

After hearing these arguments, the court held that application of this CVM study to this particular case did not meet evidentiary requirements, and dismissed all claims based on existence values.

The Court finds that the study is not persuasive and it would be conjecture and speculation to allow damages based on this study. Idaho must prove its damages with reasonable certainty and this study does not do so. . . . [T]he Court finds that the study fails to determine to any degree of certainty what value should be placed on these fish based on their existence value. . . . [T]he method selected by Idaho (the Northwest Planning Council study) is legally insufficient to establish existence value in this case. [\[FN213\]](#)

In the second case to rule on the validity of CVM studies, the United States and California sued a group of industrial companies for damages caused by discharges of the pesticide DDT and polychlorinated biphenyls (PCBs) onto the Palos Verdes Shelf in Los Angeles Harbor. [\[FN214\]](#) The companies included Montrose Chemical (which manufactured DDT from 1947 to 1982), [\[FN215\]](#) Westinghouse Electric, Benjamin Moore Paint, Simpson Paper, and Potlatch Corporation (which had used PCBs in their manufacturing processes). [\[FN216\]](#) Plaintiffs added Chris-Craft Industries, Stauffer Management Co., ICI American Holdings, and Atkemix due to their connections with Montrose. [\[FN217\]](#) Sanitation companies from Los Angeles County and a number of other municipalities were later added as third-party defendants. [\[FN218\]](#) The governments sought NRD for injuries to fish and bird habitats and for deaths to a number of fish and endangered birds. [\[FN219\]](#)

To assess the amount of NRD to seek in this case, NOAA contracted with a group of economists in 1991, including Richard T. Carson, W. Michael Hanemann, Raymond J. Kopp, Jon A. Krosnick, Robert C. Mitchell, Stanley Presser, Paul A. Rudd, and V. Kerry Smith. NOAA asked these economists to *81 develop an original study based upon the contingent valuation method to estimate lost nonuse value in the Southern California Bight from these injuries. [\[FN220\]](#) This group included the leading practitioners of the contingent valuation method, and all of the authors of the Exxon Valdez CVM study, which along with this Montrose study were the two largest CVM studies ever prepared. [\[FN221\]](#) The total cost of different studies done to support the damage assessment was thirty million dollars. [\[FN222\]](#) Of this, approximately eight to ten million was spent on the CVM study. [\[FN223\]](#)

To calculate lost nonuse value, these economists "designed and implemented a CV study following best-available practices for survey design and administration." [\[FN224\]](#) This study was the "culmination of an extensive program of instrument development--including focus groups, cognitive interviews, small pretests, and pilot studies--conducted over the course of 32 months." [\[FN225\]](#) In comparing their study with the conclusions of the NOAA blue-ribbon panel on CVM, these economists concluded that their "approach adheres to NOAA recommendations or demonstrates that the approach used in the main survey is superior." [\[FN226\]](#)

To construct their study, the economists relied on information provided to them by NOAA in 1991 on injuries to two species of birds: bald eagles and peregrine falcons, and two species of fish: white croaker and kelp bass.

[FN227] While bald eagles and peregrine falcons are endangered species, white croaker and kelp bass are very populous, with estimates of millions of croaker and bass living along the California coast. [FN228] The information provided by NOAA specified that concentrations of DDT and PCBs in the sediment in the Southern California Bight had probably led to reproduction problems for these species. [FN229] In particular, "White Croaker and Kelp Bass *82 produce[d] fewer young than elsewhere along the California coast [,]" and "populations of [eagles and falcons] in the South Coast area disappeared." [FN230] This information was then provided to survey respondents.

The economists developed two surveys that were administered over twenty-four weeks during 1994, a "base" survey and a "scope" survey. [FN231] In the base survey, respondents were asked to determine how much they would be willing to pay to speed up the recovery of both bird species and both fish species from the natural recovery period of fifty years to a period of only five years (an improvement of forty-five years). [FN232] In the scope survey, respondents were asked to determine how much they would be willing to pay to speed up the recovery of only the fish species from a period of fifteen years to a period of five years (an improvement of ten years). [FN233]

Based on these surveys, the authors concluded that the amount that a household would be willing to pay for the improvements in the base survey was \$55.58, and \$29.52 for improvements in the scope survey. [FN234] The authors then multiplied these amounts by the number of households in California (10.3 million) to calculate total lost nonuse values of \$575 million and \$305 million, respectively. [FN235]

However, between the time that NOAA had originally provided information about these injuries in 1991 and administration of these surveys in 1994, the government trustees also hired biological experts to determine what injuries had occurred to these four species. Unfortunately, the economists conducting the surveys did not "consult with [the government trustees'] biological experts to confirm whether the injury descriptions in the surveys were accurate." [FN236] This was unfortunate because in depositions of the government trustees' biological experts, the defendants established numerous factual inconsistencies between the descriptions of the injuries offered by the CVM surveys and the actual scientific evidence developed by the trustees' own experts. [FN237] Inconsistencies were found in the descriptions of the injuries for each of the four species. [FN238]

Concerning the peregrine falcons, the survey administrator told the respondents that these birds "'have usually not been able to hatch any of their eggs; [and] that the birds 'are not increasing' in the Southern California *83 Bight.'" [FN239] However, deposition of the trustees' biological experts revealed that peregrine falcons had been able to hatch some eggs. [FN240] Also, the numbers of peregrine falcons were actually increasing. [FN241]

In addition, the CVM survey told respondents that there were approximately twenty-four pairs of bald eagles living in the South Coast area during the 1940s (before the production of DDT). [FN242] It also told respondents that bald eagles were having reproduction problems in the South Coast, but were "'increasing in number' in 'the rest of the United States.'" [FN243] However, the trustees' expert "testified that he did not know of 'any factual basis to support the statement [in the survey] that there were about 24 pairs of bald eagles successfully hatching eggs in the south coast in the 1940s.'" [FN244] The trustees' expert further testified that bald eagles were "suffering reproductive impairment and not increasing" in the "Great Lakes area and the Columbia River Basin." [FN245]

Regarding the fish species, the CVM survey informed respondents that "white croaker were experiencing reproductive problems . . . [in the South Coast], and that they 'produce fewer young [there] than elsewhere.'" [FN246] However, the trustees' experts testified that they could not conclude that white croaker in the South Coast were having reproductive problems. [FN247] They also did not find that they were "producing fewer young than elsewhere." [FN248] Instead, as pointed out by defense counsel, "William Conner, the head of NOAA's damage assessment effort for this case, wrote a memo to [the trustees' expert] stating that the government needed to 'be prepared to explain why we think white croaker may have increased.'" [FN249]

Finally, defense counsel also demonstrated inconsistencies concerning kelp bass. The survey similarly informed respondents that "kelp bass were experiencing reproductive problems . . . [in the South Coast], and that they 'produce fewer young [there] than elsewhere.'" [FN250] However, the trustees' expert "testified that kelp bass on the Palos Verdes Shelf enjoyed greater reproductive success than fish from a clean control site." [FN251]

Defense counsel then argued that these factual discrepancies meant the survey failed the "fit" requirement established in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* [FN252] Under this requirement, courts must "exclude proffered scientific evidence under Rules 702 and 403 unless they are *84 convinced that it speaks clearly and directly to an issue in dispute in the case." [FN253] Therefore, the defense argued that the trustees' CVM study did not "speak clearly and directly" to the issues of this case and should be excluded. [FN254]

The government trustees responded that the "court should not exclude the CV report because [despite these factual inconsistencies] it provide[d] valuable information to the fact-finder in assessing damages." [FN255] Nevertheless, defense counsel replied that the government trustees essentially admitted that the injury descriptions in the original survey were distorted. To show this, defense counsel pointed out that the trustees had recently developed a new survey with the following instruction: "According to scientists, the only animal population that is currently affected by this deposit is the Channel Island bald eagle population." [FN256] The trustees thus seemed to admit that three of the four species described in the prior survey were actually not harmed.

After evaluating the arguments about the discrepancies between the descriptions offered by the CVM study and the actual scientific evidence about injuries to these species, the court granted the defendants' motion to exclude the CVM study. [FN257] A few months later, the court ruled that DDT on the ocean floor had harmed eagles and falcons on the Channel Islands. [FN258] Less than four weeks later, the trustees and DDT defendants settled the case. [FN259] Under the terms of the settlement, the DDT defendants agreed to pay seventy-three million dollars to restore the ocean environment impacted by the DDT. [FN260]

D. Analysis of Cases Relying on CVM Studies

Southern Refrigerated and Montrose provide limited opportunities to examine how courts have handled CVM studies in NRD cases. Nevertheless, they span a spectrum of sophistication in CVM studies. In *Southern Refrigerated*, the trustees did not have the funds for an original CVM study, so they incorporated a previously produced study. In *Montrose*, however, the trustees had significant funds to invest in a state of the art, site-specific, original CVM study. After extensive development, the trustees' economists produced a sophisticated study that met or exceeded the recommendations of the NOAA panel. However, in both cases, the courts rejected the validity *85 of the CVM studies. These rejections indicate that there may be significant difficulties in implementing the second principle of the Ohio decision.

The underlying reasoning behind both rejections was essentially the same: the facts used to develop the CVM studies were very different from the facts that were eventually presented to the courts. These significant differences led the courts to find that the studies did not meet the certainty and concreteness standards required for scientific evidence.

It is interesting to contrast these courts' rejections of CVM studies with the acceptance of the Lee and Bellworthy study in the *American Trader* case. The factual setting of the Lee and Bellworthy study also differed significantly from the facts of that case. Nonetheless, the court accepted this study as the basis for damage calculations. This suggests that CVM studies may face higher standards for certainty and concreteness than other economic evidence in NRD cases.

These higher standards may be justified considering the plausibility of the damage estimate produced by the scope survey in *Montrose*. This state of the art survey was extremely carefully developed. In it, the trustees' economic experts calculated lost nonuse values due to ten years of harm to only white croaker and kelp bass. [FN261] Nonuse values consist of existence values and option values. However, millions of white croaker and kelp bass existed along the California coast, and residents of California had the option of catching these available fish. When a CVM study produces an estimate of \$305 million for harm to white croaker and kelp bass along the South Coast, even though millions of the fish remain in other parts of California, higher standards for CVM studies may be appropriate.

These higher standards will continue to present significant obstacles to the use of CVM studies in NRD cases. In most NRD cases, the trustees will not have the funds to develop original CVM studies. They will instead need to

rely on previously completed CVM studies. However, Southern Refrigerated suggests that finding studies based on sufficiently similar fact patterns may be extremely difficult.

Meanwhile, trustees with the good fortune to have enough funds to develop an original CVM study could face the danger that the facts might change from when they begin the study to when they present it in trial, as occurred in Montrose. Therefore, trustees could face an unappealing choice, either proceed with the development of an original CVM study and face the possibility that new information will make the expensive study irrelevant, or choose to wait until the facts are more fully developed. However, requirements for speedy trials combined with the lengthy process of developing an original CVM study (the Montrose study took thirty-two months to develop) could mean that the results would not be available in time for trial.

In addition to these significant problems with the use of CVM studies in trials, the requirement to include nonuse values in the calculation of compensable value for all NRD cases presents obstacles to the achievement of an important goal of CERCLA--the preference that recovery of natural *86 resource damages be achieved through settlement rather than by a court.

Perhaps cognizant of the difficulties in calculating natural resource damages in a court setting, Congress drafted CERCLA to encourage settlements between trustees of natural resources and responsible parties. A court in one of the first NRD cases based on CERCLA claims, *In re Acushnet River & New Bedford Harbor*, [FN262] noted that in enacting [CERCLA] . . . it would appear that Congress desired judicial involvement kept to a minimum. In broad brush, CERCLA enforcement proceedings ought normally progress through an administrative stage in which an environmental hazard is identified, a cost effective plan adopted to deal with it, and those costs assessed against the responsible parties. [FN263]

This intent to encourage settlements continued in SARA. As noted by the Court in *City of New York v. Exxon Corp.*, [FN264] "Congress, in enacting the 1986 amendments to CERCLA sought to 'expedite effective remedial actions and minimize litigation.'" [FN265] Indeed, in the legislative history of SARA, Representative Lent stated, "I am pleased to report that the idea of encouraging settlements is no longer considered ground breaking but now is a simple and obvious matter of good policy. Costly protracted litigation threatens the effectiveness of the Superfund Program and consumes resources better spent on cleanup." [FN266]

Settlement discussions may be hindered by uncertainty about the amount of nonuse value damages trustees will seek. This possibility presented difficulties in Montrose. Concerning the possible settlement of trustees' settlements with other defendants (the local sewage companies and the owners of plants that discharged PCBs), the DDT defendants argued that settlement with these other parties should not be approved because their own potential liability could increase, depending upon whether the trustees eventually decided to seek \$305 million in NRD based on the scope survey or \$575.5 million based on the base survey. [FN267] At the point of the settlement discussions, the government was using the lower figure, which helped its argument that the settling defendants were paying a sufficiently high proportion of the total NRD claim. Thus, the uncertainty in calculating nonuse damages presented obstacles to settlement with a number of defendants.

Even when trustees and defendants agree on reasonable damage amounts to settle a case, the need to consider nonuse damages in NRD cases under the second principle of the Ohio decision can present obstacles to settlement. In *Kennecott*, the state and Kennecott had agreed on a settlement addressing the natural resource damages to groundwater *87 contaminated by Kennecott's mine. [FN268] The settlement figure "primarily was based upon an estimate of the market value of water rights" [FN269] to this groundwater. However, because the settlement did not include estimates of "non-consumptive use values of the aquifer, i.e., option and existence values," the "court conclude[d] that inadequate consideration of damages requires that the proposed Consent Decree be rejected." [FN270] It was on the basis of this rejection of its settlement that Kennecott sued DOI, hoping that DOI would add restrictions on the applicability of nonuse values, enabling it to justify its proposed settlement. However, Kennecott lost, and to the author's knowledge this case still has not settled.

Furthermore, even when settlement does occur, paying for the substantial cost of original CVM studies may lead to less restoration of damaged resources. Most NRD cases eventually settle. When the settlement is approved, the responsible party pays the agreed-upon settlement amount. When an original CVM study was developed as part of

the case, part of the settlement amount may be used to reimburse the cost of the study. This reimbursement reduces the amount of money available to restore the damaged resource. This effect can be significant, as we can see when we compare the cost of the CVM study in the Montrose case of approximately ten million dollars with the settlement amount for the DDT defendants of seventy-three million. The cost of undertaking CVM projects can limit the restoration of the damaged resources. Because of this high cost, limitation of the application of CVM studies may further the aims of CERCLA by allowing more money to be spent on damaged resources. [\[FN271\]](#)

The second principle of the Ohio decision suggests that NRD cases may need to include nonuse values calculated by CVM as compensable damages. However, difficulties in using specific CVM studies in particular cases and other factors suggests that it might be beneficial to limit the availability of nonuse damages.

VI. Conclusion

This Article examines how courts and legal scholars have grappled with economic evidence supporting natural resource damages over the twelve years after the Exxon Valdez disaster and the Ohio decision. While the contingent valuation method seemed to offer the means to value a wide array of natural resources, its usefulness in specific cases has been disappointing. Other economic techniques that avoid problems associated with valuing the environment seem more promising.

In making its decision, the Ohio court struggled with these issues and announced two principles. Experience with NRD cases offers support for the first principle of the Ohio decision, that damages should be based on the *88 costs of restoration. However, application of the second principle, that nonuse values calculated by CVM are compensable natural resource damages, should be limited.

The restoration approach focuses on the qualities of natural resources, but it does not place monetary values on these resources, avoiding many of the ethical and moral criticisms lodged against valuation-based economic evidence. Courts have been more receptive and better prepared to evaluate restoration evidence than valuation evidence. This experience therefore supports the emphasis of restoration costs under the first principle of the Ohio decision. However, experience with the use of CVM studies in NRD cases suggests significant difficulties in implementing the second Ohio principle. In both cases where courts assessed specific CVM studies, they rejected these studies as invalid evidence for NRD claims, due to differences between the factual settings used to develop these CVM studies and the facts of each case.

Other trustees wishing to use a CVM study as the basis for a NRD claim will likely face similar difficulties in establishing consistency between the different factual settings. These difficulties may exist regardless of whether the trustee must rely on a previously produced CVM study, as was the case in *Southern Refrigerated*, or whether the trustee has the funds to develop an original, state of the art CVM study, as was the case in *Montrose*. As a result of these difficulties, future CVM studies may face significant obstacles to achieving the high standard of certainty and concreteness demanded of them. Their usefulness thus may be significantly limited. Furthermore, the principle that nonuse values calculated by CVM studies are always compensable may interfere with the achievement of an important goal of CERCLA--encouraging the settlement of NRD claims.

Since the usefulness of CVM may be limited, and because the availability of nonuse damages in all cases may interfere with the restoration of resources achieved through settlement, it would be beneficial to limit the availability of CVM in NRD cases. Current regulations offer perhaps too much discretion on the choice of assessment technique.

These cases suggest one alternative structure for determining which economic technique to apply in NRD claims. As suggested by the first principle of the Ohio decision, the emphasis should be on restoring the services provided by damaged resources. When reasonably similar substitutes are available, [\[FN272\]](#) service-to-service approaches, including HEA, should be applied. If substitutes are available, but significantly different in type and quality from the damaged resource, [\[FN273\]](#) then valuation approaches may be applied.

Furthermore, the use of CVM to calculate nonuse values should be limited to resources for which no practical

substitute exists, such as endangered species, the "crown jewels" of the National Park System, or *89 exceptionally distinct resources or areas. [FN274] When a damaged resource has significant substitutes, the services previously provided by this resource--and the option to use them--will continue. However, when a damaged resource has no reasonable substitutes, services provided by the resource are threatened and the option to use these services may be significantly limited or eliminated. Thus, in these cases, the relevance of nonuse value damages is clear. Consequently, the availability of nonuse value damages calculated by CVM must be maintained, but only in those cases.

Other economists may suggest that this approach may not be completely supported by economic theory, but under certain conditions, theory is consistent with a limitation of existence values to resources without close substitutes. [FN275] However, not all courts are properly prepared to resolve arcane arguments over economic theory. The more simplified approach suggested by this Article is a better fit for the assessment of NRD in a court setting.

To implement this approach, DOI and NOAA will need to amend their NRD regulations. Both agencies are currently in the process of amending their regulations [FN276] and this process could provide the opportunity for adoption of this simplified approach. Furthermore, to override the Ohio decision's second principle, Congress must specifically amend CERCLA to limit the application of nonuse damages. CERCLA's requirement that it periodically face reauthorization will provide an opportunity to adapt to this approach. By making these changes, these agencies and Congress can significantly improve the ability of courts to handle NRD cases. Furthermore, by emphasizing more straightforward techniques over extremely expensive valuation techniques, they can allow more funds to be allocated to restoration of damaged resources.

Valuing the environment will remain extremely difficult and contentious. This Article suggests that alternative economic techniques that avoid this problem may be better suited for protecting natural resources in the courts.

[FN1]. J.D. 1998, Stanford Law School; Ph.D. 1998, Stanford University (Economics). This research was partially funded by Grant #SBR-9815472 from the National Science Foundation, awarded to Leonard Shabman and S. Kurt Stephenson, Department of Agricultural and Applied Economics, Virginia Polytechnic and State University (Virginia Tech). The author appreciates their support and advice in developing this research, however, the author remains solely responsible for the content of the Article. In addition, the author wishes to thank A. Mitchell Polinsky, Barton H. Thompson, Jr., George B. Shepherd, Henry E. Smith, and Susan K. Snyder for comments on this Article. He also thanks a number of people involved in natural resource damages cases for providing very helpful information on these cases. They include Bruce Peacock of the National Park Service of the Department of the Interior; Curtis Carlson and David Chapman of the National Oceanic and Atmospheric Administration; John Lyons of the United States Environmental Protection Agency; John A. Saurenman, Deputy Attorney General of the State of California; Paul Galvani of Ropes & Gray; José R. Allen of Skadden, Arps, Slate, Meagher & Flom LLP; Karl S. Lytz of Latham & Watkins; Manning Gasch, Jr. of Hunton & Williams; John D. Dunn of Warner, Norcross & Judd, LLP; and Charles M. Denton of Varnum, Riddering, Schmidt & Howlett. West Coast Copy in Los Angeles also provided a number of documents in the Montrose case.

[FN1]. A variety of economic techniques were developed to value natural resources. These techniques include market-valuation techniques that calculate damages based on market prices of the resources, and non-market valuation techniques--many of which rely on survey information. These surveys collect information about expenditures spent to enjoy natural resources, or about opinions on the values of resources. For more information on this process, see *Valuing Natural Assets: The Economics of Natural Resource Damage Assessment* (Raymond J. Kopp & V. Kerry Smith eds., 1993).

[FN2]. The contingent valuation method is a survey technique that calculates the total value someone may derive from the resource. A typical study asks someone whether they would vote to support a referendum on a project that will protect a natural resource, but will cost a certain amount.

[FN3]. A natural resource has both use values and nonuse values. Use values derive from the actual use of the resource. Only someone who actually uses the resource receives use value benefits from that resource. In contrast, anyone-- whether they use the resource or not--can receive nonuse value benefits from a resource. Nonuse values include both an existence value, the value someone derives from knowing that a resource exists, and an option value, the value someone derives from having the opportunity to use the resource in the future. Nonuse value is sometimes referred to as "passive use" value.

[FN4]. Natural resource damages are sought by trustees of natural resources to compensate the public for damages caused by a responsible party. The most famous case where NRD were sought arose from damages caused by the Exxon Valdez oil spill in 1989. See *Natural Resource Damages: Law and Economics* (Kevin M. Ward & John W. Duffield eds., 1992) (includes case studies of individual NRD assessments).

[FN5]. [880 F.2d 432 \(D.C. Cir. 1989\)](#). This decision was announced four months after the Exxon Valdez accident.

[FN6]. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, [42 U.S.C. §§ 9601-9675 \(1994 & Supp. III 1997\)](#).

[FN7]. Restoration costs are calculated by determining the cost of a project that restores the resource.

[FN8]. See Richard T. Carson et al., *Contingent Valuation and Lost Passive Use: Damages from the Exxon Valdez*, Discussion Paper QE94-18 at 55-56 (Resources for the Future 1994) (discussing various estimates of the lost passive use value of the Exxon Valdez spill).

[FN9]. [104 F.3d 1507 \(9th Cir. 1997\)](#).

[FN10]. See *infra* Part V.D (discussing study to estimate lost nonuse value relating to DDT manufacturing).

[FN11]. See *infra* Part III (discussing scholarly critique of the utility of restoration costs versus lost use values).

[FN12]. [33 U.S.C. §§ 2701-2761 \(1994 & Supp. IV 1998\)](#). NOAA is responsible for NRD regulations under the OPA, which was passed in the wake of the Exxon Valdez accident.

[FN13]. Release of Contingent Valuation Methodology Report, [58 Fed. Reg. 4601, 4602 \(Jan. 15, 1993\)](#) [hereinafter NOAA CV Panel Report] (panel members included Nobel laureates Kenneth Arrow and Robert Solow as co-chairs, and Edward Leamer, Paul Portney, Roy Radner, and Howard Schuman).

[FN14]. Brian R. Binger et al., *The Use of Contingent Valuation Methodology in Natural Resource Damage Assessments: Legal Fact and Economic Fiction*, [89 Nw. U. L. Rev. 1029, 1030 \(1995\)](#).

[FN15]. *Id.*

[FN16]. *Id.* at 1031.

[FN17]. To the author's knowledge. Another significant NRD case, the so-called "Bunker Hill" case, is currently in litigation, but the validity of its NRD assessment studies has not been addressed. *United States v. Asarco Inc.*, No. CV 96-0122-N-EJL, No. CV 91-342-N-EJ (D. Idaho 1991). Also, in the New Bedford Harbor litigation, the judge did strike a contingent behavioral analysis study as being untested and unreliable. [In re Ascushnet River & New Bedford Harbor](#), 725 F. Supp. 1264 (D. Mass. 1989). However, this ruling preceded the Ohio decision. Telephone Interview with Paul Galvani, Ropes & Gray (Nov. 6, 2001).

[FN18]. For example, the values of a day at a beach, or the values of habitat for a bird.

[FN19]. See *infra* Part II (analyzing the Ohio decision); Part III (analyzing the legal debate about the decision); Part IV (analyzing administrative and court responses to the decision).

[FN20]. *Idaho v. S. Refrigerated Transp., Inc. (Southern Refrigerated)*, No. 88-1279, 1991 U.S. Dist. LEXIS 1869 (D. Idaho Jan. 24, 1991); [United States v. Montrose Chem. Corp.](#), 104 F.3d 1507 (9th Cir. 1997).

[FN21]. CERCLA required the creation of two sets of procedures for NRD assessments. One was for "simplified assessments" (Type A) and the other was for assessments that required collection of much more data for the specific damaged site (Type B). Comprehensive Environmental Response, Compensation, and Liability Act of 1980, [42 U.S.C. § 9651\(c\)\(2\) \(1994\)](#).

[FN22]. [Natural Resources Damage Assessment](#), 51 Fed. Reg. 27,674 (Aug. 1, 1986).

[FN23]. [Pub. L. No. 99-499](#), 100 Stat. 1613 (1986) (codified as amended at [42 U.S.C. §§ 9601-9675 \(1994 & Supp. V 1999\)](#)).

[FN24]. See [51 Fed. Reg. at 27,678-80](#) (discussing major steps in the assessment process).

[FN25]. [42 U.S.C. § 9607\(f\)\(2\)\(C\) \(1994\)](#).

[FN26]. [51 Fed. Reg. at 27,687](#).

[FN27]. [43 C.F.R. § 11.83\(c\) \(1987\)](#).

[FN28]. *Id.*

[FN29]. *Id.* [§ 11.83\(b\)\(2\)](#).

[FN30]. [Ohio v. United States Dep't of Interior](#), 880 F.2d 432, 438 (D.C. Cir. 1989).

[\[FN31\]](#). [Id. at 459.](#)

[\[FN32\]](#). [Id.](#)

[\[FN33\]](#). [Id. at 464.](#)

[\[FN34\]](#). [Id. at 463 \(citing \[Natural Resources Damage Assessment, 51 Fed. Reg. 27,674, 27,720 \\(Aug. 1, 1986\\)\]\(#\)\).](#)

[\[FN35\]](#). [Id. at 474-81.](#)

[\[FN36\]](#). [The Ohio decision was significantly influenced by these articles. Id. at 463-64.](#)

[\[FN37\]](#). [Frederick R. Anderson, Natural Resource Damages, Superfund, and the Courts, 16 B.C. Envtl. Aff. L. Rev. 405 \(1989\).](#)

[\[FN38\]](#). [Id. at 445.](#)

[\[FN39\]](#). [Id.](#)

[\[FN40\]](#). [Id.](#)

[\[FN41\]](#). [Frank B. Cross, \[Natural Resource Damage Valuation, 42 Vand. L. Rev. 269 \\(1989\\)\]\(#\).](#)

[\[FN42\]](#). [Id. at 271 \(citing S. Rep. No. 96-848, at 13 \(1980\)\).](#)

[\[FN43\]](#). [Externalities arise when someone who is not party to an exchange derives some benefit or harm from that exchange. NRD for oil spills are examples of externalities because the general public, who is not selling the oil, nor jointly purchasing the oil, is harmed by the spill that occurs in the process of delivering the oil for sale.](#)

[\[FN44\]](#). [Cross, supra note 41, at 273.](#)

[\[FN45\]](#). [Id. at 334.](#)

[\[FN46\]](#). [Id. at 335.](#)

[\[FN47\]](#). [Id. at 338.](#)

[\[FN48\]](#). [Id.](#)

[FN49]. Frank B. Cross, [Restoration for Natural Resource Damages](#), 24 U. Tol. L. Rev. 319, 328-29 (1993).

[FN50]. A collection of papers from this symposium was later published in book form. See *Contingent Valuation: A Critical Assessment* (Jerry A. Hausman ed., 1993).

[FN51]. R.K. Niewijk, Note, "[Ask a Silly Question...](#)" [Contingent Valuation of Natural Resource Damages](#), 105 *Harv. L. Rev.* 1981 (1992). But see Miriam Montesinos, Note, [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, 72-79 (1999) (arguing for the use of CVM). Cf. Jeffrey C. Dobbins, Note, [The Pain and Suffering of Environmental Loss: Using Contingent Valuation to Estimate Nonuse Damages](#), 43 *Duke L.J.* 879, 944 (1994) (encouraging agencies and courts to "permit CV to serve as one piece of evidence in the effort to properly assess the value of natural resource damages").

[FN52]. Niewijk, *supra* note 51, at 1982.

[FN53]. *Id.* at 2000.

[FN54]. NOAA CV Panel Report, *supra* note 13, at 4610.

[FN55]. *Id.* at 4608-09.

[FN56]. This journal published the first paper on contingent valuation. Robert K. Davis, *Recreation Planning As an Economic Problem*, 3 *Nat. Resources J.* 239 (1963) (describing the preference for considering market analysis when deciding issues of recreational planning).

[FN57]. [34 Nat. Resources J. 1](#) (1994).

[FN58]. Ronald G. Cummings & Glenn W. Harrison, [Was the Ohio Court Well Informed in its Assessment of the Accuracy of the Contingent Valuation Method?](#), 34 *Nat. Resources J.* 1, 4 (1994).

[FN59]. *Id.* at 36.

[FN60]. Peter Bohm, [CVM Spells Responses to Hypothetical Questions](#), 34 *Nat. Resources J.* 37, 47 (1994).

[FN61]. David Brookshire & Michael McKee, [Is the Glass Half Empty. Is the Glass Half Full? Compensable Damages and the Contingent Valuation Method](#), 34 *Nat. Resources J.* 51, 70-71 (1994).

[FN62]. *Id.* at 51.

[FN63]. K.E. McConnell, [Reflections on the Ohio Decision](#), 34 Nat. Resources J. 93, 93 (1994).

[FN64]. Binger et al., supra note 14, at 1035-36.

[FN65]. Id. at 1108.

[FN66]. Id. at 1105.

[FN67]. Id. at 1107.

[FN68]. Katherine K. Baker, [Consorting with Forests: Rethinking Our Relationship to Natural Resources and How We Should Value Their Loss](#), 22 Ecology L.Q. 677, 720 (1995).

[FN69]. See Natural Resource Damages: Law and Economics, supra note 4 (includes case studies of individual NRD assessments); see also John Loomis & Peter Anderson, Idaho v. Southern Refrigerated, in Natural Resource Damages: Law and Economics, supra note 4, at 389 (describing the assessments used in that case, for which Deputy Attorney General Anderson was lead counsel for the State of Idaho); John W. Duffield, Exxon Valdez--Lost Recreation Use, in Natural Resource Damages: Law and Economics, supra note 4, at 581 (examining recreation use studies from the Exxon Valdez case). Duffield later published a more complete analysis of these studies. John W. Duffield, Nonmarket Valuation and the Courts: The Case of the Exxon Valdez, 15 Contemp. Econ. Pol'y 98 (1997) [hereinafter Duffield, Nonmarket Valuation and the Courts].

[FN70]. [Kennecott Utah Copper Corp. v. United States Dep't of Interior \(Kennecott\)](#), 88 F.3d 1191, 1200 (D.C. Cir. 1996).

[FN71]. Id. at 1204.

[FN72]. Id. at 1200-01.

[FN73]. [Natural Resource Damage Assessments](#), 59 Fed. Reg. 14,262 (Mar. 25, 1994) (codified at 43 C.F.R. pt. 11 (2001)).

[FN74]. [Kennecott](#), 88 F.3d at 1201.

[FN75]. Id. at 1216.

[FN76]. Id. at 1208 (citing 59 Fed. Reg. at 14,266).

[FN77]. [Natural Resource Damage Assessments](#), 59 Fed. Reg. 1062, 1077 (Jan. 7, 1994).

[FN78]. [Gen. Elec. Co. v. United States Dep't of Commerce, 128 F.3d 767, 772 \(D.C. Cir. 1997\)](#) (citing [59 Fed. Reg. at 1182-84](#)).

[FN79]. [Natural Resource Damage Assessments, 60 Fed. Reg. 39,804, 39,804 \(Aug. 5, 1995\)](#) (codified at 15 C.F.R. pt. 990 (2001)).

[FN80]. [Natural Resource Damage Assessments, 61 Fed. Reg. 440, 440 \(Jan. 5, 1996\)](#) (codified at 15 C.F.R. pt. 990 (2001)).

[FN81]. [128 F.3d 767 \(D.C. Cir. 1997\)](#).

[FN82]. [Id. at 770](#).

[FN83]. William H. Desvousges & Janet C. Lutz, Symposium: Environmental Restoration: Challenges for the New Millennium: [Compensatory Restoration: Economic Principles and Practice, 42 Ariz. L. Rev. 411, 412 \(2000\)](#).

[FN84]. In all of these scaling exercises, the trustee will "discount" future services to determine the "present value" of these future services. Discounting is a standard economic tool that reflects the idea that we would rather get something today than tomorrow. It implies that a restoration project that provides \$1000 worth of value next year (at that time) may be more beneficial than another project that provides \$1001 of value in ten years (at that time). See [15 C.F.R. § 990.53\(d\) \(2001\)](#) (describing how scaling is to be determined by the trustee).

[FN85]. [Id. § 990.53\(d\)\(2\)](#).

[FN86]. Actually, the new wetland will be somewhat larger, due to the influence of the discount rate in the scaling exercise. However, the "present value" of the new wetland will be ten acres.

[FN87]. [15 C.F.R. § 990.53\(d\) \(2001\)](#).

[FN88]. NOAA, Damage Assessment and Restoration Program, National Resource Damage Assessment Guidance Document: Scaling Compensatory Restoration Actions (Oil Pollution Act of 1990) xii (1997) [hereinafter NOAA Guidance Document].

[FN89]. [15 C.F.R. § 990.53\(d\)\(3\) \(2001\)](#).

[FN90]. NOAA Guidance Document, *supra* note 88, at xii.

[FN91]. [Id.](#)

[FN92]. [15 C.F.R. § 990.27 \(2001\)](#).

[\[FN93\]](#). [Id. § 990.27\(a\)](#).

[\[FN94\]](#). [Desvousges & Lutz, supra note 83, at 412 \(citing Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. 440 \(Jan. 5, 1996\) \(codified as amended at 15 C.F.R. pt. 990 \(2001\)\)\)](#).

[\[FN95\]](#). [General Electric, 128 F.3d 767, 772 \(D.C. Cir. 1997\)](#).

[\[FN96\]](#). [Natural Resource Damage Assessments, Final Rule, 61 Fed. Reg. 440, 499 \(Jan. 5, 1996\)](#) (codified as amended at 15 C.F.R. pt. 990 (2001)).

[\[FN97\]](#). [88 F.3d 1191 \(D.C. Cir. 1996\)](#). The D.C. Circuit later reviewed DOI's Type A NRDA regulation, which was issued two years after the Type B regulation. [Nat'l Ass'n of Mfrs. v. United States Dep't of Interior, 134 F.3d 1095, 1099 \(D.C. Cir. 1998\)](#) (denying plaintiff's request to set aside DOI's Type A rule).

[\[FN98\]](#). [Kennecott, 88 F.3d at 1206](#).

[\[FN99\]](#). [Id. at 1207](#).

[\[FN100\]](#). [Id. at 1209](#).

[\[FN101\]](#). [Id. at 1215-17](#).

[\[FN102\]](#). [Id. at 1215](#).

[\[FN103\]](#). [Id.](#)

[\[FN104\]](#). [Id.](#)

[\[FN105\]](#). [Id. at 1217](#).

[\[FN106\]](#). The court upheld one challenge concerning the definition of the date when the regulations were promulgated under section 301(c). [Id. at 1209-13](#). The court also held that DOI did not adequately explain its replacement of the concept "services" with the concept of "resources and services." [Id. at 1220](#). All other challenges were denied. [Id. at 1231](#).

[\[FN107\]](#). [General Electric, 128 F.3d 767, 771 \(D.C. Cir. 1997\)](#).

[\[FN108\]](#). [Id. at 773](#).

[\[FN109\]](#). Id.

[\[FN110\]](#). Id.

[\[FN111\]](#). Id. at 773-74.

[\[FN112\]](#). Id. at 778.

[\[FN113\]](#). Id.

[\[FN114\]](#). See, e.g., Duffield, Nonmarket Valuation and the Courts, *supra* note 69 (analyzing the Exxon Valdez litigation); Richard W. Dunford, The American Trader Oil Spill: An Alternative View of Recreation Use Damages, AERE Newsletter, May 1999, at 12; Loomis & Anderson, *supra* note 69; Carol Adaire Jones, Use of Non-Market Valuation Methods in the Courtroom: Recent Affirmative Precedents in Natural Resource Damage Assessments, 109 Water Resources Update 10 (1997). Two Florida Keys cases were described, but not significantly analyzed, in Carol Adaire Jones, Economic Valuation of Resource Injuries in Natural Resource Liability Suits (June 2000) (unpublished manuscript, on file with author) [hereinafter Jones, Economic Valuation in Natural Resource Suits]. To the author's knowledge, no other author has yet discussed the Montrose case. See *infra* Part V.C.

[\[FN115\]](#). In re Exxon Valdez, No. A89-0095-CV (consolidated), 1996 U.S. Dist. LEXIS 8173 (D. Alaska June 11, 1996).

[\[FN116\]](#). Duffield, Nonmarket Valuation and the Courts, *supra* note 69, at 99.

[\[FN117\]](#). Id. at 102-03.

[\[FN118\]](#). Id. at 102.

[\[FN119\]](#). Id.

[\[FN120\]](#). Id.

[\[FN121\]](#). Id. at 102-03.

[\[FN122\]](#). Id. at 103.

[\[FN123\]](#). In contrast to the commercial fishermen case, there seemed to be little dispute over the size of the diminished harvest, because there was only one survey of native subsistence available; nor was there any dispute over market price effects, which were not relevant for the subsistence claim. Id. at 103-04.

[\[FN124\]](#). Id.

[\[FN125\]](#). Id.

[\[FN126\]](#). Id. at 104, 107.

[\[FN127\]](#). Id. at 107.

[\[FN128\]](#). Id.

[\[FN129\]](#). Id. at 108 (citing Order No. 237 in the Exxon Valdez case).

[\[FN130\]](#). Id. at 106-07 (citing Order No. 190 in the Exxon Valdez case).

[\[FN131\]](#). Id. at 107-08 (citing Order No. 237 in the Exxon Valdez case).

[\[FN132\]](#). Id. at 109.

[\[FN133\]](#). Case No. 64 63 39 (Cal. Super. Ct. Dec. 8, 1997).

[\[FN134\]](#). Dunford, *supra* note 114, at 19; see also Deborah Schoch, *Worth of a Day at the Beach Is Key to Trial*, L.A. Times, Oct. 6, 1997, at A3 (discussing how the American Trader case turned on the value of a day at the beach).

[\[FN135\]](#). This technique of constructing an assessment based on a previously published estimate is known as the "benefits-transfer" approach. Jones, *Economic Valuation in Natural Resource Suits*, *supra* note 114, at 5-6.

[\[FN136\]](#). Dunford, *supra* note 114, at 19 (describing the study by Frederick W. Bell and Vernon R. Leeworthy, *An Economic Analysis of the Importance of Saltwater Beaches in Florida*, Report No. 82 (Florida Sea Grant College, Tallahassee, FL, February 1986)).

[\[FN137\]](#). Jones, *Economic Valuation in Natural Resource Suits*, *supra* note 114, at 5-6. In a travel-cost approach, the value of a resource is calculated by examining how much an individual is willing to spend on travel costs in order to enjoy the resource. Id.

[\[FN138\]](#). Dunford, *supra* note 114, at 15.

[\[FN139\]](#). David J. Chapman & W. Michael Hanemann, *Environmental Damages in Court: The American Trader Case*, Department of Agricultural and Resource Economics at the University of California, Berkeley Working Paper

No. 913 (Berkeley, CA Oct. 2000), at 16.

[\[FN140\]](#). Id. at 17.

[\[FN141\]](#). Id.

[\[FN142\]](#). Id. at 25.

[\[FN143\]](#). Id.

[\[FN144\]](#). The techniques were the following: 1) ordinary least squares with a "Log-Log" functional form, 2) Poisson regression with a "Log-Linear" functional form, and 3) Quantile regression with a "Linear-Log" functional form. Dunford, *supra* note 114, at 16.

[\[FN145\]](#). Id.

[\[FN146\]](#). Id. at 15.

[\[FN147\]](#). Id. at 15-16.

[\[FN148\]](#). Deborah Schoch, Pollution Resolution; Verdict on 1990 Oil Spill Offers Funds for Beach Projects as Well as a Precedent for Future Cases: Setting a Value on Missed Recreation, L.A. Times, Dec. 15, 1997, at B1.

[\[FN149\]](#). Dunford, *supra* note 114, at 19.

[\[FN150\]](#). [United States v. Fisher \(Fisher I\)](#), 22 F.3d 262, 265 (11th Cir. 1994).

[\[FN151\]](#). Mel Fisher and his family were famous for discovering the treasure- filled Spanish galleons Nuestra Se'ora de Atocha and Santa Margarita. See Treasure Hunter Sued Over Damage to Reefs, S.F. Examiner, Apr. 23, 1992, at A9; see also Richard Castillo, NOAA Blames Salvor for Damage to Seabed, Wash. Post, Apr. 18, 1992, at A3.

[\[FN152\]](#). Castillo, *supra* note 151, at A3.

[\[FN153\]](#). Id.

[\[FN154\]](#). [Fisher I](#), 22 F.3d at 266.

[\[FN155\]](#). Castillo, *supra* note 151, at A3.

[\[FN156\]. Fisher I, 22 F.3d at 265.](#)

[\[FN157\].](#) Castillo, *supra* note 151, at A3.

[\[FN158\].](#) *Id.*

[\[FN159\]. Fisher I, 22 F.3d at 265-70; United States v. Fisher \(Fisher II\), 977 F. Supp. 1193, 1202 \(S.D. Fla. 1997\),](#) *aff'd*, 174 F.3d 1201 (11th Cir. 1999).

[\[FN160\]. Fisher II, 977 F. Supp. at 1202.](#)

[\[FN161\].](#) *Id.* at 1197-98.

[\[FN162\].](#) *Id.* at 1198.

[\[FN163\].](#) *Id.*

[\[FN164\].](#) *Id.*

[\[FN165\].](#) *Id.*

[\[FN166\].](#) *Id.*

[\[FN167\].](#) *Id.*

[\[FN168\].](#) *Id.*

[\[FN169\].](#) *United States v. Fisher*, Nos. 92-10027-CIV, 95-10051-CIV, 1997 U.S. Dist. LEXIS 19328, at *1 (S.D. Fla. Sept. 3, 1997).

[\[FN170\]. United States v. Fisher, 174 F.3d 201 \(11th Cir. 1999\)](#) (unpublished opinion); National Ocean Service, NOAA, Weekly Report, Mar. 15, 1999, available at http://www.nos.noaa.gov/For_Employees/AA_Office/Report_Archives/Rept_Mar99.html (revised Nov. 25, 2001).

[\[FN171\].](#) *United States v. Great Lakes Dredge & Dock Co.*, Nos. 97-2510- CIV, 97-10075-CIV, 1999 U.S. Dist. LEXIS 17612 (S.D. Fla. Sept. 27, 1999).

[\[FN172\].](#) National Ocean Service, NOAA, Weekly Report, Apr. 12, 1999, available at

http://www.nos.noaa.gov/For_Employees/AA_Office/Report_Archives/Rept_Apr99.html (revised Nov. 25, 2001).

[FN173]. Great Lakes Dredge & Dock, 1999 U.S. Dist. LEXIS 17612, at *14.

[FN174]. *Id.* at *14-15.

[FN175]. *Id.* at *29.

[FN176]. *Id.*

[FN177]. See *id.* at *29-30 (the government failed to "reflect its own experts' conclusions" regarding sea bottom composition).

[FN178]. See also *Southern Refrigerated*, No. 88-1279, 1991 U.S. Dist. LEXIS 1869 (D. Idaho Jan. 24, 1991) (accepting market valuation techniques to assess the value of fish).

[FN179]. Disputes about the consequences of substitutes were also significant in the conflicting studies prepared for Colorado's suits for natural resources damages caused by the Eagle Mine and mines owned by the Idarado Mining and Milling Company. These suits were settled before the court assessed the validity of these studies. Raymond J. Kopp & V. Kerry Smith, *Eagle Mine and Idarado*, in *Natural Resource Damages: Law and Economics*, *supra* note 4, at 365.

[FN180]. *Dunford*, *supra* note 114, at 17.

[FN181]. See Kopp & Smith, *supra* note 179, at 369-81 (discussing areas of disagreement in the Eagle Mine and Idarado cases).

[FN182]. No. 83-C-2387 (D. Colo. consent decree entered June 24, 1988).

[FN183]. [707 F. Supp. 1227 \(D. Colo. 1989\)](#), amended by [735 F. Supp. 368 \(D. Colo. 1990\)](#), rev'd, [916 F.2d 1486 \(10th Cir. 1990\)](#).

[FN184]. Kopp & Smith, *supra* note 179, at 369-81.

[FN185]. *Id.* at 381 (citing Charles J. Cicchetti & Robert H. Haveman, *Environmental Litigation and Economic Efficiency: Two Case Studies*, in *Environmental Resources and Applied Welfare Economics* (V. Kerry Smith ed., 1988); Patricia Wald, [Judicial Review of Economic Analysis](#), 1 *Yale J. Reg.* 43 (1983)).

[FN186]. Binger et al., *supra* note 14, at 1034 n.18 (citing *In re Exxon Valdez*, No. A89-0095-CV (consolidated), 1996 U.S. Dist. LEXIS 8173 (D. Alaska June 11, 1996)).

[FN187]. *Id.* at 1034 n.18 (citing [Colorado v. United States Dep't of Army](#), 707 F. Supp. 1562 (D. Colo. 1989)) (concerning cleanup of hazardous waste disposal pond on federally controlled land); [Idarado](#), 707 F. Supp. at 1227 (holding mine operators liable for NRD at and near their facilities); *Eagle Mine*, No. 83-C-2387 (D. Colo. 1988); *Colorado v. Cotter Corp.*, No. 83-C- 2389 (D. Colo. 1988); *Colorado v. Union Carbide Corp.*, No. 83-C-2384 (D. Colo. 1987); [Colorado v. ASARCO](#), 616 F. Supp. 822 (D. Colo. 1985) (discussing damages caused by the release of hazardous substances from plant and associated response costs incurred by the state)).

[FN188]. *Binger et al.*, *supra* note 14, at 1035 (citing [In re Ascushnet River & New Bedford Harbor](#), 725 F. Supp. 1264 (D. Mass. 1989)).

[FN189]. *Id.*

[FN190]. No. 5:91:CV:45, 1994 U.S. Dist. LEXIS 21194 (W.D. Mich. Oct. 27, 1994).

[FN191]. *Id.* at *64.

[FN192]. E-mail from Charles M. Denton, Varnum, Riddering, Schmidt & Howlett, LLP, to Dale Thompson (July 12, 2001) (on file with author); E-mail from John D. Dunn, Warner, Norcross & Judd, LLP, to Dale Thompson (July 13, 2001) (on file with author). Denton represented Four Winns, Inc., in this case, and Dunn represented Kysor Industrial.

[FN193]. 1995 Mich. Pub. Acts 71 (sections 20104 (2) and (3) provide that contingent nonuse valuation shall not be used and nonuse damages shall not be recovered).

[FN194]. No. CV 90-3122-AAH (JR_x) (C.D. Cal. 1990).

[FN195]. *Southern Refrigerated*, No. 88-1279, 1991 U.S. Dist. LEXIS 1869, at *5-6 (D. Idaho Jan. 24, 1991).

[FN196]. *Id.* at *8.

[FN197]. *Loomis & Anderson*, *supra* note 69, at 395.

[FN198]. *Id.*

[FN199]. *Southern Refrigerated*, 1991 U.S. Dist. LEXIS 1869, at *54.

[FN200]. *Id.* at *61.

[FN201]. *Id.* at *56-59.

[\[FN202\]](#). Id. at *59-61.

[\[FN203\]](#). Id. at *62-63.

[\[FN204\]](#). Loomis & Anderson, *supra* note 69, at 407 (citing D. Olsen et al., Existence and Sport Values for Doubling the Size of Columbia River Basin Salmon and Steelhead Runs, 2 Rivers 44 (1991)).

[\[FN205\]](#). Southern Refrigerated, 1991 U.S. Dist. LEXIS 1869, at *54-55.

[\[FN206\]](#). Id. at *55.

[\[FN207\]](#). Id. at *55-56.

[\[FN208\]](#). Loomis & Anderson, *supra* note 69, at 407.

[\[FN209\]](#). The exact number was 1644. Id.

[\[FN210\]](#). Id. at 408-09.

[\[FN211\]](#). Id. at 409.

[\[FN212\]](#). Id.

[\[FN213\]](#). Southern Refrigerated, No. 88-1279, 1991 U.S. Dist. LEXIS 1869, at *55-56 (D. Idaho Jan. 24, 1991).

[\[FN214\]](#). David Freed, U.S. to Sue 15 Firms Over Pollution, L.A. Times, Jan. 18, 1990, at B1.

[\[FN215\]](#). Id.

[\[FN216\]](#). Id.

[\[FN217\]](#). Robert Reinhold, Suit Seeks to Force Repair of Pollution's Damage, N.Y. Times, June 19, 1990, at A14.

[\[FN218\]](#). Notice of Motion and Motion for the Entry of the 1) Amended Consent Decree with the Settling Local Governmental Entities, 2) Amendment to the May 19, 1992 Consent Decree with Potlatch Corporation and Simpson Paper Company, and 3) Consent Decree with CBS Corporation; Memorandum and Attachments in Support Thereof at 3, United States v. Montrose Chem. Corp., No. CV 90-3122- AAH (JRx) (C.D. Cal. Apr. 14, 1999) (No. 99-1552).

[\[FN219\]](#). Reinhold, *supra* note 217, at A14.

[\[FN220\]](#). Richard T. Carson et al., Natural Resource Damage Assessment, Inc., Prospective Interim Lost Use Value Due to DDT and PCB Contamination in the Southern California Bight, Vol. I, Rep. to the Nat'l Oceanic and Atmospheric Admin., Under Contract No. 50-DGNC-1-00007, at I (1994) Sept. 30, 1994, at i [hereinafter Montrose CVM Report]. Note that although the title of this report mentions "Use Value," the surveys were administered primarily to households that probably had not seen Channel Islands falcons and eagles, and that probably had not fished for nor eaten white croaker and kelp bass. These households were therefore reporting only nonuse values. It therefore seems appropriate to call these values nonuse values.

[\[FN221\]](#). Center for Env't and Resources Econ., Richard Carson (biography), at <http://www.econ.duke.edu/~kerrys/carson.html> (last visited Nov. 1, 2001).

[\[FN222\]](#). Memorandum of Defendants Montrose Chemical et al. in Opposition to Motions Filed by Plaintiffs the United States of America and the State of California and by Defendants County Sanitation District No. 2 of Los Angeles County and CBS Corporation to Enter: 1) Amended Consent Decree with the Settling Local Governmental Entities; 2) Amendment to the May 19, 1992 Consent Decree with Potlatch and Simpson Paper Company; and 3) Consent Decree with CBS Corporation at 5, *United States v. Montrose Chem. Corp.*, No. CV 90-3122-AAH (JR_x) (C.D. Cal. Jul. 16, 1999) (No. 99-1635) [hereinafter DDT Defendants' Memo in Opposition to Consent Decree].

[\[FN223\]](#). Telephone Interview with Paul Galvani, Ropes & Gray (Nov. 6, 2001).

[\[FN224\]](#). Montrose CVM Report, *supra* note 220, at ii.

[\[FN225\]](#). *Id.*

[\[FN226\]](#). *Id.* at iii.

[\[FN227\]](#). *Id.* at 8.

[\[FN228\]](#). *Id.* at 121.

[\[FN229\]](#). *Id.* at 10.

[\[FN230\]](#). *Id.*

[\[FN231\]](#). *Id.* at 70, 149.

[\[FN232\]](#). *Id.* at 122-25.

[\[FN233\]](#). Id.

[\[FN234\]](#). Memorandum of Points and Authorities in Support of Defendants' Motion to Exclude Plaintiffs' Contingent Valuation Report and Testimony Based Thereon at 4, *United States v. Montrose Chem. Corp.*, No. CV 90-3122-R (C.D. Cal. Mar. 6, 2000) (No. 99-1769) [hereinafter DDT Defendants Memo to Exclude CV Report].

[\[FN235\]](#). Id.

[\[FN236\]](#). Id.

[\[FN237\]](#). Id. at 4-10. The trustees did not deny the inconsistencies in their response to the motion to exclude the CVM study. See Plaintiffs' Opposition to Defendants' Motion to Exclude Plaintiffs' Contingent Valuation Report and Testimony Based Thereon, *United States v. Montrose Chem. Corp.*, No. CV 90-3122-R (C.D. Cal. filed Mar. 27, 2000) (No. 99-1811) [hereinafter Plaintiffs' Opposition to Motion to Exclude CV Report].

[\[FN238\]](#). DDT Defendants Memo to Exclude CV Report, *supra* note 234, at 4-10.

[\[FN239\]](#). Id. at 5.

[\[FN240\]](#). Id. at 5-7.

[\[FN241\]](#). Id. at 6-7.

[\[FN242\]](#). Id. at 7.

[\[FN243\]](#). Id.

[\[FN244\]](#). Id.

[\[FN245\]](#). Id.

[\[FN246\]](#). Id. at 8.

[\[FN247\]](#). Id. at 8-9.

[\[FN248\]](#). Id.

[\[FN249\]](#). Id. at 9.

[\[FN250\]](#). [Id.](#)

[\[FN251\]](#). [Id.](#) at 10.

[\[FN252\]](#). [509 U.S. 579, 591 \(1993\)](#); see also [Daubert v. Merrell Dow Pharm., Inc., 43 F.3d 1311, 1315 \(9th Cir. 1995\)](#) (applying Supreme Court's test).

[\[FN253\]](#). [Daubert, 43 F.3d at 1321.](#)

[\[FN254\]](#). Reply Memorandum in Support of Defendants' Motion to Exclude Plaintiffs' Contingent Valuation Report and Testimony Based Thereon at 6, [United States v. Montrose Chem. Corp., No. CV 90-3122-R \(C.D. Cal. Apr. 3, 2000\) \(No. 99-1870\)](#) [hereinafter Defendants' Reply Memo].

[\[FN255\]](#). Plaintiffs' Opposition to Motion to Exclude CV Report, [supra](#) note 237, at 7.

[\[FN256\]](#). Defendant's Reply Memo, [supra](#) note 254, at 10.

[\[FN257\]](#). Proceedings at 1, [United States v. Montrose Chem. Corp., No. CV 90-3122-R \(C.D. Cal. Apr. 17, 2000\) \(No. 1914\)](#).

[\[FN258\]](#). Marla Cone, DDT Injured Eagles, Falcons, Judge Rules, [L.A. Times](#), Oct. 3, 2000, at B1.

[\[FN259\]](#). Marla Cone, DDT Maker Agrees to Pay for Polluting Ocean, [L.A. Times](#), Oct. 28, 2000, at A1.

[\[FN260\]](#). Marla Cone, Chemical Firms Settle DDT Suit, [L.A. Times](#), Dec. 20, 2000, at B1.

[\[FN261\]](#). Montrose CVM Report, [supra](#) note 220, at 98.

[\[FN262\]](#). [712 F. Supp. 994 \(D. Mass. 1989\)](#).

[\[FN263\]](#). [Id.](#) at 996.

[\[FN264\]](#). [697 F. Supp. 677 \(S.D.N.Y. 1988\)](#).

[\[FN265\]](#). [Id.](#) at 693 (quoting [42 U.S.C. § 9622\(a\) \(1994\)](#)).

[\[FN266\]](#). [132 Cong. Rec. 29,917 \(1986\)](#).

[FN267]. See DDT Defendants' Memo in Opposition to Consent Decree, *supra* note 222, at 4-8.

[FN268]. [Utah ex rel Utah Dep't of Health v. Kennecott Corp.](#), 801 F. Supp. 553, 559-60 (D. Utah 1992), appeal dismissed, [14 F.3d 1489 \(10th Cir. 1994\)](#).

[FN269]. [Id.](#) at 559.

[FN270]. [Id.](#) at 571.

[FN271]. See also 132 Cong. Rec. 29,917 (1986) (statement of Representative Lent).

[FN272]. This is a lower standard than the standard offered in the NOAA regulations.

[FN273]. Or if, as noted in Ohio, the costs to restore the resource are greatly disproportionate to the value of services.

[FN274]. An example of such an area is the Prince William Sound area damaged by the Exxon Valdez spill.

[FN275]. See Richard O. Zerbe, Jr., Can Law and Economics Stand the Purchase of Moral Satisfaction?, 20 Res. in Law and Econ. (forthcoming 2002) (supporting this restriction with a theoretical argument concerning the relevance of the availability of substitutes to "existence value").

[FN276]. NOAA has recently issued a proposed amended regulation. [Natural Resource Damage Assessments](#), 66 Fed. Reg. 39,464 (proposed July 31, 2001) (to be codified at 15 C.F.R. pt. 990 (2001)). Meanwhile, DOI's new regulations have been "placed on hold by the Bush administration." Monica P. Medina, Just Do It, Env'tl. F., July-Aug. 2001, at 23, 24.

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