State of Washington
Joint Legislative Audit & Review Committee (JLARC)

Review of Oil Spill Risk and Comparison to Funding Mechanism

Report 09-2

January 7, 2009

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Audit Authority

The Joint Legislative Audit and Review Committee (JLARC) works to make state government operations more efficient and effective. The Committee is comprised of an equal number of House members and Senators, Democrats and Republicans.

JLARC's non-partisan staff auditors, under the direction of the Legislative Auditor, conduct performance audits, program evaluations, sunset reviews, and other analyses assigned by the Legislature and the Committee.

The statutory authority for JLARC, established in Chapter 44.28 RCW, requires the Legislative Auditor to ensure that JLARC studies are conducted in accordance with Generally Accepted Government Auditing Standards, as applicable to the scope of the audit. This study was conducted in accordance with those applicable standards. Those standards require auditors to plan and perform audits to obtain sufficient, appropriate evidence to provide a reasonable basis for findings and conclusions based on the audit objectives. The evidence obtained for this JLARC report provides a reasonable basis for the enclosed findings and conclusions, and any exceptions to the application of audit standards have been explicitly disclosed in the body of this report.

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Committee Approval

On January 7, 2009, this report was approved for distribution by the Joint Legislative Audit and Review Committee.

Acknowledgements

We appreciate the technical advice and assistance provided by Tom Leschine, the Director of the School of Marine Affairs at the University of Washington, in conducting this study. His suggestions on providing multiple views of risk were particularly helpful to the project.

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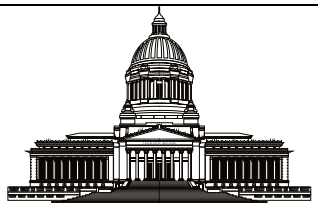

STATE OF WASHINGTON

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REPORT SUMMARY

To protect Washington's waters from oil and hazardous spills, in 2004 the Legislature established a zero spills strategy. This strategy is to be accomplished through a focus on prevention activities, complemented by preparation for spills, and actual spill clean-up (RCW 90.56.005).

In 2007, the Legislature directed the Joint Legislative Audit and Review Committee (JLARC) to investigate a number of issues related to oil spills (2SHB 1488). JLARC's assignment can be summarized into two key questions: 1) What are the sources of oil spill risk in Washington's waters, and 2) Do the sources of revenue that fund the state's oil spill prevention, preparedness, and response programs align with the sources of oil spill risk?

Oil Spills In Washington

Mention of an oil spill may invoke a memory of the *Exxon Valdez* spill of 10.9 million gallons of crude oil in Alaska. The largest spill in Washington during the timeframe for this study (1995-2007) is the 277,200-gallon pipeline spill of gasoline in Bellingham. This analysis identifies that over 90 percent of the oil spills in Washington's waters are less than 1,000 gallons. Many different types of oil are spilled, and spills come from many sources.

What Are the Sources of Oil Spill Risk?

Oil spill risk is a function of both the *probability* (likelihood) of an oil spill and the *impacts* (consequences) of that spill. There are numerous ways to assess risk. The relative risk assessment conducted for this study uses four different approaches to estimate the future of oil spill risk in Washington's waters. The analysis estimates spill impacts using formulas derived from the Department of Ecology's Washington Compensation Schedule, which is a schedule used to calculate individual spill damages. The report provides detail on the results from all four approaches.

No matter which of the four approaches is used, the ***risk results show that oil spills are likely to occur across the state from many sources in both large and small amounts*** rather than concentrated in just one source such as oil tankers.

What Are the Sources of Revenue for the State's Oil Spill Programs?

The two major sources of revenue that fund the state's oil spill programs are two dedicated taxes: the Oil Spill Administration Tax and the Oil Spill Response Tax. These two taxes are imposed on the owner of crude oil or petroleum products when the oil is first received into a storage tank at a marine terminal in Washington from a waterborne vessel or barge (RCW 82.23B.020). These two taxes are not imposed on other marine vessels, other

facilities, or vehicles that may spill oil, nor is this tax imposed if the oil enters a storage tank at a marine terminal by another transportation mode, such as by pipeline. Other revenue sources include the Hazardous Substance Tax, reimbursements, one cent of the marine use motor vehicle fuel excise tax refund, penalties, fees, fines, and natural resource damage assessment settlements.

Do the Sources of Risk and the Sources of Revenue Align?

To determine if the sources of risk are aligned with the sources of revenue that fund the state's oil spill prevention, preparedness, and response programs, JLARC compared the sources of revenue and the sources of risk to determine if there is a *direct* connection between the two. The risk sources are based on the transportation mode or activity involved with the movement or use of oil, such as a pipeline, a tank barge, or a manufacturing facility. The major revenue sources are based on the taxable event of the ownership of the oil at the time the oil is first received into a storage tank at a marine terminal from a waterborne vessel or barge. ***The sources of revenue and the sources of risk are not directly aligned***. It is possible that there are *relationships* between risk and revenue; for example, the owner of the oil *may* own the facility that is a source of risk. However, any such relationships are coincidental and do not result from an alignment of the sources of revenue and the sources of risk.

Tax Theory, Tax Law, and How Other Coastal States Fund Their Oil Spill Programs

Having determined that the sources of oil spill risk do not align with the sources of revenue, JLARC looked at three issues regarding alternative funding methods: tax theory regarding the attributes of a high quality tax structure, the impacts of Washington tax law on alternatives, and what other coastal states do to provide dedicated funding for oil spill activities.

Tax theory points to the need for balance and equity along with ease of administering taxes. Tax law illustrates the need to pay careful attention to interstate commerce issues. The practices of other states show that while not necessarily aligned with risk, there are other ways of funding oil spill activities. For instance, Oregon taxes each vessel trip. New Hampshire includes pipelines in the tax base. Delaware has a wholesale gross receipts tax paid on the sale of most petroleum products.

Alternative Funding Approaches

Ultimately it is up to the Legislature to choose whether or not revenue sources should be directly aligned with risk sources and to choose the criteria for a revenue structure. In making that decision, if the Legislature is interested in creating a *risk-based* revenue structure there are a number of practical issues to consider. Such an effort would need to include:

- A broad-based approach that includes alignment of revenue collection with the transportation modes and activities associated with oil spill risk;
- A data system designed specifically for the purposes of risk assessment;
- Selection of a specific approach for assessing risk; and
- Incorporation of the fact that risk changes over time.

REPORT OVERVIEW AND BACKGROUND

Report Overview

JLARC was asked to answer a number of questions related to the sources of oil spill risk to Washington waters and the revenues for oil spill programs in Washington State. The two principal questions are: 1) What are the sources of oil spill risk, and 2) Do the sources of revenue that fund the state's oil spill prevention, preparedness, and response programs align with the sources of oil spill risk? The risk assessment in this report shows that oil spills are likely to occur across the state from many sources in both large and small amounts. JLARC's comparison of the risk and revenue structures concludes that *the sources of revenue do not align with the sources of risk*.

To help understand how JLARC arrived at this conclusion, the report's detail is divided into three topic areas:

- What are the sources of oil spill risk to Washington's waters?
- What are the sources of revenue that are used to fund the state's oil spill prevention, preparedness, and response programs?
- Do the sources of risk align with the sources of revenue?

The report also provides information on tax theory, tax law, and how other coastal states fund their oil spill programs. A glossary of terms begins on page 35 of the report. Appendices to the report include additional details on oil spill issues.

To provide a context for these later discussions, the remainder of this introductory chapter includes additional information on the impacts of oil spills, briefly describes the state's oil spill policy and programs, and explains how the state's role fits into the overall oil spill regulatory framework.

Background

Impacts of Oil Spills

No oil spill is entirely harmless. Major spills have obvious impacts, such as dead or oiled seabirds and marine mammals. After almost 20 years, impacts of the 10.9-million gallon 1989 *Exxon Valdez* spill in Alaska continue to be mitigated and litigated. The largest oil spill since 1995 into Washington waters was a 277,200-gallon gasoline pipeline spill, but even much smaller spills can result in significant natural resource damage, such as killing marine organisms, stunting their development, reducing reproduction, or damaging shorelines.

While not expressly included in the risk assessment for this study, we note that there are also human and economic impacts associated with oil spills. The pipeline spill in June 1999 in Bellingham killed three people. Costs associated with the SS Catala shipwreck clean up at Damon Point State Park from July 2006 through October 2007 (removal of oil from the hull and sand) are $6.9 million.

Oil Spill Regulatory Relationships: International, Federal, State, Local Governments, and Tribes

In response to an awareness of oil spill impacts to areas such as aquatic environments, surrounding shoreline habitats, and economic resources, the international community, the federal government, individual states, local governments, and tribes are involved in prevention, preparedness, and response activities.

While relationships tend to be hierarchical, there is an opportunity for an active state role. For example, the federal government works in conjunction with the state for many prevention, preparedness, and response activities while maintaining distinct regulatory responsibilities.

The regulatory relationship between the international community, the federal government, Washington, local governments, and tribes is displayed in Exhibit 1 on the following page. Appendix 3 provides detail on the regulatory activities of the state.

Exhibit 1 – Regulatory Relationships

Government Participants	Role and Legal Framework
International	
International Maritime Organization (IMO)	International conventions (treaties developed by the IMO and signed by individual Governments) cover many aspects of shipping, including maritime safety and prevention of marine pollution.
Federal	
Two Primary Federal Entities: United States Coast Guard and Environmental Protection Agency Other Federal Entities: National Oceanic and Atmospheric Administration, United States Fish and Wildlife Service, and Department of Transportation	As a member of the IMO, the United States government is cognizant of developing regulations and laws that are compatible with formally adopted and accepted international conventions. Federal Legislation protects the navigable waters and adjacent shore areas and prevents pollution of the marine environment from accidental or intentional discharges. The Oil Pollution Act of 1990 (OPA 90) addressed problems associated with preventing, responding to, and paying for oil pollution incidents in navigable waters of the U.S. caused by vessels and facilities. OPA 90 created a comprehensive federal program that increased federal oversight of maritime oil transportation, added new environmental safeguards, and increased penalties and enforcement. OPA 90 also recognized a state role outside of federal preemption, allowing states to create legislation for oil spill prevention and response activities.
States	
Each state has discretion for identifying the responsible agencies. In Washington: Department of Ecology's Spills Program, Department of Fish and Wildlife's Oil Spill Team, and the Washington Oil Spill Advisory Council	State statutes must align with the federal government's regulatory structure, which defines what states are and are not allowed to regulate. Two court cases have also helped to shape Washington's oil spill program activities. These two cases found that the state's attempt to regulate particular aspects of vessel manning and design were preempted by federal statute (Ray v. Atlantic Richfield and U.S. v. Locke). In the case of U.S. v. Locke 2000 (Intertanko) the unanimous Supreme Court decision stated that Washington was not allowed to require tankers to submit prevention plans as part of a tank vessel inspection program.
Local Governments/Tribes	
Local Governments and Tribes within the state of Washington	State statutes do not directly dictate the role of local governments and tribes in oil spill activities. However, they do work with the federal government and the state for prevention, preparedness, and response activities, which includes working within the framework of the Northwest Area Contingency Plan describing roles and responsibilities for responses in the Pacific Northwest.

Source: JLARC analysis of International conventions, federal legislation, state statutes, and Department of Ecology publications.

Washington's Oil Spill Prevention, Preparedness, and Response Programs

The Legislature Sets a Zero Spills Objective

The state Legislature chose to focus on prevention in 1990, and in 2004 created a zero spills strategy:

> The Legislature finds that prevention is the best method to protect the unique and special marine environments in this state. The technology for containing and cleaning up a spill of oil or hazardous substances is at best only partially effective. Preventing spills is more protective of the environment and more cost-effective when all the response and damage costs associated with responding to a spill are considered. Therefore, the Legislature finds that the primary objective of the state is to achieve a zero spills strategy to prevent any oil or hazardous substances from entering waters of the state (RCW 90.56.005(2)).

Three State Agencies Have Responsibility for the State's Oil Spill Activities

The Legislature directs three state agencies to be responsible for oil spill prevention, preparedness, and response activities. These agencies are:

- The Department of Ecology, through its Spill Prevention, Preparedness, and Response Program;
- The Department of Fish and Wildlife, through its Oil Spill Team; and
- The Washington Oil Spill Advisory Council.

Department of Ecology

The Department of Ecology is directed in statute to establish a comprehensive oil spill prevention and response program to protect Washington waters and the state's natural resources, with a goal of achieving zero spills (Chapters 88.46 and 90.56 RCW).

The Spill Prevention, Preparedness, and Response Program (Spills Program) has responsibility for all types of spills throughout the state including oil spills, hazardous substances, and methamphetamine lab clean-up. The oil spill activities comprise approximately 93 percent of the Spills Program.

The Spills Program has a wide range of responsibilities such as: educating and providing outreach to individuals at marinas; vessel, pipeline, refinery, and facility inspections; oil spill drills; and response to a spill of any size, large or small. Appendix 4 lists oil spill activities categorized by the four focus areas of prevention, preparedness, response, and restoration.

The oil spill portion of the Spills Program budget is estimated to be $30.4 million for the 2007-09 Biennium with a total of 67.1 FTEs. Approximately 46 percent ($13.9 million) of the budget is restricted in use. Appendix 5 provides information regarding the calculation of the Spills Program budget and the restricted funds.

Department of Fish and Wildlife

Since 1992, the Oil Spill Team, within the Habitat Program, has focused on natural resource protection, wildlife rescue, and damage assessments. The majority of the activities involve preparedness, such as the development of geographic response plans in coordination with Ecology and an oiled wildlife rescue response plan; development of a GIS database for use in natural resource damage assessments; drill participation; and other activities related to fish and wildlife affected by oil spills. The Oil Spill Team responds to marine and freshwater oil spills in cooperation with other state and federal agencies and participates in natural resource damage assessments. The Department of Fish and Wildlife is responsible for the rehabilitation of wildlife after an oil spill.

The 2007-09 Biennium budget totals $1.2 million with 6.5 FTEs. According to the Oil Spill Team, the Department of Fish and Wildlife provides an additional $0.4 million in indirect support.

The Washington Oil Spill Advisory Council

The Legislature established the Washington Oil Spill Advisory Council (Council) in 2005 to review the adequacy of oil spill prevention, preparedness, and response activities in the state (RCW 90.56.120). The Council is comprised of a chair-facilitator, 16 members, and two representatives from tribal governments, all of whom are appointed by the Governor. The 16 members are composed of:

- Three representatives from environmental organizations;
- Three representatives of county governments bordering Puget Sound, the Columbia River/Pacific Ocean, and the Strait of Juan de Fuca/San Juan Islands;
- Two representatives of marine trade interests;
- One representative of; tourism interests, commercial shellfish interests, commercial fisheries primarily fishing in Washington's waters, marine recreation, marine labor, major oil facilities, public ports; and
- An individual residing on a shoreline with an interest, experience, and familiarity in the protection of water quality.

As an advisory body, the primary purpose of the Council is to ensure the state maintains an emphasis on the prevention of oil spills to marine waters while improving preparedness and response. Statute describes the specific duties of the Council, including a requirement to make yearly recommendations for improvements to the state's oil spill activities to the Governor, the Department of Ecology, and the Legislature (RCW 90.56.130).

The 2007-09 Biennium budget totals $715,000 with 3 FTEs.

WHAT ARE THE SOURCES OF OIL SPILL RISK?

There are many different ways to analyze risk. The analysis conducted for this JLARC study predicts relative oil spill risk in Washington's waters. Risk scores are assigned to each source category (e.g., all trucks that carry oil as cargo are grouped into the source category "Tanker Trucks") in a particular geographic location and are relative to all of the other sources and locations. By relative risk we mean that all of the source categories and geographic locations are compared to each other. In general, higher risk scores indicate higher risk for spills relative to all other sources and geographic locations.

To calculate relative risk, JLARC contracted with experts in the field of oil spill risk. Results of the relative risk assessment show that *oil spills are likely to occur across the state from many sources in both large and small amounts*. Appendix 6 contains maps that provide a state-wide orientation to some of the locations and transportation routes of some source categories.

Five Key Points About the Methodology

JLARC contracted with experts that used the best available data for this study. However, understanding these five key points about the methodology used to conduct this JLARC analysis is important for understanding the results:

1. JLARC's oil spill risk experts developed estimates of spills in Washington's waters of 50 gallons or more from 1995-2007. Their estimates are based on combining the best available oil spill data from state, federal, and private agencies. Because the data come from varied sources, they do not always contain consistent information, such as the volume of an individual spill.
2. The purpose of the spill data information systems that were used is for spill response and program management. It is not collected for the purpose of conducting a risk assessment. Thus, the experts spent considerable time interpreting the data for risk analysis purposes.
3. The experts developed four different approaches for estimating relative spill risk.
4. Spill impacts are estimated using formulas derived from the Washington Compensation Schedule, which was designed for a different purpose, analyzing and quantifying damages from individual spills.
5. Spills between 50 and 100 gallons are likely significantly under reported, however the total volume and impacts as calculated in this risk assessment are extremely small.

Assessing the Relative Risk of Oil Spills in Washington's Waters

The assessment relies on historic spill data to estimate future oil spill risk in Washington's waters. The first step in this assessment begins by identifying relevant risk factors based on a review and synthesis of previous research as well as the consultants' expertise. Previous reports most directly related to spill probability in Washington, as it related to the assessment of risk, and studies and modeling of the impacts of oil spills were reviewed. This review and the consultants' previous

experience informed the choice of appropriate factors to consider in data analysis and categorization of relative risk.

The risk factors used for this study are:

- Spill volume;
- Geographic location of the spill;
- Oil type spilled;
- Timing (season);
- Source of the spill;
- Oil toxicity, mechanical injury, and persistence;
- Vulnerability of estuarine, marine, aquatic, and coastal resources; and
- Vulnerability of water and habitat types.

The next step in the risk assessment compiles several spill data sources for the customized database of oil spills used in this analysis including: Department of Ecology's Environmental Response Tracking System (ERTS) and Marine Information System (MIS) data, United States Coast Guard's Marine Safety Information System (MSIS), Marine Information for Safety and Law Enforcement (MISLE), Office of Pipeline Safety data, National Response Center, United States Environmental Protection Agency's Emergency Response Notification System (ERNS), industry sources, the *Oil Spill Intelligence Report*, and Lloyd's Casualty.

The data included a full range of oil separated into six types: light, gasoline, jet fuel, heavy, crude, and non-petroleum. The analysis includes spills in Washington's waters of 50 gallons or more between 1995 and 2007. However, not all spills are reported, so the spill total is an estimate. This estimate also includes those spills that were partially cleaned up and those that did not spill directly into water but were likely to have entered water, such as through a storm drain. Impacts from spills that are considered "cleaned up" can affect the environment before any clean-up takes place.

The next step in the risk assessment is to calculate the relative risk of oil spills in Washington's waters by applying the standard technical definition of risk, which includes both the *probability* (likelihood) of oil spill incidents and the *impacts* (damages or consequences) of those oil spill incidents.

Spill risk = probability of spill x impacts of spill

Spill probabilities were determined by identifying spill source, location, volume, and oil type for each spill incident contained in the customized database through the analysis of historic data from 1995 through 2007. From this, the probability of an incident in a certain location, of a certain volume and oil type occurring was calculated.

Spill impacts are calculated using formulas adapted from the Department of Ecology's Washington Compensation Schedule, which is designed to differentiate the impacts for individual spills of different oil types, in different parts of the state, during different times of the year.

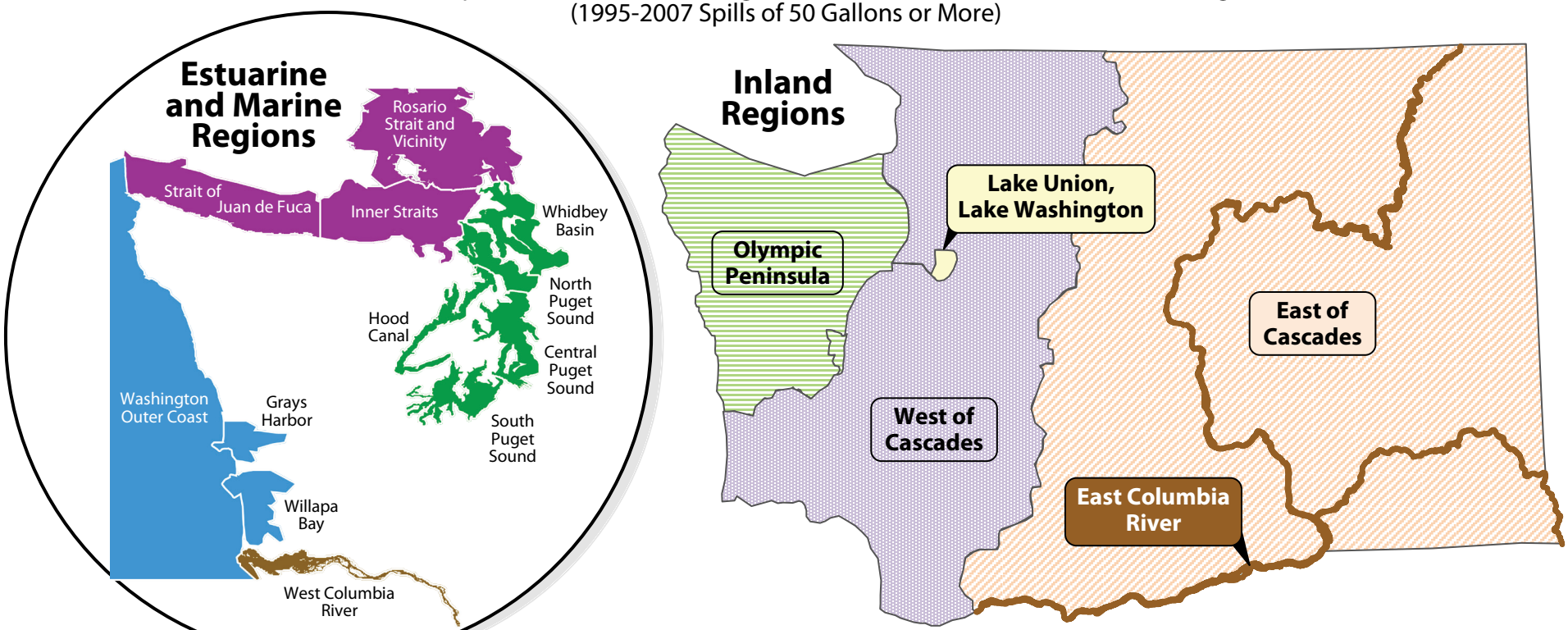
Separate analyses were conducted to assess the vulnerability of marine and estuarine waters and of freshwater streams, rivers, and lakes, since vulnerability varies by location and season. These analyses estimate the level of impact an individual oil spill would have. The results of the calculations provide a score for each individual spill that includes consideration of when, where, and what was spilled.

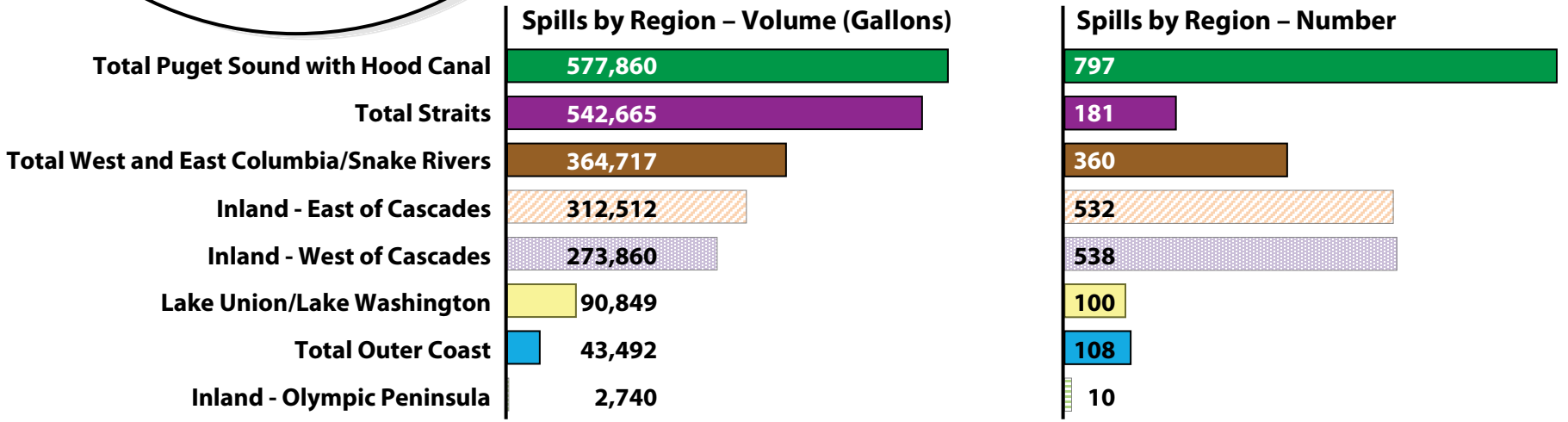
The impact scores were then multiplied by the probability of each spill using volume to determine the spill risk. This calculation resulted in a spill risk quotient that was then normalized to a 100-point scale. The resulting oil spill risk scores provide an indicator for the relative measure of oil spill risk for each sector (source category and geographic location).

Large and Small Spills across the State

The historic spills data shows oil spills across the state from many sources and many oil types in both large and small amounts. Exhibit 2 on the following page shows the total volume of oil spills, in gallons, and the number of oil spills from 1995 through 2007 based on geographic location.

Exhibit 2 – Oil Spills Occur Across Washington State's Inland and Marine/Estuarine Regions
(1995-2007 Spills of 50 Gallons or More)





Note: These numbers are estimates based on the data used for this analysis.
Source: JLARC consultants, Applied Science Associates (ASA).

Four Approaches for Assessing Relative Risk

There are many ways to calculate risk, four of which were used to calculate relative risk for this study. Each of these four approaches was developed by JLARC's consultants, Applied Science Associates (ASA). A summary of each approach is provided below. Appendix 7 provides further detail on the methodology and results of the risk assessment.

The four approaches estimate future oil spill risk to Washington's waters. Approach #1 is based on historic spill data (1995-2007). Approach #2 incorporates potential spill volumes. Approach #3 and #4 apply knowledge about projected changes as a result of regulations, industry operations, and traffic. Results of these four approaches are shown in four different risk matrix tables that follow. Each table provides scores for each source category and geographic location as indicators of their relative risk to Washington's waters.

In order to be able to create the following oil spill risk matrices, the analysis assigns both a spill probability and a spill impact based on the location of the spill (geographic zone), its inherent sensitivity by oil type (based on factors of toxicity, mechanical injury, and persistence), and season.

No matter which of the four approaches is used, the risk results show that *oil spills are likely to occur across the state from many sources in both large and small amounts*. No single source indicates the majority of relative oil spill risk. However, depending on which approach is used the estimate of relative risk changes.

Finally, it is important to note that all risk scores are *estimates* based on data that was available for this analysis and should not be used as the basis for a revenue collection system.

Beginning on page 35 of the report is a glossary of terms including detailed descriptions of source categories from the risk matrix results that follow.

Which Approach Is Best?

The four approaches presented above look at relative risk based on past history, potential spillage, and projected changes in shipping and other oil handling operations for the year 2015. Each approach is supported by actual data or other available information directly relevant to oil spills in Washington waters.

No one approach is better than another. If state policymakers want to pursue a risk-based revenue structure, they would need to select an approach to estimating risk. Numerous approaches could be developed and four are included in this report.

Assigning an indicator of relative risk based on actual spill history, Approach #1, assumes that what has happened since 1995 will continue into the future. This approach does not consider the potential for a worst-case discharge with catastrophic impacts, which varies by the source in terms of the potential volume of oil and location.

Assigning an indicator of relative risk based on potential spillage, Approach #2, takes into account a range of potential spill volumes for each source category listed under vessels, facilities, and mobile sources. This approach includes the small, but finite probability of a worst-case discharge and the different probabilities associated with that range.

Approaches #1 and #2 are conditioned on the assumption that oil transport and handling operations will remain as they are today.

Approach #3 however, uses historic spill data and factors in *future estimations based on projected changes* as a result of regulations, industry operations, and traffic for 2015. These projected changes are estimated for each source category associated with the shipping industry and facilities with regard to the volume and patterns of spillage. This approach provides data based on what the range of historic spill incidents from 1995-2007 might be expected to be like if they were to occur in 2015, with a reduction in spill probability and spill volumes for some source categories.

Approach #4 uses *potential spillage data and factors in future estimations based on projected changes* as a result of regulations, industry operations, and traffic for 2015. These projected changes take into account an adjusted range of potential spill volumes for each source category associated with the shipping industry and facilities, including the probability of a worst-case discharge and adjusted probabilities associated with that range. This approach provides data based on what the range of potential spill incidents might be expected to be like if they were to occur in 2015.

Lesson Learned: Risk Changes Over Time

While there are many different ways to analyze risk, JLARC also learned that risk changes over time:

1. Relative risk scores will continue to change in the future as the history of oil spill data is updated.
2. Elements that are factored into risk assessments, such as regulations, industry operations, and traffic, will continue to change over time.
3. Continued concerted efforts at prevention and preparedness may decrease risk.

Approach #1 – Historic Spill Data

The first approach used to estimate future risk looked at actual oil spill history in Washington's waters from 1995-2007. Rank-ordered results of the relative risk of oil spills based on historic spill data by sector (sector is source category and geographic location combined) are shown in Exhibit 3 on the following page. The sources of risk are categorized by various types of vessels, facilities, and mobile sources in the first column. A separate military source category is also included. The grouped geographic locations are listed across the top row.

Relative Risk Scores Based on Historic Data

Each relative risk score, based on data used for this analysis, indicates the individual source category's risk for a particular geographic location, relative to all of the other sources and locations. In general, higher risk scores indicate higher risk for spills based on higher probability of spillage, higher volume, and higher impact based on oil type, location, and season, relative to all other sources and geographic locations. A total risk score has also been included for each source category across all geographic locations and for each geographic location across all source categories.

The rank-ordered results for Approach #1 show that risk is spread across all of the source categories across the state. The source category Facility-Other, followed by Pipelines and Refineries, presents the highest risk across all waters relative to all of the other source categories across all waters. For this study, Facility-Other is defined as any fixed facility that stores and uses oil for their operations for fuel and/or raw materials, such as a hotel that uses oil for generating heat or a bowling alley, but excludes those facilities that have their own source category such as milling facilities.

Relative risk can also be compared across geographic locations. For Approach #1, Total Puget Sound with Hood Canal grouped geographic location, followed by Total Inland and Total Straits, indicates the highest risk relative to each of the other grouped geographic locations. Appendix 8 provides four tables, for Approaches #1 through #4, of relative risk results by non-grouped locations. Different groupings of geographic locations may change the perspective on results.

Exhibit 3 – **Approach #1 – Historic Spill Data**: Relative Risk Scores of Oil Spills Based on Historic Spill Data from 1995-2007

	Grouped Geographic Location						
Rank-Ordered Source Category	**Total Puget Sound with Hood Canal**	**Total Inland**	**Total Straits**	**Total Columbia River with Snake River**	**Lake Union/ Washington**	**Total Outer Coast**	**Total All Waters**
Facility-Other	5.13	7.72	0.50	3.85	0.51	0.20	**17.90**
Pipeline	0.49	0.36	13.46	1.36	0.09	0.00	**15.76**
Refinery	5.71	0.00	9.73	0.13	0.01	0.00	**15.57**
Railroad	1.03	7.02	0.01	0.55	0.04	0.00	**8.66**
Oil Terminal	2.16	1.49	0.08	2.01	1.38	0.23	**7.35**
Tanker Truck	0.89	3.56	0.50	0.88	0.01	0.70	**6.55**
Gas Station	2.92	0.73	0.13	2.43	0.02	0.06	**6.29**
Power Utility	0.70	1.44	0.50	1.68	0.00	0.00	**4.33**
Tank Barge	3.35	0.00	0.30	0.01	0.00	0.00	**3.66**
Vehicle-Other	0.73	2.08	0.12	0.46	0.04	0.08	**3.51**
Non-Tank Vessel	1.24	0.00	0.39	0.18	0.03	0.04	**1.89**
Military	0.85	0.96	0.03	0.00	0.00	0.00	**1.85**
Fishing Vessel	0.31	0.01	0.25	0.39	0.07	0.52	**1.56**
Facility-Milling	0.27	0.70	0.12	0.20	0.00	0.14	**1.42**
Residential	0.35	0.80	0.03	0.20	0.00	0.02	**1.41**
Pleasure Craft	0.91	0.06	0.16	0.02	0.02	0.02	**1.18**
Tank Ship	0.33	0.00	0.14	0.03	0.00	0.00	**0.50**
Towboat/Tugboat	0.22	0.00	0.02	0.01	0.02	0.04	**0.31**
Airport	0.06	0.06	0.00	0.00	0.00	0.00	**0.12**
Aircraft	0.08	0.02	0.00	0.00	0.00	0.00	**0.10**
Passenger Vessel	0.01	0.00	0.00	0.02	0.00	0.02	**0.06**
Unknown	0.01	0.00	0.00	0.01	0.00	0.01	**0.02**
Ferry	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**27.76**	**27.01**	**26.48**	**14.41**	**2.24**	**2.10**	**100.00**

Note: The relative risk scores are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system.

Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

Approach #2 – Potential Spillage

The second approach builds on historic spill data by incorporating *potential* spillage. This approach takes into account the range of potential spill volumes, including the low, but real probability of a worst-case discharge. For each source category a range of different probabilities that those spill volumes would occur was determined. Probabilities for each of the potential spill volumes are based on an analysis of U.S.-wide, and for tank ships, world-wide, estimated and historic outflow percentages. These outflow percentages are the estimated proportion of oil that flows out of a specific container.

Relative Risk Scores Taking Potential Spillage into Account

Exhibit 4 on the following page provides the rank-ordered relative risk results by sector (source category and geographic location). The source categories are in the first column and the geographic locations are across the top row. Each relative risk score, based on data used for this analysis, indicates the individual source category's risk for a particular geographic location, relative to all of the other sources and locations. A total risk score has also been included for each source category across all geographic locations and for each geographic location across all source categories.

While the relative risk scores are still spread across all of the sources and across the state, the pattern of relative risk by source category changes when potential spillage, Approach #2, is considered. While Facility-Other remains the highest relative risk across all waters, Tank Ships now pose the second highest relative risk, compared to ranking as the seventeenth highest risk in Approach #1. This is due to the fact that the potential outflow for tank ships is the largest of all the source categories. Likewise, the Towboat/Tugboat source category has moved from the 18th highest relative risk in Approach #1 to the fourth highest relative risk in Approach #2 across all waters.

The score for Total Puget Sound with Hood Canal grouped geographic location still indicates the highest relative risk compared to the other grouped geographic locations.

When comparing the results between Approaches, it would be a mischaracterization to say that since a sector's specific *score* is different, that sector is now more or less risky than it was in a previous Approach. Rather, the key is to continue to focus on how one sector *ranks* between Approaches *relative* to another sector.

Exhibit 4 – **Approach #2 – Potential Spillage**: Relative Risk Scores of Potential Oil Spills Based on Historic Spill Data

	Grouped Geographic Location						
Rank-Ordered Source Category	**Total Puget Sound with Hood Canal**	**Total Inland**	**Total Straits**	**Total Columbia River with Snake River**	**Total Outer Coast**	**Lake Union/ Washington**	**Total All Waters**
Facility-Other	6.08	9.14	0.58	4.56	0.24	0.60	**21.21**
Tank Ship	11.24	0.00	4.73	0.96	0.00	0.04	**16.96**
Railroad	1.22	8.30	0.01	0.65	0.00	0.05	**10.24**
Towboat/Tugboat	5.74	0.07	0.45	0.33	1.07	0.45	**8.10**
Oil Terminal	2.36	1.63	0.09	2.20	0.25	1.51	**8.04**
Refinery	2.89	0.00	4.92	0.06	0.00	0.00	**7.88**
Pipeline	0.17	0.13	4.77	0.48	0.00	0.03	**5.58**
Tanker Truck	0.53	2.09	0.29	0.52	0.41	0.01	**3.84**
Non-Tank Vessel	1.86	0.01	0.58	0.27	0.06	0.05	**2.83**
Gas Station	1.18	0.30	0.05	0.98	0.02	0.01	**2.54**
Power Utility	0.40	0.83	0.29	0.96	0.00	0.00	**2.48**
Facility-Milling	0.42	1.07	0.18	0.30	0.22	0.00	**2.20**
Tank Barge	1.72	0.00	0.15	0.01	0.00	0.00	**1.88**
Fishing Vessel	0.35	0.01	0.28	0.44	0.58	0.08	**1.75**
Vehicle-Other	0.31	0.88	0.05	0.20	0.03	0.02	**1.49**
Pleasure Craft	0.56	0.03	0.10	0.01	0.01	0.01	**0.73**
Military	0.30	0.34	0.01	0.00	0.00	0.00	**0.66**
Residential	0.14	0.33	0.01	0.08	0.01	0.00	**0.57**
Passenger Vessel	0.07	0.03	0.02	0.21	0.18	0.00	**0.51**
Aircraft	0.22	0.05	0.00	0.00	0.00	0.00	**0.27**
Airport	0.09	0.10	0.00	0.00	0.00	0.00	**0.19**
Ferry	0.02	0.00	0.02	0.00	0.00	0.00	**0.05**
Unknown	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**37.89**	**25.33**	**17.61**	**13.22**	**3.09**	**2.86**	**100.00**

Note: The relative risk scores are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system.

Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

Approach #3 – Projected Changes Based on Historic Spill Data

The third approach estimates future risk by applying knowledge about projected changes to spill volumes as a result of regulations, industry operations, and traffic for the year 2015. For example, the expected volume of the largest spill for facilities was adjusted to a lower volume based on known regulatory changes (ongoing Environmental Protection Agency regulations under its Spill Prevention Control and Countermeasures program). This approach builds on the historic spill data by factoring in future projections for 2015 for each source category with regard to the volume and patterns of spillage.

Relative Risk Scores Based on Historic Data in 2015

Rank-ordered results for this approach are in Exhibit 5 on the following page in a risk matrix that provides the relative risk results by sector (source category and geographic location). The risk matrix lists the source categories in the first column and the geographic locations across the top row. Each relative risk score, based on data used for this analysis, indicates the individual source category's risk for a particular geographic location, relative to all of the other sources and locations.

Again, we see that the relative risk scores show risk across all of the sources across the state. However, due to the projected changes for 2015, the rank-ordering of the source categories has changed. For example, compared to Approach #1 where Facility-Other presented the highest risk, this source category now presents the second highest relative risk across all waters. Conversely, the relative risk ranking across all waters for Pipelines was the second highest risk in Approach #1, but now presents the highest relative risk in Approach #3.

There are changes in rank orders for most of the facilities and the tank ships across all waters compared to the same rank-ordered results in Approach #1. This is related to projected changes for 2015 that include decreases in spill probabilities for these source categories (large facilities and tank ships), relative to the other source categories, as a result of regulations, industry operations, and traffic.

When comparing the results between Approaches, it would be a mischaracterization to say that since a sector's specific *score* is different, that sector is now more or less risky than it was in a previous Approach. Rather, the key is to continue to focus on how one sector *ranks* between Approaches *relative* to another sector.

Exhibit 5 – **Approach #3 – Future Projections from Historic Spill Data**: Relative Risk Scores of Oil Spills Projected to 2015 Based on Historic Spill Data

	Grouped Geographic Location						
Rank-Ordered Source Category	**Total Inland**	**Total Straits**	**Total Puget Sound with Hood Canal**	**Total Columbia River with Snake River**	**Total Outer Coast**	**Lake Union/ Washington**	**Total All Waters**
Pipeline	0.41	15.51	0.57	1.56	0.00	0.10	**18.16**
Facility-Other	6.67	0.43	4.43	3.33	0.17	0.44	**15.47**
Refinery	0.00	8.40	4.93	0.11	0.00	0.01	**13.45**
Railroad	8.09	0.01	1.19	0.63	0.00	0.05	**9.97**
Tanker Truck	4.10	0.58	1.03	1.01	0.80	0.01	**7.54**
Oil Terminal	1.28	0.07	1.87	1.73	0.20	1.19	**6.35**
Gas Station	0.63	0.11	2.52	2.10	0.05	0.01	**5.43**
Tank Barge	0.00	0.34	3.86	0.01	0.00	0.00	**4.21**
Vehicle-Other	2.39	0.14	0.84	0.53	0.09	0.04	**4.04**
Power Utility	1.25	0.43	0.61	1.45	0.00	0.00	**3.74**
Non-Tank Vessel	0.00	0.50	1.57	0.23	0.05	0.04	**2.40**
Military	1.11	0.04	0.98	0.00	0.00	0.00	**2.13**
Fishing Vessel	0.02	0.29	0.36	0.45	0.60	0.08	**1.80**
Residential	0.92	0.03	0.40	0.23	0.03	0.00	**1.62**
Pleasure Craft	0.06	0.18	1.05	0.02	0.02	0.02	**1.37**
Facility-Milling	0.60	0.10	0.23	0.17	0.12	0.00	**1.23**
Tank Ship	0.00	0.13	0.31	0.02	0.00	0.00	**0.46**
Towboat/Tugboat	0.00	0.02	0.25	0.02	0.05	0.02	**0.35**
Aircraft	0.02	0.00	0.09	0.00	0.00	0.00	**0.11**
Airport	0.05	0.00	0.05	0.00	0.00	0.00	**0.10**
Passenger Vessel	0.00	0.00	0.01	0.03	0.02	0.00	**0.06**
Unknown	0.00	0.00	0.01	0.01	0.01	0.00	**0.03**
Ferry	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**27.62**	**27.33**	**27.16**	**13.64**	**2.22**	**2.03**	**100.00**

Note: The relative risk scores are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system.

Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

Approach #4 – Projected Changes Based on Potential Spillage

The fourth approach estimates future projections for 2015 the same way in which Approach #3 does, by applying the same knowledge about projected changes to spill volumes as a result of regulations, industry operations, and traffic for the year 2015. However, Approach #4 builds on potential spillage data by factoring in these future projections through the use of probability distributions that estimate the range of potential spill volumes for each source category, including the probability of a worst-case discharge, adjusted for 2015 projected changes. For example, the expected volume of the largest spill for tank ships was adjusted to a lower volume based on known regulatory changes (e.g., double-hull requirement by 2015).

Relative Risk Scores Based on Potential Spillage in 2015

Rank-ordered results for this approach are in Exhibit 6 on the following page in a risk matrix that provides the relative risk results by sector (source category and geographic location). The risk matrix lists the source categories in the first column and the geographic locations across the top row. Each relative risk score, based on data used for this analysis, indicates the individual source category's risk for a particular geographic location, relative to all of the other sources and locations.

The relative risk scores still show risk spread across all of the sources across the state. We also see, as in Approach #2, that risk scores for Facility-Other and Tank Ships indicate the highest relative risk across all waters of the state. Similarly, the Total Puget with Hood Canal grouped geographic location still indicates the highest relative risk compared to the other grouped geographic locations.

When comparing the results between Approaches, it would be a mischaracterization to say that since a sector's specific *score* is different, that sector is now more or less risky than it was in a previous Approach. Rather, the key is to continue to focus on how one sector *ranks* between Approaches *relative* to another sector.

Exhibit 6 – **Approach #4 – Future Projections from Potential Spillage**: Relative Risk Scores of Oil Spills Projected to 2015 Based on Potential Spillage

	Grouped Geographic Location						
Rank-Ordered Source Category	**Total Puget Sound with Hood Canal**	**Total Inland**	**Total Straits**	**Total Columbia River with Snake River**	**Total Outer Coast**	**Lake Union/ Washington**	**Total All Waters**
Facility-Other	5.37	8.07	0.52	4.03	0.21	0.53	**18.73**
Tank Ship	10.01	0.00	4.21	0.85	0.00	0.03	**15.10**
Railroad	1.44	9.78	0.02	0.77	0.00	0.06	**12.06**
Towboat/Tugboat	6.76	0.08	0.53	0.39	1.26	0.53	**9.54**
Oil Terminal	2.09	1.44	0.08	1.94	0.22	1.34	**7.10**
Refinery	2.55	0.00	4.35	0.06	0.00	0.00	**6.96**
Pipeline	0.21	0.15	5.61	0.57	0.00	0.04	**6.57**
Tanker Truck	0.62	2.46	0.35	0.61	0.48	0.01	**4.53**
Non-Tank Vessel	2.41	0.01	0.76	0.35	0.08	0.06	**3.67**
Gas Station	1.04	0.26	0.05	0.86	0.02	0.01	**2.24**
Power Utility	0.36	0.73	0.25	0.85	0.00	0.00	**2.19**
Tank Barge	1.92	0.00	0.17	0.01	0.00	0.00	**2.10**
Fishing Vessel	0.41	0.02	0.34	0.52	0.69	0.09	**2.06**
Facility-Milling	0.37	0.95	0.16	0.27	0.19	0.00	**1.94**
Vehicle-Other	0.36	1.04	0.06	0.23	0.04	0.02	**1.75**
Pleasure Craft	0.66	0.04	0.12	0.01	0.01	0.02	**0.86**
Military	0.36	0.40	0.01	0.00	0.00	0.00	**0.77**
Residential	0.17	0.39	0.02	0.09	0.01	0.00	**0.67**
Passenger Vessel	0.09	0.03	0.02	0.25	0.21	0.00	**0.60**
Aircraft	0.26	0.06	0.00	0.00	0.00	0.00	**0.32**
Airport	0.08	0.09	0.00	0.00	0.00	0.00	**0.16**
Ferry	0.03	0.00	0.03	0.00	0.00	0.00	**0.05**
Unknown	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**37.55**	**25.99**	**17.64**	**12.66**	**3.43**	**2.73**	**100.00**

Note: The relative risk scores are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system.

Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

SOURCES OF REVENUE FOR THE STATE'S OIL SPILL PROGRAMS

The previous chapter looks at the sources of oil spill risk. This chapter discusses the sources of revenue for the state's oil spill programs.

Where Does the Money Come From?

The two major sources of revenue are two dedicated taxes: the Oil Spill Administration Tax and the Oil Spill Response Tax. Other revenue sources include the Hazardous Substance Tax, reimbursements, one cent of the marine use motor vehicle fuel excise tax refund, penalties, fees, fines, and natural resource damage assessment settlements.

Oil Spill Administration and Oil Spill Response Taxes

The Legislature created the Oil Spill Administration and Oil Spill Response taxes in 1991 "to provide an adequate funding source for state response and prevention programs"(RCW 82.23B.020 and RCW 90.56.005(4)(h)).

The statutory tax liability for these two taxes is placed on specific ownership of crude oil or petroleum products. The taxes are imposed on the *first receipt* of crude oil or petroleum products at a marine terminal from a waterborne vessel or barge operating on the navigable waters of the state. The taxes are imposed on the *owner of the crude oil or petroleum products* immediately *after receipt into storage tanks* (RCW 82.23B.020).

These two taxes are not imposed on the owner of oil in marine vessels or vehicles that may spill oil, nor is this tax imposed when oil enters a storage tank at a marine terminal by another transportation mode, such as by pipeline.

There are two credits provided for the oil spill taxes. The export credit is for crude oil and petroleum products that are exported or sold for export from the state (RCW 82.23B.040). For instance, the owner of previously taxed oil that is transferred onto a ship, or any other mobile source, exiting the state does not pay the tax through the receipt of this tax credit. The manufacturing credit is for the use of petroleum products for a purpose other than fuel or as a component or ingredient in the manufacture of an item which is not a fuel (RCW 82.23B.045).

There is also a statutory mechanism for turning on and off both of these oil spill taxes. While the Oil Spill Administration Tax has not been turned off to date, the Oil Spill Response Tax was turned off from January 2002 through March 2007 due to the statutory cap currently set at $9 million.

The Oil Spill Administration Tax is currently four cents per barrel, and the Oil Spill Response Tax is currently one cent per barrel. In Fiscal Year 2008, the Oil Spill Administration Tax net revenues were $3.4 million, and the Oil Spill Response Tax net revenues were $1.1 million.

Shortfall and Fluctuations

As JLARC conducted a comparison of risk sources and revenue sources to assess their alignment, we found that the 2007-09 expected revenue from the Oil Spill Administration Tax is $8.1 million and the 2007-09 budgeted expenditures from the Oil Spill Prevention Account (the account into which tax revenues from the Oil Spill Administration Tax are deposited) is $14.4 million. We also found fluctuations in revenues from the two oil spill taxes since their inception in 1991. Appendix 9 provides additional details.

Hazardous Substance Tax

The main purpose of the Hazardous Substance Tax is to raise sufficient funds for the cleanup and prevention of hazardous waste in the state's land and waters (RCW 70.105D.010(2)). One such hazardous substance is petroleum products.

The tax liability is imposed on the entity that *first possesses* the hazardous substance in the state: the tax is imposed on the *possession* of the substance (RCW 82.21.010).

The rate of the tax is 7/10 of 1 percent (0.70 percent) of the wholesale value of the hazardous substance (RCW 82.21.030). The Legislature appropriates a small portion of revenues from the Hazardous Substance Tax, deposited into the State Toxics Control Account (47.1 percent), for use by Ecology's Spills Program. These appropriated funds are used for small oil spill response activities (spill responses estimated to cost under $50,000).

In Fiscal Year 2008, the estimated Hazardous Substance Tax revenues used for oil spill response activities totaled approximately $1.8 million. Appendix 10 provides additional details on the estimation of the Hazardous Substance Tax revenues.

Other Revenue Sources

There are three categories of other revenue sources that help fund the state's oil spill activities. These include: [1]

1) Reimbursements (cost recoveries) from those responsible for an oil spill or from the Federal Oil Spill Liability Trust Fund. The Trust Fund was authorized in 1990 along with the passage of the Oil Pollution Act (OPA90) to pay for oil removal and uncompensated damages. Reimbursements totaled $0.2 million in Fiscal Year 2008.
2) Penalties, fees, and fines associated with non-compliance and violations (both vessel and non-vessel) and natural resource damage assessment settlements. In Fiscal Year 2008 revenues totaled $1.3 million.
3) One cent per gallon of the marine use motor vehicle fuel excise tax refund. Fiscal Year 2008 revenues totaled $9,000.

[1] Any revenues associated with the State Toxics Control Account have been excluded from these totals as they are captured in the discussion under "Hazardous Substance Tax".

In addition to these other revenue sources, revenues from a temporarily diverted motor vehicle title fee expired July 1, 2008. Fiscal Year 2008 revenues from this source totaled $1.2 million. These revenues were used to help pay for the Neah Bay rescue tug contract. The 2008 Legislature authorized one-time Fiscal Year 2009 expenditures of $3.4 million from four accounts (State Toxics, Local Toxics, Coastal Protection, and Aquatic Lands) to pay for a year-round stand-by rescue tug contract at Neah Bay.

Exhibit 7 below summarizes the Fiscal Year 2008 revenues previously discussed.

Exhibit 7 – Fiscal Year 2008 Oil Spill Revenues: The Largest Sources Are From the Oil Spill Administration and Response Taxes

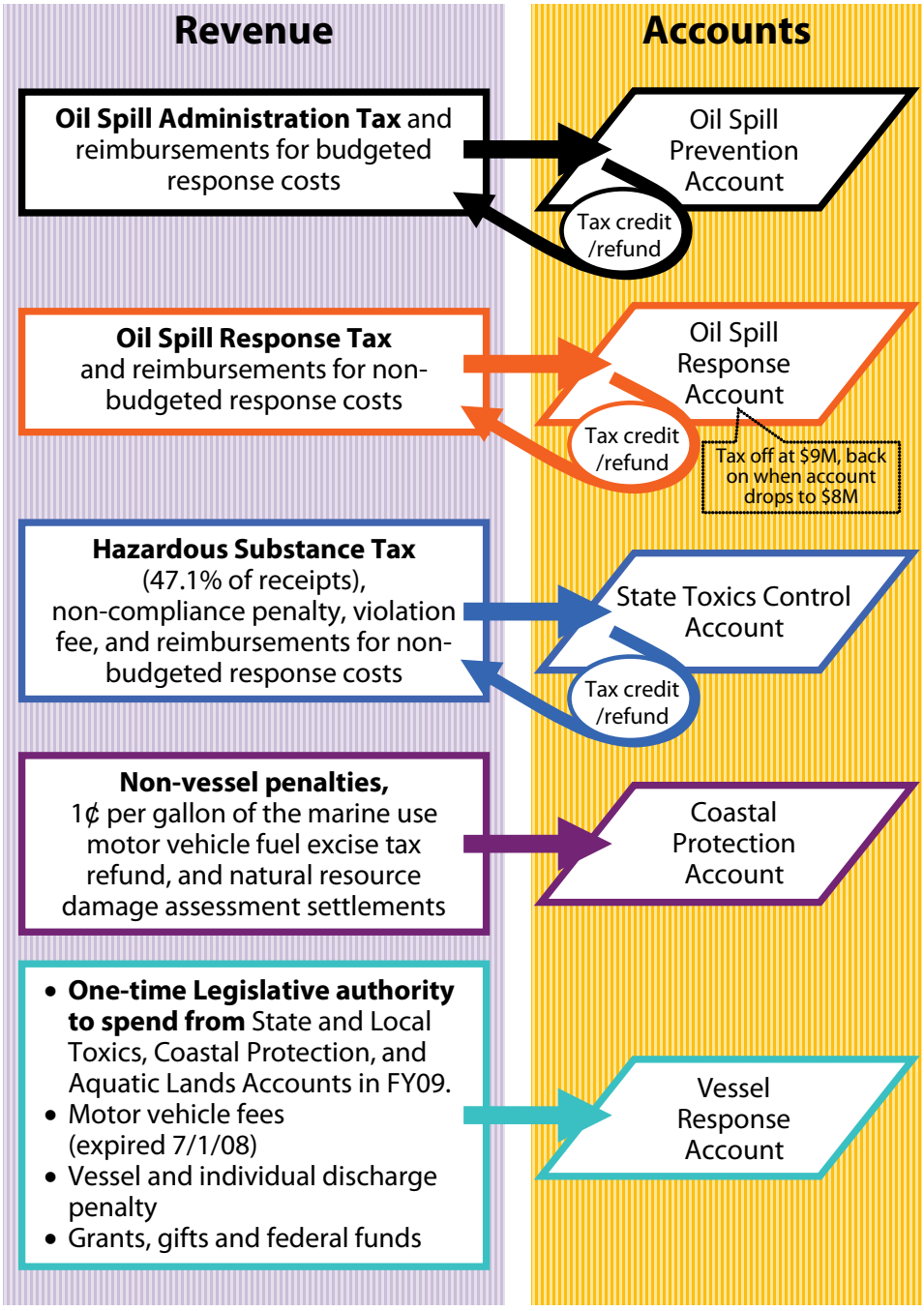
Revenue Source	Fiscal Year 2008 Total (millions)
Oil Spill Administration Tax (net)	$3.4
Oil Spill Response Tax (net)	$1.1
Hazardous Substance Tax (for oil spill activities)	$1.8
Reimbursements (cost recoveries)	$0.2
Penalties, fees, fines, and natural resource damage settlements	$1.3
One cent per gallon of the Marine Use Motor Vehicle Fuel Excise Tax Refund	$0.009
Motor vehicle title fees (expired 7/1/2008)	$1.2
Total	**$9.1**

Note: Not all revenues presented above are for operating costs. See Appendix 5 for a discussion about Ecology's Spills Program budget. See Appendix 10 for additional details on the estimation of the Hazardous Substance Tax revenues. Numbers may not total due to rounding.

Source: 2007-09 budgeted data from the Department of Ecology, LEAP reporting data, and the Department of Revenue tax data.

Exhibit 8 on the following page provides a picture of revenues associated with the five major accounts that fund state oil spill activities.

Exhibit 8 – Revenue Sources for the Five Major Accounts Utilized for Oil Spill Activities



Source: State statute and the 2007-09 Operating Budget.

DO THE SOURCES OF OIL SPILL RISK ALIGN WITH THE SOURCES OF THE STATE'S OIL SPILL PROGRAM REVENUES?

Having determined the sources of risk and the sources of revenue, we answered the question: Do the sources of revenue that fund the state's oil spill prevention, preparedness, and response programs align with the sources of oil spill risk? *We found that they are not aligned.*

Defining Alignment, Risk Source, and Revenue Source

JLARC defines alignment very specifically: a direct connection between two structures or mechanisms. The two structures compared are the *sources of risk* and the *sources of revenue.*

The risk sources are based on the transportation mode or activity involved with the movement or use of oil, such as a pipeline, a barge, or a manufacturing facility. The major revenue sources (Oil Spill Taxes as discussed on page 23) are based on a taxable event of the ownership of certain oil. Aligning risk with revenue sources requires a comparison of mode or activity on the one hand and a taxable event such as ownership of oil on the other. The two do not align. The following list provides examples.

- Oil Spill Taxes: Imposed on the *ownership* of crude oil or petroleum products first received into a marine terminal storage tank when transferred from a waterborne vessel or barge. This is not directly aligned with a transportation mode or activity, such as a tank ship or pipeline.
- Hazardous Substance Tax: Imposed on the first *possession* of hazardous substances. This too is not directly aligned with a transportation mode or activity.
- Penalties, Fees, and Fines: Collected for damages from oil spills and non-compliance. Any transportation mode or activity responsible for an oil spill will likely pay a penalty or fine. However, this is not a proactive revenue collection.
- One cent per gallon of the Marine Use Motor Vehicle Fuel Excise Tax Refund: Use of motor vehicle fuel as marine fuel is eligible for a refund. One cent per gallon of that refund is deposited in the Coastal Protection Account. This revenue could present a direct alignment with recreational boaters (an identified risk source) who happen to purchase fuel at a gas station and subsequently apply for a refund. However, if the recreational boater purchases fuel at the marina, the fuel is tax exempt. Therefore the individual would not apply for a refund. Likewise, an individual who is eligible to receive a refund may choose not to apply for a refund.

Is There a Relationship Between the Sources of Risk and the Sources of Revenue?

The fact that risk is not aligned with the sources of revenue is different from the question: Is there a *relationship* between risk sources and revenue sources? There may be coincidental relationships between risk sources and revenue sources based on who owns the oil and transportation mode or activity associated with the movement of oil.

The oil spill tax is based on the ownership of the oil, and therefore does not directly align with risk sources identified in the risk assessment. There is a relationship between the method by which this oil is brought into the storage tanks and a source of risk (mode)—a waterborne vessel or barge. However, the owner of the oil who is liable for paying the tax may not own the vessel or barge that off-loaded the oil. Similarly, the owner of the oil in the storage tank is not necessarily the owner of the oil before it is off-loaded. And if the oil came into the same terminal via pipeline, the oil owner would not be liable for the oil spill taxes.

Likewise for the first possession of a hazardous substance (Hazardous Substance Tax), there is a relationship between the mode of transportation by which a hazardous substance is brought into the state and sources of risk. However, the entity that is liable for remitting the tax does not necessarily own the mode by which the hazardous substance was brought into the state.

These relationships are coincidental and do not result from a deliberate alignment between sources of risk and sources of revenue.

Lesson Learned: Complexity of Oil Industry Taxation

JLARC learned an important lesson in assessing alignment of risk sources to revenue sources: oil industry taxation is complex. There are multiple layers of complicating factors such as changing ownership, the potential for coincidental relationships due to multiple business holdings, contracts, credits, and shifting of risk levels over time. Two examples of these complexities follow:

1) The entity who owns the taxable oil may or may not own, or partially own, one or more of the various transportation modes or activities identified as a source of risk.

2) The entity that pays the oil spill tax may not be the entity that receives the export credit on that taxed oil. Thus, the credits may further distance the relationship between the sources of risk and the sources of revenue.

CONSIDERATIONS FOR FUNDING OIL SPILL PROGRAMS

Having determined that the sources of oil spill risk do not align with the sources of revenue that fund the state's oil spill programs, JLARC looked at three issues regarding alternative funding methods:

- The attributes of a high quality tax structure,
- The impacts of Washington tax law on alternatives, and
- What other coastal states do to provide dedicated funding for oil spill activities.

Attributes of a High Quality Tax Structure

A number of national and state organizations have established criteria for what they consider to be the attributes of a high quality tax structure. JLARC reviewed five:

- The National Conference of State Legislatures (NCSL) sets out nine principles.
- The General Accountability Office (GAO) summarizes generally accepted principles.
- The Washington State Department of Revenue lists the attributes of a high quality tax system.
- The 2002 Washington State Tax Structure Study Committee lays out the commonly accepted definition of a well-designed tax system.
- The Washington Oil Spill Advisory Council lists four factors considered when they reviewed oil spill funding alternatives.

Common themes across these attributes include:

- Taxes should be reliable and equitable, meaning that the tax imposes a similar burden on people in similar circumstances.
- Taxes should be inexpensive and efficient to administer.
- Taxes should have minimal impacts on economic decision making.

In addition, the Washington Oil Spill Advisory Council explicitly called out that the burden of the tax should be proportionate to risk in its 2006 recommendations for establishing sustainable funding for the oil spill program.

The summary of the various principles and attributes included by these organizations is presented in Appendix 11 organized under three topic areas: equity and reliability; compliance and administration; and economic impacts.

Washington Tax Law

An exhaustive review of tax law is beyond the scope of this analysis. However, in looking at one specific issue - an export credit for oil spill taxes - we learned an important lesson regarding funding options and tax law: some elements of the tax structure may be "required" by courts.

The statutes authorizing the dedicated oil spill taxes include a credit for any crude oil or petroleum products first received into a storage tank at a marine terminal from a waterborne vessel or barge and subsequently exported from or sold for export from the state (RCW 82.23B.040).

Elimination of the credit was proposed by the Washington Oil Spill Advisory Council as a means of increasing the amount of revenue available for oil spill activities. There is an issue however, as to whether or not completely eliminating the credit would run contrary to court decisions related to the Interstate Commerce Clause of the federal Constitution.

The U.S. Constitution provides that the federal government regulates interstate commerce and prohibits the states from unduly infringing on interstate commerce. Under this Interstate Commerce Clause, a state may not impose a tax which might result in taxation on the same activity in two different states. The *absence* of an oil spill tax credit may become a debated legal issue under this clause.

The important lesson is that oil transportation is likely part of interstate commerce. When determining policies regarding its transportation and taxation, policy makers must be attentive to possible impacts on interstate commerce. Ultimately, the question is not answered until a court makes a decision. No such specific decision has been made regarding the oil spill tax credit.

Funding Oil Spill Activities in Other Coastal States

JLARC reviewed the laws of other coastal states to learn if these states provide dedicated funding for oil spill activities and how that funding is structured. Of the 22 coastal states including Alaska, we identified 15 with dedicated revenue sources for either oil spill prevention and clean-up, or for hazardous materials more generally.

The focus of the revenue source, where it is applied, and the amount of the tax, varies. Also, the definition of whether the funding is a tax or a license fee varies. Information on states with key differences to Washington is summarized below, with detail provided in Appendix 12.

Oregon

Oregon's Oil Spill Prevention Fund receives revenue from a *fee for vessel trips*, rather than on a per-barrel basis. Cargo and passenger vessels pay a fee as well as tank vessels. In addition, offshore and onshore facilities pay a yearly flat fee.

Fees include:

- $60 per trip for a non-self propelled tank vessel of 25,000 barrels or less,
- $70 per trip for cargo and passenger vessels,
- $1,200 per trip for self-propelled tank vessels over 300 gross tons, and
- $5,900 yearly flat fee for offshore and on-shore facilities.

California

California's Oil Spill Prevention and Administration Fund revenues are similar to Washington's in that one of the fees is imposed on the receipt of crude oil at a marine terminal. Operators of *pipelines* also pay a fee for each barrel of petroleum product transported into the state if the pipeline runs through marine waters of the state.

Alaska

As a major producer of crude, Alaska's Oil and Hazardous Substance Release Prevention and Response Fund receives revenues from a surcharge on each taxable barrel of *oil produced* in the state.

Maine

Maine's Coastal and Inland Clean-Up Fund receives revenues that include a tax on *transports* by rail or highway of more than 25 barrels of petroleum products into Maine.

New Hampshire

New Hampshire's Oil Pollution Control Fund's revenues come from a tax that is imposed on oil imported into the state by *vessel, pipeline, truck, railroad, or any other conveyance*.

New York

New York's Environmental Protection and Spill Compensation Fund's revenues are considered to be a *license fee* for the operation of a major facility (refinery, storage terminal, pipeline, etc.). The license fee is expressed on a per-barrel basis.

Delaware

Delaware's Hazardous Substance Cleanup Fund receives revenues based on a *wholesale gross receipts tax* based on 0.9 percent of gross receipts paid on the sale of most petroleum products.

Deciding On a Funding Method

Ultimately, it is up to the Legislature to choose whether or not revenue sources should be directly aligned with risk sources and to choose the criteria for a revenue structure. In making that decision, tax theory would point to the need for balance and equity along with ease of administration. Tax law illustrates the need to pay careful attention to interstate commerce issues. Finally, the practices of other states show that while not necessarily aligned with risk, there are other ways of funding oil spill activities, such as Oregon, where each vessel trip is taxed, or Delaware, with a wholesale gross receipts tax paid on the sale of most petroleum products.

REPORT CONCLUSION

The relative risk assessment conducted for this study uses four different approaches to estimate future oil spill risk in Washington's waters. All four of the approaches show that *the risk of oil spills is likely to occur across the state, spread across many sources in large and small amounts*.

The two major sources of revenue that fund the state's oil spill prevention, preparedness, and response activities are two dedicated taxes: the Oil Spill Administration Tax and the Oil Spill Response Tax. For these two taxes, statute prescribes that the owner of crude oil and petroleum products pays a tax when the oil is first received into storage tanks at a marine terminal from a waterborne vessel or barge in the state.

Other revenue sources include the Hazardous Substance Tax, reimbursements, one cent of the marine use motor vehicle fuel excise tax refund, penalties, fees, fines, and natural resource damage assessment settlements.

The structure of the risk sources is based on transportation mode or activity involved with the movement or use of oil, such as a pipeline, a tank barge, or a manufacturing facility. The structure of the major revenue sources is based on the taxable event of the ownership of oil first received into a storage tank at a marine terminal from a waterborne vessel or barge. *These two structures do not align*.

Alternative Funding Approaches

Ultimately, it is up to the Legislature to choose whether or not revenue sources should be directly aligned with risk sources and to choose the criteria for a revenue structure. However there are a number of important concepts to consider when looking at possible oil spill funding alternatives, including:

- Over 90 percent of the oil spills into Washington's waters are less than 1,000 gallons and occur across the state.
- No data system exists that collects data specifically for the purpose of risk assessments.
- Risk changes over time:
    - Relative risk scores will continue to change in the future as the history of oil spill data is updated.
    - Elements that are factored into risk assessments such as regulations, industry operations, and traffic will continue to change over time.
    - Continued concerted efforts at prevention and preparedness may decrease risk.
- Various sources offer guidance on the fundamentals of quality tax structures, such as ease of administration, and court decisions provide interpretations of important interstate commerce considerations.
- Other coastal states have adopted alternative funding approaches: some have broader bases that include pipelines, railroads, or trucks, while some apply the revenue collection tool

differently, such as Oregon's taxation of each vessel trip or Delaware's broad taxation on petroleum sales.

If the Legislature is interested in creating a risk-based revenue structure as a funding source for the state's oil spill prevention, preparedness, and response programs, the concepts above and the other lessons learned as JLARC conducted this analysis point to a number of practical considerations. Such an effort would need to include:

- A broad-based approach that includes alignment of revenue collection with the transportation modes and activities associated with oil spill risk;
- A data system designed specifically for the purposes of risk assessment;
- Selection of a specific approach for assessing risk; and
- Incorporation of the fact that risk changes over time.

GLOSSARY

Acute Toxicity: The degree to which oil is capable of causing adverse effects on fish, invertebrates and wildlife after short-term exposure (hours to days).

Alignment: A direct connection between two structures.

Facility: A structure, group of structures, equipment, or device (other than a vessel) that is used for one or more of the following purposes: exploring for, drilling for, producing, storing, handling, transferring, processing, or transporting oil. [2] In this study, facilities are separated into oil terminals (also known as oil storage terminals), refineries, milling facilities (establishments involved in wood, paper, and pulp milling), power utilities (establishments involved in the generation and distribution of electricity), gas stations (service stations that store and sell gasoline, diesel fuel, and other petroleum products), airports, pipelines, and residential facilities (i.e., residences).

Facility–Other: Other facilities are not included in any of the categories described above. This category can include manufacturing facilities, agricultural facilities, mining facilities, and other establishments that store and use oil as part of their operations for fuel and/or raw materials. This category would also include any facility that was not readily classified as to one of the other categories due to lack of data on the establishment.

Geographic Location: Spill location with regard to general location category such as marine waters, estuarine waters, inland freshwater bodies and waterways (lakes, rivers, streams), and land (for spills in which oil also enters water). A total of 17 individual geographic locations were identified for risk scores in this study. These 17 locations were combined into a total of six grouped geographic locations for presentation of the risk results (Total Inland, Total Puget Sound with Hood Canal, Total Columbia/Snake Rivers, Total Outer Coast, Total Straits, and Lake Union/Washington with Ship Canal).

Impact: The effect of a spill on the environment.

Mechanical Injury: Injury caused by coating, fowling or clogging of organisms and their appendages and apertures, such that movements and behaviors are mechanically inhibited.

Mobile Sources: Oil sources capable of motion. This includes tanker trucks (carry oil as cargo), other vehicles included in the source category "Vehicle-Other" (trucks and larger automobiles that carry oil as fuel and lubrication), aircraft, and railroads.

Oil Type: General chemical category of oils, including crude oil, heavy oil (heavy fuel oil, intermediate fuel oil, No. 6 fuel oil, No. 5 fuel oil, asphalt, wax), light oils (diesel, mineral oil, motor oil, low-sulfur marine gas oil, lubricating oil, hydraulic oil, No. 2 fuel, home heating oil, bilge slops, waste oils, "chlorinated oil"), gasoline, jet fuel, and non-petroleum oils (organic oils, biodiesel, animal fat, vegetable oil, volatile organic distillate).

[2] Under federal regulations (e.g., in OPA-90 and EPA regulations), the term "facility" includes pipelines and mobile sources (e.g., tanker trucks and railroads), but in this study these sources are considered separately as they represent different types of risks.

Persistence: The length of time oil is known or likely to remain in a variety of habitat types.

Probability Distribution Function: The array of possible spill volumes from the most probable or likely (usually smallest volume) to the most improbable or rarest maximum volume.

Relative Risk: The risk of an oil spill from one source compared to a different source (e.g., oil terminals compared to pipelines).

Responsible Party: Any person owning oil or having control over oil that enters waters of the state is potentially liable for damages to persons or property, public or private, caused by the oil spill regardless of whether the spill is a result of intentional or negligent conduct, accident, or other cause (RCW 90.56.370 and 90.56.320).

Seasons: From WAC 173-183-100, the following definition is applied: "Season" or "seasons" means winter, spring, summer, and/or fall, where winter occurs during the months December through February, spring occurs during the months March through May, summer occurs during the months June through August, and fall occurs during the months September through November.

Spill Risk: The product of the probability (likelihood) of a particular type of spill occurring and its potential impacts.

Spill Sector: Spill sources (tanker truck, pipeline, etc.) in one of the specific geographic locations (Central Puget Sound, Olympic Peninsula, etc.) of Washington. An example of a sector would be tanker trucks in Central Puget Sound.

Spill Source: The origin of a spill. The following categories and spill sources were considered in this study.

> Facilities: refineries, oil terminals (also called oil storage facilities), gas stations, power utilities, milling facilities, residential facilities, airports, pipelines, and any other facility included in the source category “Facility-Other”.
>
> Mobile Sources: tanker trucks, other vehicles included in the source category “Vehicle-Other”, railroad, and aircraft.
>
> Vessels: tank ships (tankers), tank barges, non-tank vessels (e.g., cargo vessels 300 Gross Register Tonnage and greater), fishing vessels, pleasure craft, passenger vessels, towboats/tugboats, and ferries.
>
> Military: spills from facilities, vessels, vehicles, and aircraft related to military operations.
>
> Unknown: spill incidents of unknown origin.

Spillage: The aggregation or sum total of oil entering the environment from spill incidents including oil releases, spills, and outflows.

Unknown: Spill incident records have no indication of spill source.

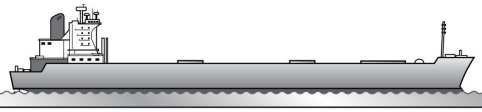
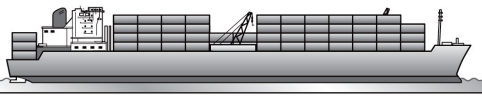
Vessel: A ship or boat capable of independent motion through water or a barge that is towed or pushed through water by a towboat or tugboat. This category includes: tank ships that carry oil as cargo; tank barges that carry oil as cargo but are pushed or pulled by a towboat or tugboat; non-tank vessels (cargo vessels of 300 gross registered tons and larger that carry oil as fuel but not as cargo);

fishing vessels; passenger vessels (e.g., commercial cruise ships that carry passengers); pleasure craft (smaller recreational vessels); ferries; towboats and tugboats.

Worst-Case Discharge: The maximum theoretical spill volume by spill source (the complete loss of the entire contents of a storage tank or tank ship). The worst-case discharge is to be distinguished from the largest historical spill volume. For some source types, such as tank ships, there has never been a worst-case discharge in Washington waters.

Zone: One of the geographical locations of the state developed during this study. Marine zones are divided into sub-regions (smaller geographic areas than the zones based on distribution of environmental resources and water body separations) according to the Washington Compensation Schedule. The inland zones are divided into the 62 watersheds known as Water Resource Inventory Areas (WRIAs) of the State.

Exhibit 9 – Description of Vessel Types

Vessel type	
Oil tanker 	An **oil tanker (tank ship)** is a ship designed to carry oil in large tanks.
Tank barge 	A **tank barge** is a non-self propelled vessel that carries liquid, solid, or gaseous cargos in bulk in tanks primarily through rivers and inland waterways.
Cargo/freight 	A **cargo ship or freighter (non-tank vessel)** is a vessel that transports non-oil goods and materials.
Fishing vessel 	A **fishing vessel** is a ship that is used to catch fish for commercial use.

Source: JLARC analysis of Government Accountability Office, *Maritime Transportation*, December 2007, (GAO-08-357T).

APPENDIX 1 – SCOPE AND OBJECTIVES

Review of Oil Spill Risk and Comparison to Funding Mechanism

SCOPE AND OBJECTIVES

MAY 21, 2008

STATE OF WASHINGTON
JOINT LEGISLATIVE AUDIT AND
REVIEW COMMITTEE

STUDY TEAM
Valerie Whitener
Elisabeth Donner

PROJECT SUPERVISOR
Keenan Konopaski

LEGISLATIVE AUDITOR
Ruta Fanning

Joint Legislative Audit & Review Committee
1300 Quince St SE
Olympia, WA 98504
(360) 786-5171
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Website: www.jlarc.leg.wa.gov
e-mail: neff.barbara@leg.wa.gov

Why a JLARC Review of Oil Spill Risk and the Funding Mechanism for Spill-Related Activities?

In 2007, the Legislature passed Second Substitute House Bill 1488, which found that demand for the state's oil spill prevention, preparedness, and response programs was exceeding available funding. The Legislature directed the Joint Legislative Audit and Review Committee to review the sources of spill risk and compare it to the funding mechanism for the state's oil spill programs.

Who is Responsible for the State's Oil Spill Prevention, Preparedness, and Response Activities?

The state established a statutory objective to achieve a "zero spills strategy to prevent any oil or hazardous substance from entering waters of the state" (RCW 90.56.005(2)).

The Legislature has directed the Department of Ecology (Chapters 88.46 and 90.56 RCW) to establish a comprehensive oil spill prevention and response program to protect Washington waters and natural resources. The Department of Fish and Wildlife is responsible for the protection of natural resources from oil spills and to restore fish and wildlife resources impacted by spills (RCW 90.56.110).

The Legislature also established an independent Oil Spill Advisory Council to provide ongoing review of the adequacy of oil spill prevention, preparedness, and response activities in the state (Chapter 90.56 RCW).

In addition to state agencies, federal, tribal, and local governments play a large role in spill prevention, preparedness, and response activities. Federal law dictates which entities have jurisdiction over spill activities, and private industry is a key participant in fulfilling federal and state government prevention, preparedness, and response regulatory requirements.

Sources of State Oil Spill Funding

Two taxes serve as the major revenue sources for the state's oil spill prevention, preparedness, and response activities. The state assesses an oil spill administrative tax of 4 cents per barrel of crude oil or petroleum products. When certain conditions apply, the state also assesses an additional 1 cent per barrel tax that is dedicated to oil spill response activities. These taxes are assessed when crude oil or petroleum products are first received into storage tanks at marine terminals from waterborne vessels or barges. In addition to these two taxes, there are a number of smaller revenue sources derived from penalties, fees, and other taxes.

Study Scope

JLARC will analyze the relative risk of oil spills in Washington waters and review the oil spill prevention, preparedness, and response program funding mechanism. The study will include a comparison of the relative risk of spills to the program funding sources.

Study Objectives

The study will provide answers to the following questions:

1) What previous evaluation reports, frameworks, and models contribute to understanding the risk of oil spills to Washington waters? What risk factors do they identify?
2) Which additional risk factor categories should be considered when assessing oil spill risk?
3) What is the relative risk of oil spill for these categories? What is the relative risk for different sectors of the state's maritime and related economies?
4) What are the sources of funding for the state's oil spill prevention, preparedness, and response activities?
5) How does the source of risk align with the current source of funding?
6) What are the advantages and disadvantages of alternative funding methods?

Timeframe for the Study

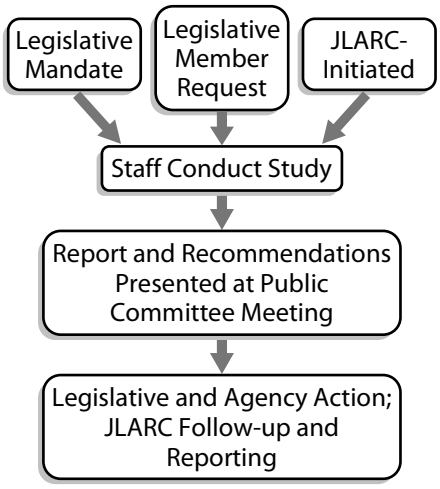
Staff will present the preliminary and final reports at the JLARC meetings in September and October 2008, respectively.

JLARC Staff Contact for the Study

Valerie Whitener (360) 786-5177 whitener.valerie@leg.wa.gov

Elisabeth Donner (360) 786-5190 donner.elisabeth@leg.wa.gov

JLARC Study Process



Criteria for Establishing JLARC Work Program Priorities

- Is study consistent with JLARC mission? Is it mandated?
- Is this an area of significant fiscal or program impact, a major policy issue facing the state, or otherwise of compelling public interest?
- Will there likely be substantive findings and recommendations?
- Is this the best use of JLARC resources? For example:
  - Is JLARC the most appropriate agency to perform the work?
  - Would the study be nonduplicating?
  - Would this study be cost-effective compared to other projects (e.g., larger, more substantive studies take longer and cost more, but might also yield more useful results)?
- Is funding available to carry out the project?

APPENDIX 2 – AGENCY RESPONSES

- Department of Ecology
- Department of Fish and Wildlife
- Oil Spill Advisory Council
- Department of Revenue
- Office of Financial Management

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

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JLARC

December 10, 2008

Ruta Fanning, Legislative Auditor
Joint Legislative Audit Review Committee
1300 Quince Street SE
PO Box 40910
Olympia, WA 98504-0910

RE: The Joint Legislative Audit and Review Committee's Report "Review of Oil Spill Risks and Comparison to Funding Mechanism"

Thank you for providing an opportunity to review and comment on the Joint Legislative Audit Review Committee's (JLARC) preliminary report, "Review of Oil Spill Risk and Comparison to Funding Mechanism." Congratulations on preparing a solid report on a difficult and often controversial technical subject. This report will help foster more fact-based deliberations as legislators and stakeholders debate implications of the shortfall in the state's oil spill program funding.

Our spill prevention and preparedness efforts are facing a 60% cut, and the emergency response tug at Neah Bay needs permanent funding. Finding a solution to these problems will be difficult in the upcoming session because of the economic downturn. However, we cannot allow this program to go unfunded on the 20th anniversary (March 24, 2009) of the *Exxon Valdez* incident. My goal is to establish a fully reliable, equitable, and sustainable funding mechanism for the Spill Prevention, Preparedness and Response Program. This program is critical to our effort to restore and protect Puget Sound.

Before addressing your report, it is important to understand that the barrel tax has never been sustainable since it was established in 1991 and the program's funding source is in jeopardy for the following reasons:

- The amount of taxable oil imported into the state has remained relatively unchanged, but tax revenues have dropped sharply since 2005.
- The barrel tax has never been adjusted for inflation.
- The Legislature has increased appropriations without providing new funding.
- Periodic tax refunds have made program revenues unpredictable.

Until a reliable, equitable, and sustainable funding approach is put in place, our oil spill prevention and preparedness efforts will be at significant risk.

With regard to your report, we believe that JLARC has met the intent of the Legislature. I believe, however, that there are other critical factors that must be considered in any policy discussion regarding a permanent solution to the funding problem. In developing a program funding plan, risk is an important aspect to consider, but, as you have experienced, opinions regarding risk are divergent.

A more fundamental issue is the scope of our prevention and preparedness program. The JLARC report highlighted significant risk from railroads, auto-repair shops, and other smaller sources that the prevention and preparedness units of the spills program do not currently regulate at all. These smaller sources are covered by our spill response unit or other programs within Ecology. This being the case, it does not seem appropriate to ask these sources to help fund the prevention and preparedness efforts, despite the fact that they present some risk of spills. If the Legislature wants Ecology to address smaller spills from the other 14 sources of risk that are identified in the JLARC report, *additional* authority and funding would be necessary.

While we believe "risk" is one appropriate factor to consider in developing a reliable, equitable, and sustainable funding approach for the prevention and preparedness program, we believe another factor is even more important to consider. We believe that the program workload should be the *determining* factor for establishing a new revenue scheme. The prevention and preparedness unit currently regulates 9 of the 23 JLARC sources of risk. Of the 9 that we regulate, only one -- the refineries -- currently pay the barrel tax. The prevention and preparedness unit, however, spends considerable time and effort working to prevent spills at the 8 other covered sources. As explained below, we think that the prevention and preparedness program should be funded by a fee or tax equitably distributed amongst these 9 sources. The burden amongst the 9 sources should be proportional to the time the prevention and preparedness unit spends regulating each source category.

Recommendation

The spills program needs a new reliable, equitable, and sustainable funding source. I recommend that a new funding source be established that incorporates the following principles. Any new fee should be:

- Proportionate to current program workload.
- Based on industry sectors we currently regulate (See Attachment).
- Administratively efficient and legally sustainable.

The social and environmental impact of the *Exxon Valdez* spill still lingers in Prince William Sound. It would be a monumental achievement for the state of Washington to say twenty years later that we continue to invest in the diligence of industry and vigilance of the public to prevent a spill of that magnitude from happening in Washington State.

Again, thank you and your talented team for working to provide a more rigorous and very credible technical base for legislative deliberations on the future of the state's oil spill budget during the upcoming session.

Sincerely,

Jay J. Manning,
Director

Attachment

cc: Dale Jensen, WA State Department of Ecology, Spills Program
Keith Phillips, Governor's Office

Department of Ecology – Spill Prevention, Preparedness and Response Program

Activities by Sector Study Results

The risk source categories used for the survey is consistent with the JLARC technical report at the time the survey was conducted. The report has since added several other categories. For the purpose of the survey, prevention and preparedness activities considered residential as "general public" and for response activities as "private" residents. **GREEN** indicates regulated sectors.

Activity	Aircraft/ Airport	Facility (other)	Military	Non-Tank Vessel	Oil Terminal	Other Vessel	Pipeline	Railroad	Refinery	Residential	Tank Barge	Tank Ship	Tanker Truck	Vehicle-Other
Prevention Activities	0%	5%	1%	35%	10%	10%	1%	0%	10%	0%	10%	7%	9%	1%
Preparedness Activities	1%	2%	5%	11%	18%	2%	11%	1%	15%	3%	8%	11%	9%	2%
Response Activities	1%	10%	2%	6%	4%	26%	2%	3%	5%	13%	4%	4%	7%	12%
Average Time Spent in sectors	**1%**	**5%**	**3%**	**18%**	**11%**	**13%**	**5%**	**1%**	**10%**	**6%**	**7%**	**7%**	**8%**	**5%**

State of Washington
DEPARTMENT OF FISH AND WILDLIFE

Mailing Address: 600 Capitol Way N • Olympia, WA 98501-1091 • (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building • 1111 Washington Street SE • Olympia, WA

December 9, 2008

RECEIVED
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JLARC

Ms. Ruta Fanning
Legislative Auditor
Post Office Box 40910
Olympia, Washington 98504-0910

Dear Ms Fanning:

Thank you for the opportunity to review and provide comments on the preliminary report Review of Oil Spill Risk and Comparison to Funding Mechanism by the Joint Legislative Audit & Review Committee. The Director asked me to convey our comments to you on his behalf. First, however, I would like to congratulate your staff on their professional approach to this complex subject. Please extend our appreciation to your team.

Following are the Department of Fish and Wildlife's comments:

1. The report indicates that oil spill risk is spread over a wide number of source categories. While we believe this is an accurate characterization, we would caution policy makers not to attach too much precision to the actual numbers in the report. Two examples will illustrate the problem.
   Example 1: The report assigns a relative risk factor of zero for the category "tank barge" on the outer coast. The 1989 Nestucca spill which would fit this category was not part of the data set. In 2005, there was a tank barge that grounded on a sandy beach on the coast between two rocky headlands; fortunately, no oil was spilled. More recently, a tug lost its tow on a tank barge, but was able to recover control of the barge. These two near misses are not in the data set because no oil was spilled. All three events suggest that the risk of an oil spill on the outer coast from a tank barge is something greater than zero.

   Example 2: Over the timeline of the data set, the U.S. Navy has substantially reduced the frequency and severity of spills from naval vessels. The risk associated with the "military" category reflects an average for the time period not the current risk.

2. The report demonstrates that it would be difficult to distribute the costs of the spill program to those groups that spill petroleum into our waterways in proportion to the risk that they represent. The sources of risk are diverse and the tax structure would be inefficient to administer. Perhaps a funding solution based on each exchange of oil and petroleum products in our society would be more practical. It is the presence of oil that creates the risk, because the possibility of a spill exists wherever oil is stored, transported or used.

3. The report correctly identifies that relative risk will continue to change over time. The spills program in Washington has been instrumental in reducing spill risk. The Department of Fish and Wildlife is concerned that these gains will be diminished significantly if current response programs are reduced for lack of a solution to the funding crisis in the Oil Spill Prevention Account. A major oil spill in Washington could be catastrophic for natural resources and the area's economy. The recent spills in San Francisco Bay and the Mississippi River are a reminder that the risk of large oil spills is ever present.

If you need additional information about our comments, please contact Brian Edie at 902-8123. The Department appreciates the opportunity to provide comments on the preliminary report, and we look forward to your final report in January 2009.

Sincerely,

Greg Hueckel, Assistant Director
Habitat Program

STATE OF WASHINGTON
OIL SPILL ADVISORY COUNCIL
PO BOX 43113 • OLYMPIA, WASHINGTON 98504-3113 • (360) 725-0221

December 10, 2008

Ruta Fanning
1300 Quince Street SE
P.O. Box 40910
Olympia, WA 98504

Re: Response to JLARC Preliminary Report: Review of Oil Spill Risk and Comparison of Funding Mechanism, December 3, 2008.

Dear Ms. Fanning:

Thank you for inviting the Washington Oil Spill Advisory Council to provide a formal response to the above referenced preliminary report. I would like to commend the JLARC staff and their consultants for putting together a well-researched and written report. The full Council was not able to meet to discuss and come to consensus on this report. Therefore, the following statements are mine and have not been vetted through the entire Council.

The scope of my comments is two fold. First, I would like to articulate what I believe to be the practical implications of the report's findings regarding oil spill risk and funding source alignment. Second, I would like put forth a few ideas of funding sources for the Legislature to consider. In this letter, I compare these funding source ideas to the criteria the report recommends the Legislature consider when evaluating new revenue source ideas for enactment into legislation.

Background to the JLARC Report

The Legislature tasked the Washington Oil Spill Advisory Council with recommending to the Legislature a means of sustainably funding Washington's oil spill programs. In 2006, the Council issued a report recommending a suite of complementary revenue stream options. In addition to keeping and altering the barrel tax, the Council recommended a fee on the transfer of oil on or over water.

As the JLARC report found, several national and state organizations have established criteria for what they consider to be attributes of a high quality revenue structure. As the JLARC report found, there are a few common themes across these attributes. These include:

- From a reliable source that imposes a similar burden on those in similar circumstances.
- Administration of the tax or fee is inexpensive and efficient.
- The tax of fee has minimal impact on economic decision making.

In addition to these criteria, when considering what fee to recommend, the Council articulated that any tax or fee should be roughly proportionate to risk.

Consistent with these criteria, the Council proposed a fee on the activity of transferring oil on or over water. This fee would increase based on increases in volume transferred. It was understood that this fee would not address all factors that contribute to risk, such as the rate of vessel transits, pipeline transfers, storage near water, company safety culture and history, the nature of economic activity being performed, and more. However, the Council members instinctively knew it would be extremely difficult to find a revenue source that could be exactly matched to risk.

The Council determined that nature and universality of oil transfers over water provided a rational basis for a fee that would be reliable, similarly burden those in similar circumstances, have minimal impact on decision making, and provide administration ease for transfers tracked by the Department of Ecology Spills Program. The fee would be charged based on the volume of oil / fuel transferred. Because transferring oil over water is an activity that is universally done by all vessel operators and the risk to Washington's marine environment increases with the volume of oil transferred, this approached seemed to meet the above criteria. As I understand it, the Department of Revenue felt that if the fee was extended to transfers not tracked by the Spills Program, administration of the fee would be difficult and expensive. It was acknowledged, thereafter, that this issue could be addressed by limiting the fee to larger economic players engaging in oil transfers tracked by the Spills Program.

The Legislature directed JLRAC to report on whether it would be possible to align risk to the revenue stream.

Practical Implications of the Report's Findings on Oil Spill Risk and Funding Source Alignment

The JLARC report found, in essence, that the revenue streams that fund Washington's oil spill programs are not aligned with the entities or activities that create risk, except possibly coincidentally.

In my view, the upshot of the JLARC report is that it is not practicable to directly align the revenue streams that fund Washington's oil spill programs with all economic interests that pose risk proportionately to that risk.

As the report indicates:

- Risk will change over time.
- There are at least four ways to judge risk, none of which are any more legitimate than another. All sources analyzed appear to pose more or less risk depending on the method used to judge risk.
- Sources of risk are varied and stem from numerous sources that use oil to engage in a large variety of economic activities.
- These entities, large or small, can spill oil in large or small amounts
- Both large and small spills can be extremely damaging to the environment.

In lieu of the above, it is clear to me that it would be almost impossible to directly align revenue streams with the percentage of risk posed by all sectors that pose risk. If such a system could be created, it would be extremely complex and difficult to administer. Tying revenue to risk is a laudable ideal. It would be of benefit for each industrial sector to pay for the percentage of Washington's oil spill programs for which it bears responsibility through the risk it poses. However, it seems unlikely that it would be possible to construct a system that would do this, let alone in a manner for which: all portions of the revenue stream are reliable; similarly situated entities are similarly burdened and have their burden shifted over time to match risk; is inexpensive and efficient to administer; and does not impact economic decision making. Further, as noted in the JLARC report, to create such a system, the Legislature would need to make the revenue stream directly associated with the actions / transport modes relating to oil, decide on which of the four methods to use for judging risk, and create an expensive data system solely for the purpose of tracking risk through time.

Funding Sources to Consider and Comparison to Criteria for Connecting Revenue Streams to Risk

To avoid a hyper complex system that would be extremely difficult to administer, the Legislature should consider taking one of the following steps.

1. **Charge a fee or tax that is related to the oil itself or an activity inherent to the commodity of oil, and charge the fee as close to the well head as possible.**

   But for oil being the energy source used as the engine of economic activity, there would be no risk of oil spills. The oil is the risk.

   Any substantial tax or fee associated with oil close to the wellhead would be passed onto oil consumers—both industrial consumers and citizen consumers, all of whom pose risk that is somewhat commensurate with the amount of oil they use. While this approach does not try to impact behaviors that lead to oil spills, behavior can be impacted absent a tax / fee system; a well-funded and well-run regulatory / enforcement program can change the behavior that contributes to the risk of oil spills.

   One way to create this revenue stream is to charge a fee for transporting bulk

quantities of commodity oil (volume to be determined) either via pipeline, vehicle, train, or vessel into or out of a facility where the transport, or transfer after transport, is done on or over water or within a distance that could drain to waters of the state.

This approach provides all of the attributes of a high quality revenue structure. It comes from a reliable source and imposes a similar burden on those in similar circumstances—those who engage in the trade of oil as a commodity above certain volumes. It would allow for administration that is inexpensive and efficient. Also, the fee would have minimal impact on economic decision making for two reasons. First, as long as oil is the engine of our economy, a fee on its transport will not prevent its import into Washington State. Second, because the fee would be passed to all consumers of oil, the fee would be diluted that it should not be a disincentive for large vessels to refuel in Washington State.

There is precedent in other states that have broadened the base of revenue that supports oil spill programs to include pipelines, railroads, and trucks.

Also, this approach would seem to burden primarily the industrial sectors that had an average top ten ranking across all four of the risk evaluation methods presented by JLARC in its report. Burdened would be tank ships, pipelines, refineries, railroads, oil terminals, tank trucks, gas stations, and tank barges. In addition to burdening oil associated with tank ships, it would also burden oil associated with activities that appear to pose even more risk than tank ships—such as pipelines, refineries, railroads, oil terminals, and tank trucks. Those ranking in the top ten that would likely to be directly burdened under this system would be facility / other, power utilities, and cargo vessels. It is not clear what comprises the "facility / other" category.

2. **Eliminate the current barrel tax and replace it with an across the board fee on all bulk transfers of oil products (volume to be determined) on or over water or within a distance that could drain to waters of the state.**

The Legislature could bring all fee transfers under the jurisdiction of the notification requirements set forth in Ecology Spills Program's oil transfer rule. All transfers, both in and out of a refinery, for example, would be subject to notification and a fee.

The volume set for this fee could be aimed at burdening the top ten riskiest industrial sectors identified in the JLARC report. These include facility / other, tank ships, pipelines, refineries, railroads, oil terminals, tank trucks, gas stations, power utilities, tank barges, and cargo vessels.

This approach provides all of the attributes of a high quality revenue structure. It comes from a reliable source and imposes a similar burden on those in similar circumstances—those who either engage in the trade of oil as a commodity above certain volumes or use / transfer oil for use above certain volumes. Because it

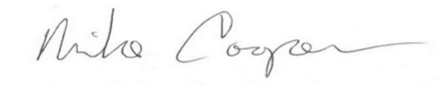
would be tied only to transfers regulated by the Ecology Spills Program, this system would allow for administration that is inexpensive and efficient. Also, the fee would have minimal impact on economic decision making. If it is otherwise profitable to do business in Washington State, a reasonable fee on bulk transfers may be fairly unnoticeable.

Additionally, the Department of Ecology Spills Program recently briefed the Council on a new fee that the Program is proposing. The proposed fee is called the Oil Handling Fee. It would serve as a means of filling the gap between the predicted funds that will be available in the next biennium from the Oil Spill Prevention Account and projected programmatic spending from that account based on current spending levels.

This fee is consistent with the type of funding source that the Council proposed in its 2006 Annual Report. For this reason, I believe that the Council would generally be supportive of this fee.

Thank you again for the opportunity to provide comment. Please do not hesitate to contact me regarding these comments.

Very truly yours,



Mike Cooper, Chair
Washington Oil Spill Advisory Council

cc: Jay Manning, Director, Department of Ecology
Cindi Holmstrom, Director, Department of Revenue
Phil Anderson, Interim Director, Department of Fish and Wildlife
Keith Phillips, Executive Policy Advisor, Governor's Policy Office
Victor Moore, Director, Office of Financial Management

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JLARC

December 5, 2008

TO: Ruta Fanning, Legislative Auditor
Joint Legislative Audit and Review Committee (JLARC)

FROM: Cindi Holmstrom, Director
Department of Revenue

SUBJECT: **JLARC Preliminary Report: "Review of Oil Spill Risk and Comparison to Funding Mechanism"**

Thank you for providing the Department of Revenue the opportunity to respond to JLARC's preliminary report: "Review of Oil Spill Risk and Comparison to Funding Mechanism."

The report focuses on whether the mechanisms funding the state's oil spill programs align with the sources of oil spill risk. The report makes no recommendations with respect to alternative funding mechanisms. We have no comments to offer other than to say we have enjoyed working with JLARC staff on this study. I would like to commend you on the care that has gone into this preliminary report.

Representatives from the Department will look forward to attending the presentation of the final report to the JLARC members on January 7, 2009, and working with you and JLARC staff on future JLARC studies.

cc: Leslie Cushman, Deputy Director, Department of Revenue
Russ Brubaker, Senior Assistant Director for Tax Policy, Department of Revenue
Mark Craig, Assistant Directory, Legislation and Policy, Department of Revenue
JoAnne Gordon, Tax Policy Specialist, Legislation and Policy, Department of Revenue
Don Taylor, Tax Policy Specialist, Research, Department of Revenue

STATE OF WASHINGTON
OFFICE OF FINANCIAL MANAGEMENT
Insurance Building, PO Box 43113 • Olympia, Washington 98504-3113 • (360) 902-0555

December 8, 2008

TO: Ruta Fanning, Legislative Auditor
Joint Legislative Audit and Review Committee

FROM: Victor A. Moore, Director
Office of Financial Management

SUBJECT: **JLARC REVIEW OF OIL SPILL RISK AND COMPARISON TO FUNDING MECHANISM – PRELIMINARY REPORT**

Thank you for this opportunity to review and comment on the Joint Legislative Audit and Review Committee's preliminary report on the Review of Oil Spill Risk and Comparison to Funding Mechanism.

We have no specific comments at this time, but appreciate knowing that the preliminary report was presented to the Committee at its December 3, 2008, meeting and that the proposed final report is scheduled for presentation to the Committee on January 7, 2009.

Again, thank you for the opportunity to comment. Please don't hesitate to contact Linda Steinmann of my staff at 902-0573 with any questions.

cc: Jay Manning, Director, Department of Ecology
Cindi Holmstrom, Director, Department of Revenue
Phil Anderson, Interim Director, Washington Department of Fish and Wildlife
Mike Cooper, Chair, Oil Spill Advisory Council
Keith Phillips, Executive Policy Advisor, Governor's Policy Office

APPENDIX 3 – ECOLOGY'S SPILLS PROGRAM REGULATORY ENVIRONMENT

The Department of Ecology's Spill Prevention, Preparedness, and Response Program (Spills Program) performs regulatory activities, related to oil, that are authorized in statute. The majority of these activities are performed within a shared jurisdiction with the U.S. Coast Guard or the Environmental Protection Agency (EPA). The Spills Program's regulatory activities are listed in the table on the following page. The table provides information pertaining to the Spills Program's regulatory activities within the four focus areas of prevention, preparedness, response, and Natural Resource Damage Assessments (NRDA) or restoration. Sources are listed in the first column, with the regulatory activities by focus area listed across the corresponding rows.

Ecology's Regulatory Universe—An Overview

Sources	Prevention	Preparedness	Response	NRDA
	Oil products only / spills to surface and ground water		From All Sources	
Note: Shared jurisdiction with the US Coast Guard or EPA.	Authority: RCW 88.46.050, 88.46.160, 88.46.165, 90.56.220, 90.56.230, 90.56.300, 90.56.310	Authority: RCW 88.46.060-100, 88.46.120, 88.46.160, 90.48.080, 90.56.050-060, 90.56.210, 90.56.240, 90.56.270-280, 90.56.310-320	Authority: RCW 90.56.020, 90.56.350, 90.56.500, 69.50.511	Authority: RCW 90.48.366, 90.48.367, 90.48.368
Oil tankers and barges	• Voluntary Best Achievable Practices (VBAP) / ECOPRO • Waterway Management • Monitor oil transfer operations	• Review contingency plans • Conduct drills • Financial Responsibility	• All spills and hazmat • Spills and hazmat to water and ground	• Oil spills where 25 gallons or more spill to surface water
Cargo (non-tank), fishing vessels, and passenger vessels > 300 gross tons	• Conduct inspections of vessels • Waterway Management • Monitor oil transfer operations • Education and outreach through UW Sea Grant program for fishing vessels	• Review contingency plans—umbrella plans • Conduct oil spill contingency plan notification drills • Financial Responsibility		
Class 1Facility: Cargo terminals and pipe lines (refineries)	• Review prevention and training certifications plans • Review operations manuals • Conduct inspections of facilities • Monitor oil transfer operations	• Review contingency plans • Conduct drills • Financial Responsibility		
Class 2 Facility: Tank trucks, railcars, and portable tanks	• Review prevention and training certifications plans • Review operations manuals • Conduct inspections of facilities • Monitor oil transfer operations	• Review response plans • Conduct drills		
Class 3 Facility: Tank farms and terminals (transfers to vessels with a capacity of > 10,500 gallons but not to tank vessels or pipelines)	• Conduct inspections of facilities • Monitor oil transfer operations			
No shared jurisdiction Class 4 Facility: Marinas or other small fueling facility that transfers oil to non-recreational vessel with capacity of < 10,500 gallons.	• Collect transfer volume data bi-annually • Education and outreach through UW Sea Grant program for marinas			

Source: Department of Ecology.

APPENDIX 4 – PREVENTION, PREPAREDNESS, RESPONSE, AND RESTORATION ACTIVITIES

The table on the following page provides a detailed reference list describing the types of oil spill activities performed by the Department of Ecology's Spill Prevention, Preparedness, and Response Program. These activities are categorized by the four focus areas; Prevention, Preparedness, Response, and Restoration.

Prevention: The goal of prevention is to keep oil spills from vessels and oil handling facilities from occurring in Washington State. See Appendix 3 for regulatory activities related to prevention.

Preparedness: The goal of preparedness is to establish and maintain industry and state ability to respond to oil spills. See Appendix 3 for regulatory activities related to preparedness.

Response: The goal of response is to clean up oil spills of any size by the responsible party, the state, local governments, tribes, and the federal government when appropriate.

Restoration: The goal of restoration is to bring the environment back to its original condition prior to damage caused by an oil spill. Natural Resource Damage Assessments are conducted to determine the extent of damage caused by an oil spill to surface water of 25 gallons or more.

Department of Ecology's Prevention, Preparedness, and Response Program Oil Spill Activities

Prevention	Preparedness	Response	Restoration
• Vessel and facility inspection • Vessel risk screening • Plan/Operations manual review and approval • Spill and accident investigation • Oil transfer monitoring • Enforcement • Emergency response tug management • Voluntary Best Achievable Standard/Exceptional Compliance Program • Activity/Incident/Inspection Database management • Interagency cooperation and collaboration on prevention measures • Outreach and education	• Oil spill drills and review of industry spill plans • Development of Area Plan including Geographic Response Strategies • Development of rules and protocols • Inspection of response equipment • Staff, industry, and volunteer training • Work groups (NWAC) • Washington Oil Spill Advisory Council activities such as independent research and reports • Enforcement • Approval of response contractors • Outreach and education	• Physical response and cleanup of small and large oil spills • Oversight activity when Responsible Party is actively participating • Shoreline mapping and clean-up planning • Oversee wildlife rescue, rehabilitation, and release • Resource Risk Analysis • Develop and maintain NRDA baseline data • Public information • Develop response plans (sampling, disposal, decontamination, salvage, etc.) • Enforcement • Outreach and education	• Natural Resource Damage Assessments (evaluate damages to fish, wildlife, natural environment, and resources) • Negotiation of restoration settlements • Participation in post-response committees or teams • Oversight for restoration projects • Outreach and education

Source: Department of Ecology's Spill Prevention, Preparedness, and Response Program.

APPENDIX 5 – ECOLOGY'S SPILLS PROGRAM BUDGET

As discussed on page 6 of the report, the oil spill portion of the Department of Ecology's Spills Program budget is estimated to be $30.4 million for the 2007-09 Biennium. This estimate, as well as budget information for the Department of Fish and Wildlife and the Washington Oil Spill Advisory Council discussed on page 7 of the report, is based on data obtained in May 2008. Of the $30.4 million, 46 percent ($13.9 million) of the estimated biennial budget for the Spills Program's oil spill activities includes funds that are restricted in their use:

- Oil Spill Response Account funds ($7.1 million) are used for non-budgeted activities in the event of a spill response estimated to cost over $50,000.
- The Spills Program received authority to spend one-time funds from four accounts (State and Local Toxics, Coastal Protection, and Aquatic Lands Accounts) in Fiscal Year 2009 for the Neah Bay rescue tug contract ($3.4 million).
- The balance of the Vessel Response Account funds ($1.6 million) is used solely for the Neah Bay rescue tug contract.
- Coastal Protection Account funds ($1.8 million) are dedicated to natural resource restoration and special research projects, not including FTEs.

All other budgeted expenditures from the remaining two major accounts, Oil Spill Prevention Account and State Toxics Control Account, as noted on page 26 in Exhibit 8, total to $16.5 million. These expenditures are associated with oils spills over land as well as over water.

The 2007-09 Spills Program budget also includes an estimation related to the State Toxics Control Account budgeted expenditures. The Department of Ecology estimated that 62 percent ($3.6 million) of the State Toxics Control Account funding is used specifically for oil spill response. This required an estimate due to the fact that this account is used for both hazmat and oil and these activities are not accounted for separately. JLARC calculated the State Toxics Control Account budgeted expenditures (and FTEs) based on this estimate.

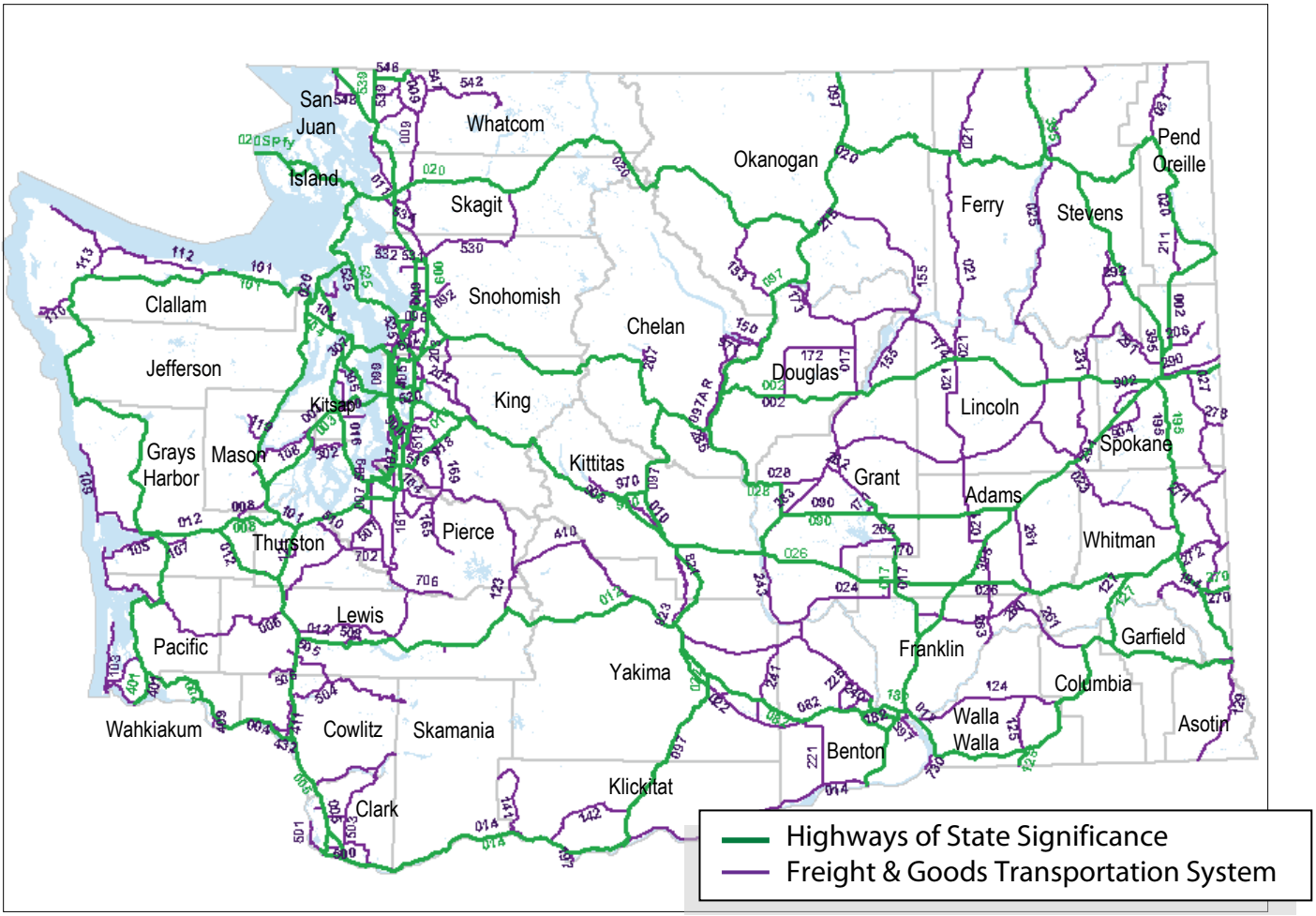
APPENDIX 6 – MAPS: GEOGRAPHIC LOCATIONS OF SOME POTENTIAL RISK SOURCES

There are many ways in which oil spills can end up in the state's waters as shown in the relative risk assessment results. The following maps provide a state-wide orientation to *some* of the locations and transportation routes from *some* of the source categories in the risk assessment. These maps include major highways and interstates, state-regulated facilities with oil spill contingency plans, marine terminals and refineries, gas and hazardous liquid pipelines, ferry routes, large vessel transit routes, railroads, and airports.

It is important to note that these maps are intended to provide a visual perspective on some areas in which there are identified source categories as indicated in the risk assessment. These maps are not intended to provide a comprehensive view of every potential source of oil spills in the state.

Major Highways and Interstates

The map below shows the major highways and interstates in Washington. Those routes with thinner, purple lines represent the roads with the heaviest truck traffic.



Source: Washington State Department of Transportation.

State-Regulated Facilities with Oil Spill Contingency Plans

(legend on following page)

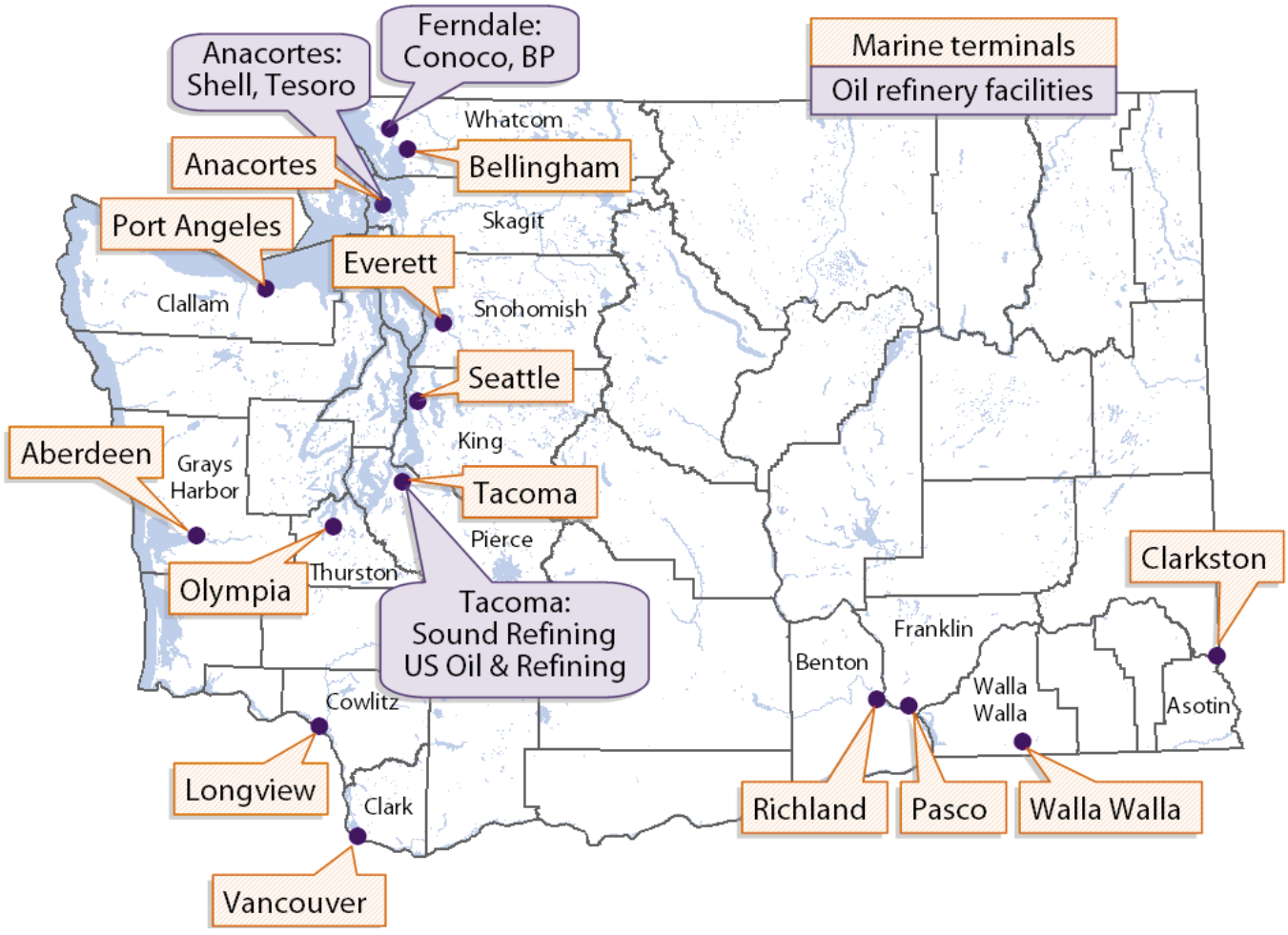
Source: Department of Ecology.

Legend: Map of State-Regulated Facilities with Contingency Plans

1. Rainier Petroleum
2. Conoco Phillips Tacoma Terminal South
3. Olympic Pipe Line Co Woodinville Station
6. Tesoro West Coast Co Vancouver Terminal
8. Tidewater Terminal Co Snake River
9. Conoco Phillips Co Ferndale Refinery
10. BP Cherry Point Refinery
11. Shell Opus Puget Sound Refinery
12. US Oil & Refining Tacoma
13. US Navy Fisc Manchester PCB
14. US Navy Fisc Manchester
15. US Navy Fisc Manchester Industrial
18 Tesoro Refining & Marketing Company
20. Nustar Energy LP
21. Olympic Pipeline Company
22. McNeil Island Corrections Center
23. Shore Terminal Nustar Energy LP
24. Conoco Phillips Renton Terminal
25. Olympic Pipe Line Co Harbor Island
26. BP West Coast Products
27. Shell Oil Product Seattle Terminal
30. Olympic Pipe Line Co Renton Station
32.Trans Mountain Oil Pipe Line
33. Sound Refining Inc
34. Olympic Pipe Line Co Ebey Slough Cross
35. Imperium grays Harbor Biodiesel Products
36. Olympic Pipe Line Co Anacortes Station
37. Tidewater Terminal Co Wilma Terminal
38. Olympic Pipe Line Co Olympia Df
39. Olympic Pipe Line Co Olympia Station
42. Olympic Pipe Line Co Tacoma Df
44. Conoco Inc
45. Exxon Mobil Spokane Terminal
46. Chevron Pipeline Co Pasco Bulk Terminal
47. Olympic Pipe Line Co Bayview Terminal
48. Olympic Pipe Line Co Castle Rock Station

Note: refineries are noted in red.

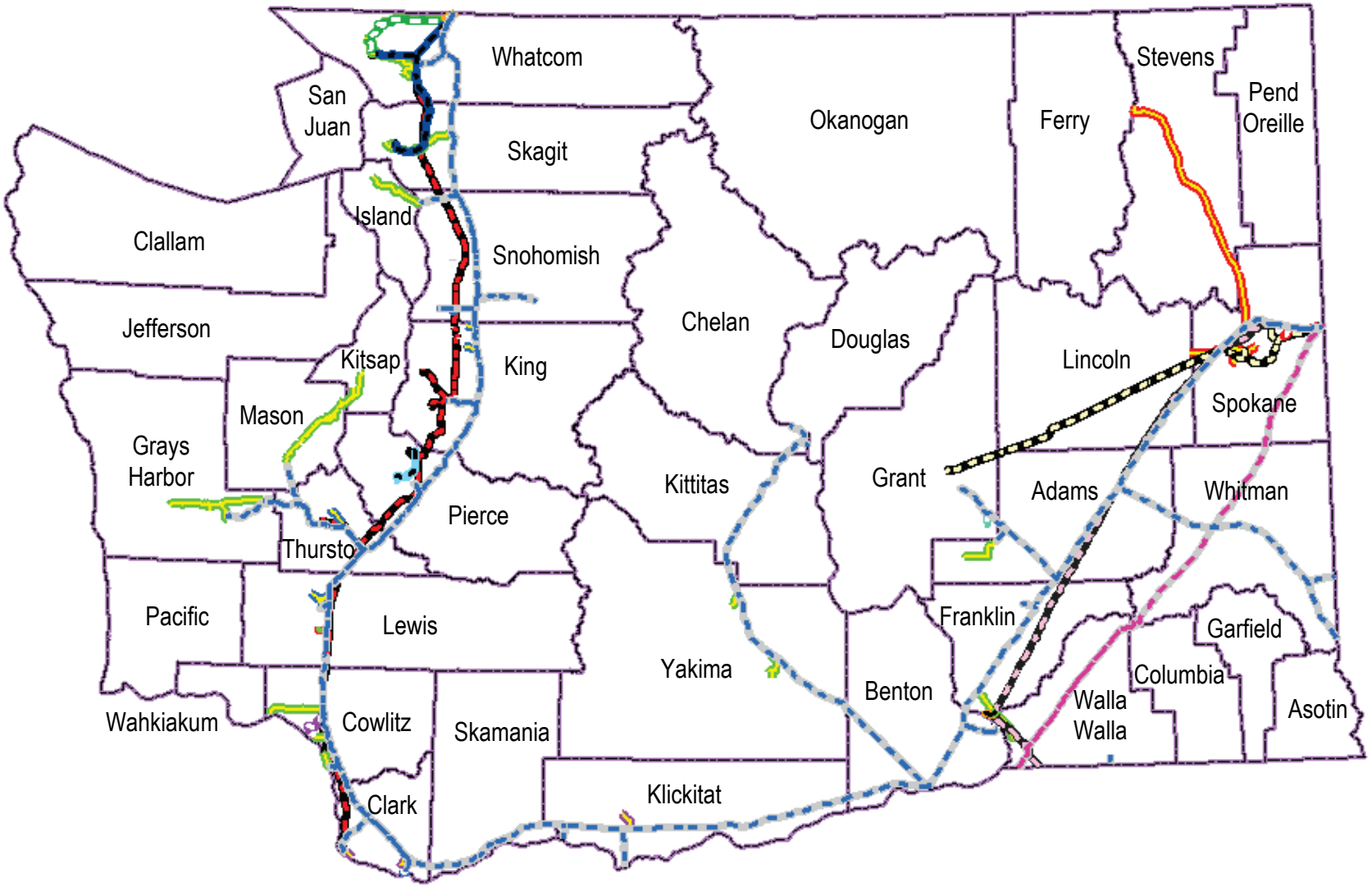
Marine Terminals and Refineries



Source: Department of Ecology and Washington Ports.

Gas and Hazardous Liquid Pipelines

(legend on following page)



Source: Utilities and Transportation Commission.

Legend: Map of Gas and Hazardous Liquid Pipelines			
Agrium U.S. Inc.		Kinder Morgan Canada	
Avista Utilities Corp.		McChord Pipeline Company	
BP Cherry Point Refinery		Northwest Natural	
BP Pipelines North America		NuStar Energy L.P.	
Cardinal Glass		Ochoa AG Unlimited Foods	
Cascade Natural Gas		Puget Sound Energy	
Chevron Pipeline Company		Sumas Cogeneration Co. L.P.	
Conoco Phillips - Yellowstone Pipeline		Tidewater Barge Lines	
Evergreen Aluminum		TransCanada - GTN System	
Ferndale Pipeline System		Weyerhaeuser Paper Co.	
Georgia Pacific - Camas Mill		Williams Northwest Pipeline	
Inland Empire Paper Co.			

Ferry Routes

Source: Washington State Department of Transportation.

Large Vessel Transit Routes – Actual Track Line Examples

The maps on the following page provide two examples of large vessel transit track lines to illustrate vessel routing through the Outer Coast, Strait of Juan de Fuca, Inner Straits, Rosario Strait and Vicinity, Whidbey Basin, and the Puget Sound region.

The first map on the following page provides an example of track lines (thin blue line) from an actual petroleum tanker transit inbound to Cherry Point. The purple dotted lines are directional reference points for the vessels.

The second map on the following page provides an example of a week of actual cargo ship transits into and out of Washington's waters (including transits to/from Canadian ports).

Tracked Transits from the Marine Exchange of Puget Sound

The Marine Exchange of Puget Sound (Marine Exchange) is a non-profit organization that serves as an information clearinghouse related to maritime operations, for its members. The primary role of the Marine Exchange is to track and monitor vessel movement. The Marine Exchange tracks vessel arrivals to Puget Sound ports through the use of an electronic vessel tracking system. The majority of the tracked vessels are called deep draft vessels, due to their size, and they call on both public ports and private terminals throughout the Puget Sound region.

Vessel types include petroleum tankers, non-petroleum tankers, cruise ships, container vessels, bulk vessels, car carriers, roll-on roll-off vessels (RoRo's) that carry vehicles including trucks with trailers carrying cargo, cable layers, large commercial fishing vessels, yachts, etc.

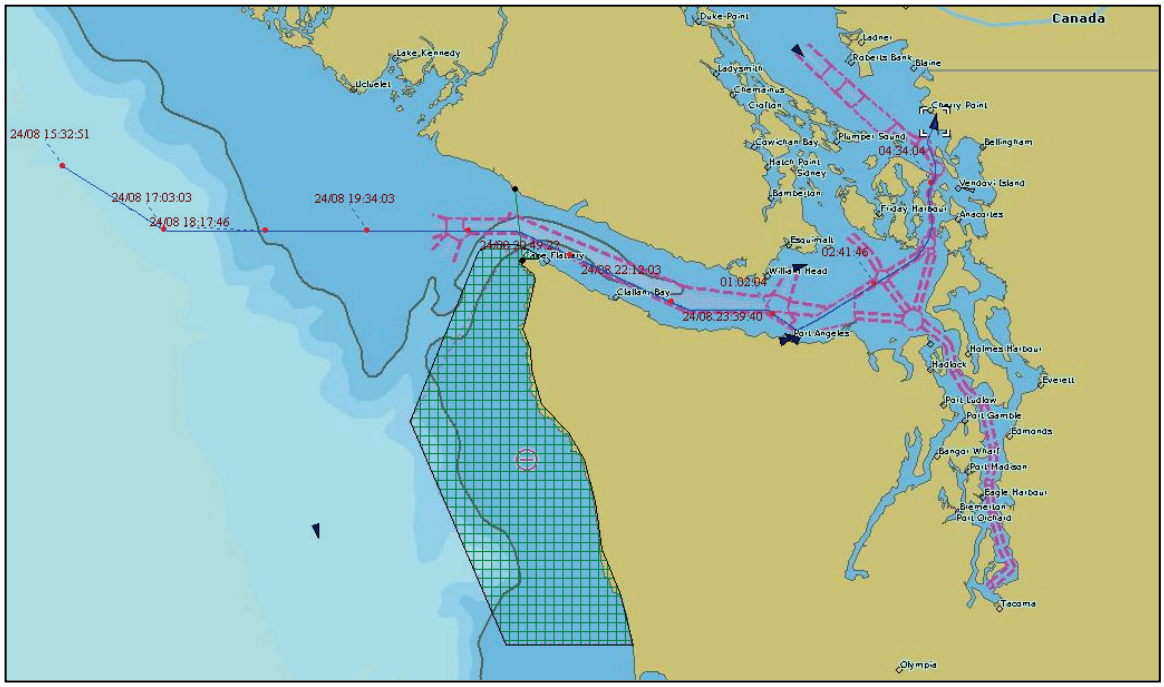
The Vessel Routing System

Vessels follow specific traffic separation routes into and out of public and private terminals and to and from designated anchorages. This traffic system with specified routes is set up to provide predictability in the movement of vessels throughout Washington's waters.

Vessel Traffic

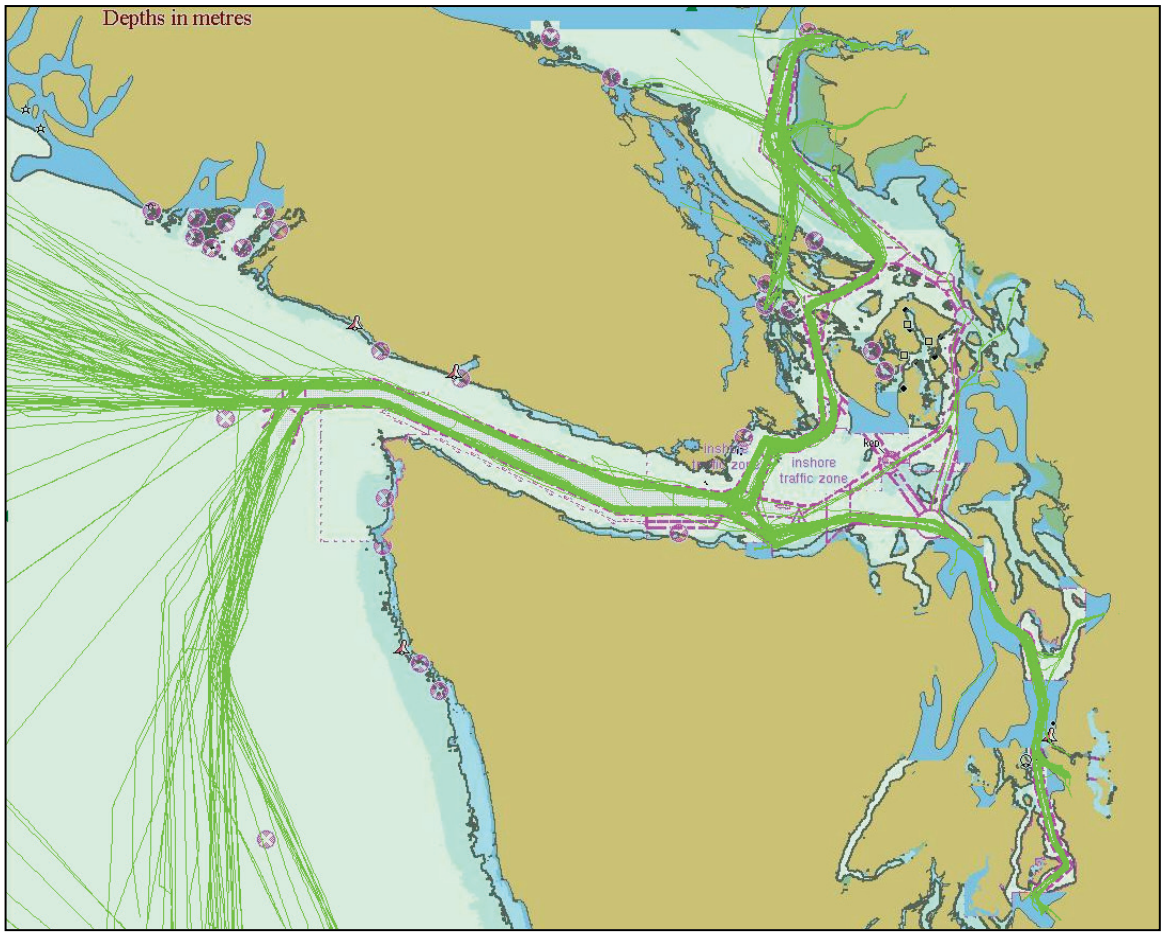
While the focus of this report was not on characterizing vessel traffic routes, JLARC did learn about some patterns in the types of vessels that move through western Washington's waters based on maps from the Department of Ecology: most passenger vessel trips are located in the Puget Sound region, the larger crude and petroleum vessels travel to Cherry Point, Ferndale, and Anacortes, and other commodities transit routes beyond those transited by crude and petroleum vessels into areas south of Tacoma.

Petroleum Tanker Transit to Cherry Point



Source: Marine Exchange of Puget Sound.

Cargo Ship Transits



Source: Marine Exchange of Puget Sound.

Railroads

Source: Washington State Department of Transportation.

Airports

Source: Washington State Department of Transportation.

Airports (continued)

Source: Washington State Department of Transportation.

Airports (continued)

Source: Washington State Department of Transportation.

APPENDIX 7 – OIL SPILL RISK ASSESSMENT METHODOLOGY

One of JLARC's assignments is to assess the risk of oil spills in Washington's waters. There are many different ways to analyze risk. The analysis conducted for this JLARC study looks at the relative risk of oil spills in Washington's waters to estimate such risk in the future.

For this task, JLARC contracted with experts in the field of oil spill risk analysis. The consultants were hired from Applied Science Associates, Environmental Research Consulting, and Herbert Engineering Corporation to conduct the assessment of the relative risk of oil spills in Washington's waters. The team is internationally recognized for their expertise in the fields of oil spill risk, oil spill modeling, impact assessment, Natural Resource Damage Assessment, response cost analysis, spill database development, and vessel traffic analysis. The team members also have specific experience in spill risk analysis in Washington.

The purpose of this appendix is to provide additional detail about the approach the consultants' analysis uses to assess oil spill risk in Washington's waters.

Waters of the State Defined

The scope of this study refers to an analysis of the relative risk of oil spills in Washington's waters. Waters of the state is defined based on RCW 90.56.010, but excludes underground water.[3] Waters of the state included in this analysis are lakes, rivers, ponds, streams, inland waters, salt waters, estuaries, tidal flats, beaches and lands adjoining the seacoast of the state, sewers, and all other surface waters and watercourses within the jurisdiction of Washington.

Review of Related Previous Reports

The initial step in the assessment of risk was to identify relevant risk factors for this study based on a review of previous research and the consultants' expertise. Previous reports most directly related to spill probability in Washington, as it relates to the assessment of risk, and studies and modeling of the impacts of oil spills were used to form the perspective of the study. This review and the consultants' previous experience informed the choice of appropriate factors to consider in data analysis and categorization of relative risk.

Oil Spill Risk: A Function of Spill Impacts and Spill Probability

The analysis approaches the assessment of oil spill risk in Washington waters by applying a standard technical definition of risk that includes the probability (likelihood) of spill incidents and the impacts (consequences) of those oil spill incidents. In other words,

Spill risk = probability of spill x impacts of spill

[3] Underground water does not align with the focus of oil spills "over water" for the purposes of this study.

While this formula reflects a standard technical definition of risk, there are many different ways to calculate this risk. The analysis conducted for this JLARC study can be described in four steps: 1) the calculation of spill impacts; 2) analyzing spill probabilities; 3) identification of four approaches to assessing relative risk; and 4) bringing the impact scores and probability together to calculate relative risk.

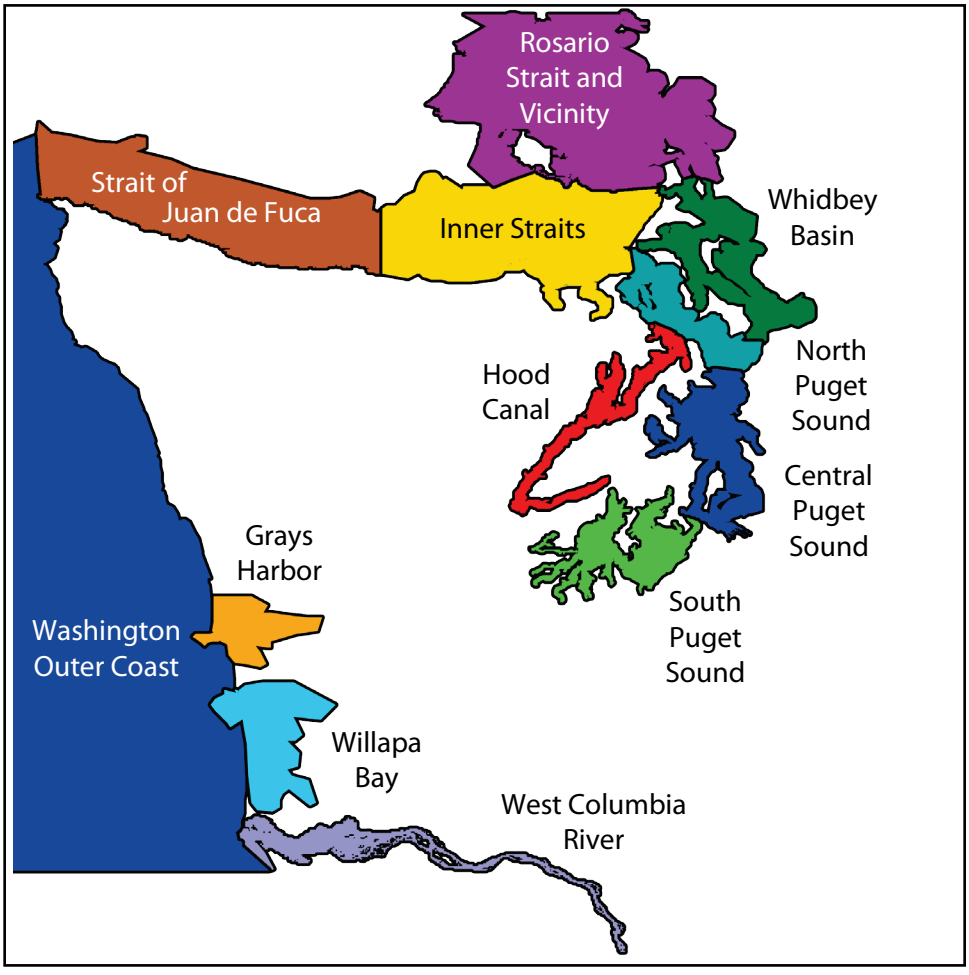
Step #1 – Calculating Spill Impacts

The calculation of spill impacts derives from the Department of Ecology's Washington Compensation Schedule located in Chapter 173-183 of the Washington Administrative Code (WAC), "Preassessment screening and oil spill compensation schedule regulations." This chapter contains separate provisions for assessing the vulnerability to oil spills of marine and estuarine waters and of freshwater streams, rivers, and lakes. The analysis conducted for JLARC follows this same division.

Spill Impact Calculations in Marine and Estuarine Waters

The impact analysis begins with the division of Washington's marine and estuarine waters into 12 geographic zones, as shown in the map below.

Marine and Estuarine Waters Are Grouped Into Twelve Geographic Zones



Source: JLARC consultants, Applied Science Associates (ASA).

With the exception of the Western Columbia River zone, each of these zones is further divided into subregions. The analysis then breaks these subregions down further into a habitat grid, with each cell representing one of 37 habitat types (for example, marine intertidal or estuarine subtidal).

The analysis calculates a Spill Vulnerability Score (SVS) for each subregion, using combinations of the four seasons and six oil types. (The six oil types used throughout the risk assessment are light oils, gasoline, jet fuel, heavy oils, crude, and non-petroleum oils.) For example, the analysis includes a SVS for each subregion for a crude oil spill in the Spring.

Conceptually, the Spill Vulnerability Score is a function of three different aspects of the spilled oil, combined with consideration of what is vulnerable to the spill.

The three different aspects of spilled oil are:

- **Acute toxicity** – The degree to which oil is capable of causing adverse effects on fish, invertebrates, and wildlife after short-term (hours to days) exposure;
- **Mechanical injury** – The propensity of the type of oil to coat or clog organisms and their appendages and openings (e.g., oiled birds); and
- **Persistence** – The length of time the type of spilled oil is known to or is likely to persist in a variety of habitat types.

In terms of what is vulnerable to the spill, the calculation incorporates the vulnerability of:

- Marine birds;
- Marine mammals;
- Marine fish;
- Shellfish;
- Salmon;
- Recreation; and
- Habitat.

The vulnerability for the first six elements in this list varies by subregion and by season. Habitat vulnerability scores are calculated using the finer gradations of the subregions into the 37 specific habitat types. A habitat vulnerability score for a subregion reflects the averaging of all the habitat vulnerability scores in the subregion based on the habitat grid.

The Spill Vulnerability Score for a marine/estuarine geographic zone is an area-weighted average of the values for all the subregions within that zone.

A spill impact score is a relative score on a scale of 1–50 per gallon based on all of these factors as follows:

$$0.1*[(OIL_{AT}*SVS_{AT,j}) + (OIL_{MI}*SVS_{MI,j}) + (OIL_{PER}*SVS_{PER,j})]$$

using the following for SVS_{ij}

$$SVS_{ij} = HVS_i + BVS_j + MVS_j + MFVS_j + SFVS_j + SAVS_j + RVS_j$$

where:

$SVS_{i,j}$ = *spill vulnerability score (from WAC 173-183-400(3), Equation 2)*

OIL_{AT} = *Acute Toxicity Score for oil*

OIL_{MI} = *Mechanical Injury Score for oil*

OIL_{PER} = *Persistence Score for oil*

0.1 = multiplier to adjust score to the 1-50 per gallon range

i = acute toxicity (AT), mechanical injury (MI), or persistence (PER)

j = the most sensitive season affected by the spill: spring, summer, fall or winter

HVS_i = *habitat vulnerability to oil's propensity to cause impact, varies by habitat type and each of acute toxicity (AT), mechanical injury (MI), or persistence (PER)*

BVS_j = *marine bird vulnerability score, varies by subregion and season*

MVS_j = *marine mammal vulnerability score, varies by subregion and season*

$MFVS_j$ = *marine fish vulnerability score, varies by subregion and season*

$SFVS_j$ = *shellfish vulnerability score, varies by subregion and season*

$SAVS_j$ = *salmon vulnerability score, varies by species, habitat type and season*

RVS_j = *recreation vulnerability score, varies by subregion and season*

WAC 173-183-340 through WAC 173-183-470 provide additional detail on this approach. The spill impact scores provide a measure of the relative impact ***per gallon*** from a spill of a particular type of oil in a particular season in a marine or estuarine area.

Special Modification for the Western Columbia River

Consistent with WAC 173-183-500, the analysis uses a slightly different approach to assess spill impact within the estuarine zone designated as the Western Columbia River, which runs from the mouth of the Columbia River to Bonneville Dam. This geographic zone is divided into a grid of squares, each measuring one square kilometer.

The analysis yields Spill Vulnerability Scores for each square in the grid. Scores are calculated for the four different seasons and the six types of oil. These scores can then be averaged over the geographic zone.

As with the other marine and estuarine zones, the result is an impact score on a scale of 1-50 per gallon. The formula for the impact score for the Western Columbia River geographic zone is as follows:

$$0.2^* SVS_j (OIL_{AT} + OIL_{MI} + OIL_{PER})$$

where:

0.2 = multiplier to adjust score to 1-50 per gallon range

SVS_j = *spill vulnerability score (from WAC 173-183-500(3), Equation 7)*

j = the most sensitive season affected by the spill

OIL_{AT}, OIL_{MI}, and OIL_{PER} are the three different aspects of the spilled oil

$$SVS_j = (VS_1 + VS_2 + \ldots\ldots + VS_x)/x$$

$$VS_{i,j} = BSS_{i,j} + FSS_{i,j} + MSS_{i,j} + ISS_{i,j} + HSS_{i,j} + HUS_{i,j}$$

where:

VS_i = vulnerability score for cell i for a particular season

x = number of cells in the grid

BSS = bird sensitivity score (Appendix 6 of Chapter 173-183 WAC)

FSS = fish sensitivity score (Appendix 6 of Chapter 173-183 WAC)

MSS = mammal sensitivity score (Appendix 6 of Chapter 173-183 WAC)

ISS = invertebrate sensitivity score (Appendix 6 of Chapter 173-183 WAC)

HSS = habitat sensitivity score (Appendix 6 of Chapter 173-183 WAC)

HUS = human use sensitivity score (Appendix 6 of Chapter 173-183 WAC)

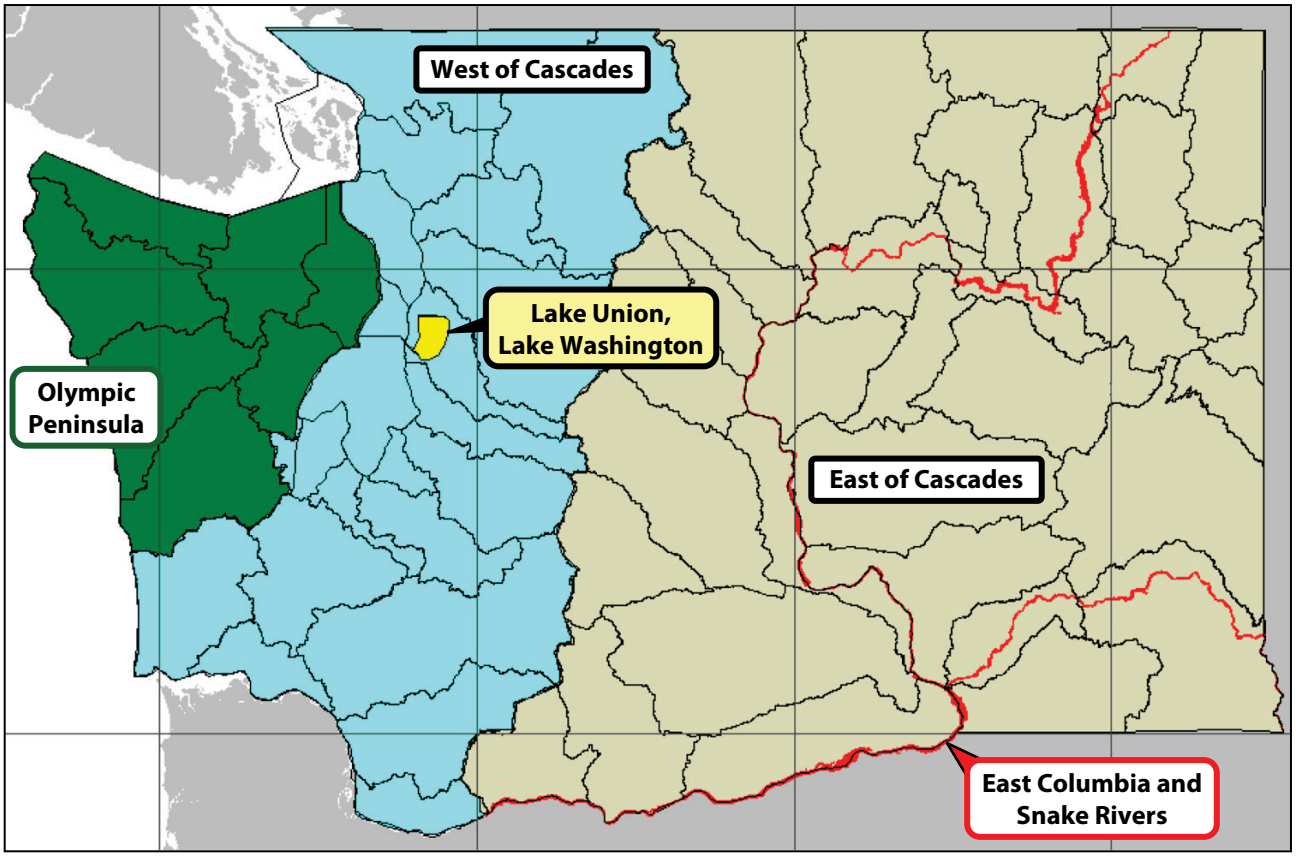
The impact scores provide a measure of the relative impact ***per gallon*** from a spill of a particular type of oil in a particular season within the Western Columbia River zone.

Spill Impact Calculations in Freshwater Streams, Rivers, and Lakes

The impact analysis for the freshwater bodies begins with the identification of the geographic areas to use in the calculations. The freshwater analysis designates Lake Union and Lake Washington (including the Ship Canal) as a geographic zone, as well as the Columbia and Snake Rivers upstream of Bonneville Dam.

The remainder of the inland area is divided into watersheds or Water Resource Inventory Areas (WRIAs). Chapter 173-500 WAC defines WRIA boundaries. The freshwater spill impact analysis groups WRIAs into three additional geographic zones: Olympic Peninsula, West of the Cascades, and East of the Cascades. The map on the following page shows the five geographic zones used in the freshwater analysis. The map includes the outlines of the WRIA boundaries.

Inland Areas Are Grouped into Five Geographic Zones



Source: JLARC consultants, Applied Science Associates (ASA).

The calculation below is for relative impact scores per gallon for oil spills into inland lakes, rivers, and streams:

$$0.08 * SVS * (OIL_{AT} + OIL_{MI} + OIL_{PER})$$

where:

0.08 = multiplier to adjust score to 1-50 per gallon range

SVS = Spill vulnerability score [from WAC 173-183-600(3)];

OIL_{AT} *= Acute Toxicity Score for Oil [from WAC 173-183-340];*

OIL_{MI} *= Mechanical Injury Score for Oil [from WAC 173-183-340]; and*

OIL_{PER} *= Persistence Score for Oil [from WAC 173-183-340].*

This formula is similar in many aspects to the formula for the marine and estuarine areas. SVS is again a Spill Vulnerability Score, and the oil components represent the same three aspects of spilled oil (acute toxicity, mechanical injury, and persistence). Scores are calculated for the same six types of oil.

A key difference in the freshwater calculations is that, for freshwater bodies,

$$SVS = HI$$

where HI is a habitat index. As WAC 173-183-620 explains, a habitat index is calculated to represent existing stream conditions prior to an oil spill. This approach acknowledges any degradation in the water body already present and not attributable to an oil spill. The greater the degradation, the lower the Spill Vulnerability Score.

WAC 173-183-620 spells out the factors to use in calculating the impacts of a specific freshwater spill. It was not possible to incorporate all of these factors into the risk assessment for the JLARC report. In some cases this is due to the lack of state-wide data. For some factors data is only available at a scale too fine to extend the information to the larger scales used in this analysis. This same issue arose in attempting to calculate impact scores for oil spills into freshwater wetlands. Information was not available statewide to delineate all freshwater wetlands into the required four wetland categories. The analysis assigns a score to these wetlands using the assumption that all freshwater wetlands are Category III. Likewise it was not possible to identify a state-wide database with water types classified for the Freshwater Vulnerability Score. However, for this study, a score of 5 for "Type 1 waters" was used based on WAC 222-16-031, resulting in a non-discriminating factor in the risk ratings. The habitat index used in this risk assessment is calculated as follows:

$$Habitat\ Index\ (HI) = [(P1+P2+P5+P6) \div Np]\ [f1 * f2]$$

where:

P1 = barriers to natural fish movement

P2 = urbanization

P5 = land use of watershed

P6 = impoundment

Np = number of P parameters used to calculate HI = 4

f1 = health of salmon and steelhead runs

f2 = water quality

For the first four factors in the above equation, the analysis uses the same scoring mechanism as described in the administrative rule. However, the analysis uses the scoring mechanism for what the rules call "Flow Alteration" to score the variable labeled as "P6 = impoundment". The analysis adds a factor to incorporate consideration of the health of salmon and steelhead runs. Lastly, the calculation uses a different scoring for water quality than what the rule presents. Consistent with WAC 173-183-620, the freshwater calculations do not include a seasonal component. The freshwater impact scores also exclude consideration of the following factors identified in WAC 173-183-620: water type; condition of riparian vegetation; condition of the flood plain; channel modification; and streambed condition. By using area-weighted averages, the analysis yields scores for WRIAs and for the geographic zones.

These impact scores provide a measure of the relative impact ***per gallon*** from a spill of a particular type of oil into a freshwater stream, lake, or river.

Step #2 – Analyzing Spill Probabilities

The analysis of spill probabilities utilizes a customized database of oil spill incidents in Washington's waters developed by the consultants. The database consists of reported spills from state, federal, and private sources from 1995 through 2007. Spills had to be a minimum of 50 gallons for inclusion in the database as this aligned with the consultants level of confidence in the accuracy of spill data. Spills that were considered "cleaned up" were included in the data set for analyses since much of the impact of these spills would have already occurred. Spills that did not spill directly into water but were likely to have entered water, such as through a storm drain, were also included. A more detailed discussion of data parameters and assumptions begins on page 93.

The time period of 1995 through 2007 was used because of changes in oil spill rates following the passage of significant federal legislation in 1990 and the implementation of the related regulations. The use of data prior to 1995 may have skewed the analysis toward conclusions that there was a higher oil spill risk than is actually realistic for the present or the future.

The customized database includes detailed information on 2,626 oil spill incidents, with a total spill volume of 2.2 million gallons.

The database of spill incidents was used to analyze the probability of spills by source, oil type, season, and geographic location. A probability distribution for each sector (source category and geographic location) was also developed. An example of a probability distribution of spill volumes in Washington is displayed in the table below.

Probability Distribution of Spill Volumes:
50 percent of spills are between 50 and 100 gallons

Percentile	Volume (gallons)
25th	55
50th	100
75th	200
90th	755
95th	1,900
99th	16,000
100th	277,200

Source: JLARC consultants, Applied Science Associates (ASA).

The percentile column indicates the percentage of incidents that are below that value. For example, 95 percent of Washington spills between 1995 and 2007 are less than 1,900 gallons.

In general, the pattern with oil spills is a negative linear correlation. This means that as spill volume decreases the number of spill incidents increase. However, there are fewer spill incidents below 100 gallons than expected. The consultants acknowledge that there are likely numerous spills under 100 gallons that are not reported. It is not possible to determine how many of these spills occur in Washington waters. However, the consultants used a statistical estimator (Bayesian) to analyze the number of unreported spills between 50 and 100 gallons based on Washington's historic spill data from 1995 through 2007. The analysis acknowledges that the total impact from unreported spills

under 100 gallons is negligible in this risk calculation framework. A description of this analysis begins on page 91.

Impact scores are integrated into the probability analysis by using volume as the multiplier to establish the relative risk score results. The relative risk score calculation is discussed in detail in Step #4.

Step #3 – Four Approaches for Assessing Relative Risk

The next step is to establish the framework for assessing the relative risk of oil spills in Washington's waters. The analysis conducted for the JLARC study uses four approaches to assess the relative risk of oil spills:

- Approach #1 - historic spills in Washington between 1995 and 2007;
- Approach #2 - potential spillage;
- Approach #3 - projected changes for the year 2015 based on historic spill data; and
- Approach #4 - projected changes for the year 2015 based on potential spillage.

These approaches incorporate spill volume, location of spills, type of oil spilled (the same six types as the impact scoring), timing of spills, and – importantly – the source of the spills for each of the oil spill incidents in the customized database. Each approach yields unique relative risk scores for each source category and geographic location.

Approach #1 - Historic Spills in Washington

For this first approach, the consultants used the customized database of actual historic oil spill incidents in Washington's waters from 1995 through 2007. The spills in the database were used to represent the geographic distribution of spills as well as the type of spills that occurred with regard to source, oil type, and volume. An impact score was assigned to each of the spill incidents based on the spill location, season (where applicable), and oil type. Step #4 discusses how probability and impact are combined to develop the relative risk scores.

Spill data is sorted by each of the geographic locations, the grouped geographic locations, and source categories. Results of the historic spill data risk assessment approach provide a relative measure of spill risk for each sector (source category and geographic location), estimating such risk in the future based on past history.

Approach #2 - Potential Spillage

A second approach to estimating future oil spill risk recognizes that some of the actual spills used in the first approach could have been worse resulting in larger volumes of oil spilled. This second approach combines a range of potential spill volumes for each source category with the probability that those spill volumes would occur. The range of potential spill volumes includes the small probability of a worst-case discharge. Probabilities for each of the potential spill volumes were based on an analysis of U.S.-wide, and for tank ships, world-wide, historic outflow percentages (the rate at which oil flows out of its container).

This range of potential spill volumes and their associated probabilities is applied to each of the source categories from the historic spill data. This application assumes that the pattern of past spill incidents remains the same.

For example, the worst-case discharge for a tank ship in Washington's waters is 32.7 million gallons.[4] Using national and world-wide spill data, there is a 0.01 percent chance that a tank ship spill would be a worst-case discharge, and a 90 percent chance that a tank ship spill would be less than 400,000 gallons. This information is used to derive revised relative risk scores for the seven tank ship spills in the database. A comparison between the actual volumes and the resulting potential volumes provided a percentage increase in spillage. These percentage increases were then used to recalculate the relative risk scores.

Results of the potential spillage risk assessment approach provide a relative measure of spill risk for each sector (source category and geographic location). This approach estimates such risk in the future based on a probability distribution of potential spill volumes, including the probability of a worst-case discharge.

Approach #3 - Projected Changes for the year 2015 Based on Historic Spill Data

A third approach builds from the historic spill data by applying knowledge about projected changes as a result of regulations, industry operations, and traffic. The analysis projects the extent to which these changes will impact spill volumes by the year 2015 assuming that the pattern of past incidents remains the same.

This estimation of future oil spill risk for 2015 adjusts the volume and patterns of spillage for each source category from the historic spill data using the following five assumptions:

- Owners and operators of tank ships and tank barges will have fully implemented requirements from the federal Oil Spill Pollution Act of 1990 for double hulls;
- The reduction of spill probability for tank ships will be about 20 percent, and there will be no net reduction for spill probability from tank barges;
- There will be an increase in spill probability from non-tank vessels of about 10 percent;
- For the largest spill volumes, the oil outflow from a double-hulled tank ship or tank barge accident will be 50 percent of the expected outflow from a similar accident involving a single-hulled vessel; and
- By 2015, there will be 25 percent fewer spills from oil terminals, gas stations, milling facilities, power utilities, airports, and other facilities captured under the source category "Facility-Other". This projection is based on a decrease in spillage from facilities that are regulated by the Environmental Protection Agency (EPA) under its Spill Prevention Control

[4] Washington State statute (RCW 88.16.190) limits the size of oil tankers to no greater than 125,000 deadweight tons (DWT) from entering Washington's waters at a point east of a line extending from Discovery Island light south to New Dungeness light. DWT is a measurement of weight at any loaded condition minus the lightship weight, or the actual weight of the ship itself. DWT includes crew, passengers, cargo, fuel, water, and stores.

and Countermeasures Program. The majority of these facilities are regulated by the EPA based on the volume of oil that they store.[5]

A number of trends in the marine industry influence the expected spillage of oil in Washington from shipping sources. These trends are grouped into three major areas; design, traffic, and operations. A list of some factors that influence vessel spill rates follow.

Design:

- Double-hull requirements for tankers and tank barges with the final phase-out of single hull completed in 2015
- Protective location of bunker tanks
- Transverse segregation of tankers (minimum double hull dimensions and elimination of single-tank-across tankers)
- Larger sizes of container ships, increases the volume of fuel carried
- Increase in Trans-Alaska Pipeline System (TAPS) oil transport in safer tank ships
- Double-hulling impact on total losses
- Changes in worldwide standards for ship design

Traffic:

- Vessel traffic into Washington waters will grow along with world and U.S. population and economic growth (this growth is likely to also occur with non-vessel oil transport such as tanker trucks).
- Increased congestion in waterways will be mitigated by effects of vessel tracking systems.
- Relevant, but harder to predict traffic factors:
    - Productivity of container ship industry is expected to decline due to port congestion.
    - Vessel speed: Lower speeds to improve fuel consumption and reduce air emissions will lead to increased tonnage requirements to meet scheduling.
    - Vessel routes transiting the Arctic may reduce traffic in Puget Sound when they become available.
    - Global and U.S. economic factors such as short-term swings cannot be taken into account in projections of traffic growth and corresponding spill risk over several years.

Operations:

- Spills in port (usually from routine operations) are expected to grow proportionally to traffic rates.
- Recognition by the industry of risk of liability is an impetus for improved operations.

[5] According to JLARC's consultants any facility that has had a previous spill would also fall under EPA regulations.

- Fundamental safety improvements in the marine industry
- Recent shortage of experienced crews to man larger fleets
- Rescue tug at western entrance to the Strait of Juan de Fuca
- Changes in fuel: Evolving air emission requirements may lead to the increased use of marine gas oils such as light diesel as fuel and "cold ironing" in port where a moored vessel utilizes shore sources to provide power for loading and unloading, reducing the use of fuel onboard.

Results of these reasonably anticipated projections for the 2015 risk assessment approach built on historic spill data provide a relative measure of spill risk for each sector (source category and geographic location). This approach estimates such risk in the future based on what the range of historic spill incidents from 1995 through 2007 might be expected to be like if they were to occur in 2015.

Approach #4 - Projected Changes for the year 2015 Based on Potential Spillage

The fourth approach uses the same five assumptions about percentage changes in future spill incidents and volumes as noted in the third approach. However, the fourth approach builds from the potential spillage data and factors in future estimations based on projected changes as a result of regulations, industry operations, and traffic by taking into account an adjusted range of potential spill volumes for each source category, including the probability of a worst-case discharge.

Results of projections for the 2015 risk assessment approach built on potential spill data provide a relative measure of spill risk for each sector (source category and geographic location). This approach estimates the future of such risk based on what the range of potential spill incidents might be expected to be like if they were to occur in 2015.

Step #4 – Calculating Relative Risk

Step #1 in this risk assessment provides a per-gallon estimate of the impact of an oil spill. This impact score includes consideration of the type of oil spilled, the location of the spill, and for marine and estuarine waters, the season of the spill. Step #2 of the process analyzes spill probabilities based on a customized database of spills. The source, volume, oil type, location, and timing of each spill incident is identified and analyzed. A framework of spill volumes is created by which the impact scores are integrated to establish the relative risk score results. Step #3 of the process identifies four different approaches for assessing the relative risk of oil spills in Washington's waters.

The fourth step in the risk assessment brings together the per-gallon impact scores and the probability distributions associated with each of the four approaches to develop spill risk matrices. There are two parts to Step #4. First, spill impact scores are assigned to each spill incident based on the location, season (if applicable), and oil type. Each unique probability distribution is then applied to the equations including adjustments for potential spillage and future estimations. The impact scores are then multiplied by the volume of each spill incident to obtain that spill's risk quotient.

These initial spill risk quotients (the number of gallons of a particular oil type multiplied by the relevant spill impact rating based on spill location, season, and oil type) can then be added together

in different groupings, for example, by geographic zone, by sub-region or WRIA, or by source type for further analysis. These spill risk quotients reflect both the probability of spills of different types and their relative impacts providing a relative measure of spill risk. For each of the four approaches, these results are placed in a risk matrix.

Each of these relative risk quotients, which range from 0 (for no spills in a particular category) to 30.2 million (for the risk of all spills across all of Washington's waters), are normalized to a 100-point scale in the risk matrices. The resulting numbers are the oil spill risk scores that are based on the data used for this analysis. These risk scores facilitate comparison within and between categories such as sectors (source category and geographic location) and relate the quotients with percentages (or proportions) of relative risk.

Normalizing the data involves dividing all the quotients by the largest total and then multiplying each by 100 to obtain a percentage score. Since each of the four approaches to determining spill volume is based on data from 2,626 spills, the probability that a single spill will occur that meets any one of the specific 2,626 combinations of probability and impact is assumed to be 1 in 2,626, or approximately 0.04 percent. The conversion to a 100-point scale means that each probability-weighted risk score for all spill incidents is proportionally scaled so that the total of all risk scores across all sectors (source category and geographic location) now adds up to 100 points, or 100 percent.

The final risk matrices reflect the normalized relative risk scores for each sector such that higher scores represent relatively higher oil spill risk and lower scores represent relatively lower oil spill risk.

Unreported Spills Estimated: Volume and Impacts Are Likely Small

The most common spills involve less than 1,000 gallons. The largest spills are the rarest. Spills of 10,000 gallons or more make up less than two percent of incidents. Below, the table identifies categorized spill volumes in Washington's waters.

Oil Spills in Washington's Waters by Volume Category From 1995-2007

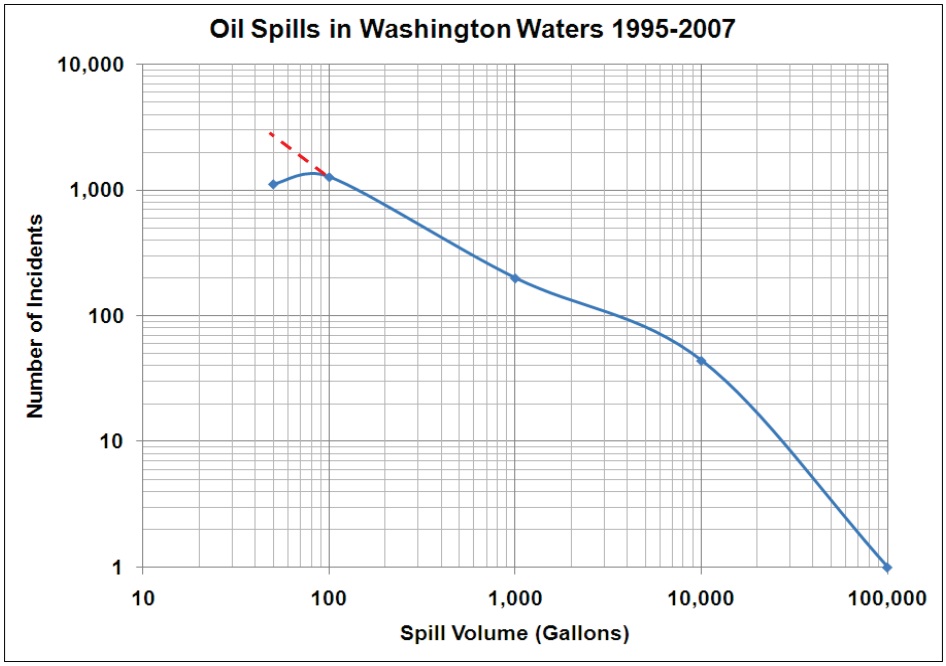
Spill Volume Category (gallons)	Total Number of Incidents	Percentage of Incidents
50-99	1,115	42.46
100-999	1,269	48.32
1,000-9,999	199	7.58
10,000-99,999	42	1.60
100,000-999,999	1	0.04
Total	**2,626**	**100.00**

Source: JLARC consultants, Applied Science Associates (ASA).

The fact that there are fewer spills in the 50-99 gallon category than the 100-999 gallon category indicates that there likely is a reduction in spill reporting in the smaller spills of less than 100 gallons.

In general, there is a negative correlation between the spill size and the spill number. This means that as spill volume decreases the number of spill incidents should increase. This relationship is shown in the graph below. The statistical estimator analysis of Washington spill incidents estimates the number of unreported spills between 50 and 100 gallons as indicated by the continuation of the actual correlation line with the red dotted line.

Bayesian Analysis Shows a Likely 1,500 Unreported Spills Between 50 and 100 Gallons



Source: Source: JLARC consultants, Applied Science Associates (ASA).

The red dotted line indicates that there are perhaps 1,500 spills between 50 and 100 gallons that are not reported to authorities. There are also likely to be tens of thousands of incidents less than 50 gallons going down to one gallon or less.

While there may be large numbers of spill incidents less than 100 gallons that are unreported, the consultants point out that the total volume is likely minimal compared to the actual volumes reported for spills over 100 gallons. However, their impact is not necessarily small. The impact, and thus the risk for these spills, will depend on the oil type, location, and season in which they occur. Since this risk assessment calculates spill impacts based on the Department of Ecology's Washington Compensation Schedule which is a per-gallon calculation, the total impact from the unreported spills would make up a small percentage of the total volume of gallons spilled and therefore would be negligible in the larger risk calculation perspective.[6]

[6] According to JLARC's consultants, the estimation of these unreported spills is important from the perspective of spill response activities.

Is the Impact of One Gallon the Same as Another?

The impact side of the risk equation is based largely on the Department of Ecology's Washington Compensation Schedule which creates a per-gallon impact score for each oil spill of a particular oil type, location, and season. This impact score is then multiplied by the volume spilled for each incident. The resulting risk quotient is therefore influenced by the volume spilled. However, the impact model incorporates the most important factors controlling impact such as the sensitivity and density of the resources in the locations oiled and the oil type, which determines the nature and degree of injury.

The influence of the various factors that affect oil spill risk scores is apparent in the data. Two examples follow:

- Two separate incidents in Rosario Strait and South Puget Sound spilled 84,000 gallons of light oil, but have different risk quotients due to their location.
- Two spills of 11,000 gallons each have different risk quotients because they involved different oil types, light and heavy, and they occurred in different locations.

Based on the risk results, it is clear that the impact of one gallon spilled is not the same as another gallon spilled due to a variety of factors that control the impact of oil spilled.

Data Reliability and Parameters

The consultants utilized several spill data sources for compiling the customized database of oil spills in Washington's waters from 1995 through 2007. These include: Department of Ecology's Environmental Response Tracking System (ERTS) and Marine Information System (MIS) data, United States Coast Guard's Marine Safety Information System (MSIS), Marine Information for Safety and Law Enforcement (MISLE), Office of Pipeline Safety data, National Response Center, United States Environmental Protection Agency's Emergency Response Notification System (ERNS), industry sources, the *Oil Spill Intelligence Report*, and Lloyd's Casualty.

The purpose of most of the spill data that was used for this study is for tracking emergency responses. The purpose of Ecology's spill data is for spill response and program management. None of the data was collected for the purpose of conducting a risk assessment.

For the impact rating calculations, the Department of Ecology's Washington Compensation Schedule qualitative rating system (WAC 173-183, "Pre-assessment Screening and Oil Spill Compensation Schedule Regulations") was used as the basis for a framework along with expert opinion. Data was also obtained from a variety of sources to perform some of the calculations such as: Washington Department of Fish and Wildlife (fish barriers), The 2001 National Land Cover Database (urban development), and Washington Department of Ecology Dam Safety Unit data (storage volumes of all dams).

Department of Ecology's Data: Reliability of Volume Determination

According to the Department of Ecology (Ecology), response and investigation staff receive training on volume determination. They use guidelines prepared specifically for oil spill investigations titled *Guidelines for Determining Oil Spill Volume in the Field (1996)*. These guidelines were compiled by

an independent contractor with spill response expertise from input by recognized industry and government experts from industry segments including: facility tanks, pipelines, marine barges, tugs, rail, highway, tank trucks, fishing vessels, ferries, tank ships, pleasure craft, aircraft, oil spill response and recovery, and sampling and analytical characterization.

Ecology states that each spill staff responds to is investigated and a determination of the volume spilled is made. The methods and assumptions used in the volume determination are documented in anticipation of an enforcement action (such as a penalty), cost recovery, natural resource damage assessment, and potential litigation.

There are three primary approaches to determining volume, in order of preference as indicated by Ecology:

1. Source (volumetric)
2. Recovery
3. Observation (aerial, shoreline)

In some cases a combination of these approaches is used to determine the volume spilled because source information is not always available or attainable due to late or no reporting by the spiller, container damage, or lack of record keeping.

According to Ecology, the methods are based on accepted scientific principals, such as geometric calculations, measured density calculations, temperature measurements, standard volumetric tables, and recognized American Petroleum Institute and American Society for Testing and Materials methods.[7] The least preferred method of obtaining volume estimates, from observations, also relies on accepted industry parameters determined from experimental evidence, such as oil thickness estimations made from oil-on-water color observations.

Applicability of the Washington Compensation Schedule

The spill impact analysis estimates oil spill impacts using formulas derived from the Department of Ecology's Washington Compensation Schedule (WCS), which is used by the state to calculate damages for individual spills. The resulting spill impact scores provide a measure of the relative impact per gallon from a spill of a particular type of oil in a particular season in a marine or estuarine area, within the Western Columbia River zone, or in freshwater streams, rivers, and lakes. A large range of impacts was taken into account for this analysis.

According to the consultants, compensation schedules, such as the WCS, are becoming increasingly popular around the world because they provide a clear process to estimate compensation for damages from the spill. These schedules are available for review by any interested party including the public, resources trustees, and potential responsible parties.

[7] The American Petroleum Institute is a trade association for the oil and gas industry that develops equipment and operating standards based on accredited standards from the American National Standards Institute with regular audits of its processes. The American Society for Testing and Materials is a voluntary standards development organization for testing, operation, and safety for all industries including the formulation of test methods, specifications, classifications, standard practices, definitions, and other standards pertaining to performance, durability, strength of systems and techniques used for the control of oil and hazardous substance spills.

The consultants identified two issues related to the WCS:

- Development of the WCS was intended for use with small spills that do not warrant the full Natural Resource Damage Assessment process. The range of compensations was set by statute to be $1-$50 per gallon spilled which was based on 1989 dollars. The range for the WCS estimates lead to much higher results than a full Natural Resource Damage Assessment as the size of the spill increases.
- The consultants also found that the table data for birds, habitats, marine fish, recreation, salmon and shellfish in the WCS were said to have been developed by expert opinion, but experts were not available at the time to develop the freshwater tables. Biologists and other resource experts are often concerned that the WCS lacks detail.

However, the purpose of this study is to develop a model for the *relative* impact of oil spills using a relative spill impact score on a scale of 1-50 per gallon.[8] The impact score is proportional to spill volume and therefore does not reflect the potential lessening of incremental impacts incurred with additional gallons spilled at higher spill sizes. However, it does incorporate the most important factors controlling impact such as the sensitivity and density of the resources in the locations oiled and the oil type, which determines the nature and degree of injury. Since the approach and risk rating factors are a quantitative method for characterizing impacts based on spill volume and oil effects and vulnerability rankings that are based on expert opinion, the relative impact risk model using these risk factors is a reliable method for the purposes of this study.

Data Parameters

The data that was used by the consultants to develop the customized database is the best available data from state, federal, and private sources during the time period of 1995 through 2007. However, it is important to keep in mind that: this data is collected for the purposes of program management and not for conducting a risk assessment, the accuracy of data collection has improved over time, and the science behind oil spills is relatively new and is continuing to improve over time. There is consensus among experts about the uncertainty of what is known, while recognizing that the industry is continuing to improve.

For this study, the consultants' were asked to analyze existing spill data to answer a very specific question: What are the sources of oil spill risk in Washington's waters? In reviewing and analyzing data to answer this specific question, the consultants used the following guidelines:

- In Washington's waters from 1995 through 2007;
- Of at least 50 gallons;
- Involve crude oil, refined petroleum products, vegetable oils, but not chemicals, non-petroleum hazmats, BTEX compounds, paints, or solvents;[9]

[8] The schedule that was used for this study was the one available at the time the consultants conducted their analyses. This did not account for the July rule change to $1-$100 per gallon.

[9] BTEX is an acronym for benzene, toluene, ethylbenzene, and xylene, which are volatile organic compounds found in common environmental contaminants. This definition is based on information from the United States Geological Survey, Toxic Substances Hydrology Program.

- Involve any type of source such as vessels, facilities, and residences;
- Enters a waterway directly or indirectly through storm sewers, culverts, or drainage ditches;
- Includes oil spills that are likely to have entered any pathway to water, even if during the next rain;
- Includes oil spills that are noted as having been cleaned up;
- Occurs as a discrete release over no more than one month's time;
- Does not involve the mere removal of oil-contaminated soil surrounding a long-term leak; and
- Occurred in Washington's waters or on Washington lands only.

For each incident the following factors were identified *when available*:

- Date the incident occurred or was reported;
- Exact location;
- Name of source;
- Owner of source;
- Description of source;
- Subcategory of source (if a vessel, the type of vessel);
- Cause of incident;
- Oil type, including breakdown of fuel type:
    - If the spill involves more than one product and the percentage of the product with lesser quantity does not exceed 10 percent of the total amount spilled, it is considered one spill incident with the predominant oil type included;
    - If the minor components exceed 10 percent by volume, they are considered separate incidents since their impacts will be significantly different;
- Total amount of oil spilled;
- Department of Ecology's Environmental Response Tracking System (ERTS) record number and incident number; and
- Any other record numbers.

APPENDIX 8 – RELATIVE RISK RESULTS BY NON-GROUPED GEOGRAPHIC LOCATIONS

The following four pages contain tables of relative risk results by non-grouped geographic locations for Approach #1 – Historic Spill Data and Approach, #2 – Potential Spillage, #3 – Projected Changes for the Year 2015 Based on Historic Data, and #4 – Projected Changes for the Year 2015 Based on Potential Spillage. Some of the perspectives on the highest relative risk scores change when the geographic locations are not grouped together. For example, in Approach #1, Rosario Strait represents the highest relative risk for the non-grouped geographic locations. When these geographic locations are grouped together Total Puget Sound with Hood Canal, which does not include Rosario Strait, represents the highest relative risk.

Approach #1 – Relative Risk of Oil Spills Based on Historic Spill Data from 1995-2007, Non-Grouped Geographic Locations

	Non-Grouped Geographic Location																	
Rank-Ordered Source Category	**Rosario Strait And Vicinity**	**South Puget Sound**	**West Cascades**	**East Cascades**	**West Columbia River**	**Central Puget Sound**	**East Columbia/ Snake River**	**Lake Union/ Washington**	**Whidbey Basin**	**Grays Harbor**	**Inner Straits**	**North Puget Sound**	**Willapa Bay**	**Outer Coast**	**Strait Juan De Fuca**	**Olympic Peninsula**	**Hood Canal**	**Total All Waters**
Facility-Other	0.33	2.59	2.76	4.89	2.68	2.01	1.17	0.51	0.48	0.18	0.12	0.03	0.02	0.01	0.05	0.06	0.03	**17.90**
Pipeline	13.47	0.39	0.33	0.02	0.26	0.02	1.10	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**15.76**
Refinery	9.73	5.61	0.00	0.00	0.13	0.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**15.57**
Railroad	0.01	0.33	4.09	2.93	0.32	0.59	0.23	0.04	0.02	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	**8.66**
Oil Terminal	0.05	0.28	0.57	0.92	0.02	1.88	1.99	1.38	0.00	0.16	0.03	0.00	0.06	0.01	0.00	0.00	0.00	**7.35**
Tanker Truck	0.41	0.10	2.23	1.28	0.13	0.65	0.75	0.01	0.14	0.54	0.08	0.00	0.16	0.00	0.02	0.06	0.00	**6.55**
Gas Station	0.13	2.77	0.33	0.41	2.33	0.03	0.10	0.02	0.11	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	**6.29**
Power Utility	0.49	0.48	1.26	0.19	1.61	0.19	0.07	0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**4.33**
Tank Barge	0.14	3.17	0.00	0.00	0.00	0.18	0.01	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	**3.66**
Vehicle-Other	0.05	0.33	1.22	0.84	0.34	0.24	0.12	0.04	0.13	0.06	0.07	0.03	0.01	0.01	0.00	0.02	0.00	**3.51**
Non-Tank Vessel	0.22	1.05	0.00	0.00	0.18	0.11	0.00	0.03	0.02	0.01	0.12	0.03	0.00	0.03	0.05	0.00	0.04	**1.89**
Military	0.00	0.06	0.13	0.82	0.00	0.49	0.00	0.00	0.25	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.02	**1.85**
Fishing Vessel	0.17	0.12	0.01	0.01	0.39	0.11	0.00	0.07	0.08	0.23	0.01	0.00	0.01	0.28	0.07	0.00	0.00	**1.56**
Facility-Mill	0.11	0.27	0.65	0.04	0.19	0.01	0.01	0.00	0.00	0.05	0.00	0.00	0.09	0.00	0.00	0.00	0.00	**1.42**
Residential	0.02	0.20	0.77	0.04	0.19	0.10	0.00	0.00	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.02	**1.41**
Pleasure Craft	0.11	0.09	0.01	0.05	0.01	0.33	0.01	0.02	0.03	0.00	0.04	0.45	0.01	0.00	0.00	0.00	0.00	**1.18**
Tank Ship	0.10	0.33	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	**0.50**
Towboat/Tugboat	0.02	0.02	0.00	0.00	0.01	0.16	0.00	0.02	0.03	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.01	**0.31**
Airport	0.00	0.00	0.01	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.12**
Aircraft	0.00	0.05	0.01	0.01	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.10**
Passenger Vessel	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.06**
Unknown	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	**0.02**
Ferry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**25.57**	**18.26**	**14.36**	**12.49**	**8.84**	**7.28**	**5.57**	**2.24**	**1.42**	**1.30**	**0.72**	**0.66**	**0.41**	**0.38**	**0.20**	**0.16**	**0.13**	**100.00**

These numbers are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system. Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

Approach #2 – Relative Risk of Oil Spills Based on Potential Spillage, Non-Grouped Geographic Locations

	Non-Grouped Geographic Location																	
Rank-Ordered Source Category	**South Puget Sound**	**Rosario Strait And Vicinity**	**West Cascades**	**East Cascades**	**Central Puget Sound**	**West Columbia River**	**East Columbia/ Snake River**	**Lake Union/ Washington**	**Inner Straits**	**Whidbey Basin**	**Grays Harbor**	**Outer Coast**	**North Puget Sound**	**Willapa Bay**	**Hood Canal**	**Strait Juan De Fuca**	**Olympic Peninsula**	**Total All Waters**
Facility-Other	3.07	0.39	3.27	5.79	2.38	3.17	1.39	0.60	0.14	0.57	0.21	0.01	0.03	0.02	0.04	0.06	0.07	**21.21**
Tank Ship	11.24	3.28	0.00	0.00	0.00	0.96	0.00	0.04	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**16.96**
Railroad	0.39	0.01	4.84	3.46	0.70	0.38	0.27	0.05	0.00	0.02	0.00	0.00	0.10	0.00	0.00	0.00	0.00	**10.24**
Towboat/Tugboat	0.57	0.45	0.07	0.00	4.22	0.33	0.00	0.45	0.00	0.75	0.26	0.81	0.00	0.00	0.20	0.00	0.00	**8.10**
Oil Terminal	0.31	0.06	0.62	1.01	2.05	0.02	2.18	1.51	0.03	0.00	0.18	0.01	0.00	0.06	0.00	0.00	0.00	**8.04**
Refinery	2.84	4.92	0.00	0.00	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**7.88**
Pipeline	0.14	4.77	0.12	0.01	0.01	0.09	0.39	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**5.58**
Tanker Truck	0.06	0.24	1.31	0.75	0.38	0.07	0.44	0.01	0.04	0.08	0.32	0.00	0.00	0.09	0.00	0.01	0.03	**3.85**
Non-Tank Vessel	1.58	0.33	0.00	0.01	0.16	0.27	0.00	0.05	0.19	0.02	0.02	0.04	0.04	0.00	0.06	0.07	0.00	**2.83**
Gas Station	1.12	0.05	0.13	0.16	0.01	0.94	0.04	0.01	0.00	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00	**2.54**
Power Utility	0.28	0.28	0.72	0.11	0.11	0.92	0.04	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.48**
Facility-Mill	0.41	0.18	1.01	0.06	0.01	0.29	0.01	0.00	0.00	0.00	0.08	0.00	0.00	0.14	0.00	0.00	0.01	**2.20**
Tank Barge	1.62	0.07	0.00	0.00	0.09	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.88**
Fishing Vessel	0.13	0.19	0.01	0.01	0.13	0.44	0.00	0.08	0.01	0.08	0.25	0.32	0.00	0.01	0.00	0.08	0.00	**1.75**
Vehicle-Other	0.14	0.02	0.52	0.36	0.10	0.15	0.05	0.02	0.03	0.05	0.03	0.00	0.01	0.00	0.00	0.00	0.01	**1.49**
Pleasure Craft	0.06	0.07	0.00	0.03	0.20	0.01	0.00	0.01	0.03	0.02	0.00	0.00	0.28	0.01	0.00	0.00	0.00	**0.73**
Military	0.02	0.00	0.05	0.29	0.17	0.00	0.00	0.00	0.01	0.09	0.00	0.00	0.01	0.00	0.01	0.00	0.00	**0.66**
Residential	0.08	0.01	0.31	0.02	0.04	0.08	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	**0.57**
Passenger Vessel	0.00	0.02	0.00	0.03	0.02	0.07	0.14	0.00	0.00	0.05	0.18	0.00	0.00	0.00	0.00	0.00	0.00	**0.51**
Aircraft	0.15	0.00	0.02	0.03	0.05	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.27**
Airport	0.00	0.00	0.01	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.19**
Ferry	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.05**
Unknown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**24.21**	**15.36**	**13.01**	**12.21**	**11.00**	**8.27**	**4.96**	**2.86**	**2.02**	**1.87**	**1.53**	**1.19**	**0.48**	**0.37**	**0.31**	**0.23**	**0.13**	**100.00**

These numbers are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system. Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

Approach #3 – Relative Risk of Oil Spills For Projected Changes in the Year 2015 Based on Historic Spill Data, Non-Grouped Geographic Locations

	Non-Grouped Geographic Location																	
Rank-Ordered Source Category	**Rosario Strait and Vicinity**	**South Puget Sound**	**West Cascades**	**East Cascades**	**West Columbia River**	**Central Puget Sound**	**East Columbia/ Snake River**	**Lake Union/ Washington**	**Whidbey Basin**	**Grays Harbor**	**Inner Straits**	**North Puget Sound**	**Outer Coast**	**Willapa Bay**	**Strait Juan De Fuca**	**Olympic Peninsula**	**Hood Canal**	**Total All Waters**
Pipeline	15.50	0.45	0.39	0.03	0.30	0.02	1.26	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**18.15**
Facility-Other	0.28	2.24	2.39	4.22	2.31	1.73	1.01	0.44	0.41	0.15	0.10	0.02	0.01	0.01	0.04	0.05	0.03	**15.46**
Refinery	8.40	4.84	0.00	0.00	0.11	0.08	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**13.44**
Railroad	0.01	0.38	4.71	3.37	0.37	0.69	0.27	0.05	0.02	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	**9.97**
Tanker Truck	0.47	0.11	2.56	1.47	0.14	0.76	0.87	0.01	0.16	0.63	0.09	0.00	0.00	0.18	0.02	0.06	0.00	**7.54**
Oil Terminal	0.05	0.25	0.49	0.80	0.01	1.62	1.72	1.19	0.00	0.14	0.03	0.00	0.01	0.05	0.00	0.00	0.00	**6.35**
Gas Station	0.11	2.39	0.28	0.35	2.01	0.03	0.09	0.01	0.09	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	**5.43**
Tank Barge	0.16	3.65	0.00	0.00	0.00	0.21	0.01	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	**4.21**
Vehicle-Other	0.06	0.37	1.40	0.96	0.40	0.28	0.14	0.04	0.15	0.07	0.08	0.03	0.01	0.01	0.00	0.02	0.00	**4.03**
Power Utility	0.43	0.42	1.08	0.16	1.39	0.16	0.06	0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**3.74**
Non-Tank Vessel	0.28	1.33	0.00	0.00	0.23	0.13	0.00	0.04	0.02	0.01	0.16	0.03	0.04	0.00	0.06	0.00	0.05	**2.40**
Military	0.00	0.07	0.15	0.94	0.00	0.56	0.00	0.00	0.29	0.00	0.04	0.03	0.00	0.00	0.00	0.01	0.02	**2.13**
Fishing Vessel	0.19	0.14	0.01	0.01	0.45	0.13	0.00	0.08	0.09	0.26	0.01	0.00	0.33	0.01	0.08	0.00	0.00	**1.80**
Residential	0.02	0.23	0.88	0.04	0.22	0.12	0.00	0.00	0.02	0.03	0.01	0.02	0.00	0.00	0.00	0.00	0.03	**1.62**
Pleasure Craft	0.13	0.11	0.01	0.05	0.01	0.38	0.01	0.02	0.04	0.00	0.05	0.52	0.00	0.02	0.00	0.00	0.00	**1.37**
Facility-Milling	0.10	0.23	0.56	0.03	0.16	0.01	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.08	0.00	0.00	0.00	**1.23**
Tank Ship	0.09	0.31	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	**0.46**
Towboat/Tugboat	0.02	0.03	0.00	0.00	0.02	0.18	0.00	0.02	0.03	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.01	**0.35**
Aircraft	0.00	0.06	0.01	0.02	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.11**
Airport	0.00	0.00	0.01	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.10**
Passenger Vessel	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.06**
Unknown	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	**0.03**
Ferry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**26.31**	**17.62**	**14.93**	**12.51**	**8.18**	**7.18**	**5.46**	**2.03**	**1.46**	**1.38**	**0.79**	**0.76**	**0.44**	**0.42**	**0.22**	**0.16**	**0.15**	**100.00**

These numbers are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system. Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

Approach #4 – Relative Risk of Oil Spills For Projected Changes in the Year 2015 Based on Potential Spillage, Non-Grouped Geographic Locations

	Non-Grouped Geographic Location																	
Rank-Ordered Source Category	**South Puget Sound**	**Rosario Strait And Vicinity**	**West Cascades**	**East Cascades**	**Central Puget Sound**	**West Columbia River**	**East Columbia/ Snake River**	**Lake Union/ Washington**	**Whidbey Basin**	**Inner Straits**	**Grays Harbor**	**Outer Coast**	**North Puget Sound**	**Hood Canal**	**Willapa Bay**	**Strait Juan De Fuca**	**Olympic Peninsula**	**Total All Waters**
Facility-Other	2.71	0.34	2.89	5.11	2.10	2.80	1.22	0.53	0.50	0.12	0.18	0.01	0.03	0.03	0.02	0.05	0.07	**18.73**
Tank Ship	10.01	2.92	0.00	0.00	0.00	0.85	0.00	0.03	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**15.10**
Railroad	0.46	0.02	5.70	4.08	0.83	0.44	0.32	0.06	0.03	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	**12.05**
Towboat/Tugboat	0.67	0.53	0.08	0.00	4.96	0.39	0.00	0.53	0.89	0.00	0.31	0.95	0.00	0.23	0.00	0.00	0.00	**9.54**
Oil Terminal	0.27	0.05	0.55	0.89	1.81	0.02	1.92	1.34	0.00	0.03	0.16	0.01	0.00	0.00	0.06	0.00	0.00	**7.10**
Refinery	2.51	4.35	0.00	0.00	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.96**
Pipeline	0.16	5.61	0.14	0.01	0.01	0.11	0.46	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.57**
Tanker Truck	0.07	0.28	1.54	0.88	0.45	0.09	0.52	0.01	0.10	0.05	0.37	0.00	0.00	0.00	0.11	0.01	0.04	**4.53**
Non-Tank Vessel	2.04	0.43	0.00	0.01	0.21	0.35	0.00	0.06	0.03	0.24	0.02	0.06	0.05	0.08	0.00	0.09	0.00	**3.67**
Gas Station	1.00	0.05	0.12	0.15	0.01	0.84	0.04	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	**2.27**
Power Utility	0.25	0.25	0.64	0.09	0.10	0.81	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.19**
Tank Barge	1.82	0.08	0.00	0.00	0.10	0.00	0.01	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.10**
Fishing Vessel	0.16	0.22	0.01	0.01	0.15	0.52	0.00	0.09	0.10	0.02	0.30	0.37	0.00	0.00	0.01	0.10	0.00	**2.06**
Facility-Milling	0.36	0.16	0.89	0.05	0.01	0.26	0.01	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.13	0.00	0.01	**1.94**
Vehicle-Other	0.16	0.02	0.61	0.42	0.12	0.17	0.06	0.02	0.06	0.03	0.03	0.00	0.01	0.00	0.00	0.00	0.01	**1.75**
Pleasure Craft	0.07	0.08	0.01	0.03	0.24	0.01	0.00	0.02	0.02	0.03	0.00	0.00	0.33	0.00	0.01	0.00	0.00	**0.86**
Military	0.03	0.00	0.06	0.34	0.20	0.00	0.00	0.00	0.10	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	**0.77**
Residential	0.10	0.01	0.37	0.02	0.05	0.09	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	**0.67**
Passenger Vessel	0.00	0.02	0.00	0.03	0.02	0.09	0.17	0.00	0.06	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	**0.60**
Aircraft	0.18	0.00	0.02	0.04	0.06	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.32**
Airport	0.00	0.00	0.01	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.17**
Ferry	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.05**
Unknown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Total All Source Categories	**23.02**	**15.45**	**13.61**	**12.24**	**11.58**	**7.90**	**4.77**	**2.73**	**2.02**	**1.93**	**1.67**	**1.40**	**0.56**	**0.37**	**0.36**	**0.26**	**0.13**	**100.00**

These numbers are estimates based on data that was used for this analysis and should not be used as the basis for a revenue collection system. Scores add to 100. Numbers may not total due to rounding.

Source: JLARC consultants, Applied Science Associates (ASA).

APPENDIX 9 – OIL SPILL TAX REVENUES

Oil Spill Administration and Oil Spill Response Tax Revenues

As JLARC conducted a comparison of risk sources and revenue sources to answer the alignment question, we found; budgeted expenditures exceeding expected revenues, fluctuations in net tax revenues over time, and historical fund transfers and tax rate changes.

Revenues versus Budgeted Expenditures

JLARC found that the 2007-09 expected revenue from the Oil Spill Administration Tax is $8.1 million and the 2007-09 budgeted expenditures from the Oil Spill Prevention Account (the account into which tax revenues from the Oil Spill Administration Tax are deposited) is $14.4 million.[10] Expected revenues from the Oil Spill Administration Tax represent approximately 56 percent of budgeted expenditures from the corresponding account.

Oil Spill Tax Revenue Fluctuations

While reviewing revenues over time, JLARC found revenue fluctuations in the two oil spill taxes since their inception in 1991. Forecasting available revenues is complicated by fluctuations from tax credits, refunds, and a cap imposed on one of the accounts receiving oil spill response taxes.

The table on the following page shows net revenues from both oil spill taxes since 1991.

[10] Revenues are based on the Department of Revenue's September 2008 forecast and the Oil Spill Prevention Account budgeted data was obtained in May 2008 from the Department of Ecology's Spill Program, Department of Fish and Wildlife's Oil Spill Team, and the Washington Oil Spill Advisory Council.

Net Revenues Fluctuate From Year to Year

Fiscal Year	Oil Spill Administration Tax	Oil Spill Response Tax*
1991	$0	$0
1992	$2,849,217	$1,899,478
1993	$3,464,069	$2,309,379
1994	$3,327,130	$2,218,087
1995	$1,906,456	$1,270,971
1996	$3,691,049	$2,460,699
1997	$2,749,567	$1,891,363
1998	$4,776,875	$1,752,240
1999	$2,942,022	$113,410
2000	$4,510,104	$1,154,017
2001	$4,725,670	$1,229,103
2002	$4,813,136	$747,690
2003	$5,058,406	$(160,738)
2004	$5,808,766	$(100,760)
2005	$6,103,158	$66,782
2006	$5,286,855	$(9,361)
2007	$3,247,484	$(274,940)
2008	$3,398,303	$1,148,887
2009	$4,674,049	$1,168,564
2010	$4,743,600	$1,185,960
2011	$4,933,200	$1,233,360

Note: *The Oil Spill Response Tax was turned off (no longer imposed) from January 2002 through March 2007. Credits and refunds may occur for prior tax years that are within the period covered by an audit. These credits or refunds may result in a negative balance.

Source: Department of Revenue tax data. Net collections from Fiscal Year 1991 through 2008. September 2008 forecast from Fiscal Year 2009 through 2011.

Tax Credits and Refunds

As the table above shows, net revenues fluctuate from year to year. For instance, Fiscal Year 2006 Oil Spill Administration Tax net collections were $5.3 million and Fiscal Year 2007 net collections were $3.3 million, representing a 39 percent decrease. Negative collections are a result of credits and refunds exceeding total taxes collected. The credits and refunds add complexity to the forecast of available funding for oil spill programs.

Credits reduce the total amount of potential revenues. Statute provides two types of credits:

- Export credit: crude oil or petroleum products exported or sold for export from the state (RCW 82.23B.040).

- Manufacturing credit: use of petroleum products for a purpose other than fuel or as a component or ingredient in the manufacture of an item which is not a fuel (RCW 82.23B.045).

Refunds are payments made to tax payers who have over-paid their tax liability, as discovered during an audit or by tax payers. In addition, audits can increase or decrease revenues.

All of these adjustments - credits, refunds, and audit assessments - can take place at any time and in varying amounts. Between Fiscal Year 2002 and Fiscal Year 2008, net revenues from the two oil spill taxes totaled $35.1 million. During this same period of time, the export and manufacturing tax credits claimed by tax payers totaled $21.1 million and refunds totaled $4.5 million.[11] A large refund for the four cents per barrel Oil Spill Administration Tax can quickly deplete the corresponding account's (Oil Spill Prevention Account) fund balance.

Oil Spill Response Account Cap

Another factor contributing to the fluctuations is the cap on the Oil Spill Response Account which receives revenues from the Oil Spill Response Tax. The tax was "turned off" (no longer imposed) from January 2002 through March 2007 due to a statutory cap on the Oil Spill Response Account. In 1991, when the Account was created, the Legislature set the cap at $25 million. The cap was subsequently lowered in 1997 and again in 1999, which established the current cap of $9 million. The tax is turned back on when the Oil Spill Response Account fund balance drops to $8 million or below.

There is also a statutory mechanism for turning the Oil Spill Administration Tax on and off, however, to date, all of the necessary elements have never been met at the same time.[12] This tax has never been turned off.

Historical Oil Spill Fund Transfers and Tax Rate Changes

In reviewing the oil spill tax fluctuations, JLARC found related historical fund transfers and tax rate changes that have contributed to some of the fluctuations.

Transfers from the Oil Spill Response Account to the Oil Spill Prevention Account occurred in the 1995-1997, 1997-1999, and 1999-2001 biennia totaling $2.7 million to support budget appropriations that had exceeded revenue forecasts as stated in bill reports.

A change to the tax rates was made for a similar reason in 1997. When the taxes were created in 1991 the Oil Spill Administration Tax rate was three cents and the Oil Spill Response Tax rate was two cents. As noted in bill reports, these rates were changed to the current respective four cents and one cent to stabilize funding needs to ensure that oil spill prevention retained a high priority.

[11] Credits and refund data is from the Department of Revenue as of July 2008.

[12] RCW 90.56.510(1) discusses the mechanism of turning the Oil Spill Administration Tax on and off. Department of Ecology monitors the elements described in statute.

APPENDIX 10 – ESTIMATED HAZARDOUS SUBSTANCE TAX REVENUES

As noted on page 24 of the report, in Fiscal Year 2008 the Hazardous Substance Tax revenues, used for oil spill activities, were estimated at $1.8 million using budgeted expenditures. Revenues used for oil spill activities are estimated for two reasons.

First, the Hazardous Substance Tax is used for more than just oil spill activities. A portion of this tax (47.1 percent), along with fees, fines, reimbursements and grants are all revenue sources deposited into the State Toxics Control Account. The Department of Ecology's Spills Program is only one of several state programs that receive appropriations from this account. In estimating Fiscal Year 2008 revenues JLARC used Fiscal Year 2008 budgeted expenditures from the State Toxics Control Account specifically for oil spill activities in the Spills Program (budget data was obtained in May 2008).

Second, the Spills Program uses the State Toxics Control Account funds for both hazmat and oil spill activities, which are not accounted for separately. The Department of Ecology estimates that 62 percent of these funds are used for oil spill activities. JLARC calculated the State Toxics Control Account budgeted expenditures based on this estimate.

APPENDIX 11 – SUMMARY OF TAX PRINCIPLES AND ATTRIBUTES

A number of national and state organizations have established criteria for what they consider to be the attributes of a high quality tax structure. JLARC reviewed the following five which includes factors considered by the Washington Oil Spill Advisory Council as it evaluated which sources of revenue might provide sustainable funding for the Oil Spill Program.

- The National Conference of State Legislatures (NCSL): *Principles of a High-Quality State Revenue System.* Fourth edition, June 2001, updated June 2007.
- The General Accountability Office (GAO): *Understanding the Tax Reform Debate—Background, Criteria, and Questions*. September 2005.
- The Washington State Department of Revenue: *Attributes of a High-Quality State Revenue System*. Department of Revenue, Legislation and Policy Division, March 2005.
- The Washington State Tax Structure Study Committee: *Tax Alternatives for Washington State: A Report to the Legislature*. November 2002.
- The Washington Oil Spill Advisory Council: *Report Providing Recommendations to the Governor, the Legislature, and the Department of Ecology on State-of-the-Art Oil Spill Prevention Program, Council Operations and Funding, and Sustainable Funding for the Oil Spill Program.* October 2006.

Key points contained in each of the five analyses are provided in the table beginning on the following page, categorized under three general topic areas developed by JLARC: Equity and Reliability; Compliance and Administration; and Economic Impacts.

Topic Area		
Equity and Reliability	**Compliance and Administration**	**Economic Impacts**
National Conference of State Legislatures		
• Produces revenue in a reliable manner. • Relies on a balanced variety of revenue sources. • Treats individuals equitably. • Various taxes are consistent across the state.	• Facilitates tax payer compliance. • Promotes fair, efficient, and effective administration. • Accountable to taxpayers.	• Responsive to interstate and international economic competition. • Minimizes involvement in spending decisions and makes any such involvement explicit.
General Accountability Office		
• Whether one tax is more or less equitable than another are value judgments, generally based on two principles: ability to pay principle and benefits received principle. • Equity concerns may force a trade-off between fairness and efficiency. • Proposals to simplify a tax system may reduce equity because many tax provisions that are complex and difficult to comply with are also designed to promote fairness.	• Simple tax systems are in many cases the most administrable. • Tax systems that are both simple and administrable are often considered to be the most transparent. • Transparent tax systems impose less uncertainty on tax payers. • Simple tax systems impose less of a compliance burden on tax payers.	• The cost of a tax to tax payers is more than the tax liability, and includes efficiency costs, which result from taxes changing the economic decisions people make. • Minimizing the inefficiencies generally created by taxes is one criterion for a good tax.
Washington Department of Revenue		
• Progressivity: Equity or fairness is the relationship between ability to pay and tax liability. • Stability: Revenues should not fluctuate dramatically. • Broad based: Tax system should cover as many sources as possible with rates commensurately low. • Preferential tax treatment (exemptions) should be minimized.	• Productivity: Are revenues sufficient to justify imposition of the tax? • Cost to administer is an important consideration. • Cost to the tax payer of complying must be considered.	• Tax system should not influence business decisions or favor certain activities at the expense of others. • Tax system should be flexible so policy makers can respond to changing economic conditions.

Topic Area		
Equity and Reliability	**Compliance and Administration**	**Economic Impacts**
Washington State Tax Structure Committee *(Legislative guidelines refer to guidelines the Commission was to follow, included in proviso establishing the Commission)*		
• Legislative guideline: fairness, stability, transparency. **Commission:** • Adequacy: Tax systems provide for growth in revenue adequate to fund normal growth in public services as state's population and economy expand. • Equity: Tax system should distribute tax burden across tax payers in a manner that is consistent with the norms of fairness and equity.	• Legislative guideline: Administrative simplicity. **Commission:** • Transparency and Administrative Simplicity: People should know when they pay taxes how much they pay.	• Legislative guideline: Economic neutrality. **Commission:** • Tax system should facilitate purchase and maintenance of a home consistent with ability to pay.
Washington Oil Spill Advisory Council *Factors to consider when evaluating alternatives:*		
• Equitable allocation of tax burden proportionate to risk. • Financial hardship.	• Practicality of imposing and collecting fee.	• Economic and social impact of tax.

Source: JLARC analysis.

APPENDIX 12 – OTHER COASTAL STATES' DEDICATED SPILL TAXES

JLARC searched statutes of other coastal states, including Alaska, looking specifically for taxes or fees identified in statute as dedicated to oil spill activities. This appendix presents detail on the results of that review in the table beginning on the following page. Because some states, including Washington, fund oil spill activities from sources that are not dedicated specifically to oil spill activities, this is not a comprehensive listing of all oil spill activity revenue sources.

Coastal States' Taxes and Fees Dedicated to Spill Programs

State	Title	Tax or fee?	Applied to	Rate	Use
Alabama	None found				
Alaska	Oil and Hazardous Substance Release Prevention and Response Fund	Surcharge on each taxable barrel of oil produced in the state.	Fund is divided in to two accounts: Response Account is funded by surcharge of $0.01 per barrel on oil produced for each lease or property in the state, less any oil the ownership or right to which is exempt from taxation. Prevention Account: $0.04 per barrel on oil produced from each lease or property in the state, less any oil the ownership or right to which is exempt from taxation.	$0.01 per barrel for Response Account; $0.04 per barrel for the Prevention Account.	Response Account: When Governor declares an emergency, investigate and evaluate the release or threatened release of oil or hazardous substance, and contain, clean-up, and take other necessary action. Prevention Account: investigate and evaluate the release or threatened release of oil or hazardous substance, contain, and clean-up except for those covered under governor declared emergency. Account is also used to establish and maintain the oil and hazardous substance response office, review oil discharges, prevention and contingency planning, training, and inspection.

State	Title	Tax or fee?	Applied to	Rate	Use
California	1. Oil Spill Prevention and Administration Fund 2. Oil Spill Response Trust Fund	1. Fee. 2. Fee.	1. Fee imposed upon every persons owning crude oil at the time that the crude oil is received (per barrel) at a marine terminal from within or outside the state, and upon every person owning petroleum products at the time the product is received at a marine terminal from outside the state. Pipeline operator pay per barrel for crude oil originating from a production facility in marine waters and transported in the state by means of a pipeline operating across, under, or through the marine waters of the state. 2. Fee imposed upon every person owning petroleum products at the time the petroleum products are received at a marine terminal within the state by means of a vessel from a point of origin outside the state. Every operator of a pipeline shall also pay for each barrel of petroleum products transported into the state by means of a pipeline operating across, under, or through the marine waters of the state. Every operator of a refinery shall pay for each barrel of crude oil received at a refinery within the state. Fee is not imposed on independent crude oil producer who produces crude oil within the state who performs no refining of crude oil into product, and who possesses or owns no retail gasoline marketing facilities. Every marine terminal operator shall pay a fee for each barrel of crude oil that is transported from within the state by means of marine vessels to a destination outside the state and every operator of a pipeline shall pay a fee for each barrel of crude oil transported out of the state by pipeline provided (for both marine terminal and pipeline) that a level of crude transported out of the state, relative to level brought in, is exceeded (6%).	1. $0.05 per barrel. 2. Currently not collected, but $0.25 per barrel if fund is less than or equal to $54.875 million or if funds are needed to pay for response. There is also a fee on non-tank vessels with each new or renewal application for certificate of financial responsibility, up to $2,500 for non-tank vessels carrying over 6,500 barrels.	1. Implement oil spill prevention programs; implement research into prevention and control technology; carry out studies that may lead to improved oil spill prevention and response; implement, install, and maintain emergency program; respond to imminent threat of a spill, not to exceed $100,000. 2. Response and containment and cleanup of oil spills into marine waters, including damage assessment costs, and wildlife rehabilitation; to pay costs which otherwise cannot be compensated by responsible parties or the federal government; pay claims for damages; rescues, medical treatment, rehabilitation and disposition of oiled wildlife.

State	Title	Tax or fee?	Applied to	Rate	Use
Connecticut	None found				
Delaware	Hazardous Substance Cleanup Fund	Tax to implement the Delaware hazardous substance cleanup act.	Wholesale gross receipts tax on the sale of most petroleum products.	0.9% of gross receipts paid only once regardless of how many times product is sold or resold in Delaware.	Implementing hazardous substance clean-up program; providing a remedy to release or imminent threat of release; CERCLA matching funds; reimbursing for remedial costs; emergency responses.
Florida	Coastal Protection Trust Fund	Excise tax.	Excise tax for the privilege of producing in, importing into, or causing to be imported into the state pollutants for sale, use, or otherwise. Paid by any person who is licensed to engage in the production or importation of motor fuel, diesel, fuel, aviation fuel, or other pollutants.	$0.02 per barrel. If discharge of catastrophic proportions that would significantly reduce balance, up to $0.10 per barrel.	Administrative expenses, cost involved in the prevention and abatement of pollution related to the discharge of pollutant, cleanup, restoration, and rehabilitation.
Georgia	None				
Louisiana	Oil Spill Contingency Fund	Fee.	Fee on every person owning crude oil in a vessel at the time such crude oil is transferred to or from a vessel at a marine terminal within the state; imposed only once on the same crude oil.	$0.02 per barrel, until fund reaches $7.0 million.	Administration, removal, abatement, containment, protection, assessment, restoration, rehabilitation, prevention.
Maine	Coastal and Inland Surface Oil Clean-Up Fund	License fee of $0.03 per barrel of unrefined crude oil and all other refined oil, transferred by the licensee.	Any person who transports by rail or highway more than 25 barrels of oil into Maine.	$0.03 per barrel.	Sensitive area data management and mapping; research and development; administrative expenses; oil spill response, removal, and abatement.

State	Title	Tax or fee?	Applied to	Rate	Use
Maryland	Oil Disaster Containment, Clean-Up, and Contingency Fund	License fee.	Fee imposed at the first point of transfer in the state. Transfer means the offloading or on loading of oil in the state from or to any commercial vessel, barge, tank truck, tank car, pipeline, or any other means used for transporting oil.	$0.04 per barrel for oil transferred in the state.	Develop equipment, personnel, and plans; for contingency action to respond, contain, clean-up, and remove.
Massachusetts	Oil Spill Prevention and Response Trust Fund	Fee not exceeding $0.02 for each barrel of petroleum product.	Imposed upon a person owning petroleum products at the time the petroleum products are received at a marine terminal within the commonwealth by means of a vessel from the point of origin outside the commonwealth.	$0.02 per barrel on petroleum products.	Oil spill response and prevention, improvements to vessel navigational systems and infrastructure, development of spill response plans, procurement and maintenance of spill response equipment, drills and exercises.
Mississippi	None found				
New Hampshire	Oil Pollution Control Fund	License fee of $0.00125 per gallon of oil imported by any person who imports or causes to be imported into the state.	Import means any import of oil into the state by any person whether by vessel, pipeline, truck, railroad or any other contrivance.	$0.00125 per gallon.	Purposes of chapter: Cope with the problem of pollution from the spillage or discharge of oil, recognizing the damage resulting to vegetation, marine, animal and bird life from such pollution. It is the intent of the chapter to provide procedures that will expedite the cleanup of oil spillage, mitigate the adverse effects, encourage preventive measures, and provide financial assistance to victims.

State	Title	Tax or fee?	Applied to	Rate	Use
New Jersey	Spill Compensation Fund	Tax to insure compensation for cleanup costs and damages associated with any discharges of hazardous substances.	Transfer of petroleum products and other hazardous substances at the first point of transfer. Payable by owner or operator of a major facility (200,000 gallons petroleum products, 20,000 or more for nonpetroleum hazardous substances).	Petroleum products: $0.023 per barrel; non-petroleum: 1.53% of fair market value; precious metals: $0.023 per barrel; Elemental phosphorus: $0.023 per barrel; Elemental antimony or antimony trioxide: $0.023 per barrel.	Clean-up and removal; research on prevention and effects; development of improved cleanup, removal, and disposal operations.
New York	Environmental Protection and Spill Compensation Fund	License fee for operation of a major facility. Charged on a per-barrel basis. Currently $.08 per barrel.	First point of transfer. Major facility: refinery, storage or transfer terminal, pipeline, deep water port, drilling platform; that are used to refine, produce, store, handle, transfer, process or transport petroleum. A vessel is considered a major facility only when petroleum is transferred between vessels.	Base rates and surcharges: currently published as $0.08 per barrel.	Clean-up of oil spill, protection of the environmental and public health, and reimbursement of costs related to oil spills.
North Carolina	None found				

State	Title	Tax or fee?	Applied to	Rate	Use
Oregon	Oil Spill Prevention Fund (There is also an "Oil and Hazardous Material Emergency Response and Remedial Action Fund". "Money received by the Department of Environmental Quality for the purpose of oil or hazardous material emergency response or remedial action shall be paid into the State Treasury and credited to the fund." There appears to be no dedicated fund source.)	Fee.	Collected on a per-trip basis for vessels. Department of Environmental Quality assesses fees on covered vessels and offshore and onshore facilities to recover the costs of reviewing the plans and conducting inspection, exercise, training and activities. Cargo and passenger vessels: $70 Non self-propelled tank vessels: -Fewer than 25,00 barrels: $60 -25,000 to 99,999 barrels: $70 -100,000 or more: $100 Self propelled tank vessels of 300 gross tons or less, $60 per trip; over 300 gross tons, $1,200 per trip; Dredge vessels, $36 per day; Offshore and onshore facilities: $5,900 per year.	See column to left. "Trip" means travel to the appointed destination and return travel to the point of origin within the navigable water of Oregon.	All costs of Department of Environmental Quality to: review contingency plans, conduct training, response exercises, inspection and tests in order to verify equipment inventories and ability to prevent and respond to oil release emergencies and to undertake other activities intended to verify or establish the preparedness of the state.

State	Title	Tax or fee?	Applied to	Rate	Use
Rhode Island	Oil Spill Prevention, Administration and Response Fund	Fee.	$0.05 per barrel. Fee is $0.01 per barrel of asphalt products or derivatives.	$0.05 per barrel imposed upon every person owning petroleum products at the time the petroleum products are received at a marine terminal within the state by means of a vessel from a point of origin outside the state.	Response, containment, and cleanup of spill into marine or estuarine waters; site evaluations; damages; emergency loans to workers ineligible for unemployment insurance; pay for structural improvement to vulnerable coastal features; restoration; response training and equipment; personnel drills and exercises; research, development and monitoring activities.
South Carolina	None found				
Texas	Coastal Protection Fee for the Coastal Protection Fund	Fee.	Fee on every person owning crude oil in a vessel at the time such crude oil is transferred to or from a marine terminal, imposed only once on the same crude.	$0.01333 (expressed as one and one-third cents) per barrel.	Administration, response costs, abatement and containment, assessment, restoration, rehabilitation, mitigation, education program, purchase response equipment; agreements with state universities for research, testing, and development of oil discharge prevention and response.
Virginia	None found				