Working Paper Series

WORKING PAPER NO. 686

NATURAL RESOURCE DAMAGE ASSESSMENT: ECONOMIC IMPLICATIONS FOR FISHERIES MANAGEMENT

by

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California Agricultural Experiment Station
Giannini Foundation of Agricultural Economics
August, 1993

Natural Resource Damage Assessment:

Economic Implications for Fisheries Management

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Introduction

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) created a process for natural resource damage litigation. The importance of economic concepts and analyses in natural resource damage assessments it encompasses is considerable, as evidenced by the $1 billion settlement in the Exxon-Valdez oil spill. The scrutiny given to assuring "proper" use of economic concepts also has been considerable, as evidenced by the guidelines established by the Department of the Interior (DOI) and by the National Oceanic and Atmospheric Administration's (NOAA) "Blue Ribbon Panel" report (Arrow, et al. 1993) on use of contingent valuation (CVM) in damage assessment. The procedures for assessing natural resource damages have received more attention from economists than any other government process dealing with natural resources.

In this paper we consider similarities and contrasts between the economic concepts and procedures used in connection with natural resources damages assessment and those that arise in connection with fisheries management. Federal fisheries management proceeds with limited economic rationale, even though the sway of economic analysis has been greater in the 1990s. Although a part of a typical Fisheries Management Plan (FMP) under the Magnuson Fisheries Conservation and Management Act (MFCMA), economic analyses have rarely been pivotal in U.S. management decisions. Recently, however, economic instruments such as individual transferable quotas (ITQs) and economic logic such as benefit/cost analysis have begun to play a significant role in the allocation of fisheries resources.

The more significant point that we make is the requirement for a consistent approach to economic valuation, in order both to eliminate opportunities for mistakes in the economic

analysis and to provide a coherent economic argument for politicians, bureaucrats and the public. The problem arises because of the fragmentation in the legal and political setting within which economic analysis is conducted and the fact that these different entities have different viewpoints and adopt different guidelines. For example, the California State Water Resources Control Board in 1988 decided as a matter of policy *not* to place a monetary value on the environmental impacts associated with water diversions from the San Francisco Delta to the San Joaquin Valley. That same year, the Board was a plaintiff in a natural resource damage suit brought by the State of California against the Shell Oil Company in which damages in monetary terms were claimed for the lost use and non-use values arising from the spill. A second example concerns the type of economic analysis that is permitted; for reasons to be explained below, the Department of the Interior (DOI) has tended to the view that consumer's surplus is part of natural resource damages, but producer's surplus is excluded. Conversely, the management of fisheries under MFCMA has generally focussed on producer's surplus to the exclusion of consumer's surplus. Moreover, natural resource damage assessments seem to have gone out of their way to exclude impacts on foreign consumers, whereas foreign markets figure prominently in fisheries management objectives.

Private versus Public Claims

CERCLA was passed by Congress in 1980 in response to public concern about hazardous toxic waste releases. CERCLA contains provisions establishing liability on potentially responsible parties (PRPs) to pay damages for the injuries to natural resources resulting from the spill or release of hazardous substances, in addition to the costs of cleanup, removal, remediation, and any other necessary response costs including the costs of the

damage assessment. The final regulations for CERCLA damage assessment were issued in August 1986 and March 1987. Appeals were filed against the regulations with the District of Columbia Circuit of the U.S. Court of Appeals: some state governments and environmental groups attacked the rules for being too narrow, while some industrial groups representing potential PRPs attacked them for being too broad. The Court issued its ruling on what became known as the case of *Ohio v. U.S. Department of the Interior* in July 1989. On the crucial issues concerning environmental valuation it sided firmly with the states.

A distinction is made in CERCLA between public and private damages, one that is firmly rooted in its legislative history. The early drafts covered "all damages for personal injury, injury to real or personal property, and economic loss." However, after the November 1980 elections, Congress changed direction and dropped all damage provisions except damages to public natural resources. If private individuals have suffered a loss they can bring their own suits under existing laws. The governments "may not assert the claims of injured private interests. Rather they must seek to recover losses sustained by the public as a whole."

With more valor than success, DOI Rules translate this into economics, stating: "For the Purposes of this part, use values are the value to the public of recreational or other public uses of the resource, as measured by *changes in consumer surplus, any fees or other payments collectable by the government for a private party's use of the natural resource, and any economic rent accruing to a private party because the government does not charge a fee or price for the use of resource."* [1] One can interpret this to mean that public damages are lost consumer's surplus plus the portion of producer's surplus which constitutes a resource rent.

The issue of public versus private damages was raised in the *Ohio* case, but peripherally to the issue of private versus public *ownership*. In this regard, the Court held that "while the statute excludes purely private resources, it clearly does not limit the definition of "natural resources" to resources *owned* by a government." Accordingly, it remanded the record to DOI to clarify whether this was indeed it official position. DOI confirmed this in the April 1991 draft of the damage assessment rules. Apart from that, the new rules did not address the distinction between public and private damages. In fact, matters are the same as they were in 1986.

This is unsatisfactory because DOI's position that the loss of consumer's surplus constitutes a public damage while that of producer's surplus (net of rent) constitutes a private damage is, in fact, inconsistent with what tort law actually says. As we understand it, two propositions can be stated about the common law treatment of damage claims in situations such as oil spills, both of which would seem to undercut DOI's position. First, tort law makes *no* distinction between lost producer's surplus and lost consumer's surplus—generally, it treats them both as private damages. Second, with certain important exceptions to be explained below, it recognizes *neither* as a valid claim for compensation.

At issue here is what are called economic losses. In general, tort law makes a distinction between injuries that involve some form of physical harm to a plaintiff or his property and those that involve a purely business or economic loss; the general rule has been that tortfeasors or *not* liable for negligently inflicted economic losses.[2] However, this "bright-line" rule was eroded by the U.S. Court of Appeals for the Ninth Circuit in 1974 in a suit arising from the 1969 Santa Barbara oil spill.[3] That court upheld the claims of commercial

fishermen for compensation for profits lost as a result of the reduction in commercial fishing potential of the channel. Because the plaintiffs did not own the fish in the ocean, they could not sue Union Oil for negligently destroying their property. Hence, to the untrained eye, it would appear that they were claiming a pure business loss, of the sort proscribed by *Robins Dry Dock*. Nevertheless, the court created an exception for them.

The exemption for commercial fishermen was endorsed in *Louisiana ex re. Geste v. M/V Testbank*, 752 F 2d 1019 (1985). There, the U.S. Court of Appeals for the Fifth Circuit permitted commercial fishermen to sue for damages resulting form an oil spill, as in *Oppen*, but it upheld the denial of damages (on economic-loss grounds) sought by recreational fishermen, seafood companies not actually engaged in fishing, marina and boat operators, and shipping interests that incurred losses from rerouting or delay. Thus, the loss of consumer's surplus (for recreational fishermen) was once more treated perfectly symmetrically with the loss of producer's surplus.

The situation finally changed in 1986 when the U.S. Supreme Court ruled on *East River S.S. Corp. v. Transamerica Delaval, Inc,*[4] and strongly affirmed the application of the *Robins* rule to all aspects of maritime law. In this case, bareboat charterers of four oil tankers sued the manufacturer of a defective turbine installed in the ships, claiming that the defective product had caused them economic harm, namely the cost of repairing the part and the income lost during repairs. The Court expressed its concern that, if courts recognized a tort action for purely economic harm, such liability "could subject the manufacturer to damages of an indefinite amount" (id. at 874). The Court reasoned that "if charterers—already one step removed from the transaction—were permitted to recover their economic losses, then the

companies that subchartered the ships might claim their economic losses from the delays, and the charterers' customers also might claim their economic losses, and so on." Therefore, the Court concluded, "whether stated in negligence or strict liability, no products-liability claim lies in admiralty when the only injury claimed is economic loss" (id. at 876). The implication is that there is no exception, not even for commercial fishermen.

The most recent developments on this issue have occurred in connection with the litigation over two Alaskan oil spills—the *Exxon Valdez* spill and an earlier spill in the Cook Inlet involving the *Glacier Bay*. Both suits are being hear in the same U.S. District Court in Anchorage, which issued two key rulings in September 1990 and February 1991.[5] In these rulings, Judge Russell Holland denied motions to dismiss economic loss claims from fish tenders, fish processors, fish buyers, and fish spotters, in the *Glacier Bay* case, and, in the *Exxon Valdez* case, economic loss claims from area business, such as boat charters, taxidermists, and fishing lodges; those with use and enjoyment claims, such as sport fishermen, photographers, and kayakers; and fish processors and fish tenders. Judge Holland determined that, in the area of strict liability regarding spills of oil carried by the Trans-Alaska Pipeline System (TAPS), two pieces of legislation—the federal Trans-Alaska Pipeline Authorization Act (TAPAA), 43 U.S.C. 165-1655, and the State's Alaska Act, AS 46.03.022—preempt maritime law. TAPAA imposes strict liability up to $100 million, while the Alaska Act provides for unlimited liability. He found that the language of TAPAA "is that all provable damages sustained by any person as a result of a TAPS oil spill are compensable and are not limited by maritime law." Therefore, the *Robins* rule does not apply

up to the $100 million limit of TAPAA, although it does apply under the Alaska Act for damages in excess of that amount.

As far as we can determine, no attempt was made in these cases to argue that the loss of consumer's surplus for those with lost use and enjoyment claims was a public damage which, therefore, should be treated differently from the private damage claims on the part of the fishing and other businesses for lost producer's surplus. To the contrary, Judge Holland's ruling implies strongly that claims for lost consumer's and producer's surplus have the same standing and can all be asserted up to the $100 million limit of TAPAA. In the *Exxon Valdez* ruling he stated: "While TAPAA provides a mechanism to gather all the claims and fairly prorate them to meet its $100M liability limits, the Alaska Act has no such mechanism. It was in part this concern which brought the court to endeavor to the extent it could to require all potential TAPAA claimants to file with the Fund. In that fashion, all claimants would be before one claims processing agency—the entity that has $100 million to pay against all claims, inclusive of purely economic losses. It was also out of concern for such individual claims, including economic loss claims, that the Court previously urged the U.S. Government and the State of Alaska to refrain from making claims against the Fund. These governmental entities have other remedies available to them. The inclusion of their claims would drastically draw down the Fund when it is allocated on a pro raga basis amongst all claimants. The pro raga payment out of the fund is particularly acute for plaintiffs whose claims are not viable because of the rule in *Robins Dry Dock* once the statutory $100 million limit for strict liability is exceeded."[6]

The last sentences have an ironic ring to them. Had the federal and state governments not settled their civic claims against Exxon in October 1991, the muddle that lies at the heart of the DOI rules might have been exposed, since the situation could then have arisen where the trustees and private plaintiffs were both pursuing claims for the same loss of consumer's surplus arising from the disruption of water-based recreation in Prince William Sound. Under the DOI rules, this is a public damage *par excellence*. But, in the eyes of Judge Holland, this is a valid private cause of action.

This brings us to the core of our objection to CERCLA's treatment of public and private damages, and its distinction between "the claims of injured private interests" versus those of "the public as a whole." To an economist, this is a fundamentally meaningless distinction. As emphasized above, economic valuation is inherently anthropocentric: it measures the value that people place on the natural environment. Since the public consists of individuals, how is one to distinguish damage to the public as a whole from damage to the individuals that constitute the public?

An Operational Definition of Damages

We propose a simple economic perspective for resolving the private versus public claim dilemma. Define the value of a public asset as the present value of all current and future returns from an asset (say fish stocks) to the public.[7] Society includes producers, consumers, and non-users, so we count the surplus accruing to them from the goods and services flowing from the asset. Damage assessment arises when parties cause injury to the asset, altering its flow of goods and services. The public who owns the resource would

collect through their Trustees all damages to its asset. Then, through administrative process, the Trustees will allocate the damages to individuals who could can substantiate their claims.

In this scheme[8], the principal interaction between damage assessment and fisheries management arises because the amount of surplus attainable from the use of the asset will vary depending on how the public chooses to manage the asset.[9] This is especially important because the value of the asset includes future returns; and in the future, circumstances could be different—either by chance or by design. Is the asset value the present value of future producer surplus and consumer surplus, conditioned on optimal management? Or is it the present value of future producer surplus and consumer surplus, conditioned on current practices?

This is a relevant problem because fisheries are often open access (or strangely-restricted), subject to public management. The actual asset value is influenced by open - access management in two ways. First the return to the fish stock itself is reduced or eliminated. That is, if the asset were managed efficiently, there would be a rent to the fish stock (which could be collected by the public or allowed to accrue to producers). Second, consumer surplus from the harvests of the stocks is reduced because the harvest levels that are sustainable in the long run are typically smaller under inefficient management schemes, generating less consumer surplus.

Rather than use the past asset value, one could calculate the consumer surplus and the rent that would be lost if the asset were managed optimally. That is, imagine an efficient plan of regulating the fishery and calculate the rents and consumer surplus that would accrue to the fishery under that plan. Then the damage to the fishery from an oil spill or other ecological

disaster would be the reduction in rents and consumer surplus that would accrue under the best of plans. One could argue that in the long-run fisheries management will become more efficient , and so it is wrong to extrapolate the damages under the current management regime to calculate the present discounted value of future monetary losses.[10]

Now add the complication that not all of the consumer surplus accrues to the "owner" of the resource (presumably the U.S. public). Also, assume institutions are such that the sum of producer surplus and consumer surplus is maximized. However, the owner is the U.S. society and some of the consumer surplus accrues to foreigners. Some would argue to treat all consumption the same, irrespective of nationality. There is precedent for this. When we manage other natural resources, such as national parks and forests, we do not charge higher entrance fees for foreigner visitors.

However, others argue that foreigners are not part of the U.S. public and thus should be excluded. But if foreign surplus is excluded, an inconsistency arises with goals of fisheries management. There is nothing in MFCMA which discourages foreign consumption, only foreign production. In fact, exports are often promoted to reduce trade surpluses. Foreign consumers obtain some of their surplus because they could outbid U.S. consumers for a portion of the harvest. If foreigners were not in the market, U.S. consumers would buy those fish. The result would be lower prices, lower producer surplus, but higher U.S. consumer surplus. With reallocation of exports to U.S. consumers, a greater potential U.S. asset value would be calculated on the basis of current trade practices (but a smaller asset value than if total producer and consumer surplus under free trade were calculated). Moreover, there are institutional arrangements that could increase the returns to the U.S. We could export fish but

attempt to extract some of their surplus through export tariffs. The potential asset value would be larger than the actual U.S. producer and U.S. consumer surplus under current conditions, but would still be smaller than total world producer and consumer surplus under free trade.

So why does the U.S. not manage so as to pursue one of the alternatives? One answer is that society's objective is not to maximize a narrow definition of U.S. "asset value". Obviously it is more valuable to U.S. interests to have the trade with foreign nations. While the U.S. may not benefit directly by the foreign consumption, fisheries trade may be a part of a larger trade agreement which results in lower prices to U.S. consumers for other goods. The U.S. may consciously choose not to impose export tariffs so as to avoid retaliation on other goods. Additionally, there are direct quid pro quo arrangements, such bilateral agreements that prohibit harvesting salmon on the high seas.

Methods of Analysis

Besides the problems in economic concepts, there are also the relationship between methods used in damage assessment and fisheries management. We restrict our discussion to the most obvious differences between the two- the greater use of CVM, consumer panel data and multimarket welfare measures in damage assessment. Because only a few damage assessments have been presented, much of the discussion is not based on published assessments.

The necessity in certain cases for considering the total claim (Randall, 1991) and the critical role of non-use value in the Exxon Valdez oil spill focused research on the use of contingent valuation. The lengthy road to acceptance of the new method has been surveyed

by the NOAA's Blue Ribbon committee. We believe that many questions are ignored in fisheries management but could be addressed using contingent valuation or conjoint analysis.[11] Anderson and Bettencourt (1993) have studied New England salmon using conjoint analysis but few studies exist. This is unfortunate because CVM has been shown to be most effective when used for goods which people are familiar with valuing (see Cummings, Brookshire and Shulze, 1986).

The definition of public claims and the necessity of obtaining consumers surplus for damage assessment requires either better data on fish retail markets or the use of household panel data on fish consumption. Since the requisite time series on retail fish markets are unlikely to be development in our lifetimes, the use of consumer panel data is quite necessary. Unfortunately, there are publicly available consumer panel data sets since 1987/88 and this limits the analysis.

Finally, the multimarket measures of damage loss are sometimes critical to damage assessment. Thurman and Easley (1992) provide an illustration of the underestimation of welfare losses from harvest restrictions when substitute species are important in ex-vessel demand and issues of general equilibrium demand are not addressed.

Conclusions

We draw two conclusions from this analysis. First, the distinction between public and private damages posited by CERCLA is untenable in logic, in economic theory, and in law. Second, even when the distinction is put aside, as in the new Oil Pollution Act, there still needs to be a mechanism for coordinating the analysis that supports the claims being brought by public and private plaintiffs. Unless the problems of coordination are resolved, the

outcome may be that the trustees are driven to focus largely on lost non-use values, since these are less likely to become the subject of private claims for damages, and to avoid spending resources on the measurement of lost use values, since these might subsequently turn out to be the subject of private claims as well. This is hardly what Congress intended.

Until this is done, damage assessment will be focussed on consumer surplus whereas fisheries management is driven by producers surplus. As a result, many of potential complementarities of economic concepts and analysis in fisheries management and damage assessment will not exist. However, linkages still exist between the two.

Perhaps the most alarming is the potential effect of fisheries mismanagement on environmental degradation. It is common knowledge that many fish stocks are overharvested (National Marine Fisheries Service, 1991), but it is not generally recognized that the mismanagement may contribute to the misuse of the stock (or its habitat) by hazardous waste dischargers. Under a narrow definition of damage, injury to assets with low values are relatively encouraged. Thus, if a producer with the potential for hazardous waste spill has an option, they would more likely produce near a fish stock with open access than one with an ITQ system. Also, they are more likely to locate near water. Precluding foreign surplus in damage claims also encourages specific kinds of environmental degradation.

Endnotes

1. In addition, the Preamble offered a list of some things that were <u>not</u> public damages: "Under this rule, the federal or State agency acting as trustee cannot collect for: taxes foregone, because these are transfer payments from individuals to the government, wages and other income lost by private individuals, except for that portion of income that represents economic rent, because these values do not accrue to the agency and may be the subject of lawsuits brought by the individuals suffering the loss; or any speculative losses."

2. In England the rule dates back to Cattle v. Stockton Waterworks, Co., 10 Q.B. 453 (1875). In the U.S. this rule was first stated by the Supreme Court in Robins Dry Dock & Repair Co. v. Flint, 275 U.S. 303 (1927).

3. Union Oil Company v. Oppen, 501 F 2d 558 (1974).

4. 476 U.S. 858 (1986).

5. In re Glacier Bay, 746 F. Sup. 1379 (D. Alaska 1990), reported in *Oil Spill Litigation News*, October 5, 1990 (2063, 2076-2085); and In re Exxon Valdez, slip op. at 11-12 (D. Alaska Feb. 8, 1991), reported in *Oil Spill Litigation News* February 12, 1991 (2749-2753). Of course, both cases pre-date the 1990 Oil Pollution Act.

6. *Oil Spill Litigation News*, February 12, 1991 (2753).

7. Much of the discussion about asset value comes from previous work with Nancy Bockstael and Kenneth McConnell.

8. The following may be true with the current situation but, as our discussion points out, it is muddled at best.

9. The issue of joint management of fisheries and environmental concerns is raised in McConnell and Strand (1989) and Freeman (1991).

10. Fisheries managers could assist damage assessment by managing fisheries to acjieve economic efficiency. The surf clam ITQ system (Anderson, 1993) illustrates that efficient schemes are possible. However, we recognize that efficiency is a difficult concept which includes a broad array of monetary values, including the value to fishermen of maintaining options to future resource access and the costs of enforcement.

11. For example, a possible solution to the Maryland oyster problem is to harvest oysters at a smaller size before the disease inflicts mortality. This, combined with oyster sanctuaries, might provide a sustainable oyster harvest. However, there are few good estimates of the premium carried by the larger oyster.Surveys of wholesalers and other buyers which addressed size premiums would shed light on the problem.

References

Anderson, L.G., "Implementation of ITQs: Efficiency and Distribution Effects with Malleable and Non-malleable Harvesting and Processing Capital," Working Paper, College of Marine Studies, University of Delaware, 1993.

Anderson, J.T. and S.U. Bettencourt, "A Conjoint Approach to Model Product Preferences: The New England Market for Fresh and Frozen Salmon," Marine Resource Economics, Vol. 8(1): 31-50, 1993.

Arrow, K.R., R. Solow, P. Portey, E. Leaner, R. Radner, and H. Schuman, Report of the NOAA Panel on Contingent Valuation, January 1993.

Cummings, R.G., D.S. Bookshire and W.D. Shulze, Valuing Environmental Goods: An Assessment of the Contingent Valuation Method, New Jersey: Rowman and Allanheld, 1986.

Freeman, A.M., "Valuing Environmental Resources Under Alternative Maanagement Regimes," Ecological Economics, Vol. 3: 247-256

Hanemann, W.M., "Natural Resource Damages for Oil Spills in California," in Natural Resource Damage: Law and Economics, Ward and Duffield (eds), J. Wiley and Sons, New York, 1992.

McConnell, K.E. and I.E. Strand, "Benefits from Commercial Fisheries when Demand and Supply Depend on Water Quality," J. Environ. Econom. Management, Vol. 17: 284-292, 1989.

National Marine Fishery Service, Our Living Oceans: The First Annual Report on the Status of U.S. Living Marine Resources, NOAA Tech. Memo. NMFS-F/SPO-1, 1991.

Randall, A., "Total and Nonuse Values," in Measuring the Demand for Environmental Quality, Braden and Kolstad, eds., North-Holland, 1991.

Russell, C.S., "First Steps in the Development of a Method for Ranking Environmental Restoration Projects," Institute for Water Resources, U.S. Army Corps of Engineers, October 1992.

Thurman, W.N. and J.E. Easley Jr., "Valuing Changes in Commercial Fishery Harvests: A General Equilibrium Derived Demand Analysis," J. Environ. Econom. Management, Vol. 22: 226-240, 1992.

Ward, K.E. and J.W. Duffield, Natural Resource Damages: Law and Economics, John Wiley and Sons, New York, NY, 1992.