May 2010; revised June 2010

BACKGROUNDER

A Taxonomy of Oil Spill Costs

What are the Likely Costs of the Deepwater Horizon *Spill?*

Mark A. Cohen

1616 P St. NW
Washington, DC 20036
202-328-5000 www.rff.org

A Taxonomy of Oil Spill Costs—What are the Likely Costs of the *Deepwater Horizon* Spill?

Mark A.Cohen*

While we will never know the true costs of the *Deepwater Horizon* oil spill, past experience in assessing these kinds of damages provides both a framework for assessing the nature of damages as well as information on the potential magnitude of costs. From society's perspective, the cost of an oil spill consists of both "private" costs to the oil rig operator(s) and "external" or third-party costs to the government, victims, and natural resources. While many of these external costs will ultimately be borne by the legally responsible parties (subject to any liability caps), it is useful to start from this categorization:

Private Costs

- Damage to the oil rig and related equipment
- Containment costs to stop or reduce further oil spillage (e.g., efforts to cap wells, booms, dispersants, controlled burning)
- Cleanup costs incurred by responsible parties
- Lost oil
- Cost of litigation (including punitive damages or other penalties not directly related to above)

External Costs

- Loss of life and injury to workers
- Containment costs to stop or reduce further oil spillage (e.g., booms, dispersants, controlled burning)
- Cleanup costs incurred by government agencies

* Mark A. Cohen is vice president for research and senior fellow at Resources for the Future; cohen@rff.org. He also serves as a professor of management and law at Vanderbilt University.

- Cost of repairing public infrastructure
- Lost income by affected businesses (e.g., fisheries, tourism business)
- Lost consumer value from shifting purchases and/or behavior
- Natural resource damages
- Cost of litigation (both to government and victims)

What are the "Social Costs" of an Oil Spill?

From society's standpoint, all of the external costs of oil spills are social costs. They represent real resources that could have been used elsewhere to produce a social benefit. In addition, all of the private costs of an oil spill, except fines and punitive damages, are social costs as well. Fines and punitive damages—unless they are designed to compensate for other third-party losses—are simply transfers of wealth from one party (firms) to another (government). They may serve an important deterrent or punishment function, but they are not "social costs." Note that some law and economics scholars have argued that punitive damages (or treble damages that are ingrained in many statutes) may play the role of the "detection multiplier" in an optimal penalty. See Cohen, "Deterring Oil Spills—Who Should Pay and How Much?"

While every oil spill has the potential to impose these costs, some spills will have no costs in one or more categories—and the magnitude of the costs that do occur can vary widely. Many factors will affect the ultimate cost of a spill, including the type of oil, weather patterns at the time of the spill, and the proximity to industry, tourism, recreation, and environmentally sensitive areas. Because oil tends to disperse in water, very small spills are likely to have negligible costs. Most small spills can be contained easily or will disperse on their own, and cause little harm. Many large spills also have relatively little or no impact when they do not reach sensitive shores.

The average oil spill in the United States costs approximately $16 per gallon in cleanup and damages.[1] Adding the current price of oil (approximately $75 to $80 per barrel, or $2/gallon) brings total costs to approximately $18 per gallon, excluding litigation costs. However, the variation in this estimate is enormous.

For example, the Exxon *Valdez* —a spill of approximately 10.8 million gallons in Alaska in 1989—cost over $630 per gallon, according to my estimates (see the appendix). In contrast to the *Valdez*, the largest accidental spill ever recorded was the Pemex *Ixtoc I* oil rig off the Gulf Coast of Mexico that occurred between June 1979 and March 1980, a spill10-12 times the size of the *Valdez*. The total cleanup and damage costs associated with the *Ixtoc I* are estimated to have been less than $7 per gallon.[2]

As this is being written, the Deepwater Horizon spill has already affected tourism and fishing, but only time will tell whether or not the total damages will be as high as the Exxon *Valdez*. However, it has certainly passed the costs of the *Ixtoc I*, as cleanup costs alone have already been reported as high as $2 billion. To date (June 21, 2010), an estimated 90 to 150 million gallons of oil has already been spilled, and if the rate of oil spillage is unabated through August 2010, it could go as high as 150 to 200 million gallons. If the average social cost of the Deepwater Horizon approached that of the Exxon *Valdez*, the total social cost could easily exceed $60 billion to $90 billion, based on the amount spilled to date, or even higher if the spill continues through August 2010.

---

[1] According to Cohen (1986: Table 10), the average cost of cleanup was $3.42 in 1981 dollars, and the average cost of environmental damages was $3.00. Updating to 2010 dollars by the consumer price index (approximately 2.5 times 1981 dollars), yields an estimate of $16 per gallon.

[2] See Restrepo (1982), who estimated total losses to the tourism and recreation industry of $7.0 to $7.5 million, over $70 million for the cost of cleanup, $465 million for the value of lost oil, and outstanding damage claims of about $400 million.

Appendix: Estimating the Total cost of the Exxon *Valdez* Oil Spill

It is important to distinguish between the "social cost" of the Exxon *Valdez* oil spill, and the total cost paid by Exxon (or its insurers). According to court documents,[3] Exxon paid the following:

- Cleanup costs $2.1 billion
- Criminal fine of $25 million, plus $100 million restitution
- Civil/criminal settlement to the United States and Alaska of "at least $900 million" and as much as $1 billion (with the remaining $100 million being held in limbo pending future natural resource damages not known at the time of the spill).
- Economic damages paid to private parties of approximately $500 - $600 million
- Punitive damages of $500 million

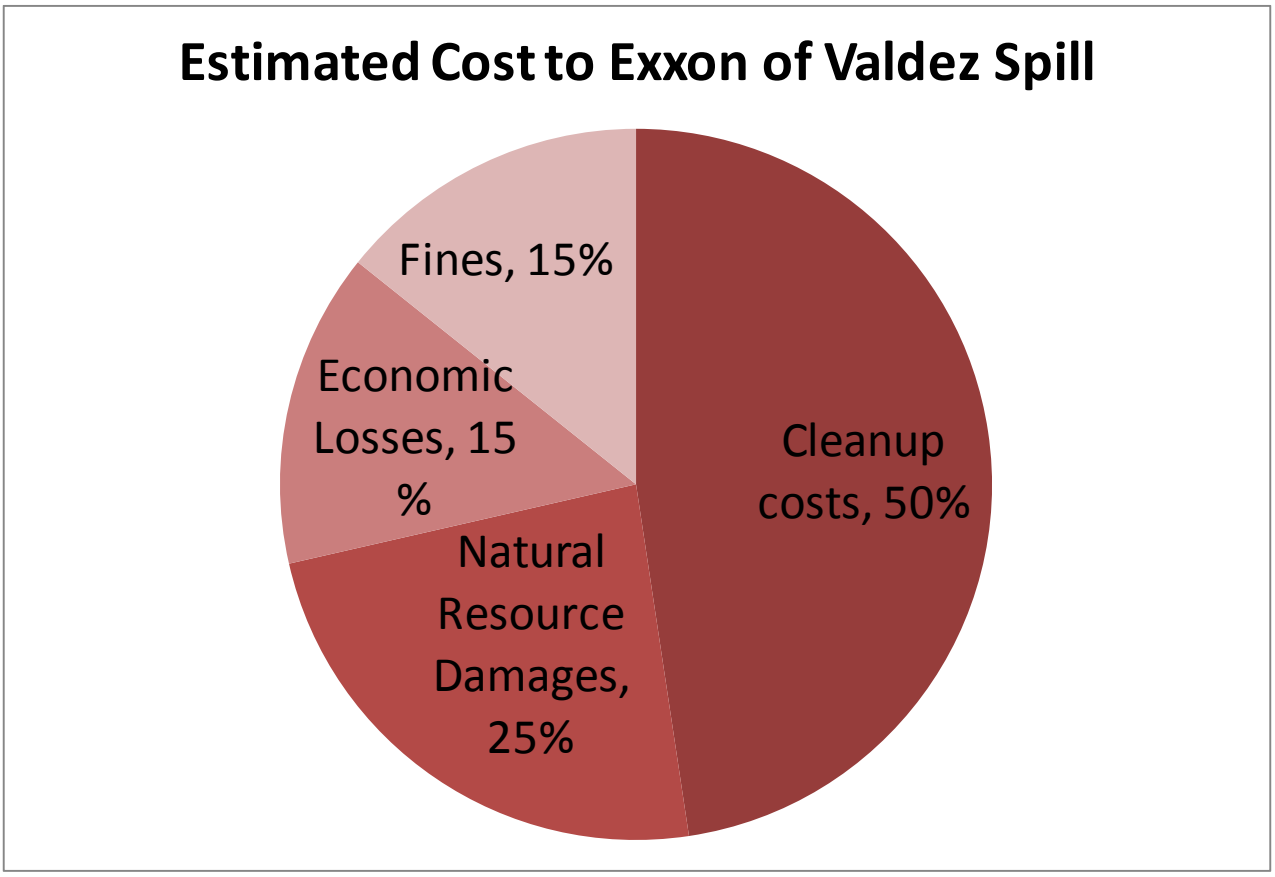
Thus, ignoring punitive damages, the social costs are approximately $3.7 to $3.8 billion. In 2010 dollars, this is about $6.8 billion—or $630 per gallon of oil spilled. This ignores the cost of the oil, litigation costs to Exxon, punitive damages, etc.

However, the actual natural resource damages might have been considerably higher than the $1 billion that Exxon ultimately paid. A contingent valuation study conducted around the time of the spill estimated that the lower-bound estimate of the public's willingness to pay to avoid the loss of wildlife from the *Valdez* spill was $2.8 billion—far in excess of the $1 billion paid in natural resource damages.

As shown in the charts below, about 50 percent of the estimated cost to Exxon was for cleanup, whereas 25 percent was paid for natural resource damages (through the $1 billion settlement), 15 percent in other court-imposed penalties, and 10 percent in economic damages. These figures are approximate, and based on the amount actually paid (although some of the economic damage claims were confidential and thus are likely under-estimated here). In contrast, if we assume actual natural resource damages were $2.8 million, then about 50 percent

[3] *Exxon Shipping Co., et al. v. Baker et al.*, Available at: http://laws.findlaw.com/us/000/07-219.html. In addition, see Bradley M. Marten, "The Relevance (And Irrelevance) of the Exxon Valdez Oil Tanker Spill to the Deepwater Horizon Oil Rig Spill," Litigation Blog www.lexisnexis.com/Community/LitigationResourceCenter/blogs/litigationblog/.

of the *social* costs of the Exxon *Valdez* spill were natural resource damages, 40 percent cleanup costs, and 10 percent economic losses.



References

Carson, Richard T., Robert C. Mitchell, Michael Hanemann, Raymond J. Kopp, Stanley Presser, and Paul A. Ruud. 2003. Contingent Valuation and Lost Passive Use: Damages from the Exxon Valdez Oil Spill. *Environmental and Resource Economics* 25: 257–286.

Cohen, Mark A. 1986. The Costs and Benefits of Oil Spill Prevention and Enforcement. *Journal of Environmental Economics and Management* 13: 167–188.

Cohen, Mark A. 2010. Deterring Oil Spills: Who Should Pay and How Much? RFF Backgrounder. Washington, DC: Resources for the Future. http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21161

Restrepo, Carlos E., et al. 1982. Ixtoc I Oil Spill Economic Impact Study: Executive Summary. http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3929.pdf