Shellfish Contamination: Reducing the Necessity for Scientific Evidence in Natural Resource Damages Under The Comprehensive Environmental Response, Compensation, and Liability Act

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"No witchcraft, no enemy action had silenced the rebirth of new life in this stricken world. The people had done it themselves." –Rachel Carson[1]

I. INTRODUCTION

The shellfish natural resource provides both economic and ecological benefits to the coastal regions of the United States. However, urbanization and industrial activities harm the fragile coastal eco-system that sustains shellfish.[2] This

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[1] Rachel Carson, Silent Spring, 3 (Houghton Miffin, 1962).

[2] Randy Lowell, *Private Actions and Marine and Water Resources: Protection, Recovery and Remediation,* 8 S.C. ENVTL. L.J. 143, 146–47 (2000). "While humankind may still enjoy the right to the oceans and waterways, mankind's ability to enjoy the oceans and waterways has been severely hindered in modern times. With the Industrial Revolution and the staggering rate of increase in human population, industrialization, and resource consumption, the earth's capacity to sustain this rate has dwindled, with man having 'followed an implicit policy of ignoring uncertain environmental risks until disaster hits.'" *Id.* (*quoting* Larry D. Silver, *The Common Law of Environmental Risk and Some Recent Applications*, 10 HARV. ENVTL. L. REV. 61, 62 (1986)).

degradation reduces the availability and quality of the valuable shellfish resource.[3] One of the primary culprits continually contaminating shellfish is the discharge of hazardous materials into coastal waterways, which ultimately accumulate in shellfish harvesting areas.[4] These discharges give way to long term economic, ecological and human health problems.

Plaintiffs who have been harmed by hazardous waste discharge of this nature have two major avenues for pursuing a claim against a polluter. First, plaintiffs may rely on common law tort theories such as: nuisance, trespass, negligence or strict liability claims.[5] More often than not, the causation element proves to be a major obstacle to the plaintiff when making a prima facie case. Thus, the claim may fail.[6]

The more viable option for recovering natural resource damages resulting from the discharge of hazardous waste is to pursue a claim under the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA").[7] Since there is much confusion regarding the parameters of the causation element in natural resource damage actions,[8] CERCLA appears to be the more effective

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[3] *Id.* at 147 ("One-fourth of shellfish harvesting areas have been closed due to contamination");

See also Council on Environmental Quality, 25th Annual Report 225 (1994), *Protecting and Enhancing Shellfish Resources*, http://www.buzzardsbay.org/shellac2.htm. (last visited March 7, 2006).

[4] *See* Table 1-1, Hazards and Risks of Seafood Consumption and Their Control Arranged According to Importance, in Institute of Medicine, Seafood Safety 4-5 (Farid E. Ahmed ed., 1991).

[5] Julie Mendel, *CERCLA Section 107: An Examination of Causation*, 40 WASH. U. J. URB. & CONTEMP. L. 83, 84 (1991); Charles B. Anderson, *Damage to Natural Resources and the Costs of the Restoration*, 72 TUL. L. REV. 417, 420-426 (1997).

[6] Mendel, *supra* note 5.

[7] Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675 (2002).

[8] The D.C. circuit court of appeals has determined that CERCLA is unclear on the issue of whether the causation standard should be less strict than that of the common law standard. State of Ohio v, U.S. Dept. of

vehicle for compensating the public for damages to natural resources than those offered by traditional common law principles.

The ultimate manifestations of hazardous waste pollution are unpredictable and long term. The cleanup of a contaminated site may never return that site to its original condition. Also, the damages recovered in a natural resource damage action may never fairly compensate the public, who bears the loss of the natural resources.[9] Because of the speculative nature of the scientific evidence and conflicting standards used to substantiate such a claim, obtaining results favorable to both the environment and the public through the CERCLA process has proven cumbersome.

In the case of shellfish contamination, the coastal shellfish harvesting areas tend not to be the primary hazardous waste sites. Instead, the accumulation of contamination in the harvesting areas occurs incidentally to the activities taking place on adjacent waste disposal sites. Accordingly, gathering evidence of contamination on adjacent sites and creating the causal link between the release and the damage is more speculative. Because the environmental damage can take years to materialize, the damage may not be capable of being accurately predicted until long after the initial contamination to an adjacent site

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Interior, 880 F.2d 432, 470-472 (D.C. Cir. 1989). The trial courts have also reached different conclusions regarding the standard for causation in natural resource damage actions. *See In Re* Acushnet River and New Bedford Harbor, 722 F.Supp. 893, 897 n. 8 (D. Mass 1989) *citing* O'Neil v. Picillo, 883 F.2d 176, 179 n 4 (1st Cir. 1989) (the court concluded that the causation requirement of CERCLA's section 107(a)(4)(C) could be met so long as the defendant's actions were a "contributing factor" to the injury); *see also* State of Idaho v. Bunker Hill Co., 635 F.Supp. 665, 674 (D. Idaho 1986) (the court required a "casual link" between the release of hazardous substances and the alleged damages).

[9] John M. Heyde, *Is Contingent Valuation Worth The Trouble?*, 62 U. CHI. L. REV. 331, 334 (1995)("[E]ven if a polluter is fully liable for the cost of restoring a contaminated natural resource, the public is still not made whole. First, restoration is never immediate, and the public loses some of the resource's value for the period between the contamination and the restoration. Second, some damage can never be repaired.").

has occurred. Also, there may be more than one possible source for the contamination.[10]

Because of the speculative nature of the scientific evidence used to substantiate a natural resource damage claim, its reliability should be called into question and thoroughly examined. Evidentiary requirements for causation in a natural resource action under CERCLA should be loosened in order to duplicate the quasi strict liability standards imposed on a plaintiff in a remediation action to reflect Congress' intention.[11] The imposition of such a standard will reduce the requirement for the expensive and impractical gathering of scientific evidence. This would, in turn, empower the Natural Resource Trustee with the requisite resources to be more proactive in combating future pollution. It would also allow the trustee to restore the damaged natural resource to its baseline condition and give the trustee the ability to purchase coastal land for conservation purposes.

II. SOURCES AND CONSEQUENCES OF SHELLFISH CONTAMINATION

Shellfish are particularly vulnerable to contamination present in the coastal waterways they occupy.[12] The shellfish (e.g., oysters, clams, scallops) commonly found in the Northeast, known as "bivalve mollusks," thrive in shallow

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[10] Artesian Water Co. v. New Castle County, 659 F.Supp 1269, 1283 (D.Del.1987) ("[I]f the release or threatened release of contaminants from the Site was a substantial factor in causing [Plaintiffs] to incur costs, [Defendants] may not escape liability merely because other causes…have contributed to the result").

[11] Patrick D. Taylor, *Liability of Past Owners: Does CERCLA Incorporate a Causation-Based Standard?*, 35 S.TEX.L.REV. 535, 544–45 (1994) (Author argues that Congress intended to implement a strict liability causation standard in CERCLA natural resource damage actions).

[12] Ian Dore, *Shellfish: A Guide to Oysters, Mussels, Scallops, Clams and Similar Products for the Commercial User* 15–17 (Van Nostrand Reinhold) (1991).

coastal waters located near freshwater flows.[13] Essentially, they feed by filtering water and extracting the organisms within.[14] As a direct result of their feeding behavior, shellfish frequently absorb toxins, bacteria, disease causing microorganisms (pathogens), metals, and other pollutants that may be present in the water.[15] Many factors influence the success of shellfish populations, but due to the physical characteristics of the species, water quality is paramount.[16] Unfortunately, shallow coastal waterways, where shellfish thrive, often serve as repositories for pollutants.[17]

Although there are many sources that lead to the contamination of the shellfish population, CERCLA is best designed to combat the problem of pollution specifically in the form of releases[18] of hazardous substances, pollutants or contaminants that find their way into coastal waters. Rhode Island's experience with the Naval Construction Battalion Center in North Kingstown is a prime example of CERCLA's applicability in recovering for a contaminated shellfish source.

From 1939 until 2001, the Navy owned and operated a landfill on several large parcels of property adjacent to Allan Harbor in Narragansett Bay.[19] The Navy disposed of hazardous substances on the property, such as methylmercury, which eventually seeped into the harbor and accumulated in surrounding shellfish.[20] The State of Rhode

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[13] *Id.*
[14] *Id.*
[15] *Id.*
[16] *Id.*
[17] *Id.*
[18] CERCLA defines a "release" as "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment . . . " 42 U.S.C. § 9601(22) (2002).
[19] Turn to 10, *Navy Will Pay $1.4 Million For Environmental Damage In R.I.,* (Jan. 12, 2006), http://www.turnto10.com/news/6029697/detail.html?subid=10101342 (last visited May 31, 2006).
[20] *Id.*

Island indefinitely closed the area to harvesting shellfish in 1984. [21] The State of Rhode Island, acting in their capacity as Natural Resource Trustee, brought a natural resource damage action to recover for the lost use of the shellfish resource, among other things.[22] In a final settlement, the U.S. Navy agreed to compensate the State of Rhode Island $1.4 million for damages to natural resources.[23]

The availability of an uncontaminated shellfish resource is imperative for three major reasons: (1) avoiding harmful effects on human health; (2) avoiding economic harm; and, (3) preserving the coastal eco-system.

A. Human Health Considerations

Perhaps the most compelling reason for addressing shellfish contamination is eliminating the potential threat to human health. Although shellfish contain considerable nutritional value[24] and have been consumed for centuries,[25] disease and illness are constantly attributed to shellfish consumption.[26] Not surprisingly, the disease and illness originate from unsanitary conditions that are sometimes present in the water at shellfish harvesting areas.[27]

Generally, state and local governments are charged with the responsibility of preventing the consumption of contaminated shellfish.[28] In the event of contamination, the

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[21] *Id.*

[22] *Id.*

[23] *Id.*

[24] Institute of Medicine, *supra* note 4, at 1 ("[S]hellfish are nutritious foods that constitute desirable components of a healthy diet.").

[25] Katherine Szabo, *Prehistoric Shellfish Gathering*, http://www.manandmollusc.net/history_food.net. (Last visited Apr. 10, 2006).

[26] J. David Clem, *Historical Overview*, Environmental Indicators and Shellfish Safety 1, 1–29 (Cameron R. Hackney & Merle D. Pierson eds., 1994).

[27] *Id.*

[28] Environmental Protection Agency, *EPA's Recommendations on the Use of Fish and Shellfish Consumption Advisories* (October 24, 2000), www.epa.gov/waterscience/library//wqstandards/shellfish.pdf (last visited

State's Department of Health will issue consumption advisories to the general population or close shellfish beds entirely.[29] Despite the government's good faith attempts to regulate shellfish consumption, a substantial portion of shellfish is caught by recreational fisherman and may be consumed absent any regulation.[30] The availability of a shellfish resource safe for consumption is contingent upon a clean harvesting area.[31]

B. Economic Considerations

Native shellfish are responsible for providing employment and fueling economic trade in certain coastal regions; depletion in the availability of the resource affects those who depend on the resource.[32] Although coastal regions in the United States do not currently rely on natural resource industries the way they have in the past, the shellfish industry maintains tremendous economic value.[33] Moreover, when one considers the residual effects of related industries, such as boat and truck sales, retail sales, restaurants,

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December 13, 2006); *see also* Federal Food, Drug and Cosmetic Act, 21 U.S.C. §§ 342(a)(1)-(7) (2005).

[29] Environmental Protection Agency, *supra* note 28.

[30] Institute of Medicine, *supra* note 4, at 2 ("One-fifth of the fish and shellfish eaten in the United States is derived from recreational or subsistence fishing, and these products are not subject to health-based control; there is need to improve protection for consumers of these products by regulation of harvest and by education concerning risks associated with their consumption.").

[31] Dore *supra* note 12,at 17.

[32] Dick White, *Shellfisherman Will Feel Impact First*, N. B. Std. Times, April 30, 2003 at A1, *at* http://www.s-t.com/daily/04-03/04-30-03/a01lo010.htm (Discussing the impact of an oil spill on local shellfisherman).

[33] EPA, *State of the New England Environment,* (1996), http://www.epa.gov/NE/soe/coastal.html (last visited April 23, 2006) ("The commercial shellfish harvest is worth about $200 million per year to the region and represents a livelihood for thousands of people.").

wholesaling and packing and tourism, the total value of the shellfish industry is incalculable.[34]

C. Ecological Considerations

Throughout history, man has held a misconception that the ocean is a limitless resource, incapable of being damaged by human hands.[35] Passage of time and numerous scientific studies have proved that human activity is directly responsible for immeasurable damage to coastal waters.[36] The ocean is a complex ecosystem where species are intricately connected to one another; contamination of the shellfish population has unknown ramifications on the plants and other species that live within the same coastal ecosystem and feed on the resource. Unfortunately, current laws and policies tend to "emphasize use instead of protection and preservation, individual resources instead of interconnected ecosystems, problems of recent origin instead of historical accumulations of human-induced marine degradation."[37]

III. THE NATURE OF SCIENTIFIC EVIDENCE AND EXPERT TESTIMONY

Success in a natural resource damage action involving shellfish contamination case will hinge on highly sophisticated technical scientific evidence, in conjunction with the testimony of experts, specifically used in proving causation and in quantifying damages.[38] Environmental

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[34] Gregg R. Rivara, *Water Quality and Shellfish on Long Island* (2002), http://www.nywea.org/
clearwaters/02-fall/waterqualityands.html (last visited June 6, 2006).

[35] Robin Kundis Craig, *Taking the Long View of Ocean Ecosystems: Historical Science, Marine Restoration, and the Oceans Act of 2000*, 29 ECOLOGY L.Q. 649, 651 (2002).

[36] *Id.* at 652 ("[H]umans are degrading—sometimes even destroying—large areas of the oceans and the biodiversity that they contain.").

[37] *Id.* at 651.

[38] Keun J. Park, *Judicial Utilization of Scientific Evidence in Complex Environmental Torts: Redefining Litigation Driven Research*, 7 FORDHAM

litigation is "document intensive, involves a great deal of discovery, expert witnesses, and often a huge amount of technical data with their own concepts and language."[39] Accordingly, the environmental advocate must take full advantage of the Federal Rules of Evidence and existing case law to ensure that all of the relevant scientific evidence and expert testimony has a chance to be presented at trial.

The introduction of scientific evidence at trial is a routine practice during CERCLA litigation and, very often, it serves as the most critical factor for determining liability.[40] The admissibility of scientific evidence stems from the standards established in *Frye v. United States*,[41] which requires that the proponent of scientific evidence demonstrate that the scientific theory and the method used to develop that theory is "generally accepted within the relevant scientific community."[42]

In 1993, the Supreme Court departed from the venerable Frye test when it decided *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[43] *Daubert* held that Federal Rule of Evidence 702 is the new standard for determining the admissibility of scientific evidence and it further established a "gatekeeping" role for federal district courts that requires an independent judicial assessment of reliability based on several defined factors.[44]

ENVTL. L.J. 483, 491–92 (1996) ("For example, proving causation of incurrence of response costs under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), is frequently determinable only by reference to scientific opinion").

[39] *Id.* at 485.

[40] *Id.*

[41] 293 F. 1013, at 1013–14 (C.A.D.C 1923).

[42] State v. Garcia, 197 Ariz. 79, 3 P.3d 999, 1002 (1999) ("Under *Frye*, the admissibility of novel scientific evidence depends on whether the evidence sought to be introduced is derived from a scientific theory or principle that has achieved general acceptance in the relevant scientific community").

[43] Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579 (1993).

[44] Judith A. Hasko, *Daubert v. Merrell Dow Pharmaceuticals, Inc.: Flexible Judicial Screening of Scientific Expert Evidence Under Federal Rule of Evidence 702*, 1995 WIS. L. REV. 479(1995) (When making its

In 1999, the Supreme Court decided *Kumho Tire v. Carmichael*,[45] which held that *Daubert* applies to all expert testimony, not just scientific testimonial evidence.[46] Furthermore, the court clarified that it is not necessary that all of the factors mentioned in *Daubert* be present to make the evidence admissible.[47]

As with any type of evidence introduced at trial, the admissibility of scientific evidence turns on its relevancy.[48] The burden is placed on the party that seeks to have the evidence admitted to specify what issues it relates to and show how it rationally advances the inquiry about that issue.[49] Ultimately, the trial court judge is responsible for making the final determination of which evidence will be admissible at trial.[50]

A natural resource damage action involving shellfish contamination will involve highly technical information or analysis that is most likely beyond the knowledge of the typical juror and therefore, will require the testimony of an expert. Despite its ability to influence a jury "because of its aura of special reliability and trustworthiness,"[51] expert

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determination regarding the admission of scientific evidence, the court will evaluate several factors: (1) whether the scientific theory or technique has been empirically tested; (2) whether the scientific theory or technique has been subjected to peer review and publication; (3) the known or potential rate for error; (4) the expert's qualifications and stature in the scientific community; (5) whether the results can be replicated by other experts elsewhere; and, (6) whether the technique and its results can be explained with sufficient clarity so that the court and the jury can understand its plain meaning).

[45] 526 U.S. 137 (1999).

[46] *Id.* at 151–58.

[47] *Id.*

[48] Evidence is considered relevant when it has "any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." FED. R. EVID. 401.

[49] *Id.*

[50] FED. R. EVID. 104(a).

[51] United States v. Amaral, 488 F.2d 1148, 1152 (9th Cir. 1973).

testimony synthesizes and explains the intricacies of the evidence being presented at trial.

Unlike eyewitnesses or parties subject to litigation, expert witnesses testify based on their own experience and knowledge and are allowed to apply their expertise to the facts of the case.[52] A scientist holding an advanced academic degree in a field that sufficiently relates to the issue in dispute is usually qualified as an expert.[53] Trial courts are given broad discretion in making the final decision as to whether a witness qualifies as an expert based on the "facts and circumstances of the particular case."[54]

The role of the scientific expert at trial differs completely from his or her role in the scientific world. In the scientific world, the scientist seeks to achieve certainty through repetition. However, in the courtroom, the plaintiff does not have the obligation to prove his case to a scientific "certainty," but rather, to a standard of a preponderance of the evidence.[55] Justice Blackmun noted this distinction in *Daubert*:

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[52] Expert testimony is guided by the Federal Rules of Evidence 702. The rule states: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case." FED. R. EVID. 702.

[53] *Id.*

[54] Kumho Tire v. Carmichael, 119 S.Ct. 1167, 1179 (1999) ("Rule 702 grants the district judge the discretionary authority, reviewable for its abuse, to determine reliability in light of the particular facts and circumstances of the particular case").

[55] Kimberly C. Harris, *Use and Examination of Experts In Environmental Litigation*, 50 AM. JUR. *Trials* 471 §3. The role of expert proof in environmental litigation (updated 2005). ("[E]nvironmental litigation often involves an array of competing scientific 'facts' as to which some 'certainty' is sought. Indeed, even scientific facts are not certain, but only theories with high probabilities of validity. Scientific experts typically speak not of certainty, but of probability. For that reason, the resolution of many disputed environmental cases turns on the

> It is true that open debate is an essential part of both legal and scientific analyses. Yet there are important differences between the quest for truth in the courtroom and the quest for truth in the laboratory. Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly. The scientific project is advanced by broad and wide-ranging consideration of a multitude of hypotheses, for those that are incorrect will eventually be shown to be so, and that in itself is an advance. Conjectures that are probably wrong are of little use, however, in the project of reaching a quick, final, and binding legal judgment—often of great consequence—about a particular set of events in the past.[56]

Furthermore, when determining whether a proffer of scientific evidence is sufficiently reliable, it is important to consider "whether the experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying."[57] If the experts developed their opinions expressly for the purposes of testifying, then "proof that the research and analysis supporting the proffered conclusions have been subjected to normal scientific scrutiny through peer review and publication" is required.[58]

Claims and litigation involving contamination of a shellfish resource include the expertise of highly skilled

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resolution of scientific or technical issues. Both tasks that a is not prepared to handle without the assistance of experts").

[56] Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 589, 596–97 (1993).

[57] Daubert v. Merrell Dow Pharm., Inc., 43 F.3d 1311, 1318 (9th Cir. 1995) (hereinafter "Daubert II").

[58] *Id.* at 1318.

professionals such as biologists, chemists, civil engineers, hydrologists, physicians and economists as both fact and expert witnesses. These experts have the difficult responsibility of analyzing various scientific theories and simplifying them for the comprehension of the jury. This type of complex environmental litigation will frequently involve complex scientific uncertainties that go beyond the comprehension of the average juror.[59] The prospect of obtaining absolute scientific certainty at trial is unrealistic. Rather, the jury is charged with the responsibility of determining liability based on one of many potentially credible scientific theories.[60]

The D.C. Circuit Court of Appeals has recognized that environmental litigation requires a special understanding of the nature of scientific evidence:

> Undoubtedly, certainty is the scientific ideal—to the extent that even science can be certain of its truth. But certainty in the complexities of environmental medicine may be achievable only after the fact, when scientists have the opportunity for leisurely and isolated scrutiny of an entire mechanism[61]

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[59] Susan E. Cowell, *Pretrial Mediation of Complex Scientific Cases: A Proposal to Reduce Jury and Judicial Confusion*, 75 CHI.-KENT L. REV. 981, 981–82 (2000).

[60] Howard T. Markey, *Jurisprudence or "Juriscience"?,* 25 WM. & MARY L. REV. 525, 526–28 (1984); *see also* Scott C. Whitney, *The Case for Creating a Special Environmental Court System*, 14 WM. & MARY L. REV. 473, 477–82 (1973);Scott C. Whitney, *The Case for Creating a Special Environmental Court System– A Further Comment*, 15 WM. & MARY L. REV. 33, 45 (1973). (Parenthetical information is encouraged after using "see also").

[61] Ethyl Corp. v. Environmental Protection Agency, 541 F.2d 1, 25 (D.C. Cir. 1976). Author combined the words of the judge with footnote #52 of this case to get this quote, therefore it was cut out.

IV. THE FRAMEWORK OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT

Congress enacted CERCLA in 1980, primarily as a means of curing past pollution and preventing future pollution as a result of discharges of hazardous substances.[62] In addition to compensating landowners and governments for the remediation of contaminated sites, CERLCA authorizes "natural resource trustees"[63] to recover compensatory "damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release."[64] In other words, the statute provides the natural resource trustee with the ability to achieve two broad objectives: (1) the cleanup of sites contaminated by hazardous waste and (2) the ability to recover damages for the destruction of natural resources.[65]

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[62] Peter M. Manus, *Federalism Under Siege at the Rocky Mountain Arsenal: Preemption and CERCLA After United States v. Colorado*, 19 COLUM. J. ENVTL. L. 327, 352 (1994) ("According to its legislative history, CERCLA was enacted 'to establish a comprehensive response and financing mechanism to abate and control the vast problems associated with abandoned and inactive hazardous waste disposal sites.'" *quoting* H.R. Rep. No. 1016(I), 96th Cong., 2d Sess. (1980) 22, *reprinted in* 1980 U.S.C.C.A.N (94 Stat.). 6119, 6125).

[63] Natural resource trustees are federal, state, or Indian tribe officials designated to act on behalf of the public as trustees for natural resources. 42 U.S.C. § 9607(f) (2000); *see also* Alfred L. Snapp & Son, Inc. v. Puerto Rico, 458 U.S. 592, 607 (1982) ("State governments may act in their *parens patriae* capacity as representatives for all their citizens in a suit to recover damages for injury to a sovereign interest"); Alaska Sport Fishing Association v. Exxon Corp., 34 F.3d 769, 773 (9th Cir. 1994) ("A state has a sovereign interest in natural resources within its boundaries").

[64] 42 U.S.C § 9607(a)(4)(C) (2000); *see also* Patrick T. Michael, III, *Natural Resource Damages Under CERCLA: The Emerging Champion of Environmental Enforcement*, 20 PEPP. L. REV. 185, 190 (1992).

[65] *Patrick T. Michael III, supra* note 64, at 189.

A. REMEDIATION ACTION

CERCLA's primary purpose was to address pollution situations involving sites that were formerly used for the disposal of hazardous waste.[66] The statute sets forth a detailed remediation process for investigating the source of pollution, identification of the responsible party, and providing financial resources necessary to clean up the polluted sites.[67]

Although this note focuses specifically on a CERCLA action for natural resource damages, it is important to set forth the process of a remediation action because the natural resource trustee will be responsible for meeting the elements of a remediation action before it can recover for natural resource damages.[68] The plaintiff must establish the following four elements to impose liability under section 107 of CERCLA: (1) the defendant falls within one of the four categories of "responsible parties"; (2) the hazardous substances are disposed at a "facility"; (3) there is a "release" or threatened release of hazardous substances from the facility into the environment; and, (4) the release causes the incurrence of "response costs."[69]

The causation element that creates obstacles under common law principles and in CERCLA natural resource damage actions is less troublesome in remediation cases. In *Krygoski Construction Co., Inc. v. City of Menominee*, the court defined the modern view of the causation element in a CERCLA remediation: "Although liability under CERCLA is

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[66] Dedham Water Co. Inc. v. Cumberland Farms Dairy, Inc., 972 F.2d 453 (1st Cir. 1992).

[67] 55 Fed. Reg. 6154–57 (Feb. 21, 1990).

[68] Carol E. Dinkins & Kristie M. Tice, *New Solutions For Old Problems in Newark Bay,* 29 SETON HALL L. REV. 60, 65 (1998).

[69] 42 U.S.C. § 9607(a) (2000); *see also* United States v. Alcan Aluminum Corp., 964 F.2d 252, 258–59 (3rd Cir.1992); United States v. Aceto Agric. Chems. Corp., 872 F.2d 1373, 1378–79 (8th Cir.1989),Blake A. Watson, *Liberal Construction of CERCLA Under The Remedial Purpose Canon: Have The Lower Courts Taken a Good Thing Too Far?*, 20 HARV. ENVTL. L. REV. 199, 279 (1996).

strict, . . . a CERCLA plaintiff still shoulders the burden of alleging and proving an unbroken chain of events occurred which bridged his necessary response costs to the defendant's conduct."[70]

Without a doubt, the use of scientific evidence plays an integral role during a remediation action under CERCLA. "The 'expert's opinion as to fate and transport of chemicals in the soil and groundwater may be the sole means of interpreting evidence at trial, and the use of medical and toxicological experts the principle means of attempting to bring rationality to the issue of 'how clean is clean'.'"[71] The scientific tests and analysis performed through the remediation process "play an integral role in the evaluation of site conditions."[72]

B. NATURAL RESOURCE DAMAGE ACTION

CERCLA also provides a method for the natural resource trustee to recover for "injury to, destruction of, or loss of natural resources . . ." on behalf of the public.[73] Clearly, a natural resource damage action is the logical method for recovery after contamination of the shellfish resource caused

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[70] 431 F. Supp.2d 755, 763 (W.D. Mich. 2006) (*quoting* Rhodes v. County of Darlington, South Carolina, 833 F. Supp. 1163, 1190 (D.S.C. 1992)); *see also* Dedham Water Co. Inc., 889 F.2d 1146, at 1152 (Liability for response costs under CERCLA section 107 requires only a minimal connection).

[71] Park, *supra* note 38, at 492 (*quoting* Steven P. McDonald & Jon K. Wactor, *Practicing in the Brave New World of Scientific Litigation Post Daubert v. Merrell Dow*, RECORDER, Oct. 5, 1994, at 10).

[72] *Id.*

[73] 42 U.S.C. § 9607(a)(4)(C) (2000); *see generally* Ohio v. U.S. Dep't of Interior, 880 F.2d 432 (D.C. Cir. 1989); *see also* 42 U.S.C § 9601(16) (2000) (A natural resource is defined by CERCLA as: "[L]and, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States…any State or local government, any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe.")

by a release of a hazardous substance. "A natural resource damage action essentially is a tort action . . ." brought by the government on behalf of the general public.[74] The elements for establishing a prima facie case in natural resource damage action is discussed in the next section.

V. UTILIZING SCIENTIFIC EVIDENCE TO MAKE A PRIMA FACIE CASE IN A NATURAL RESOURCE DAMAGE LAWSUIT

The first step in the natural resource damage recovery process is establishing "baseline." Baseline is defined as "the condition or conditions that would have existed at the assessment area had the discharge of oil or release of hazardous substance under investigation not occurred".[75]

Next, the natural resource trustee is responsible for establishing the "causal link" between the release of the hazardous substance and the injury to the natural resource.[76] Unfortunately, the standard for determining the causal link in natural resource damage actions has been subject to many interpretations.[77] Despite its appearance as a strict liability standard for causation, the few courts that have addressed the causation issue in a natural resource damage case have determined that the plaintiff is required to at least make a minimal showing of proximate causation.[78]

To meet that causation standard, the plaintiff is charged with fingerprinting the sources of pollution or the cause of injury to a shellfish resource. This is a task that involves scientific research performed over the course of years. Detecting pollutants in the ocean and determining the

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[74] *See* Dinkins & Tice, *supra* note 68, at 65.

[75] 43 C.F.R. § 11.14(e) (2005).

[76] *See* Dinkins & Tice, *supra* note 68, at 65.

[77] *See* Mendel, *supra* note 5*,* at 101–04.

[78] *Id.; see also* Ohio v. United States Dep't of Interior, 880 F.2d 432, 470 (D.C. Cir. 1989) ("There is little evidence, however, that Congress specifically intended to ease the standard of proof for showing that a particular spill caused a particular biological injury.").

pathway those pollutants took to arrive at their final destination can be daunting.[79] Because shellfish contamination rarely occurs on the actual site in which there was a release of hazardous substances, the Natural Resource Trustee has the added difficulty of holding the owners of adjacent sites liable for the damages.

Proving that specific pollutants were the proximate cause of injury presents even more difficulties. The time restrictions, the nature of litigation and making a final determination of causation can easily be disputed. Because the scientific expert's ultimate determination will conclude only after the analysis of technical scientific data and theories, the credibility of the experts who testify at trial becomes an issue on which the litigation will turn, creating a so called "battle of the experts."[80]

Recently, the 9th circuit Federal Court of Appeals had reason to closely examine the nature of microbiologist expert testimony in shellfish contamination litigation when it decided *Clausen v. M/V New Carissa*.[81] Although the case does not deal specifically with scientific evidence in regard to a CERCLA natural resource damage action, it provides valuable insight into the battle of the experts and the nebulous nature of proving causation in a natural resource damage case specifically involving shellfish.[82]

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[79] Clifford Fisher, *The Role of Causation in Science as Law and Proposed Changes in the Current Common Law Toxic Tort System*, 9 BUFF. ENVTL. L.J. 35, 60 (2001) ("In nearly every tort action, the plaintiff must prove causation. Causation involves a two-step analysis. The first step is factual causation and the second is proximate causation. Factual causation is used to determine whether there is a connection between the allegedly tortuous conduct and the plaintiff's injury. This cause-effect relationship is the part of environmental law that is difficult for the victim to prove").

[80] Richard B. Racine, Jeffrey A. Lindeman & Katherine B. Davis, *The Battle Over Science in the Courtroom,* 42-FEB FED. LAW. 36 (1995).

[81] 339 F.3d 1049 (9th Cir. 2003).

[82] Gerald F. George, *Litigation of Claims For Natural Resource Damages*, SD88 ALI-ABA 631, 633 (1999) ("Federal statutory authority for recovery of natural resource damages has existed since the 1977 amendments to the Clean Water Act and the passage of CERCLA in

In *Clausen*, a vessel carrying 400,000 gallons of bunker and diesel fuel spilled approximately 70,000 gallons of oil into Coos Bay, Oregon, the richest oyster growing area in Oregon.[83] A report prepared by federal and state agencies concluded that the oil from the vessel was responsible for the death of approximately 3.5 million oysters.[84] Accordingly, the owners and operators of a commercial oyster farm "brought suit against the New Carissa and its corporate owners and operators in federal district court, alleging claims under the Federal Oil Pollution Act[85] and the Oregon Oil Spill Act."[86]

To establish the requisite causation, the oyster farmers offered testimony from a marine biologist.[87] It was the opinion of the plaintiff's marine biologist that the oil caused the oysters to develop lesions, which became infected, and ultimately caused their death.[88] The defendants countered the plaintiff's argument with testimony from their own marine biologist who also determined that the oysters, in fact, had developed lesions.[89] However, it was the defendant's opinion that the lesions were caused by low salinity in bay due to heavy rainfalls.[90]

Both experts reached their conclusions after examining the same six potential causes for the lesions in oysters: "(1) infectious disease; (2) freezing trauma; (3) acute toxic effects of non-oil contaminants; (4) acute toxic effects of oil; (5) low salinity; and (6) low-level toxic effects of oil."[91] Both experts were able to definitively "rule out" causes one through four

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1980. However, despite the increasing number of claims, there is still limited case law on most issues, and almost no cases have been fully litigated").

[83] C*lausen*, 339 F.3d at 1051–52.

[84] *Id.* at 1152.

[85] Federal Oil Pollution Act, 33 U.S.C. § 2701 (1990).

[86] OR. REV. STAT. § 468B.300 (2005); s*ee* Clausen*,* 339 F.3d at 1052.

[87] *Id.*

[88] *Id.* at 1053.

[89] *Id.*

[90] *Id.*

[91] *Id.*

"as the ultimate cause of the oyster deaths."[92] Predictably, the plaintiff's expert determined that the low-level toxic effects of oil were responsible for the lesions on the oysters and the defendant's expert was of the opinion that low levels of salinity in the water caused the lesions.[93]

Prior to trial, the defendant's moved to exclude the proffered testimony of the plaintiff's marine biologist on the grounds that it was not sufficient under the Supreme Court's ruling in *Daubert*.[94] The court denied the motion to exclude and the plaintiff's expert witness was able to testify at trial.[95] On appeal, the court rejected the defendant's complaint that the plaintiff's expert lacked sufficient scientific basis to "rule in" contact toxicity and that the admission of such expert testimony constitutes an abuse of discretion.[96]

A. CALCULATING NATURAL RESOURCE DAMAGES

Finally, the natural resource trustee is responsible for proving damages to and placing a value on the natural resource.[97] One of the most contentious issues involving expert testimony in environmental litigation is the quantification and valuation of damages to the natural resources destroyed by pollution. Natural resource "[d]amages are measured by the services these assets provide and how an alteration in their condition impairs the ability of the natural assets to continue to provide these services."[98] To make these important determinations, experts will refer to the Natural Resource Damage Assessment ("NRDA")

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[92] *Id.*

[93] *Id.*

[94] *Id.* at 1055; *see* Daubert v. Merrell Dow Pharm., Inc. 509 U.S. 579 (1993).

[95] *Clausen,* 339 F.3d at 1055.

[96] *Id.* at 1059 ("The ship owners' primary argument on appeal . . . [is] that [the expert's] use of methodology was unreliable because he should never have ruled in low-level toxic effects of oil as a potential cause of the oyster mortality.").

[97] Daubert*, 509 U.S. 579.*

[98] *See* Lowell, *supra* note 2, at 176.

regulations promulgated by the Department of the Interior, which "provide a framework to calculate compensatory monetary damages necessary to restore the natural resources to their "baseline" condition, and a methodology for calculating resource services lost to the public."[99]

During the valuation process, economists attempt to place a value on the natural resources by evaluating two criteria: "the choice being made to consume or use the service," and "public exclusion, appropriation, or regulation over the natural resource."[100] When a coastal waterway is contaminated with pollution and the shellfish resource is destroyed or off limits to fishing for a period of time, the value of the shellfish is quantified "by lost profits determined by directly observable market behavior."[101]

Assessing the damage to the natural resource can cause confusion. Section 301(c)(2) of CERCLA calls for the natural resource damage assessment regulations in the following terms:

> Such regulations should specify: (A) standard procedures for simplified assessments requiring minimal field observation, including establishing measures of damages based on units of discharge or release or units of affected area, and (B) alternative protocols for conducting assessments in individual cases to determine the type and extent of short and long-term injury, destruction, or loss. Such regulations shall identify the best available procedures to determine such damages, including both direct and indirect injury,

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[99] 42 U.S.C. § 9651(c) (2000). Shannon Kaster, *Natural Resource Damage Assessments*, 15 NAT. RESOURCES & ENV'T 114, 115 (2000).

[100] *See* Lowell, *supra* note 2, at 176–77 (*quoting* Raymond J. Kopp & V. Kerry Smith, *Understanding Damages to Natural Assets, In* VALUING NATURAL ASSETS: The Economics Of Natural Resource Damage Assessment 6, 1013 (Raymond J. Kopp & V. Kerry Smith eds., 1993)).

[101] *Id.* at 177.

> destruction, or loss and shall take into consideration factors, including, but not limited to, replacement value, and ability of the ecosystem or resource to recover.[102]

These regulations have been classified as "Type A" and "Type B" procedures.[103] Both procedures consist of three steps in assessing damage: an Injury Determination phase, a Quantification phase, and a Damage Determination phase.[104]

During the Injury Determination phase, the assessment focuses on determining that an injury to the resource has occurred and that the injury has resulted from the discharge or release.[105] After the injury is confirmed, the assessment moves into the Quantification phase.[106] The focus is identifying the services provided by the resource, determining the baseline level of such services, and quantifying the reduction in services resulting from the discharge or release.[107] In the damage determination phase, where focus is on economic valuation or costing techniques, the monetary compensation for injury is calculated, based on either the restoration or replacement costs or the loss in use value of the resources.[108] The use value of a natural resource is nothing more than the economic value of the resource to the people who utilize them.[109]

Beyond having economic value, natural resources are recognized as possessing a certain intrinsic value, which

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[102] CERCLA Chapter 301(c)(2). I believe that it would be cited as: 42 U.S.C § 9651(c)(2) (2005).

[103] Frank B. Cross, *Natural Resource Damage Valuation*, 42 VAND. L. REV. 269, 275 (1989).

[104] J. Terrance Ryan, The Evolution of Natural Resource Damage Assessments Under the Oil Pollution Act and the Comprehensive Environmental Response, Compensation and Liability Act, 6 FORDHAM ENVTL. L.J. 29, 35–42 (1994).

[105] *Id.*

[106] *Id.*

[107] *Id.*

[108] *Id.*

[109] *Id.* at 281.

cannot be quantified by performing an economic analysis.[110] The D.C. Circuit Court of Appeals acknowledged the abstract exercise of placing a monetary value on natural resources:

> While it is not irrational to look at market price as one factor in determining the use value of a resource, it is unreasonable to view market price as the exclusive factor, or even the predominant one. From the bald eagle to the blue whale and snail darter, natural resources have values that are not fully captured by the market system.[111]

It is widely believed that placing an economic value on natural resources using NRDA regulations "allows courts to assess damages for environmental harm, deters future pollution, and helps ensure protection for natural ecosystems."[112] On the other hand, some legal commentators have been critical of natural resource damages for having unreliable standards for assessing values, placing too much weight to the speculation of economists and placing an undue burden on business and industry.[113]

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[110] *See* Lowell, *supra* note 2, at 177–78 ("For example, phytoplankton in and of themselves are surely not worth much in their individual capacity, but when one considers that phytoplankton serve as the base of the food chain on which all marine life thrives and requires for its very existence, their worth may be invaluable"); *see* Cross, *supra* note 104, at 292–93.

[111] State of Ohio v. U.S. Dep't of Interior, 880 F.2d 432, 462–63 (D.C. Cir. 1989).

[112] *See* Cross, *supra* note 104, at 270.

[113] *See* Anderson, *supra* note 5, at 486–87. ("Both the DOI and NOAA regulations clearly give government trustees broad discretion to assess natural resource damages using a wide range of methods, some of which may not withstand scientific scrutiny."); *see also* Richard B. Stewart, *Natural Resource Damages: The New Wave of Environmental Liability*, THE FEDERALIST SOCIETY 1998, http://www.fed-soc.org/Publications/practicegroupnewsletters/environmentallaw/el020101.htm (last visited Nov. 29, 2005) ("Trustees are now mobilizing to assert ambitious NRD claims, threatening U.S. businesses and insurers and

VI. CONCLUSION

It is indisputable that shellfish contamination creates a negative impact on the economy, poses a serious risk to human health, and has a harmful effect on the fragile coastal ecosystems. However, the litigation designed to redress the harmful effects of shellfish contamination produces uncounted difficulties. Although a general public policy of preventing pollution has led Congress to enact and revise CERCLA, the application of such a statute has proven to be uncertain due to the enormous amount of discretion given to the trial courts in deciding admissibility of scientific evidence and testimony of experts.

A CERCLA natural resource damage action designed to remedy shellfish contamination is the ultimate example of the awkward partnership of law and science, requiring a fact finder to base a legal conclusion on scientific uncertainties. Unfortunately, a causation standard that requires the natural resource trustee to provide a causal connection between the release and the injuries to natural resources, instead of the strict liability standard used in remediation actions, hinders the ultimate objective of returning a clean environment to the public.

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federal agencies…with potentially enormous liabilities and massive transaction costs that go far beyond those recognized in any other country. Unless prompt steps are taken to reform the NRD programs, they will spin out of control").