

Empirical Model to Determine Natural Resource Damage Claims per the Oil Pollution Act of 1990

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Abstract

The Oil Pollution Act of 1990 (OPA 1990) is a comprehensive law regulating oil spills in U.S. waters. OPA 1990 established strict liability for oil spill damages, replacing the limited liability rule in previous laws. OPA 1990 allows damages for natural resources, the focus of this research. Federal regulations define two natural resource damage assessment methods – Type A computer models, and Type B scientifically rigorous studies. The regulations limit Type A methods to resource damages up to \$100,000, regardless of the model results. At this threshold, Trustees need to either: 1) limit claims to the threshold, 2) advance a claim using Type B methods, or 3) not pursue a claim. This creates a class of spills for which no claims are sought, and that class is defined by the threshold at the lower limit with an undefined upper limit established by damages equaling Type B assessment costs, the dollar limit at which it becomes cost efficient to advance a claim. Those three options yield economically inefficient outcomes via uncompensated externalities. My research hypothesis is that an empirically derived simplified natural resource damage assessment model adequately values damages above the current regulatory limit.

Statistical analyses of closed NOAA natural resource damage cases in coastal environments (N=53) were conducted to test my hypothesis. The multiple regression model showed a high correlation (r=0.901) and robust explanatory power (r²=0.828) of the dependent variable, ln damage claim, by the ln of five explanatory variables: gallons spilled, miles of shoreline oiled, human use compensation, protected natural resources harmed, and region (N=20, F=13.471, d.f. 1=5, d.f. 2= 14, p<0.001). This finding shows that this multiple regression model explains approximately 83% of the settled claim value, from a dataset with a median damage claim of \$3,304,166. This regression analysis documents that simplified methods can adequately determine claim values above the regulatory threshold.

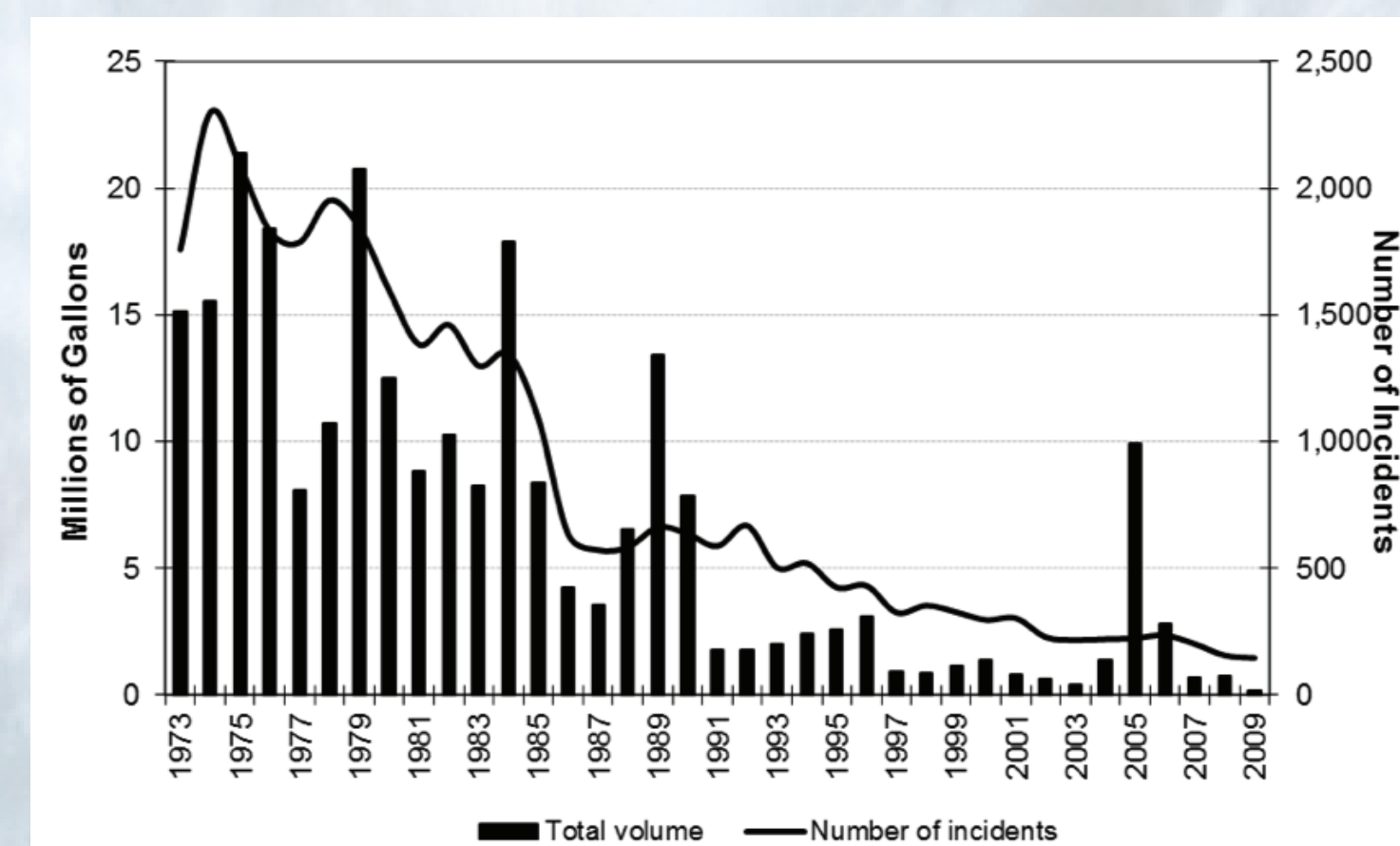


1. Spills greater than 1,000 gallons
Source: U.S.C.G. 2011

I recommend raising the Type B threshold to \$2.3 million, which correlates to fifty thousand gallons based on a median damage claim of \$47/gallon of spilled oil. Raising the threshold would increase the number of natural damage claims using Type A assessments and advance the OPA 1990 goal by: more efficiently internalizing oil spill externalities, reducing spills ex ante through increased precautionary investment, and increasing the deterrence value of the law; and concurrently provide funds to Trustees to fund coastal restoration projects.

Background

- Oil Pollution Act of 1990 passed after 1989 Exxon Valdez oil spill in Prince William Sound, AK
- Oil Pollution Act of 1990 utilizes *ex ante* regulation and *ex post* measures to prevent pollution and prosecute clean-up spills
- OPA 1990 based on Polluter Pays Principle:
 - Liability
 - Deterrence
 - Internalize externalities



Source: USCG, 2011. *Polluting Incidents In and Around U.S. Waters A Spill/Release Compendium: 1969-2009*. Washington, D.C.

Effect of OPA 1990

Summary of U.S. Coastal Oil Spills Pre- and Post-OPA 1990

	Pre-OPA 1990 (1973-1989)		Post-OPA 1990 (1990-2009)	
	Total	Annual Average	Total	Annual Average
Number of Spills ¹	7,376	434	1,750	88
Volume Spilled (Gallons) ¹	197,646,142	11,626,244	41,357,776	2,068,889

Pre and Post OPA 1990 Metrics

- 1990 to 2009 NOAA pursued 57 natural resource damage settlements ~3.3% and totaling 11,508,240 gallons ~28%
- Limited number of NRD Claims per OPA 1990:
 - Not all Responsible Parties held Liability
 - Weakens Deterrence value of OPA 1990
 - Externalities not Internalized

Barriers to Full Implementation

NOAA regulations define:

- Type A assessments for small oil spills, and
- Type B assessments for large oil spills
- Type A assessments claims capped at \$100,000
- Cap, or threshold, creates a barrier to pursue claims exceeding the limit without advancing to Type B assessment methods.
- Available decisions from Type A results are:
 - Do not pursue a claim,
 - Limit claim to \$100,000, or
 - Advancing to Type B assessment



Research Hypothesis

Simplified natural resource damage model adequately determines damage claims that exceed the current limit for Type A assessments.

Method and Sources

Meta-Analysis, use regression model from closed NOAA NRD cases to predict Damage Claims Data Sources:

- <http://www.darrp.noaa.gov/index.html>
- <http://www.gc.noaa.gov/naturalres-office.html>
- http://www.cerc.usgs.gov/nrdar/NRDA_Restoration_Table.htm
- Gather data from Restoration Plans and Consent Decrees
- Statistical Analysis of NOAA Data

Findings

Multiple Regression Model (General Formula)

- DC = b₀ * v^{b1} * m^{b2} * h^{b3} * p^{b4} * r^{b5}
- v = gallons of product released
- m = miles of shoreline oiled
- h = human use compensation
- p = protected resources injured
- r = region

Empirical Regression Model

DC=2,861 * v^{0.276} * m^{0.427} * h^{1.035} * p^{1.482} * r^{-0.688}
Statistically Significant: R=0.901; R²=0.828
N=20, F=13.471, d.f. 1=5, d.f. 2= 14, p<0.001

Data Set settled claim value range and median:

- \$127,000 to \$31,620,114
- Median \$3,304,166

Recommendation

Raise cap on Type A assessments to \$2.3M

- Spills up to 50,000 gallons account for 95% of all spills by number and approximately 24% of the volume spilled.
- Based on data set median claim was \$47/gallon and yield \$2,350,000 for 50,000 gallon spill.
- The remaining 5% percent of oil spills would require Type B assessments.

Raising cap allows Trustees to focus their efforts on those few large spills each year, while concurrently recovering damages for the vast majority of spills via Type A assessments.