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Recovery of Damages by States for Fish and Wildlife Losses Caused by Pollution

Faith Halter*
Joel T. Thomas**

INTRODUCTION

During the early morning hours of February 2, 1976, a tank barge carrying approximately 19,700 barrels of oil sank while in tow up the Chesapeake Bay.1 Much of the oil it was carrying escaped into the waters of the Bay off Smith Point, just below the mouth of the Potomac River. Since the use of the Chesapeake Bay by wintering waterfowl was near its peak at the time of the spill,2 the release of the oil destroyed large numbers of waterfowl and other aquatic creatures, in spite of massive cleanup efforts by the United States, the Commonwealth of Virginia, and private individuals.

Several months after the barge sank, the owner, Steuart Transportation Company, filed a complaint seeking exoneration from or limitation of liability for the damages caused by the oil spill.3 Both the United States and the Commonwealth of Virginia filed claims.4 The claim filed by Virginia totalled approximately $731,500;5 of this amount, $635,325 was for the loss of waterfowl.6 After trial on the issue of liability, but before determination of damages, the case was settled.7

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4. Id.  
5. Comptroller General of the United States, Total Costs Resulting from Two Major Oil Spills 4 (June 1, 1977) (letter from Comptroller General to Chairman, Subcommittee on Environment, Energy, and Natural Resources).  
6. Id. at 3.  
The *Steuart* case demonstrates the substantial potential for destruction of fish and wildlife posed by pollution discharges, one side effect of industrial activity.\(^8\) While large scale destruction of wildlife by pollution is not new, the idea that states can or should seek to recover compensatory damages for their destruction seems quite recent.\(^9\) During the last ten to fifteen years, an increasing number of states have actively begun to seek compensatory damages for such losses.\(^10\)

As part of the preparation of its proof of damages against Steuart Transportation Company,\(^11\) the state of Virginia, through the office of the Attorney General, hired two consultants\(^12\) to prepare testimony regarding the "economic" value of the waterfowl. The Attorney General's office also asked the National Wildlife Federation for any assistance it could provide. That inquiry prompted this article. The authors conducted a survey of all state attorneys general and fish and wildlife agencies, finding a wide variance in the frequency and sophistication of state efforts to recover compensation for large scale losses of fish and wildlife. While most of these efforts have been successful,\(^13\) they have received only limited judicial scrutiny because many of the cases are settled prior to trial.\(^14\) This Article analyzes the several bases for state recovery actions, and investigates and describes various methods for establishing the monetary value of the fish and wildlife destroyed.

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9. While it is impossible to say with certainty when the first action was brought to recover damages for the large scale loss of fish and wildlife, such actions seem to have been rare, prior to the late 1960s. The authors have reached this conclusion partly on the basis of a survey of state fish and game agencies and state Attorneys General which they conducted in 1977-78 and updated in 1981 [hereinafter cited as "Authors' Survey"], and partly on the lack of reported cases before the 1960's. A copy of a letter sent to state game and fish agencies in conducting the Authors' Survey is appended to this Article as Appendix II.

10. See sources cited in notes 31 & 32 *infra*.

11. Steuart Transportation Company agreed to pay approximately $140,000 in damages, of which $115,000 was for the destruction of waterfowl. Personal conversation with Staff Member, Office of Attorney General, State of Virginia (May 20, 1981). A major reason for the difference between the latter figure and the original claim for waterfowl losses was the estimated extent of the loss. *Id.* The state originally claimed a loss of 40,837 waterfowl, whereas the final settlement figure was based on an actual body count of about 10,000 birds. *Id.* The attorney handling the case recommended this approach after discovering that the basis for the estimate of the state's expert witness that 3-4 birds were lost for each found was based on experience acquired in the field, rather than formal research. *Id.*


14. Many states reported that all of their suits were settled through negotiation: Alabama, Arizona, Arkansas, Georgia, Kansas, Kentucky, Massachusetts, Mississippi, New Mexico, and Texas. Authors' Survey, *supra* note 9. In addition, Illinois reported that virtually all of its cases were settled. *Id.*
WHY SUE?

Two separate considerations justify state efforts to recover damages for the destruction of fish and wildlife from pollution. First, there is a traditional legal justification, which is simply that when one person wrongfully destroys or injures the property of another (in this case the citizens of the state), the injured party is entitled to compensation.\(^{15}\) Since fish and wildlife have been considered as property of the states in which they live,\(^{16}\) a state should no more forego compensation for large-scale destruction of fish and wildlife than for destruction of any other public property, such as trees in a state forest or books in a state library. Just as the state would not be expected to ignore damages to these resources, it should not be expected to ignore the destruction of fish and wildlife within its jurisdiction. Second, state actions to recover damages can be justified on grounds of economic efficiency.\(^{17}\) To the extent that persons causing fish and wildlife losses are not held financially accountable, the costs of these losses are "external" to those persons—the public pays these costs directly, while there is no impact on the polluters' business costs.\(^{18}\) In this situation, polluters have no economic incentive to reduce these fish and wildlife losses, because the cost of prevention will always be greater than the cost to them of the


16. See notes 26-56 infra and accompanying text.

17. A recent commentary has noted the role of economic analysis in this context:

The concepts which must be understood before the connection between environmental problems and the economy is clear are the role of prices in allocating resources, the damaging environmental consequences of the free use of valuable resources that as yet have no prices, and the manner in which these resources can be given prices. In a market economy . . . prices perform the key function of allocating all types of resources—raw materials, production capacity, goods, services—to their most efficient use . . . .

However, many environmental resources are still unpriced and remain outside the market. Because ownership rights have not been assigned to them, and because they are not easily broken up into units that can be bought and sold, such valuable environmental assets as watercourses, the air mantle, landscape features, [fish and wildlife,] and even silence are 'used up,' but their use is not accurately reflected in the price system. Economists describe the harms caused by such use [of the environment] as 'externalities,' because the burden [i.e., loss] of the resources consumed falls on society at large, not just the user who actually consumes them.


fish and wildlife destroyed. This is true even if the value to the public of the fish and wildlife is greater than the cost to the polluters of preventing the loss.

Insofar as the legal system requires polluters to indemnify the public, via the state, for the destruction of fish and wildlife, they will need to “internalize” (recognize on their books) at least part of the losses. As this happens, polluters will seek to maximize their profits by minimizing damage to fish and wildlife. This will be a rational course so long as the cost of avoidance (the amount spent to prevent an incremental loss of fish and wildlife) is less than the cost avoided (potential liability for that incremental loss). Eventually, this behavior should result in a more efficient allocation of resources.

19. Although recognizing that there may be some nominally noneconomic incentives for reducing fish and wildlife losses, such as the desire to avoid bad publicity, this Article will not discuss such incentives.

20. “The basis of an economic approach to law is the assumption that the people involved with the legal system act as rational maximizers of their satisfactions [i.e., profit].” Posner, The Economic Approach to Law, 53 Tex. L. Rev. 757, 761-63 (1975).


22. This conclusion entails placing an economic value on wildlife, a step possibly upsetting to many people. The two main objections are that putting a value on wildlife is morally wrong and that, since it is impossible to determine the full value of wildlife, any such attempt is useless. One author has stated:

Nowhere is ecological ineptitude more clearly demonstrated than in the notions of cost-benefit and tradeoffs. An economist who suggests that we set a money value to the fish or amenity that may be destroyed by a power plant, and submit the cost-benefit ratio to a public vote, is proposing an evil and senseless procedure. This notion that we can assign money values to such diverse matters as clean water, fisheries, pleasing scenery, kilowatts, and parking lots is a recent contribution of man's hubris, especially when we make a decision on the basis of this arithmetic of apples and oranges that may extirpate other species from the scene and set irreversible ecological decay in motion; this notion is reprehensible. The idea of assigning a dollars and cents value to life—any life—can lead to the end of life on earth as it now does to the exhaustion of non-renewable resources, a mining-out of life as if it were some raw material. This approach to the problem of environmental insult assumes that the processes of nature are simple and can be safely tampered with in terms of our idiotic anthropocentrism.

Hedgpeth, Seven Ways to Obliteration: Factors of Estuarine Degradation, in 2 ESTUARINE POLLUTION CONTROL AND ASSESSMENT 723, 725 (Proceedings of a conference held on Feb. 11-13, 1975 and published by the U.S. Environmental Protection Agency, Office of Water Planning and Standards) (footnote omitted). The primary answer to both objections is the same. The economic system does place a monetary value on fish and wildlife resources, and that value—zero—is much more inaccurate, or morally wrong, than one economists could develop. A second answer is that by assessing compensatory damages for fish and wildlife destroyed by pollution, courts need not advocate the use of these valuation methods for other purposes, such as planning. It is also important to recognize that valuing wildlife losses for purposes of calculating compensatory damages does not imply any sanction of the infliction of those losses. By way of analogy, the courts of this country are faced daily with the ugly, but nonetheless necessary, task of establishing the value of individuals who have been killed by some act of negligence. Clearly, determining a person's value after his or her death for purposes of compensatory damages does not presuppose that anyone willing to pay the price may destroy human beings.

In this context, it should be emphasized that the reason for seeking damages for the destruction of fish and wildlife is compensation, not deterrence. Traditional criminal penal-
II

AUTHORITY TO SUE

If a state files suit for injury to wildlife, questions may arise as to the state's authority to recover damages. The cases fall into two groups: those in which state legislation authorizes the action, and those in which no such legislation has been enacted.

Claims predicated on express statutory authority pose few problems. The power of the state to pass laws for the conservation and protection of resident wildlife dates from at least medieval times, and such laws are a legitimate exercise of the general police power. Thus the United States Supreme Court recently stated:

We consider the States' interests in conservation and protection of wild animals as legitimate local purposes similar to the States' interests in protecting the health and safety of their citizens.

About three-fifths of the states have enacted laws specifically authorizing the state fish and wildlife agency, or the state Attorney General, to recover compensatory damages for the destruction of fish and wildlife. So far as the authors have been able to determine, no one has ever challenged the authority of a state to recover damages for the loss of fish and wildlife, where the action was predicated on specific legislation.

In the absence of such legislation, state efforts to obtain compensation for wildlife losses have rested, without careful distinction, on one or more of three common law theories—state ownership, trusteeship, or guardianship as parens patriae of a public resource.

The authority of a state to seek injunctive relief as parens patriae for a collective injury to a substantial number of its citizens, where no private citizen has standing to bring such an action, is well established. By definition no individual can own a wild animal, but ties or a system of civil fines deliberately set above the "real" value of the resources would best obtain deterrence.


Courts have occasionally granted standing to a private individual who has suffered spe-
courts have long recognized that the doctrine of parens patriae applies to the protection of natural resources.\textsuperscript{29} The law is not, however, entirely settled on whether a state’s interest as parens patriae will support an action for damages. The U.S. Supreme Court has twice sidestepped this issue,\textsuperscript{30} but lower federal and state courts have usually allowed the recovery of damages for injury to natural resources.\textsuperscript{31} Courts upholding an action for damages based on parens patriae have focused on the importance of protecting these valuable natural resources.\textsuperscript{32} The two courts which rejected an action for damages focused on the lack of precedent and the state’s lack of technical proprietary ownership.\textsuperscript{33}
In contrast to these two recent state court decisions, the U.S. Supreme Court once held that a state’s proprietary interest in fish and wildlife living within its borders was sufficient to allow the state to regulate the subsequent ownership of the fish. In *Geer v. Connecticut*, decided in 1896, the Court upheld a statute that prohibited the transportation of wild game birds taken legally within Connecticut for sale outside Connecticut. The holding in *Geer* derived from the notion that a state, by virtue of its “ownership” of game still in the wild, could condition subsequent ownership of that wildlife so as to prohibit its transportation for sale outside the state. The majority in *Geer* found no violation of the commerce clause because the “sole consequence of the [challenged] provision . . . is to confine the use of such game to those who own it, the people of that State.” The Court also stated that “[t]he common ownership imports the right to keep the property, if the sovereign so chooses, always within its jurisdiction for every purpose.” The fact that Connecticut allowed the sale of game birds within its own boundaries was in the Court’s view irrelevant, because that was “intrastate” as opposed to “interstate” commerce.

The Supreme Court expressly overruled *Geer* in a decision that suggests the importance of proceeding as parens patriae rather than as owner of the wildlife. *Hughes v. Oklahoma* involved a constitutional challenge to an Oklahoma statute prohibiting the transportation for sale outside the state of minnows obtained directly from state waters (rather than from state hatcheries). The Court invalidated the statute on the ground that it violated the federal commerce clause. As the Court noted in *Hughes*, it had tacitly overruled *Geer* in *West v. Kansas Natural Gas Co.* During the years following *Geer*, as the Supreme Court refined its interpretation of the commerce clause, the holding in *Geer* became so isolated as to amount to little more than an anomaly. In *Hughes*, the Court recognized this fact and held that state laws regu-

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35. *Id.* at 529.
36. *Id.* at 529-30.
37. *Id.* at 529.
38. *Id.* at 530.
39. *Id.* at 530-33.
41. *Id.* at 338.
42. *Id.*
43. *Id.* at 329-330.
44. 221 U.S. 229 (1911) (invalidating an Oklahoma statute that prohibited transportation of oil obtained within the state for sale outside the state).
lating wildlife are subject to the same analysis under the commerce clause as any other form of state regulation. Applying the appropriate standard, the Court found that the Oklahoma statute was discriminatory on its face, and also that it was not the least discriminatory alternative available to achieve the state's legitimate purpose of maintaining an adequate supply of minnows in its waters.

Had the majority stopped there, Hughes would be of little interest to this Article. The majority opinion, however, dismissed the concept of state ownership of fish and wildlife as "no more than a 19th-century legal fiction expressing 'the importance to its people that a State have power to preserve and regulate the exploitation of an important resource'. . . ." One might conclude from this statement, and from several others like it in the opinion, that the Court had somehow "invalidated" the common law doctrine regarding state ownership of resident fish and wildlife. A careful reading of the opinion shows, however, that the Court probably did not intend such a result, and thus did not intend to foreclose state wildlife regulations that do not impermissibly restrict interstate commerce.

46. Id. at 335-36.
47. The Court used the standard of:
   (1) [w]hether the challenged statute regulates evenhandedly with only 'incidental' effects on interstate commerce, or discriminates against interstate commerce either on its face or in practical effect; (2) whether the statute serves a legitimate local purpose; and if so, (3) whether alternative means could promote this local purpose as well without discriminating against interstate commerce.

48. Id. at 336.
49. Id.
50. Id. at 335 (citation omitted).
51. E.g., id. at 335-36; id. at 338-39.
52. Thus the federal district court in Maine v. M/V Tamano, 357 F. Supp. 1097 (D. Me. 1973) rejected the argument that the state's authority under common law to recover damages for fish and wildlife had been invalidated by the Supreme Court's characterization of the state ownership doctrine as a "legal fiction." Id. at 1100 n.6. In Puerto Rico v. SS Zoe Colocoltroni, 628 F.2d 652, 672 (2d Cir. 1980), the Court of Appeals for the Second Circuit rejected a similar challenge to the state statute that was the basis for recovery.

Moreover, even if it had intended to do so, it is questionable whether the Supreme Court has authority to invalidate the common law doctrine of state ownership of wildlife. Article III of the U.S. Constitution does not purport to authorize the Court to decide all questions relating to property rights, much less to decide whether or not the state is the owner of certain natural resources. To the extent that a ruling on the validity of the common law doctrine is not necessary to the disposition of a question within the Article III subject matter jurisdiction of the Supreme Court, a ruling on this issue would be of questionable authority.

53. Thus the Supreme Court has stated that:

The overruling of Geer does not leave the States powerless to protect and conserve wild animal life within their borders. Today's decision makes clear, however, that States may promote this legitimate purpose only in ways consistent with the basic principle that 'our economic unit is the Nation,' and that when a wild animal 'becomes an article of commerce . . . its use cannot be limited to the citizens of one State to the exclusion of citizens of another State.'

Hughes v. Oklahoma, 441 U.S. at 338-39 (citations omitted).
Whether or not the state "owns" fish and wildlife ferae naturae, the Court did not mean to imply that states lack authority to protect their wildlife. Indeed, the Court emphasized that its decision would not impede the legitimate state interest in protecting these resources:

the general rule we adopt in this case makes ample allowance for preserving, in ways not inconsistent with the Commerce Clause, the legitimate state concerns for conservation and protection of wild animals underlying the 19th-century legal fiction of state ownership.

While Hughes will not bar common law damages actions for the loss of fish and wildlife, it does indicate that courts are more likely to scrutinize carefully the state's common law theories than in the past. Consequently, states seeking compensation for these losses without specific statutory authority should explicitly invoke their authority as parens patriae, rather than merely relying on the state ownership doctrine. Since state authority to recover damages as parens patriae is not yet firmly established, it is advisable to eliminate this potential uncertainty with legislation authorizing a state agency to sue for the value of fish and wildlife destroyed by pollution. A model statute that may resolve this and other problems is appended to this Article.

III
SUPERFUND

A. Overview of the Act

As a practical matter, enactment of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund) may have provided in many cases a statutory basis for an action to recover damages for the loss of fish and wildlife. Superfund makes individuals who release a hazardous substance liable for damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss.

54. The difficulty with Hughes is that it does not understand that the problems created by Geer arose not because the Court attributed ownership of fish and wildlife to the state, but because of the curious consequences that it assigned to that ownership in 1896. To correct the error in Geer, there was no need to determine whether the state was in fact the owner of fish and wildlife. Regardless of the answer, the state could not condition subsequent ownership in a way that placed an undue burden on interstate commerce. Thus, the Court's discussion of the state ownership doctrine was superfluous.


56. Puerto Rico v. S.S. Zoe Colocoltroni, 628 F.2d 652 (2d Cir. 1980) illustrates this point. In Zoe, the court avoided the "difficult question" of whether a state's unexercised regulatory authority over fish and wildlife would support an action for recovery of compensatory damages for their destruction, by finding that the Commonwealth of Puerto Rico had legislation authorizing one of its agencies to maintain such an action. Id. at 671-72.


58. Superfund provides:
However, the Act contains several very important limitations. First and foremost, Superfund does not cover oil spills.\textsuperscript{59} Also, the Act limits liability to five million dollars for the release of a hazardous substance,

\begin{itemize}
\item[(a)] Notwithstanding any other provision or rule of law, and subject only to the defenses set forth in subsection (b) of this section—
\begin{itemize}
\item[(1)] the owner and operator of a vessel (otherwise subject to the jurisdiction of the United States) or a facility,
\item[(2)] any person who at the time of disposal of any hazardous substance owned or operated any facility at which such hazardous substances were disposed of,
\item[(3)] any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person, by any other party or entity, at any facility owned or operated by another party or entity and containing such hazardous substances, and
\item[(4)] any person who accepts or accepted any hazardous substances for transport to disposal or treatment facilities or sites selected by such person, from which there is a release, or a threatened release which causes the incurrence of response costs, of a hazardous substance, shall be liable for—
\begin{itemize}
\item[(A)] all costs of removal or remedial action incurred by the United States government or a State not inconsistent with the national contingency plan;
\item[(B)] any other necessary costs of response incurred by any other person consistent with the national contingency plan; and
\item[(C)] damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release.
\end{itemize}
\end{itemize}
\end{itemize}

\begin{itemize}
\item[(b)] There shall be no liability under subsection (a) of this section for a person otherwise liable who can establish by a preponderance of the evidence that the release or threat of release of a hazardous substance and the damages resulting therefrom were caused solely by—
\begin{itemize}
\item[(1)] an act of God;
\item[(2)] an act of war;
\item[(3)] an act or omission of a third party other than an employee or agent of the defendant, or than one whose act or omission occurs in connection with a contractual relationship, existing directly or indirectly, with the defendant (except where the sole contractual arrangement arises from a published tariff and acceptance for carriage by a common carrier by rail), if the defendant establishes by a preponderance of the evidence that (a) he exercised due care with respect to the hazardous substance concerned, taking into consideration the characteristics of such hazardous substance, in light of all relevant facts and circumstances, and (b) he took precautions against foreseeable acts or omissions of any such third party and the consequences that would foreseeably result from such acts or omissions; or
\item[(4)] any combination of the foregoing paragraphs.
\end{itemize}
\end{itemize}

\textit{Id.} \textsection 9607(a), (b) (1980) Laws Special Pamphlet).

59. The Act notes that the term “hazardous substance” does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

\textit{Id.} \textsection 9601(14) (1980 Laws Special Pamphlet).

Since oil and most oil products are not included in subparagraphs (A) through (C), the Act is inapplicable to most oil spill situations. However, recovery for damages caused by oil spills and the release of hazardous substances may be available under the Clean Water Act, 33 U.S.C. \textsection\textsection 1251-1376, 1231(f)(5) (Supp. III 197), which provides:

The President, or the authorized representative of any State, shall act on behalf of the public as trustee of the natural resources to recover for the costs of replacing or restoring such resources. Sums recovered shall be used to restore,
or to eight million dollars if the release occurred in navigable waters. Only the President of the U.S. or an authorized representative of a state acting as trustee for the affected natural resources may recover damages, and the Act requires that the sums recovered under it be used for specific purposes. Further, Superfund denies recovery when the damages complained of were specified in an environmental analysis and the authorizing agency granted permission for the applicant's activities. Also, the Act does not allow recovery of damages resulting from a "federally permitted release" and disallows recovery of damages resulting from the Submerged Lands Act.

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60. Superfund provides:

(1) Except as provided in paragraph (2) of this subsection, the liability under this section of an owner or operator or other responsible person for each release of a hazardous substance or incident involving release of a hazardous substance shall not exceed—

(A) for any vessel which carries any hazardous substance as cargo or residue, $300 per gross ton, or $5,000,000, whichever is greater;

(B) for any motor vehicle, aircraft, pipeline (as defined in the Hazardous Liquid Pipeline Safety Act of 1979), or rolling stock, $50,000,000 or such lesser amount as the President shall establish by regulation, but in no event less than $5,000,000 (or, for releases of hazardous substances as defined in section 4601(14)(A) of this title into the navigable waters, $8,000,000).


61. The Act provides:

In the case of an injury to, destruction of, or loss of natural resources under subparagraph (C) of subsection (a) liability shall be to the United States Government and to any State for natural resources within the State or belonging to, managed by, controlled by, or appertaining to such State: Provided, however, that no liability to the United States or State shall be imposed under subparagraph (C) of subsection (a), where the party sought to be charged has demonstrated that the damages to natural resources complained of were specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement, or other comparable environmental analysis, and the decision to grant a permit or license authorizes such commitment of natural resources, and the facility or project was otherwise operating within the terms of its permit or license. The President, or the authorized representative of any State, shall act on behalf of the public as trustee of such natural resources to recover for such damages. Sums recovered shall be available for use to restore, rehabilitate, or acquire the equivalent of such natural resources by the appropriate agencies of the Federal Government or the State government, but the measure of such damages shall not be limited by the sums which can be used to restore or replace such resources. There shall be no recovery under the authority of subparagraph (C) of subsection (a) where such damages and the release of a hazardous substance from which such damages resulted have occurred wholly before the enactment of this Act.

Id. § 9607(f) (1980 Laws Special Pamphlet).

62. Id.

63. Id. Several provisions of subsection 9607(f) may require judicial interpretation. Among them are the terms "specifically identified," and "comparable environmental analysis," and the exemption for damages "authorized" by a permit or license.

64. The Act provides:

Recovery of any person (including the United States or any State) for response costs or damages resulting from a federally permitted release shall be pursuant to existing law in lieu of this section. Nothing in this paragraph shall affect or modify in any way the obligations or liability of any person under any other provision of

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Another possible basis for recovery is the Submerged Lands Act, 43 U.S.C. §§ 1301-1356 (1976), which gives the states all right, title, and interest in the natural resources of the navigable waters of the United States. Id. § 1311 (1976).
ages resulting from application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act.\textsuperscript{65} 

While these limits may detract from Superfund's utility for suits to recover for injury to fish or wildlife, the Act specifies that in many situations it does not preempt other federal or state law.\textsuperscript{66} Thus the Act does not preclude state statutes authorizing parens patriae suits. The Act appears to require the election of a remedy, however; any person who receives compensation pursuant to Superfund is precluded from recovering for the same removal costs, damages, or claims pursuant to any other state or federal law.\textsuperscript{67} Conversely, any person who receives compensation pursuant to any other federal or state law is precluded from receiving compensation for the same removal costs, damages, or claims under Superfund.\textsuperscript{68} The importance of electing a remedy will be particularly acute in cases where the identity or solvency of the person responsible for a release is uncertain, since recovery may then be

State or Federal law, including common law, for damages, injury, or loss resulting from a release of any hazardous substance or for removal or remedial action or the costs of removal or remedial action of such hazardous substance. In addition, costs of response incurred by the Federal Government in connection with a discharge specified in section 9601(10)(B) or (C) of this title shall be recoverable in an action brought under section 1319(b) of Title 33.

\textit{Id.} § 9607(j) (1980 Laws Special Pamphlet).

\textsuperscript{65} The Act provides:

\begin{quote}
No person (including the United States or any State) may recover under the authority of this section for any response costs or damages resulting from the application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act. Nothing in this paragraph shall affect or modify in any way the obligations or liability of any person under any other provision of State or Federal law, including common law, for damages, injury, or loss resulting from a release of any hazardous substance or for removal or remedial action or the costs of removal or remedial action of such hazardous substance.
\end{quote}

\textit{Id.} § 9607(i) (1980 Laws Special Pamphlet).

\textsuperscript{66} The Act provides:

\begin{quote}
Nothing in this Act shall be construed or interpreted as preempting any State from imposing any additional liability or requirements with respect to the release of hazardous substances within such State.
\end{quote}

\textit{Id.} § 9614(a) (1980 Laws Special Pamphlet).

It might be possible to state a cause of action for injury to fish or wildlife under the federal common law of nuisance. However, a recent Supreme Court case, \textit{Milwaukee v. Illinois}, 101 S. Ct. 1784 (1981), suggests that such a cause of action would not be available for injuries subject to Superfund, since that Act would be found to have preempted the federal common law remedy.

\textsuperscript{67} The Act provides:

\begin{quote}
Any person who receives compensation for removal costs or damages or claims pursuant to this Act shall be precluded from recovering compensation for the same removal costs or damages or claims pursuant to any other State or Federal law. Any person who receives compensation for removal costs or damages or claims pursuant to any other Federal or State law shall be precluded from receiving compensation for the same removal costs or damages or claims as provided in this Act.
\end{quote}

\textit{Id.} § 9614(b) (1980 Laws Special Pamphlet).

\textsuperscript{68} \textit{Id.} It is unclear whether a state could split the claims arising out of a single incident, for example by seeking clean up and removal costs under Superfund, and damages for its natural resources under a state act.
possible only against the fund created under Superfund. Where these problems do not arise, states may prefer to proceed under other federal and state laws that allow larger recoveries.

From the point of view of this Article, section 9651(c) of Superfund is probably even more important than the liability provisions noted above. Section 9651(c) requires the promulgation, within two years of the Act's enactment, of federal regulations for assessing damages for injury or destruction of natural resources resulting from a release of oil or a hazardous substance. Since Superfund was adopted on December 11, 1980, initial regulations are due on or before December 11, 1982. Section 9651(c)(2) calls for regulations embodying two approaches to measuring damages. The first approach is a formula (or formulas) by which units of release or habitat affected would be multiplied by a predetermined sum. The most attractive feature of this approach is simplicity. A major shortcoming is that environmental damage varies greatly according to the type of pollutant, type of habitat, and time of the year. An approach which fails to account for such factors as these will often produce an arbitrary measure of damages. This approach will be most acceptable where the environmental harm is relatively insignificant and/or relatively easy to predict, since spending large amounts of money in such a situation would not be cost-effective.

The second approach under section 9651(c) is the development of methods to make case-specific determinations of injury to natural resources. This approach will usually be more appropriate for valuing large scale fish and wildlife losses, since it will be worthwhile to be accurate when the loss is significant. Because many species of fish and wildlife are transient, they may or may not be present at a particular pollution incident. Furthermore, even if a species is present, the pollu-

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69. Superfund provides:
(1) The President, acting through Federal officials designated by the National Contingency Plan published under § 9605 of this title, shall study and, not later than two years after the enactment of this Act, shall promulgate regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or hazardous substance for the purposes of this Act and section 1321(f)(4) and (5) of Title 33.
(2) Such regulations shall specify (A) standard procedure 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, destruction or loss and shall take into consideration factors including, but not limited to, replacement value, use value, and ability of the ecosystem or resource to recover.

70. Id. § 9651(c)(2)(A) (1980 Laws Special Pamphlet).
71. Id. § 9651(c)(2)(B) (1980 Laws Special Pamphlet).
tation incident may not affect it. The following discussion outlines the major theories for case-specific assessments of damage.

B. Difficulties in Valuation

Unfortunately, it is not possible to compute with much precision the total environmental costs of most pollution incidents. This stems from both an absence of adequate baseline data and an incomplete understanding of the interrelationships between the various species at any pollution site and their physical habitat. At a minimum, complete evaluations of environmental costs should include the effects of pollution on the flow of goods and services (renewable resources) provided by the site; the waste assimilation capacity of the affected area; and the pollutant's impact, if any, upon public health. While some day it may be possible to make such a complete assessment of damages, this Article concerns the far more limited problem of assigning a monetary value to one of the many effects of pollution: the destruction of fish and wildlife.

The traditional measure of damages for the loss of an animal is its market value at the time of the loss. Since wildlife is free from private ownership while it remains ferae naturae, and the law frequently prohibits its sale even after it is lawfully taken, most species of wildlife will not have an ascertainable market price. Moreover, even when market prices are available, a fundamental difficulty arises from the fact that the value of fish and wildlife must be determined in its wild state and not in captivity or in hand.

Where market value is unavailable or inappropriate, plaintiffs may prove the value of their losses by some other method, so long as that method is not too speculative, conjectural, or remote. Cases dealing with compensation for injury to trees provide a useful analogy. The most common measure of damages is the difference between the value

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73. Id. at 53-54.
74. See Sorenson, Preliminary Report: Economic Evaluation of Environmental Damage Resulting from the Santa Barbara Oil Spill 5 (July 8, 1974).
75. E.g., Arkansas Valley Land & Cattle Co. v. Mann, 130 U.S. 69, 79 (1889).
76. T. Lund, supra note 23, at 63-64; 35 AM. JUR. 2d Fish and Game § 50 (1967).
77. It might seem that in such circumstances the value of the fish and wildlife should be market prices less the cost of bringing them to market. In order to measure adequately the losses involved, however, one should recognize in some way the cost of maintaining the resources themselves, especially if they are actively managed resources (such as trout in the Great Lakes), as well as the cost of maintaining the resource base (the habitat required to sustain the resource pool from which the marketed individuals were drawn).
of the underlying land before and after the injury to the tree, but if this measure is inappropriate or inadequate, the owner may sue for the damage to the tree alone as if it were severable from the land. In cases focusing on the injury to the trees themselves, courts have admitted evidence of market or use value, replacement cost, loss of productivity, and aesthetic loss. They have often admitted similar evidence in cases where damages were based on loss in value of the underlying land.

C. Valuation Methods

1. Replacement Cost

One of the most used methods for assessing damages for the destruction of fish and wildlife is replacement cost. Commercial breeders or government agencies produce many species of fish and some species of birds and mammals, and the costs of production can be measured to arrive at replacement cost. Moreover, since game farms or government facilities could produce many species not currently bred, it should not be difficult to derive replacement costs for additional species.

More than one-third of the states have indicated that they use replacement cost for determining damages in fish kill cases, and several state legislatures have formally adopted replacement schedules. Many states have based their replacement figures on the prices listed in *Monetary Values of Fish*, a pamphlet published by the American Fishery Society in 1975. The pamphlet lists prices for nearly forty species of fish by both pounds and inches. The Society determined the prices through a survey of commercial hatcheries in the southeastern United States in 1974. Although no similar schedule is yet available for birds or mammals, some agencies have surveyed commercial game breeders.

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83. *Id.* at 532-33.
84. *Id.* at 518-20.
85. For a list of states that use replacement cost, see note 86 infra.
87. *Id.* The states are Alaska, Arizona, Florida, Hawaii, Maryland, Michigan, Minnesota, Virginia, and West Virginia.
88. *Id.* These states include Alabama, Arkansas, Georgia, Kansas, Kentucky, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, North Carolina, Ohio, Oklahoma, Tennessee, Texas, and West Virginia.
in order to derive replacement costs for some species of birds, especially waterfowl.\textsuperscript{89}

The large number of states using replacement cost as a measure of damages is strong evidence of its effectiveness. The principal strengths of this approach are low cost and ease of application. Once states determine a replacement cost for a species, calculating damages becomes a simple matter of multiplying the cost per animal by the number of animals lost.\textsuperscript{90} States which use replacement cost have rarely met formal challenges and have frequently been successful in obtaining the full amount sought.

Despite its attractiveness and ease of administration, the use of replacement cost has a significant disadvantage. The method has been used primarily, but not exclusively, for valuation of fish which are, or readily could be, raised in fish hatcheries. The reliability of replacement cost figures will diminish with regard to species that are not bred in captivity and are not generally similar, especially in their breeding habits, to species which are bred. The possibility of a challenge to replacement cost was suggested in a Florida case in which the court gave presumptive, but not conclusive weight to fish schedules developed by the state’s Department of Natural Resources.\textsuperscript{91} One possible solution to this problem is, as noted above, the establishment of a statutory schedule of replacement costs. This approach, however, suffers from a serious weakness—inflexibility in the face of inflation. The 1975 edition of\textit{Monetary Values of Fish} used 1974 prices, which were 14%

\textsuperscript{89} Id. Massachusetts and Texas have used this approach.

\textsuperscript{90} Many state agencies that use replacement cost regularly have developed procedures for conducting body counts at the site of a fish kill. \textit{E.g.}, State of Washington, Department of Ecology, Guidelines for Evaluating Fishkill Damages and Computing Fishkill Damage Claims in Washington State 20 (Aug. 1973) (Technical Report No. 72-10); Pollution Committee, American Fisheries Society (Southern Division), Fish Kill Counting Guidelines (1970). For a discussion of some of the problems in conducting a body count of waterfowl, see Comptroller General of the United States, Total Costs Resulting from Two Major Oil Spills 5-6 (June 1, 1977) (letter from Comptroller General to Chairman, Subcommittee on Environment, Energy, and Natural Resources).

It is interesting to note that in 1978, an economist knowledgeable in this area suggested to an audience of professional fish and wildlife biologists that in most cases, the greater variable in determining the actual value of fish and wildlife lost from a pollution incident would result from disagreement over the number of animals killed rather than the price that might be assigned to those animals by different economists. Address by Phillip G. Myer, Habitat Protections Advisor, Department of Fisheries and Oceans, Vancouver, British Columbia, at the Joint Annual Conference of the Western Division of the American Fisheries Society (July 12-20, 1978).

\textsuperscript{91} Florida Dep’t of Pollution Control v. International Paper Co., 329 So. 2d 5, 8 (Fla. 1976) ("Construing the statute to authorize the establish of conclusive evidentiary fish table values would constitute an absolute denial of the right to present evidence on a material issue and would violate constitutional due process of law. Although the manner of determining the value of fish killed may be statutorily established as presumptive or prima facie evidence of a fact, such a statute cannot conclusively prescribe a specific amount of damages for a particular number and species of fish killed").
higher than 1970 prices. It is unlikely that a statutorily-provided schedule of replacement costs could keep pace with inflation. Therefore, it would probably be preferable for legislation to direct the state fish and wildlife agency to prepare a schedule of replacement costs and to update it periodically.

2. Liquidated Damages

States have also used liquidated damages or statutory civil penalties in addition to criminal sanctions for the wrongful taking of wildlife, particularly with respect to game animals. The amount charged is arbitrary, and it generally does not purport to represent any actual "value" of a given species. Until some of the other valuation methods discussed gain manageability and acceptance, this will sometimes be the best available means of recovering damages. Liquidated damages are particularly useful for rare species and large land animals, because replacement costs do not exist for them. Liquidated damages may tend to be lower than actual value, especially for big game animals, and at least one state agency prefers to use them only as a minimum figure for recovery.

III
NEW "ECONOMIC" APPROACHES TO VALUING FISH AND WILDLIFE

A. Gross Expenditure Method and Travel Zone Approach

This Article will discuss three economic valuation methods: the gross expenditure method (GEM), the travel zone approach, and the direct consumer's surplus (DCS). Both GEM and the travel zone approach produce valuations for sites from which values for specific resources, such as fish and wildlife, can be derived, while DCS attempts to derive values for the fish and wildlife themselves. GEM and the travel zone approach each have significant problems which suggest that DCS is the preferred approach.

Essentially, the GEM approach attempts to use the amount spent

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92. Two states, South Dakota and Wisconsin, indicated that they use a liquidated damages approach. Authors' Survey, supra note 9.
93. Given the arbitrary nature of liquidated damages, one might expect that the amount of such damages would be higher than the actual loss approximately half the time, and lower than the actual loss the remaining time. This may not be true, however, in the case of liquidated damages for the wrongful taking of fish and wildlife. In this area, poachers and other potential payors may pressure the legislature into setting relatively low amounts for the liquidated damages. Liquidated damages for big game may then become proportionately even lower because of inflation and the increasing rarity of large game animals.
94. In the Authors' Survey, supra note 9, such a preference was indicated by the New Mexico Department of Game and Fish.
on a recreational experience to measure its value.\textsuperscript{95} The calculation includes travel expenses, equipment costs, income foregone, and the like. The computation of gross expenditures for a recreational experience does not, however, measure the net benefits derived from the experience. Whatever the merits of this approach in terms of valuing a specific site or type of recreation,\textsuperscript{96} it does not appear that the GEM method will be useful in deriving case-specific values for fish and wildlife.\textsuperscript{97} Even so, for pollution incidents with a significant adverse impact on recreation, the state may wish to recover for loss of recreational use, as well as for the fish and wildlife destroyed.

Like GEM, the travel zone approach produces a value for a recreation site. This approach, developed by Clawson and Knetsch,\textsuperscript{98} is probably the most widely used method for determining recreational values.\textsuperscript{99} The distinguishing feature of the travel zone approach is that it assigns the users of a particular recreation site to geographical zones, consisting of concentric rings around the site. The researcher determines the average travel cost and other variable participation expenses for each zone, and then uses this information to construct a demand curve for the site and an estimate of the consumer's surplus.\textsuperscript{100} The method assumes that the response of persons in more distant zones to their higher travel costs indicates the reaction that people in closer zones would have to changes in price through increased access or user fees.\textsuperscript{101}

Proponents of the travel zone approach disagree on the costs that

\textsuperscript{95} Studies which have used GEM include United States Department of the Interior, United States Fish and Wildlife Service, 1975 National Survey of Hunting, Fishing and Wildlife-Associated Recreation (1977); Environmental Research Group, Georgia State University, Southeastern Economic Survey of Wildlife Recreation (March, 1974); U.S. Army Corps of Engineers and Louisiana Wildlife an Fisheries Commission, Atchafalaya Basin Usage Study: Final Report (1975). These studies derived values based not only on the GEM approach, but also on willingness to sell and to pay, concepts discussed in note 105 infra.


\textsuperscript{97} The GEM method may be appropriate for valuing some extremely rare and endangered species, in which case the total amount expended to preserve and enjoy the few remaining members of the species might be a reasonable measure of the value of the group as a whole, as it is likely that the primary purpose of a trip which includes the habitat of a rare and endangered animal is to see the animal.


\textsuperscript{99} J. HAMMACK & G. BROWN, supra note 12, at 9.

\textsuperscript{100} See note 92A infra.

\textsuperscript{101} For a good, brief description of the technique, see J. HAMMACK & G. BROWN, supra note 12, at 9-12. For a fuller explanation, see Cesareo, Value of Time in Recreation Benefit Studies, 52 LAND ECON. 32 (1976); M. CLAWSON & J. KNETSCH, supra note 98.
should be considered in making the above calculation. Since the object of the exercise is to determine the difference in cost to individuals from different zones, it would be superfluous to include expenses common to all users, such as the cost of their fishing rods. Early studies assumed that characteristics like income and tastes were similar among the populations in various zones, but some adjustment for income differences, if not tastes, seems feasible.

It is essential to note that both the travel zone approach and GEM are site valuation methods. Each method permits a researcher to estimate the total net value of the goods and services provided by a specific site at a specific time. Once an estimate is available, it should be possible to determine the total net value the site would provide if one or more of the resources at the site changed, by introducing a quality variable. An example of a quality variable would be an increase or decrease in the expected rate of success—for instance, the number of fish caught, ducks collected, or birds seen—per visit to the site. Although the gain or loss in net worth would measure the relative change in the value of an activity, rather than the resources themselves, these values should approach the value placed on the fish or wildlife involved.

While with both approaches it should theoretically be possible to derive a value for fish and wildlife at the margin, each method has significant drawbacks. Neither can isolate the value of fish and wildlife; rather, each yields only the aggregate value of the activity in connection with which fish and wildlife are enjoyed. People usually enjoy fish and wildlife while conducting activities, such as backpacking or fishing, which also have a recreational value. While the sighting of a bear or an osprey may enhance the value of such activities, it does not constitute the entire benefit derived from them. Hence the value of the bear or osprey cannot be derived solely from the total amount spent on the recreational activity.

Moreover, neither approach can account for the fact that fish and wildlife enjoyed in the course of a recreational activity provide both public good benefits and private good benefits. Since fish and wild-

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103. Samuelson developed this concept of private goods and public goods in a trilogy of articles. Samuelson, The Pure Theory of Public Expenditure, 36 REV. ECON. & STATISTICS 387 (1954); Samuelson, Diagrammatic Exposition of a Theory of Public Expenditure, 37 REV. ECON. & STATISTICS 350 (1955); Samuelson, Aspects of Public Expenditure Theories, 40 REV. ECON. & STATISTICS 352 (1958). As Samuelson explains, a commodity is a private good in economic terms if, when it is consumed by one person, it is no longer available to be consumed by another person. Given a set quantity of any private good, the more units of the good that one person consumes, the fewer are the units available to others. At the other end of the spectrum are public or collective goods, which can be consumed by one person without diminishing the number of units which other persons can consume. The standard example of a public or collective good is national defense. Not only does one person's "consumption" of national defense not diminish another person's, but the addition of more
life are sometimes enjoyed as private goods—as when a duck hunter
shoots a duck or a fisherman catches a fish—and sometimes enjoyed as
public or collective goods—as when birdwatchers practice their
hobby—an accurate method for valuing fish and wildlife must be able
to separate and account for the mixed nature, partly private and partly
public, of wildlife. It is worth noting that placing a relatively small
value on a unit of a collective or public good may nevertheless generate
very large aggregate values because the consumption of the unit by one
person does not preclude the consumption of the same unit by a large
number of other people.

Additionally, neither method can include any estimate of the exist-
ence of “option values” of fish and wildlife. These are the values which
accrue to some people from merely knowing that fish and wildlife exist
and are available for more direct enjoyment now or in the future. An-
other serious theoretical problem with both methods is that they pro-
duce, at best, an estimate of the value of the resources available only at
a specified site. If the resource use at this site is not consumptive, the
value derived will usually be inadequate because the fish and wildlife,
which are generally mobile, may also provide some value at another
site at another time. Finally, a more practical limitation upon the
travel zone approach is the potential difficulty of obtaining the neces-
sary travel cost data. Where access to a site is limited and controlled,
this problem may not be overwhelming, but in other cases the data may
be unobtainable.

Despite all these problems, there are advantages to both GEM and
the travel zone approach. Use of GEM could be particularly feasible
because at least one court has already recognized the validity of recrea-
tional studies for purposes of land use planning,104 and the concept of
recreational value is thus not entirely new to American jurisprudence.
The travel zone approach, on the other hand, appears to have signifi-
cant potential so that with further work and refinements, it may pro-
duce usable, though probably understated, estimates of the value of
various species of fish and wildlife.

B. The Direct Consumer’s Surplus Approach

The newest and most promising approach to the problem of valu-
ing fish and wildlife is the direct consumer’s surplus (DCS) approach.
With this method, researchers simply ask individuals, through personal

individuals to the national population does not reduce the amount of national defense that
ECON. & STATISTICS, 387, 387 (1954); Samuelson, Diagrammatic Exposition of a Theory of

104. E.g., State ex rel. Baxley v. United States Corps of Engineers, 411 F. Supp. 1261
interviews or mail questionnaires, to provide estimates of the surplus value they obtain from fish and wildlife.\textsuperscript{105}

Of the various methods for eliciting contingent value information, the iterative bidding technique developed by Randall and Brookshire

\textsuperscript{105} As developed by J.R. Hicks in \textit{the Four Consumer's Surpluses}, 11 REV. ECON. STUD. 31 (1943), consumer's surplus is the difference between the price that consumers pay for the goods and services they purchase and the value to them of those goods and services. Hammack and Brown define consumer's surplus as "a measure of net benefits—benefits above costs paid—received by an individual from some good or service purchased." J. HAMMACK \& G. BROWN, \textit{supra} note 12, at 4-5. Economists have used only two of the four consumer's surpluses identified by Hicks, "willingness to pay" and "willingness to sell [or accept]," to derive values for fish and wildlife. See Curriex, Murray \& Schmitz, \textit{The Concept of Economic Surplus and Its Use in Economic Analysis}, 81 ECON. J. 741 (1971); Willig, \textit{Consumer's Surplus Without Apology}, 66 AM. ECON. REV. 589 (1976). As Måler and Wyzga explain,

\textit{The compensating variation} is defined as the least amount of money necessary to compensate a consumer for a change from the present situation to some other situation. For example, if the new situation is characterised by a higher price of a commodity the compensating variation is the amount we have to give to the individual so that he does not feel worse off in the new situation. . . .

If the price of a good falls, the compensating variation is defined in exactly the same way, except that it is negative. It tells us how much we can confiscate from the individual without leaving him in a worse situation than in the original situation.

The \textit{equivalent variation} is defined as the amount of transfer in money income that the individual regards as equivalent to the change from the original situation to the new one. If, for example, the price of a good has increased, we could ask: by what quantity can we reduce the income of the individual instead of raising the price of the good so that the individual is indifferent to these two changes? If the price has fallen, we could similarly ask by what quantity must we increase the income of the individual instead of decreasing the price so that he is indifferent between the increase in income and the fall in price? The necessary changes in income in these two cases is the equivalent variation.

K. MÅLER \& R. WYZGA, \textit{supra} note 18, at 31-32.

The difference between the two measures lies in their perspectives. Essentially, the compensating variation takes the initial situation (pre-existing equilibrium) as its starting point and measures the amount of income which an individual must receive or give up in order to be as well off after some change in the initial situation as he was before the change. The equivalent variation takes the final situation (the new equilibrium) as its starting point and measures the amount by which the change from the initial situation to the final situation has reduced or improved an individual's welfare.

While it might appear that the compensating variation and the equivalent variation could be used interchangeably, Hammack and Braun have pointed out that the existing legal rights of the parties involved, as well as tradition and custom, will result in one or the other of these two measures being suited to the analysis of any particular problems or situation. See J. HAMMACK \& G. BRAUN, \textit{supra} note 72, at 7. For example, if one is trying to decide whether to grant a license to a private mining company to strip mine a portion of a national park, willingness to sell or accept, the equivalent variation, is the appropriate measure. If, on the other hand, one wants to determine how much should be spent to reclaim land which has already been strip-mined, then willingness to pay, the compensating variation, is the appropriate measure. Because this Article concerns the determination of the amount of damages which has resulted from the wrongful destruction of fish and wildlife resources, the compensating variation is the appropriate measure of damage as it recognizes the situation which existed before a particular pollution incident as the legitimate situation and measures the amount injured parties must receive in order to be as well off after the incident as they were before it.
appears to be the most flexible and promising. The technique requires respondents to indicate whether they are willing to pay a certain price for a good or service, rather than going without it or some units of it. The researcher varies the price until it is possible to identify the point at which the respondent indicates indifference. Unlike the travel zone method or GEM, this technique can include estimates of option value, as some respondents will include in their valuations the potential for future enjoyment of the fish and wildlife.

Although a complete description of the iterative bidding technique is beyond the scope of this Article, some of the potential problems and limitations of this method and other contingent valuation processes should be noted. The key to the success of the DCS approach appears to lie in the quality of the questionnaire. The use of questionnaires is fundamental to the collection of data on which persons of reasonable intelligence rely in the modern world to make important decisions, and this Article will therefore not concern itself with potential inaccuracies of self-reporting by individuals. A more serious question is whether the questions asked and answers given are reliable. In other words, objections to the DCS approach relate to how well a particular questionnaire survey conforms to the requirements of economic theory and to the standards of social science for the collection of reliable data.

The two most likely objections to the DCS technique are that the questions asked, and hence the answers to them, are necessarily hypothetical, and that some respondents will exaggerate their answers in a deliberate attempt to influence or "strategically bias" the outcome of the survey. As to the first concern, social scientists and psychologists have found that the hypothetical nature of questionnaires is not a serious problem because individuals tend to respond sincerely and accurately to surveys that provide an adequate context for consideration of questions. Researchers should describe the goods to be valued fully and consistently as to quantity, quality, location, time, and available additional units, so that all respondents will have as uniform an understanding of the problem as possible. The questionnaire should portray the hypothetical market in reasonable institutional detail and should specify a realistic mechanism for charging for the goods, such as a user fee, a license fee, or the imposition of some sort of sales or excise tax. The payment vehicle chosen should be feasible, relevant to the product or service being valued, and as familiar as possible to the respondents.

107. See id. at 10-15.
108. Id. at 10.
109. Id.
110. Id. at 15-16.
The researcher should try to convince respondents that all users of the product or service will be required to pay equally for it. The questionnaire should avoid questions likely to generate protest votes, and should attempt to eliminate various biases relating to the starting point price, the payment mechanism, and the information provided. These precautions should help to ensure that the stated intentions of a respondent will correspond with the respondent's actual behavior. Fortunately, the problem of contextual conformity does not appear severe in valuing fish and wildlife because the hypothetical action at issue—paying a somewhat higher price for a product—is something which the respondent can do in a realistic time, place, and manner.

The problem of strategic bias presents somewhat different concerns. Strategic bias may occur when a respondent strongly desires or opposes a change in the existing situation, or believes that the value the respondent places on a publicly-supplied good such as clean air or fish and wildlife, differs significantly from the value placed on it by the average member of society. In such a situation, the respondents who behave strategically will exaggerate the difference between their estimation of value and the societal mean. Respondents who think they place a lower value on the good than the societal mean will understate the price they are willing to pay in order to reduce the tax payment they anticipate having to make to cover the cost of the good; those who think they place a higher value on the good than the societal mean will overstate the price they are willing to pay in order to increase the supply or production of the good.\(^{111}\)

The possibility of this kind of strategic bias should not pose a serious problem for DCS valuations of fish and wildlife. First, the researcher should be able to identify any responses that are clearly out of line and treat them accordingly. Moreover, the time, information, and computations necessary to design a successful strategy that would not be apparent to the researcher and yet would affect the survey's results are likely to serve as a major disincentive for attempting such a ploy, especially since the chances that one individual could significantly bias the results are very small.\(^{112}\) Finally, even when strategic behavior is possible, it does not appear to be common.\(^{113}\)

In spite of these difficulties with the DCS approach, it appears that the method, as refined by Randall and Brookshire, is ready for application. Its application will, however, be expensive. Researchers must design and test a survey questionnaire, and this may prove especially

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\(^{111}\) P. Sorenson, Environmental Damage in Economics and in Law: The Case of the Santa Barbara Oil Spill 11 (Nov. 19, 1976) (paper delivered at the annual meeting of the Southern Economics Association, Atlanta, Georgia).

\(^{112}\) A. Randall & D. Brookshire, \textit{supra} note 106, at 15-17.

\(^{113}\) \textit{Id.} at 17.
time-consuming and costly because the DCS approach is just emerging from the developmental stage. Sending out the questionnaires and processing and analyzing the responses will also be time-consuming. Since this procedure has not, to the best of the authors’ knowledge, been employed directly in litigation, anyone planning to rely on it for proving compensatory damages must be prepared to explain and vigorously defend the methodology. This will require the supporting testimony of expert witnesses other than the economist who actually designed and conducted the survey. In light of the above considerations, it will probably be advisable to use DCS and other economic approaches only in cases where there have been extensive losses of wildlife with long-term impacts, while relying on periodically updated replacement or economic valuation schedules for smaller losses.

Even though there are costs and problems inherent in the DCS approach, this method appears to be, at least in theory, the best economic approach to the problem of valuing fish and wildlife. Whether it ultimately proves useful in litigation will depend, in part, upon whether the approach is as viable as it now appears and in part on the skill and preparation of those who use it. The “hypothetical” or “contingent” nature of the process, which permits it directly to attack the problems created by the absence of a “real” market, is its greatest strength from the point of view of the economist, but will no doubt trouble some judges and constitute its principal legal weakness, at least until the process has won acceptance in a few cases.

IV
RECOMMENDATIONS

Given the uncertainty of the law with respect to both the right of the state to seek compensation under common law and the means of establishing monetary values for fish and wildlife losses, the authors believe that legislation is desirable. A proposed model statute appears in Appendix I. The legislation should, at a minimum, recognize the interest of the state in fish and wildlife within its boundaries,114 and authorize an appropriate state officer or agency to bring actions for the recovery of full and adequate compensation for fish and wildlife losses.115 Since replacement cost will often be the easiest and in some cases the most appropriate measure of damages, the legislation should direct the fish and wildlife agency to develop and maintain current schedules of the cost of replacing species for which replacement is possible.116 In addition to replacement of the actual loss, legislators may

114. See, e.g., Model Act, Preamble, Appendix I infra.
115. Id. ¶ 4(2).
116. Id. ¶ 5.
wish to consider the wisdom of expressly authorizing recoveries for the necessary expense of returning reduced populations to their previous numbers as rapidly as possible. This would include factors such as the need for sufficient replacements to account for mortality within the replacement stock;\textsuperscript{117} restoration of habitat;\textsuperscript{118} and allowance for secondary losses where the impairment of brood or feed stock may affect other species.\textsuperscript{119}

The legislation should not limit recovery to replacement cost, since such an approach would be either inadequate or unavailable in some cases. The legislation should therefore expressly recognize and authorize the use of "economic" valuation methods as well,\textsuperscript{120} since some courts may otherwise be reluctant to permit recovery based on an economic measure of damages. In order to account for the loss of fish and wildlife for which there is no feasible method of assigning a reliable monetary value, the legislation should also establish a schedule of liquidated damages which will serve as a minimum measure of damages for important species of fish and wildlife for which replacement costs are unavailable.\textsuperscript{121}

The legislation should be liberal with respect to the parties and the valuation techniques that can be used to establish monetary values. Thus in addition to granting the appropriate state official or agency flexibility to develop the approaches that will most accurately reflect the value of the fish and wildlife, the legislation should authorize private citizens to initiate or intervene in actions to recover compensatory damages,\textsuperscript{122} and should authorize the payment of expenses reasonably incurred where these efforts are successful in either obtaining or increasing the amount of recovery.\textsuperscript{123} Regardless of which valuation method the state agency or private citizen uses in a particular action, the legislation should also authorize the agency to pay for the costs of clean-up and investigation, and to collect those expenses from the persons responsible.\textsuperscript{124}

CONCLUSION

The loss of substantial numbers of fish and wildlife from pollution

\textsuperscript{117} Id. ¶ 7(b).
\textsuperscript{118} Id. ¶ 6.
\textsuperscript{119} Id. ¶ 7(c).
\textsuperscript{120} Id. ¶ 7(a).
\textsuperscript{121} Id. ¶¶ 6 & 13.
\textsuperscript{122} Id. ¶ 8.
\textsuperscript{123} Id. ¶¶ 9 & 10.
\textsuperscript{124} This article has focused on actions by states to recover damages for the loss of fish and wildlife under their jurisdiction. For a discussion of a possible federal regulating scheme, see Du Bey and Fidell, \textit{The Assessment of Pollution Damage to Aquatic Resources: Alternatives to the Trial Model}, 19 Santa Clara L. Rev. 641 (1979).
caused by commercial and industrial activity has become an unfortu-
nate fact of life. Commercial and industrial activities are necessary,
but this does not mean that the public at large should pay all the result-
ing costs of the destruction of fish and wildlife. Requiring parties re-
sponsible for fish and wildlife losses to compensate the public will
increase public welfare and economic efficiency.

Legal remedies are available through legislation and, in many
cases, through state common law as well. The problem of determining
the value of fish and wildlife has been a major factor in discouraging
recoveries. As this Article has noted, methods for valuing these re-
sources are available. Some, like replacement cost, are well estab-
lished. Newer methods for more difficult valuation problems are just
developing and have not yet received much application. Specific au-
thorizing legislation will facilitate state recovery efforts by establishing
a sound legal basis and providing a framework for the development
and use of a variety of valuation methods. The growing number of
state actions and the statutory mandate of Superfund should lead to
rapid progress in this area.

APPENDIX I

A BILL

To recognize the value and importance of fish and wildlife to the
people of this State and to provide for the recovery by this State of full
and adequate damages for the loss of its fish and wildlife as a result of
the unlawful pollution of its air, land, or waters, or the direct unau-
thorized taking or destruction of its fish and wildlife.

Be it enacted by the Legislature of the State of _________ that:

Statement of Findings

1. The State of _________, in its sovereign capacity, is the
   guardian and trustee of the natural resources of this State including its
   fish and wildlife; and

2. This State has not in the past fully recognized its right and
   obligation to protect its fish and wildlife resources through the recovery
   of full and adequate compensation for loss of its fish and wildlife as a
   result of the unlawful pollution of its air, land, or waters, or the unau-
thorized taking of its fish and wildlife.

Definitions

3.(a) [Commissioner, Director, or Commission] is the [state agency
    or official] authorized and directed to develop schedules and methods
    for the valuation of fish and wildlife and to seek recovery for the injury
    thereto under this Act.
(b) **Person** includes any natural person, corporation, firm, company, partnership, joint stock company, foundation, society, association, labor organization, Indian tribe, municipality, or county existing under the laws of this State.

(c) **Unlawful pollution** means the discharge or release into the environment of any substance, including radiation and heated or cooled water, in violation of any law limiting, regulating, or prohibiting the discharge or release of such substance into or on the air, land, or waters of this State, or the intentional or negligent discharge or release of any substance which the person discharging or releasing it knows or in the exercise of reasonable caution ought to know could injure or destroy any of the fish and wildlife of this State.

(d) **Fish and wildlife** means any member of the animal kingdom, including without limitation any mammal, fish, bird, insect, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate as well as any part, product, egg or offspring thereof.

(e) **Unauthorized taking** means the killing, capturing, collecting or destroying of any fish or wildlife other than any lawful recreational or commercial fishing, hunting, or trapping.

*Development of Valuation Methods and Initiation of Actions*

4. The [Commissioner, Director, or Commission] shall: (1) to the fullest extent possible, develop reasonable methods for assessing the monetary value of fish and wildlife within this State, and shall promulgate such methods in accordance with [the applicable rulemaking provisions of the state's Administrative Procedures Act]; and (2) with the assistance of the Attorney General, initiate such actions as the [Commissioner, Director, or Commission] believes are justified to recover full and adequate compensation for the loss of any fish or wildlife of this State as a result of any unlawful pollution of the air, land, or water of this State or of the direct unauthorized taking of fish or wildlife of this State.

5. In furtherance of the authority and direction set out in Paragraph 4, the [Commissioner, Director, or Commission] shall, to the fullest extent possible, develop and promulgate and, from time to time, review, revise, and repromulgate schedules of the current cost of replacing various fish and wildlife species, in accordance with [the applicable rule-making provisions of the state's Administrative Procedures Act].

*Recoverable Damages*

6. The replacement costs set out in the schedules provided for in Paragraph 5 or, if no replacement cost has been so established, the stip-
ulated value, if any, set out in Paragraph 13 of this Act shall constitute the minimum compensation which the State shall be entitled to recover for fish and wildlife covered by a schedule. In addition to replacement cost, the State shall be entitled to recover such additional damages as it can establish with reasonable certainty, including but not limited to the loss of recreational opportunities and aesthetic values of the fish and wildlife lost. In the event that neither a replacement cost under Paragraph 5 or a stipulated value under Paragraph 13 has been established for a species of fish or wildlife which has been taken in an unauthorized taking, the State shall be entitled to recover such damages as it can establish with reasonable certainty.

7. In determining the extent or number of fish and wildlife lost as a result of some intentional, negligent, or unlawful pollution, recovery by the State of the amounts recoverable under Paragraph 6 shall not be limited to the number of animals actually counted or collected, but may be based upon estimates, made upon sound scientific principles, of:
   a. the number of fish or wildlife actually killed or lost; or
   b. the mortality of replacement stock; or
   c. the loss or impairment of productivity which may have also resulted.

Citizen Suit

8. In order to assure prompt and vigorous prosecution of claims for compensation for fish and wildlife losses and to encourage the development and utilization of a variety of methods for the valuation of fish and wildlife losses, any person may initiate an action, after thirty days notice to the [Commissioner, Director, or Commission], or may intervene in an on-going action, for the recovery of compensation for fish and wildlife lost as a result of unlawful pollution or the direct unauthorized taking of fish or wildlife of this State.

Application of Monies Recovered

9(a) Except as provided in Paragraph 9(b) below, all damages recovered in a suit brought pursuant to this Act shall be used by this State for the protection and management of its fish and wildlife.

(b) In the event that the [Commissioner, Director, or Commission] does not participate in a successful action initiated by a person pursuant to Paragraph 8 of this Act, or that a person who intervenes in an action to recover damages for fish and wildlife resources brought pursuant to Paragraph 4 of this Act is able successfully to secure for the State a recovery based on a higher value for the fish and wildlife losses than the [Commissioner, Director, or Commission] had otherwise established or sought to establish, that person shall be entitled to receive
from the final award reimbursement all expenses reasonably incurred in the prosecution of the action, including attorneys' fees, expert witness's fees, and court costs.

10. In the event that the parties to an action to recover damages for fish and wildlife losses brought pursuant to Paragraph 4 or 8 of this Act agree to a settlement of the action, the [Commission, Director, or Commission] may reimburse a person participating in the action pursuant to Paragraph 8 of this Act for all or any portion of the expenses reasonably incurred in the prosecution of the action, including attorneys' fees, expert witness's fees, and court costs, to the extent that the [Commissioner, Director, or Commission] believes that the person helped to establish a higher value for the fish or wildlife than would otherwise have been established or otherwise materially contributed to the settlement of the action.

11. Damages recovered in an action brought to recover for the loss of fish and wildlife pursuant to this Act, less experts' fees reasonably incurred in the prosecution of the action and such costs, if any, as are awarded to a private citizen pursuant to Paragraph 9 or 10 of this Act, shall be applied by the [Commissioner, Director, or Commission] to the replacement of the fish or wildlife lost, or if that is not feasible, to the propagation and protection of fish and wildlife and the acquisition, management, and protection of fish and wildlife habitat within the State.

Research Fund

12. The [Commissioner, Director, or Commission] shall establish a fund of not more than $____ for the purpose of conducting such surveys and investigations as may be necessary to establish with reasonable certainty the extent and value of any fish or wildlife lost as a result of any unlawful pollution of the air, land, or waters of this State or its fish and wildlife, or the unauthorized taking of the fish and wildlife of this State.

Stipulated Damages

13. In recognition of the fact that replacement costs cannot at the present time be determined for some species of fish and wildlife, the following values are hereby established for individual members of the species listed below until such time as the [Commissioner, Director, or Commission] establishes a replacement cost therefor under Paragraph 2 of this Act:

(a) Haliaetus leucocephalus (Bald Eagle) $5,000
(b) Pandion haliaetus (osprey) $5,000
(c) Megaceryle alcyon (Belted kingfisher) $ 50
(d) Acipenser oxyrhyynchus (Atlantic Sturgeon) $2,500
(e) Gulo luscus (Wolverine)  $ 500
(f) Oreamnos Americanus (mountain goat)  $2,500
(g) 
(h) 
etc.

**Effect on Other Laws**

14. The recoveries provided for by this Act are in addition to, not in derogation of, other recoveries, fines, or penalties authorized by any other statute or rule of law.

**APPENDIX II**

**State Survey**

**Recovery for Destruction of Fish & Wildlife**

1. Does your state have legislation authorizing any of its agencies to recover damages for the destruction of fish and/or wildlife resources as a result of pollution?
   
   yes _____  no _____

   If “yes” please cite the statute or, if possible, attach a copy.

2. Does your state have legislation setting up civil or criminal penalties for the wrongful taking of fish and/or wildlife?
   
   yes _____  no _____

   If “yes” please provide citation.

3. Do you utilize replacement costs to measure damages?
   
   yes _____  no _____

   If you use any other method in conjunction with or in place of replacement costs please identify the method briefly.

   a) Monetary Value of Fish published by the American Fisheries Society.
   b) Statutory schedule.
   c) Regulatory schedule.
   d) ad hoc survey.
   e) Other, please describe.

4. Approximately how often has your state taken action administrative or judicial to recover for the destruction of its fish and wildlife resource? ___
   
   What percentage of these actions have resulted in a recovery? ___
Have any of these cases gone to trial on the issue of
   ___ a) right to recover.
   ___ b) the method of computing or amount of the damages sought.
   If "yes" please provide citation.

5. To your knowledge are there any cases now pending before a court or an
   administrative agency to recover damages for the destruction of fish and
   wildlife resources?
   If there are please identify the case and the person or persons in charge of
   it.
Supreme Court Notes

A COLLECTION OF NOTES ON THE MAJOR ENVIRONMENTAL CASES DECIDED BY THE UNITED STATES SUPREME COURT DURING THE 1980-1981 TERM