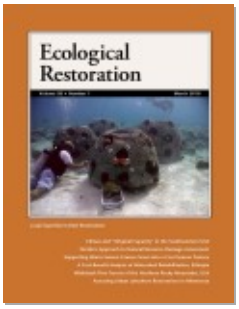
Florida's Approach to Natural Resource Damage Assessment: A Short, Sweet Model for States Seeking Compensation



Josephine Faass

Ecological Restoration, Volume 28, Number 1, March 2010, pp. 32-39
(Article)

Published by University of Wisconsin Press

POLICY REPORT

Florida's Approach to Natural Resource Damage Assessment: A Short, Sweet Model for States Seeking Compensation

Josephine Faass

ABSTRACT

A recent survey of state environmental regulators revealed that natural resource injuries caused by oil pollution are a major concern, yet few respondents reported pursuing compensation for damages on a regular basis. It appears that their reluctance is due to the fact that many view natural resource damage assessments (NRDA) as a costly, time-consuming and legally risky undertaking. This article presents a case study of Florida's approach to this type of regulation, which relies on the combination of a standardized arithmetic formula and an interactive GIS. Once compensation is obtained, dollars enter a trust fund from which withdrawals can be made when the balance is sufficient to conduct needed restorations. This approach is suggested as a model for jurisdictions interested in pursuing damages for natural resource injuries because it has proven to be a quick, inexpensive, and defensible mechanism for generating damage estimates, even for small spills. Like any real-world application, Florida's methodology is not perfect, but shortcomings are discussed here in depth and potential solutions presented.

Keywords: ecological restoration, environmental policy, environmental regulation, natural resource damage assessment, oil pollution

The practice of Natural Resource Damage Assessment (NRDA) is not a new component of environmental regulatory practice; yet for a variety of reasons, state regulators often forgo it, thereby forfeiting potentially substantial remunerations and failing to "make the public whole" (Lee and Bridgen 2002) in the aftermath of an injurious incident such as an oil spill. Although a small number of states do conduct NRDA, particularly for highly injurious events, the state of Florida stands out in this regard, as it has devised a non-resource-intensive assessment methodology that facilitates the collection of damages for every single spill reported in coastal waters. Contained here is a detailed description and critical analysis of Florida's approach, which could serve as a model for practitioners and policymakers interested in promoting NRDA within their own jurisdictions.

Ecological Restoration Vol. 28, No. 1, 2010
ISSN 1522-4740 E-ISSN 1543-4079

Included in a number of major federal and state environmental laws, NRDA involves the valuation of lost resource services in order to gain compensation from responsible parties that is then used to fund ecological restoration activities. Eligible resource services are quite varied and include "lost use" values, such as forgone recreational opportunities resulting from beach closures, and "nonuse" values, including the mortality of species like sea otters. Although less familiar than commercial declines and property damages that can occur in the aftermath of a spill, the values of resource services can represent quite substantial amounts. In the case of the 1989 grounding of the *Exxon Valdez*, for example, total damages reached $11.9 billion; of this, slightly less than $2 billion took the form of natural resource damages (Helton and Penn 1999).

It is perhaps not surprising that a major challenge to NRDA stems from the task of reliably assessing the value of damaged natural resources. There have been many attempts to produce acceptable, "case-specific" methodologies for this purpose. Contingent valuation (CV), for example, assigns dollar values to injuries using surveys that ask respondents about their "willingness to pay" for resource services of the kind impacted (Carson et al. 2001, Lee and Bridgen 2002). Forgoing monetization completely, habitat equivalency analysis (HEA) relies on a naturally occurring metric, like a native species whose abundance and health is thought indicative of overall ecosystem functioning, that can be used to gauge injuries and scale restorations (Dunford et al. 2004, Fonseca et al. 2000).

The reliability and validity of resource valuations vary according to the approach employed; however, the general consensus in the literature

Table 1. An analysis of Florida's approach to natural resource damage assessment.

	Florida's Model for NRDA	
	Effective Practices	**Suggested Revisions**
General Observations	·Makes damage assessment "automatic" when a spill is reported ·Assigns NRDA responsibilities to first responders	·Conduct NRDA for all areas statewide ·Design approach such that valuations are acceptable for federal reimbursements
Formula for Estimating Monetary Value of Damaged Resources	·Invite regulated community to participate in design ·Specify values according to real costs of remediation or replacement ·Specify damages for release, independent of identified effects ·Codify in law with inclusion of rebuttable presumption ·Create complementary GIS using Environmental Sensitivity Index data	·Automatically adjust values for inflation ·Include values for lost use and nonuse values ·Adjust for cleanup/restoration technologies used ·Document methodology for devising values ·Determine defensible values for threatened and endangered species
GIS Component of Model	·Include Gazetteer ·Allow for data entry/amendments through "ground truthing" ·Allow for instant identification of resources at risk ·Make accessible on-scene using air cards ·Provide regular training for users	·Link directly to formula and digitized Area Contingency Plans ·Create networking capability such that data entered by one user are accessible by all
Trust Fund	·Deposit all damages into a single account ·Target disbursements to areas impacted by spills	·Allow direct access by program; do not require legislative appropriations ·Limit use of fund moneys to restoration ·Identify definitive projects beforehand and disburse funds once needed amount is reached (this approach is used in California) ·Utilize an interest-bearing account

appears to be that most are time-consuming and expensive to pursue (Austin 1994, Jones 1997). The use of some approaches, particularly CV, has also given rise to lengthy and expensive legal battles with responsible parties over the terms of settlement. As I discovered in the course of a survey of state environmental agency staff, which I report on here, these characteristics combine to make NRDA a hard sell for state regulators, many of whom reported working with very limited budgets and staff and typically prefer to maintain a cooperative relationship with the regulated community. Also, because many releases are small in volume, the resulting injuries and therefore the potentially recoverable damages are typically minor, further diminishing the incentive to pursue them.

In spite of this general trend, however, several states do conduct NRDA frequently. California and Louisiana have chosen to follow the federal example, relying on case-specific assessment techniques such as CV or HEA, which are often expensive and time-consuming to conduct. New Jersey and Washington have devised abbreviated formulas for assessing damages, although damage assessment in New Jersey is restricted to groundwater injuries, and in Washington it is applied only at the discretion of a multiagency natural resource trustee committee.

In contrast, one state's approach to NRDA appears to offer a viable solution to many of the hurdles encountered by those tasked with oil pollution regulation. Florida has devised a simple yet elegant mechanism for determining losses. The technique is based upon a simplified assessment formula used in conjunction with a highly-specialized GIS. Recovered damages are deposited into a Coastal Liability Trust Fund, allowing small settlements to be amassed and dispersed as needed. Florida's approach may serve as a valuable model for other states with an interest in NRDA; an overview of its various strengths and weaknesses is included in Table 1 as an aid for anyone interested in replicating this approach. In this article, I present a survey of natural resource agency personnel and

provide an overview of the assessment methodology's legal and conceptual foundations and details of the formula and GIS. I end with a set of recommendations for the replication and improvement of these regulatory tools.

The Survey

I administered a telephone survey to state agency employees whose duties included the regulation of oil pollution. Between May and July of 2008, I interviewed more than 50 people, representing 46 agencies in 42 states. A series of 19 open-ended questions was used to gather information about a variety of topics related to NRDA, program design, and operations.

Only ten of the states surveyed reported pursuing resource damages with any regularity, and nine of those indicated that only very large incidents routinely merit regulatory intervention. In contrast, representatives of 25 states remarked that they rarely, if ever, conduct NRDA independent of federally led efforts. This finding is especially concerning in light of the number of annual oil spills estimated by respondents. These estimates ranged from a low of 10 in Indiana to a high of 9,000 in New York but averaged more than 1,400 incidents per year, many of which were described as small in scale. When asked why they routinely forgo NRDA, some survey takers cited as major obstacles the cost, time, and resources needed to conduct case-specific assessments, as well as the potential liability associated with such valuations. Others cited a lack of manpower or political will. In contrast to these general trends, the respondent from Florida reported routinely seeking damages and described how that state relies on a "formulaic" approach to NRDA.

Abbreviated formulas of the kind employed by Florida are not new, and many of the state representatives that I interviewed raised a variety of concerns about the validity and application of such assessments. Chief among these concerns were the formulas' frequent inability to adjust valuations (through discounting) to account for the effects of inflation, the apparent arbitrariness of the dollar amounts assigned to various resource types, and the possibility of legal challenges to the values assessed. These same concerns have been raised within the academic community (Ando and Khanna 2004). In speaking with the respondent from Florida, it became apparent that the specific methodology employed in that state has successfully addressed many of these concerns.

In order to investigate how Florida's approach might serve as a model for other jurisdictions interested in recovering damages, I visited Florida's Fish and Wildlife Research Institute (FWRI) and Department of Environmental Protection (DEP) offices in Tampa and Tallahassee. I conducted in-person interviews with agency staff and took a tour of restoration sites located in the Tampa Bay area. In addition, I gathered a number of internal agency documents and used them to create the case study presented here.

Legal and Conceptual Foundations

In Florida, responsibility for conducting NRDA falls to the state DEP's Bureau of Emergency Response (BER), whose employees act as first responders and approach every spill with the intention of both mitigating its effects and assessing any injuries. The BER's efforts are supported by FWRI, the agency responsible for creating and maintaining the GIS portion of the NRDA methodology.

The design of Florida's assessment methodology is justified by the principle of "liquidated damages," a legal foundation that could easily be relied upon by policymakers looking to replicate the methodology. The concept is used where the negative impacts resulting from a breach of contract are considered intangible, remote, or difficult to demonstrate but are nonetheless recognized as real. In Florida's case the "contract" exists between the state, acting as the designated resource trustee, and coastal resource users, which include shippers, operators of recreational watercraft, and any other potential spill source (Plante et al. 1993). The language contained in the state's authorizing legislation (2005 Florida Statutes, ch. 376) clearly reflects the guiding principles of liquidated damages:

> The Legislature recognizes the difficulty historically encountered in calculating the value of damaged natural resources . . . In order to avoid unnecessary speculation and expenditure of limited resources to determine these values, the Legislature hereby establishes a schedule for compensation for damage to the state's natural resources and the quality of said resources.

The articulation of consequences in advance of a breach of contract is critical to the success of this approach (Plante et al. 1993). It is also beneficial within the environmental regulatory context because regulators expect that it provides a deterrent to potential polluters (Eggleston 1997).

The Formula

To calculate injuries resulting from spills of a large number of substances (mostly oils), Florida's NRDA formula requires data related to the volume and type of pollutant spilled, the location of the incident, and the habitats and species impacted (Box 1). How and when to use the formula are spelled out in an internal guidance document (which the people I interviewed jokingly referred to as "NRDA for Dummies"), as well as in an interdepartmental memo dated April 10, 1992. Recognizing the considerable variability in the types and severities of injuries that can result from spills, Florida environmental agency staff created a relative ranking of impact values. Among the factors considered

in the ranking process were receptors' sensitivity to injury and potential for natural recovery, typical costs of restoration, and the types and degrees of habitat utilization.

A base rate of $1.00 per gallon is applied in determining damages, irrespective of any observed impacts. The volume released is then multiplied by a "location factor," the magnitude of which represents the likely severity of resulting injuries. "Inshore" locations, for example, are defined as state waters up to one mile (1.6 km) from the shoreline. This area is typically the most ecologically productive and least able to dilute or otherwise attenuate oil through either mixing or dispersal. Inshore locations are therefore subject to the highest multiplier (8). "Nearshore" refers to the region between one and three miles (1.6–4.8 km) from land, an area which typically hosts migratory species, and within which spilled oil may be dispersed to a somewhat greater degree than in the inshore regions. A multiplier of five is applied to nearshore spills. Finally, "offshore" describes waters more than three miles (4.8 km) from land. It is usually characterized by the greatest ocean depths; currents facilitate the dispersal and mitigation of oil pollution. For these reasons, offshore releases are assigned the base multiplier (one) (Plante et al. 1993).

To complete the first portion of the damage calculation, the pollutant-specific base rate is multiplied by the volume released, location factor, and finally, an indicator of whether the spill occurred within a state-designated Special Management Area (SMA). Similar to the location factor, SMA status is ascribed to areas thought to provide particularly valuable resource services. State and national parks and protected marine areas have this status, which results in a doubling of the assessment total.

The additive dollar amount for impacted habitat calculates the dollar value of injuries to various habitat types using a per unit (linear or square foot) charge and is also multiplied by SMA status. This amount is added to the value derived in the preceding calculation. The total arrived at in these two steps is then multiplied by a "pollutant characteristics" factor (either one, four, or eight), where increasing values are ascribed to heavier, more injurious substances.

Finally, the total is augmented to reflect impacts to endangered and threatened species, which are valued at $10,000 and $5,000 per animal respectively. Any administrative costs, such as those incurred while responding to a release or conducting the assessment or remediation, are also included in the damage total. These costs are calculated per person on an hourly basis.

While a verbal description of the formula is helpful, an example calculation can do much to clarify its application. Let's consider a 100 gallon spill of bunker oil in a nearshore area. The incident is within an SMA, results in the deaths of two endangered birds and the oiling of 200 square feet of coral reef, and requires the dedication of three DEP staff for 10 hours each at $25.00 per hour. According to "NRDA for Dummies," the multiplier for bunker oil is 8, and the additive dollar amount for impacted reef habitat is $10.00 per square foot. The total damages owed, therefore, would be calculated as [($1 × 100 × 8 × 2) + (($10 × 200) × 2)] × 8 + $20,000 + $750, yielding a total damage amount of $65,550. If that same release had not impacted an endangered species, had occurred in a non-SMA, or had consisted of diesel fuel instead of bunker oil, the resulting liabilities would have been $45,550, $43,150, or $26,350, respectively.

The minimum assessment is $50.00, the amount owed for any release of diesel or gasoline totaling less than 25 gallons. Domenic Letobarone, Emergency Response Specialist and Regional NRDA Coordinator, explained that this volume was selected as a cut-off because it was the amount held by the standard size automobile gas tank at the time the legislation was passed. As originally written, the applicability of the formula was clearly defined: it was to be used in all instances for releases less than 30,000 gallons. For spills in excess of that amount, a case-specific assessment was required. A recent amendment did away with these restrictions, however, giving responsible parties the freedom

Box 1. The formula used by Florida regulators to calculate natural resource damage amounts resulting from coastal spills.

Florida Department of Environmental Protection
Damage Assessment Formula

[(B × V × L × SMA) + (A × SMA)] × PC + ETS + AC = Damages

B = Base rate ($1.00)
V = Volume (gallons)
L = Location factor (8 = inshore; 5 = nearshore; 1 = offshore)
SMA = Special Management Area (2 = yes; 1 = no)
A = Additive dollar amount for impacted habitat (ranges from $10.00 to $0.05 per square or linear foot depending on habitat type)
PC = Type of pollutant/characteristic (8 = heavy oils; 4 = midweight oils; 1 = light oils)
ETS = Endangered/threatened species ($10,000 and $5,000, respectively)
AC = Administrative costs (charged hourly, based on wage)

to decide whether to use the formula, or conduct a case-specific NRDA for any size spill.

Florida Marine Spill Analysis System (FMSAS)

First developed by the Environmental Systems Research Institute at a cost of some $250,000, FMSAS is the GIS component of the state's damage assessment methodology and includes a series of specialized tools designed to assist the Bureau of Emergency Response throughout the NRDA process. The system consists of 12 data layers based upon Environmental Sensitivity Index data, but which are continually revised by Florida regulators as more accurate information becomes available. Richard Knudsen, Assistant Research Scientist and GIS specialist at Florida's Fish and Wildlife Research Institute demonstrated its operation to me.

Once a spill is reported, the first step is to locate it within the GIS. This can be accomplished using latitude and longitude coordinates or place names. The system's gazetteer facilitates the second type of operation using the U.S. Geological Survey's Geographic Names Information System. Knudsen described how the BER might use the tool after receiving notification of a release through the State Warning Point:

> If we get information about a spill, all the reporting organization has to tell us is, "It's two miles south of Lighthouse Point." We can first locate Lighthouse Point . . . and then zoom to a fixed radius around that location. From there, we can locate any other point by a bearing and a distance, which is very often how we're given information. Very rarely are we given an exact latitude and longitude.

When asked how FMSAS relates to NRDA calculations, Knudsen explained that the Complex Event Analysis Tool is the core of the numerical NRDA. To use the GIS, spill data is put into the model, either by drawing a polygon delimiting the extent of the impacts, or by entering overflight readings. For large releases, GPS is used to delineate the areas impacted. Additional spill-specific data, such as trajectory modeling, can also be entered. Knudsen described the process:

> There's a lot of different ways that I can pull that information in, but the basic function is that once I have that polygon . . . I can run a "Resource at Risk Analysis." The program is going to take that polygon and use it like a cookie cutter to drill down through all the GIS data layers that I have loaded in. For linear features it will indicate exactly how many feet, meters, miles, etc., have been affected by that polygon, and for polygon features, it's going to tell me the area affected. In Florida, those numbers are plugged into the formula to generate the damage assessment.

In addition to supporting NRDA, the Complex Event Analysis Tool allows FMSAS users to organize effective response operations on the ground. "On the Fly Resource at Risk Reports," which rely on the same "cookie cutter" approach used to calculate NRDA, contain information about the types and quantities of species that could be impacted by a spill. Maps depicting this information can be distributed to responders at the scene, allowing them to tailor their actions to minimize injuries.

FMSAS and the formula appear suited to "arm chair" application; however, spill impacts are typically verified through on-scene investigation, especially for large or particularly injurious releases. Similarly, local knowledge is frequently relied upon to validate data related to habitat and species locations and abundances. Knudsen explained:

> Around the Port Everglades Area, there's a group that actually goes out and GPS locates the turtle nesting beaches and the turtle nests themselves. These people can either provide us electronic data, or they can sit here and point to a map and say, "Well, we know that turtles are here, here, here, and here." We can drop those points on the map, and then have a map to hand out to responders.

Emergency responders are also instrumental in ensuring that the formula and FMSAS are correctly applied. The DEP's Emergency Response Manager Chris Rossbach stated: "We always want to ground truth it; we always want to be out there to see the impacts to oyster reefs, mangroves, salt marshes, and things like that." When asked how closely he would rely on the GIS in assessing impacts, Rossbach explained that there is very seldom 100% coverage of marine habitats by oil or other spilled substances. Rossbach explained that partial coverage or contamination levels are handled within the formula: "You take the total linear feet and then apply your coverage percentage. So, if it's 100 feet and it looks like it's about 50% coverage you would call it 50 feet and proceed with the calculation."

The Florida Coastal Protection Trust Fund

Once damages are calculated and submitted to the responsible party for payment, the recovered funds are deposited into the Florida Coastal Protection Trust Fund, a non-interest-bearing account that also receives non-NRDA-generated dollars. The first three statutorily defined uses of the fund are directly related to restoration and clearly state a preference for projects designed to reinstate the functioning of resources impacted by spills. The remaining seven uses are more diverse and include developing and updating the "Sensitivity of Coastal

Environments and Wildlife to Spilled Oil in Florida" atlas and expanding or enhancing the state's pollution prevention and control education program. Distribution decisions are made by the state legislature with no particular required prioritization for outcomes. This flexibility represents a departure from the federal approach, where damages must be used to fund restoration projects.

In FY 2000–2001, 27 ecological restoration projects were paid for using Trust Fund money generated through applications of the formula. Projects included a large-scale study of the fate and effects of oil in the marine environment and the creation of an artificial reef using oyster shells. Funding was also distributed to the nonprofit group "Save Our Seabirds," to design and produce informational signs related to fishing and the safe handling of accidentally hooked wild birds (Figure 1).

When asked why Florida has not accessed the fund to pay for restorations since 2001, interviewees noted that a legislative appropriation would be necessary to access the money and that a request for such a disbursement has not been forthcoming. Regulators' reluctance to seek restoration dollars is due in part to the fact that the balance of the fund has remained below $1 million (an unofficial benchmark used by the Chief of BER, Phil Wieczynski), and to fears that once awareness of the money has been raised, it could conceivably be diverted to cover non-restoration-related expenditures. Wieczynski also explained how increased demands on BER further discourage restoration efforts:

> It's very time-consuming to develop and process projects, and since September 11th our Bureau has had a lot of other missions. We end up doing a lot more than we did in 1999–2000 when we were focusing more on spill response and the coastal side. We've also had an increase in our missions to include supporting criminal environmental investigations. I don't have the resources now to dedicate to restoration.

Sign produced by "Save Our Seabirds" serves its purpose at a fish cleaning table at Fort Desoto Park, Florida. Photo by Josephine Faass

Weaknesses of Florida's Approach to NRDA

Despite these benefits and strengths, Florida's approach to NRDA is not a regulatory panacea. The formula does not apply to inland spills, so there is no automatic mechanism for generating damage assessments for releases east of Highways 19 and 41 and west of U.S. 1 (the landmarks chosen to delimit coastal from interior state lands). By all accounts, NRDA is rarely conducted for inland releases.

The methodology's ability to calculate values for ecological injuries but not for human-use and nonuse resource injuries means that only a portion of potential damages is recovered for any given spill. Phil Wieczynski, who was not with the DEP at the time of the formula's design, speculated that this omission may have been intentional, as provisions in other laws provide some mechanism for the recovery of compensation for impacts such as beach closures. Also, the formula is not designed to take into account the cleanup technology used, despite the fact that it can impact the resource injuries as well as the speed and degree of recovery possible. The FWRI's Director George Henderson described Florida's omission of this consideration as an important difference between state and federal assessments:

> If you were doing a natural resource damage assessment and restoration plan according to the NOAA models, the planning could and would be different, if you had somebody stomping through and wiping down the mangroves, creating muddy paths, and changing the hydrology in the area. Or in a salt marsh; if you go in there and burn the salt marsh it's one thing, but if you go in there and try to flush the oil out it's something else. You can potentially be dealing with different kinds of damage to the resources, but the way the formula's set up, it says: X number of gallons of oil, X number of linear feet of mangrove or salt marsh . . . times the type of oil, and you're done . . . It's irrespective of what kinds of cleanup technologies were employed. That's one of the real criticisms, because in the real world, it definitely does make a difference.

Another limitation stems from the fact that the formula itself is codified in law. While this affords regulators a good deal of security because values are not up for debate, the amounts are forever static; no provision was included to allow for adjustments in response to changing remediation technologies or inflation. Legislative action would be required to facilitate corrections of this kind, and the general sentiment appears to be that revisiting the issue now could result in the weakening or discontinuation of the methodology.

Also, somewhat surprisingly, documentation of the origins of the resource values contained within the formula are not available. Injuries to a square foot of coral reef, for example, are worth $10.00, while the oiling of the same area of beach will cost the responsible party just 50 cents. According to interviewees, the dollar values are not arbitrary, but were derived using quantitative estimates and actual restoration costs. Henderson explained, for example, that the value assigned to beach injuries represents the cost incurred by the U.S. Army Corps of Engineers to conduct beach restoration at the time the statute was passed.

An article published in the proceedings of the 1993 Oil Conference includes a detailed description of the steps used to derive the $1.00 per square foot value ascribed to mangrove forests (Plante et al. 1993). Measures taken into account included the cost per mangrove seedling and the additional acreage which must be planted to compensate for the relatively higher productivity of established forests compared to newly created ones. Despite indications that the resource values are based upon actual replacement costs, however, in the absence of full documentation it is impossible to verify the accuracy or legitimacy of the methodology used to derive them.

The damage amounts associated with impacts to threatened and endangered species were described by those I interviewed as the closest thing to an "arbitrary" value included in the formula. That the Florida Legislature recognizes this arbitrariness is revealed in the legislation's authorizing statement: "These amounts are not intended to reflect the actual value of said endangered or threatened species, but are included for the purposes of this section." George Henderson described why no more definitive numbers were included:

> With threatened and endangered species it's actually very difficult to determine a value from the federal lexicon because you're not allowed to value endangered species in monetary terms. The state doesn't have that prohibition; they did assign a monetary value for impacts to threatened and endangered species. That number, it is safe to say, is rather arbitrary because it's difficult to come up with good restoration plans for these animals. One of the reasons they're threatened and endangered in the first place is because the management actions generally aren't working very well.

Henderson also explained that the monetary values in the formula are designed to be high enough to support restoration. "The formula is not a fine; it's not in any way a punitive assessment. It is designed to help restore the resources back to a state similar to what was impacted." To date, the formula has not been used for an endangered or threatened species harmed by an oil spill, so it is not yet known whether the state-assigned values would be challenged by responsible parties seeking lower amounts or by environmental groups arguing for higher dollar values.

Another controversial element of the formula is that it calculates damages for oil releases to the water column irrespective of observed injuries. This practice is intended to account for damages that occur as a result of the pollutant entering the marine environment, but which do not produce visible oiling (Ando and Polasub 2006). The base rate for a spill is $1.00 per gallon, an amount Henderson explained had been derived from an extrapolation of the total value of Florida's fisheries in 1989.

Chris Rossbach noted that academics are not the only ones who raise questions about this aspect of the assessment. He described one responsible party's recent allegation that because they cleaned up immediately they should not have had to pay a damage assessment. Rossbach dismissed this argument, explaining that polluters do get credit for doing a good cleanup by eliminating shoreline impacts.

Finally, there is currently no mechanism for sharing data between users of FMSAS. If one regulator documents a spill within the GIS, others do not have remote access to it. All spill parameters can be saved within a single file, but this is not an automatic component of the system and does not facilitate real-time data sharing. This appears to be an artifact of the division of authority between the DEP and FWRI, however, and plans to move toward a partially Web-based interface may address this shortcoming.

Strengths of Florida's Approach to NRDA

Despite its shortcomings, there is considerable evidence that Florida's formula and supporting GIS serve regulators quite well. Perhaps most importantly, the valuations produced using the methodology appear to be similar to those calculated using approaches such as CV and HEA. Evidence of this similarity was found in 2001, when the state submitted a claim for reimbursement from the U.S. Coast Guard Oil Spill Liability Trust Fund for compensation stemming from a series of 21 historic spills. Because Florida could not justify each of the values contained in its formula, regulators were required to recalculate damage amounts using traditional, case-specific techniques in order to

submit the claim. Phil Wiesinski was in charge of reevaluating spill damages:

> We tried running some comparisons of our state claims for the 21 spills, where we actually had to go through the assessment and development of a restoration plan and come up with a suite of projects. I went back and estimated how much those spills would have generated using the formula. In some cases the formula was a little higher or lower, but overall it was a little higher. That was 11 years after the statute was passed, and the formula was still fairly conservative in terms of the damages.

The formula's long history of successful application provides further proof of its value as a regulatory tool. The underlying methodology has undergone only a single revision since its 1991 release, and according to state regulators its assessments have never been successfully challenged in a court of law, unlike many damage assessments conducted under federal laws (Austin 1994, Jones 1997). Wiesinski cited Florida's cooperative relationship with industry as a likely explanation.

> I think that the reason it hasn't been challenged is that industry had a hand in developing it. They realized that the state was going to do something, and they figured that they had better be plugged in. They knew they had to do something, and I think they came up with a pretty good model, which after 18 years is still in place and still pretty realistic in terms of dollar figures.

Conclusion

Florida's approach to NRDA has stood the test of time and allows regulators to quickly and consistently value resource injuries caused by coastal oil spills. Equipped with a simplified assessment formula, a specialized GIS, and a fund designed to pool damage settlements, regulators in this state are among the few who consistently seek this kind of compensation and are able to do so without the burden of costly, time-consuming legal challenges.

While clearly not perfect, Florida's methodology could serve as a valuable model for policymakers in states interested in making NRDA a regular practice within their jurisdictions. In order to aid those interested in learning from Florida's experiences, Table 1 highlights the major findings presented throughout the case study. A number of elements, such as the use of first responders to assess damages, the inclusion of the regulated community in the formula's design, and the pooling of resource damages, have proven important to the state's success. Amendments to create a more defensible methodology include making certain that all values in any newly devised formula are well documented, as well as providing a mechanism to adjust for inflation. In addition, funds generated through damage assessments should be directly accessible by program staff, and their use restricted to restoration activities.

References

Ando, A.W. and M. Khanna. 2004. Natural resource damage assessment methods: Lessons in simplicity from state trustees. *Contemporary Economic Policy* 22:504.

Ando, A.W. and W. Polasub. 2006. Envelope backs or the gold standard? Choosing the accuracy of assessment methods. *Land Economics* 82:424–444.

Austin, S.A. 1994. Recent development: The National Oceanic and Atmospheric Administration's proposed rules for natural resource damage assessments under the Oil Pollution Control Act. *Harvard Environmental Law Review* 18.2:549–62.

Carson, R.T., N.E. Flores and N.F. Meade. 2001. Contingent valuation: Controversies and evidence. *Environmental and Resource Economics* 19:173–210.

Dunford, R.W., T.C. Finn and W.H. Desvousges. 2004. The use of habitat equivalency analysis in natural resource damage assessments. *Ecological Economics* 48:49.

Eggleston, B. 1997. *Liquidated Damages in Construction Contracts*, 2nd ed. Oxford UK: Blackwell Publishing.

Fonseca, M.S., B.E. Julius and W.J. Kenworthy. 2000. Integrating biology and economics in seagrass restoration: How much is enough and why? *Ecological Engineering* 15:227.

Helton, D. and T. Penn. 1999. Putting response and natural resource damage costs in perspective. Paper presented at the 1999 International Oil Spill Conference, Seattle WA, March 8–11. www.iosc.org/papers/01767.pdf

Jones, C.A. 1997. Use of non-market valuation methods in the courtroom: Recent affirmative precedents in natural resource damage assessments. *Water Resources Update* 109:10–18.

Lee, V.A. and P.J. Bridgen. 2002. *The Natural Resource Damage Assessment Deskbook: A Legal and Technical Analysis.* Washington DC: Environmental Law Institute.

Plante, K.J., E.L. Barnett, D.J. Preble and L.M. Price. 1993. Florida's pollutant discharge natural resource damage assessment compensation schedule: A rational approach to the recovery of natural resource damages. Paper presented at the 1993 International Oil Spill Conference, Tampa FL, March 29–April 1.

Josephine Faass is a Research Associate at the Center for Transportation Safety, Security and Risk at the Edward J. Bloustein School of Planning and Public Policy at Rutgers, The State University of New Jersey, 33 Livingston Avenue, New Brunswick, NJ 08901, 732/932-4101 x566, jfaass@rci.rutgers.edu.
