

The Role of Expert-based Information in Maritime Oil Spill Prevention Policy in the Puget
Sound: How Risk Assessments Reflect the Larger Political Context

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Abstract

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Oil spills and their prevention have been political issues in Washington State and the Puget Sound area since the Prudhoe Bay oil discoveries on Alaska's North Slope. In an attempt to improve both the process and outcome of oil spill prevention debates, risk assessment-based approaches have been used as a tool to inform spill prevention efforts since the early 1980s. Quantitative tools like risk assessment have a good reputation for clarifying the worth (in terms of risk reduction and cost) of policy choices available to policymakers. However, they are also criticized for being vulnerable to prevailing power imbalances and political influence. With these critiques in mind, this thesis looks at the history of oil spill prevention efforts in Puget Sound along with associated risk assessment efforts to determine the nature and extent of political influence on their structure and use.

Guided by an expert-based information framework based on the Advocacy Coalition Framework, this thesis establishes the political context (policy subsystem) of oil spill prevention in the Puget Sound from 1975-2013 and relates it to the structure and use of selected risk assessments. Elite interviews and document review were used to describe and

categorize the political context, as well as the structure and use of five Puget Sound-specific risk assessments developed during that time.

I found that a largely adversarial policy subsystem dominated oil spill prevention policy in the Puget Sound from the 1970s until the mid to late 2000s, when the subsystem shows evidence of becoming more collaborative. The adversarial subsystem led to predominantly politicized use of risk assessment results, and also at times influenced the framing and structure of the risk assessments themselves. The collaborative policy subsystem's emergence is so recent that its influence is less clear, but it appears to be influencing risk assessment structure at present.

The results suggest that risk assessments, though sometimes touted as a solution to contentious technical debates, may be less well suited to adversarial contexts than to collaborative contexts. These results are consistent with findings in the literature regarding the use of expert-based information in contested public policy decisions.

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1.0 Introduction and Problem Definition

Oil spills and their prevention have been political issues in Washington State and the Puget Sound area since the Prudhoe Bay crude oil discoveries on Alaska's North Slope in 1968 made Washington a prime candidate for oil refining (Neel et al. 1997). The issues surrounding marine oil pollution have been on the table now for over 40 years and the debate of how best to reduce the risk of spills is ongoing. Like many environmental problems, oil spill prevention is a culturally and technically complex issue, one with significant financial and ecological costs associated with it.

These challenges have led policymakers to increasingly rely on decision support tools like risk assessment. Risk assessment is a type of expert-based information that is in widespread use as a decision support and policy making tool. In the public sphere it was first used at NASA and in the nuclear power industry in the 1960s and 1970s (Renn 1998), but is now used extensively in the fields of public health, environmental assessment, and the maritime sector. Its use in the maritime sector has been gradually increasing since its first appearance as a marine planning tool in the late 1970s (Merrick & van Dorp 2006). Since the mid-1990s, it has become a popular tool to evaluate and improve oil spill prevention in marine traffic systems (Merrick & van Dorp 2006; Li et al. 2012).

These types of quantitatively based tools are purported to improve both the decision process and outcome, especially when they provide a venue for all stakeholders to engage in decision making (National Research Council [NRC] 1996). Risk assessment has been used often in the Puget Sound region as a decision support tool in oil spill prevention policymaking. First seen here in the early 1980s, three new risk assessments were completed in just the early 2000s. More recently, risk assessments have formed part of the National Environmental Policy Act

(NEPA) mandated environmental review of two high-profile Puget Sound port projects. The NEPA process for the expansion of the BP refinery dock at Cherry Point is ongoing, while the process for the proposed Gateway Pacific Terminal, a coal exporting facility also at Cherry Point, is just getting underway. An additional coordinated maritime traffic risk assessment jointly sponsored by the Puget Sound Partnership and the Makah Tribe is underway at the time of this writing. Additionally, risk assessment has become pervasive in the language of oil spill prevention decision makers. In the years between 2007 and 2013, at least seven different Puget Sound related agency workgroups, plans, or reports advocated for the use of risk assessment based analysis in oil spill prevention decision making.¹

Though risk assessment methodology appears to enjoy widespread political approval in the Puget Sound with respect to maritime policy, its use has a number of challenges. These challenges have not gone unnoticed in the academic community. Though risk assessment may be enjoying mainstream political and cultural acknowledgement and support in the context of environmental policymaking, the literature suggests that it may be vulnerable to prevailing power imbalances and political influence (Dwyer 1990; Stirling 2007; Vaughn & Seifert 1992). It is in this context of increased reliance on this tool coupled with indications in academia that the value of the risk assessment approach could be limited in some situations, that this thesis proposed an examination of those limitations and their causes. If risk assessment is to be a truly

¹ Oil Spill Advisory Council Minority Report (2006), United States Coast Guard and Washington State Department of Ecology Strategic Work Plan (2007), Oil Spill Advisory Council Work Plan (2009-2011), Washington State Department of Ecology Spills Program Strategic Plan (2009-2015), Spill Prevention, Preparedness, Response, and Restoration Working Group for the Olympic Coast National Marine Sanctuary's Advisory Council (2010), United States Coast Guard Authorization Act (2010), and The Puget Sound Partnership's Action Agenda (2012/2013).

useful decision support tool in oil spill prevention, an accounting of its limitations is warranted. Furthermore, systematically examining those limitations will provide a basis for a more complete understanding of the nature of risk assessments.

This thesis proceeds in four parts. First, it reviews the existing scholarship on the topic of the limitations and challenges of using risk assessment as a decision support tool in policymaking. Second, it introduces an Advocacy Coalition Framework-based theory that describes the relationship between political context and the use and structure of expert-based information. Third, it applies that framework to the specific relationship between the political context of oil spill prevention in the Puget Sound and the use and structure of the risk assessments undertaken there. Fourth, it reviews the results of that application, leading to the suggestion that the political context under which risk assessments are undertaken may have an important role in determining how they are structured and used.

2.0 Background and Literature Review

To fully address the problem posed by the expanded use of risk assessment in oil spill prevention policy in the Puget Sound, a fuller understanding of both the concept of risk assessment and its use is needed. This next section provides a basic review of risk assessment concepts, and discusses their use in the maritime world.

After looking at the basics of risk assessment, the section focuses on expanding and evaluating the aforementioned critiques of risk assessment as a decision support tool in policymaking. To do so, this literature review focuses on research on the following topics:

- The larger political implications of the risk assessment model
- Weaknesses in the risk assessment model and execution

- Theories of how and under what circumstances the risk assessment process can be influenced by outside forces – and how these theories can be used to shape and inform this thesis

Each of these topics is explored with a goal of informing an approach towards the problem statement. The first topic includes philosophical critiques of risk assessment and reveals that thinking in terms of risk and risk assessment is not solely the province of experts. The theory and philosophical underpinnings of risk assessment are examined and discussed in both sociological and political science disciplines. The second topic addresses the literature that discusses the challenges that face practitioners of risk assessment, and possible weaknesses inherent to its use as a decision support tool.

The final topic addresses ways that researchers have tried to examine and explain the role of expert-based information in policy, and the potential ways that role can be influenced. This section identifies a framework that is then used to shape the analytical approach of this thesis' research questions and hypotheses.

2.1 The Basics of Risk Assessment

In its most basic form, risk assessment involves asking and answering a series of questions: “What can go wrong? How likely is it? What are the consequences? How certain is this knowledge?” (NRC 1996). While risk assessment holds as its basic goal the mathematical quantification of risk, which can be defined as, “the probability of an unwanted event times the impact of that event,” (Grabowski 1999), the political goals of risk assessment necessitate broadening that basic goal to include characterization and communication of that risk. In “Understanding Risk” the NRC argues that the entire process of a risk assessment, including the

characterization of risk, should be a mutual and recursive analytic-deliberative process (NRC 1996). The report emphasizes the importance of including the initial framing of the risk questions in the deliberative process, and suggests focusing on five primary objectives:

- Getting the science right
- Getting the right science
- Getting the right participation
- Getting the participation right
- Developing an accurate, balanced, and informative synthesis

This highlighting of the deeply participatory nature of a successful risk assessment was a break from previous NRC reports on the use of risk assessments. Early work on risk assessment emphasized the highly technical nature of the process, only discussing public interaction in the context of characterization of risk (NRC 1983). Indeed, in its report “Improving Risk Communication” the NRC describes risk communication as risk messages that flow in one direction only (NRC 1989, 23), and provides a cautionary tale of a failed EPA attempt at public participation in the risk assessment process (NRC 1989, 18). Today, the analytic-deliberative process advocated by the NRC appears more and more embedded in accepted practice. As noted in an Aleutian Islands risk assessment framing study conducted under NRC auspices, “Recent years have seen a trend in risk assessment towards extensive engagement of stakeholders throughout the process of defining and analyzing risks...” (NRC 2008).

The emphasis on engagement with stakeholders stems not just from a philosophical or political interest in a more participatory process for its own sake but from the difficulty of achieving public acceptance of risk assessment results and an acknowledgement that risk assessment framing is not an objective, bias-free process. The NRC argues that deliberative

participation aids in the acceptance of both study results and policy decisions (NRC 1996).

Busenberg (2000) found that collaborative participation increases the likelihood that results will be believed by all interested parties.

As noted by the NRC, in addition to the basic questions of probability, impact and public participation, a fundamental aspect of the risk assessment process is the determination and communication of uncertainty (NRC 1996). Generally speaking, uncertainty can be manifested as either aleatory (resulting from variability in the natural world) or epistemic (resulting from a lack of knowledge about the natural world). When appropriately recognized and quantified, it aids in a useful and effective characterization of risk (NRC 1996). A poor description of uncertainty can lead to inadequate risk characterization, which in turn has been shown to affect the decision making process (Cooke 1997).

2.2 Risk Assessments in the Maritime World

In order to shed more light on the use of risk assessments in the Puget Sound maritime community, it is appropriate and helpful to review the status and use of risk assessment in the larger maritime world. The use of risk assessment methodologies in the maritime sector has been as diverse as the maritime industry itself. In a summarizing paper, maritime risk assessment approaches are broken down into two main categories, those that attempt to estimate accident frequency and those that look at accident consequence (Li et al. 2012). Early approaches (e.g. McDuff 1974) attempted to calculate causation probability on the basis of historical accident frequencies. Such an approach can be weakened by an incompleteness of historical data. Another challenge is the relative infrequency of large oil spills since due to their rarity, a historical pattern can be impossible to develop accurately (Englehardt 1995). Other approaches have included fault

tree analysis and Bayesian network approaches. A fault tree analysis is helpful in determining a causal relationship between risk factors and accidents. Using nodes and arcs, the Bayesian network approach does something similar, though each node can be affected by another's probability. Additionally, the Bayesian approach can be improved by the involvement of expert judgment and elicitation (Li et al. 2012). These models all have their drawbacks. For example, they struggle to successfully illustrate time-dependent patterns like those of a waterway system that is tidally dependent. One way to address these issues is via computer simulation, however, that is not necessarily a panacea. In a review of a risk assessment completed in Prince William Sound the use of a fault tree analysis tool, a static tool based on historical accident rates and expert elicitation (MARCS, see Fowler & Sorgard 2000), and a computer simulation tool (a George Washington University model) were compared (NRC 1998). The review highlighted the strengths and weaknesses of each model, noting that even the simulation model was weakened by its over-reliance on expert elicitation and judgment (NRC 1998). The review is a reminder that while there are many risk assessment models, there is no clear standard bearer, and the existing strategies for completing maritime risk assessments have weaknesses along with strengths. This is another indication that risk assessments are not a scientifically established simple objective process. Each step in a risk assessment, may it be initial framing, establishment of risk framing questions, selection of risk estimation methodologies, and outputs in terms of risk characterization, have subjective aspects that require judgment, choice, and discussion.

2.3 Sociological Critiques of Risk Assessment Theory

The concepts of risk became a hot topic in the social sciences in the early 1990s with the publication of Ulrich Beck's *Risk Society: Towards a New Modernity* (1992). His work caught

the attention and imagination of many (Mythen 2007). In addition to arguing that global society had entered a new, post-class era, he presented an energetic critique of risk analysis and moved away from more traditional, technical definitions of risk itself. Instead of defining it as it is in risk analysis literature (for instance, in Sherif 1991), that is, a simple equation of likelihood times impact, Beck describes risk as “as a way of controlling...the future” (Beck 1998). Analysts in the risk assessment field are unsurprisingly dismissive of such a definition (e.g., Campbell & Currie 2006). However his popularity points to the decidedly cultural aspects of the use of risk terminology. The definition of risk as laid out in a risk assessment is not necessarily shared by many in the social sciences or by the public. Indeed, as argued extensively by Paul Slovic, risk can take a much more complex shape than the simple equation previously discussed. Slovic (1999) argues that risk is socially constructed, and that examining public perception of risk is as valid a way of learning about risk as is a more technical approach.

2.4 Possible Weaknesses in the Risk Assessment Model

Others suggest that risk assessments might allow policymakers to disguise bias and subjective judgments as expert analysis (Dwyer 1990). Furthermore, while increased public participation in policy making, both within expert-based processes and without, is generally regarded as a positive and the new norm (Laird 1993), its role is viewed as decidedly more complex than a simple, linear, ‘more participation equals a more democratic’ equation (Fiorino 1990).

The issue of bias and judgment in the framing and development of risk assessments has been well explored as well. Stewart and Leschine (1986) discussed how different analytical approaches to the same problem can lead to differing conclusions. Others linked risk study

conclusions to initial framing choices by exploring the role of risk perception and the judgments involved in selecting endpoints, among other ways (Renn 1998; Slovic 1999; Vaughan & Seifert 1992). Stirling (2007) includes a list of ways judgment may be introduced into the framing of a risk assessment and thus alter its conclusions (see Figure 1).

This increasing recognition that the risk assessment process can be subject to political and cultural influence is part of the foundation of arguments for more public and stakeholder participation in the risk assessment process.

Setting agendas	Formulating criteria
Defining problems	Deciding context
Posing questions	Setting baselines
Prioritizing issues	Drawing boundaries
Discounting time	Handling uncertainties
Characterizing options	Recruiting expertise
Choosing methods	Commissioning research
Including disciplines	Constituting proof
Exploring sensitivities	Interpreting results

Figure 1 | Factors influencing the framing of risk assessments (Stirling 2007)

However, like many processes that emphasize stakeholder involvement, this very involvement may expose risk assessments to

influence from the external political power structure (Layzer 2008), and internal power and knowledge imbalances (Kinney & Leschine 2002). Furthermore, though the risk assessment process places heavy emphasis on experts, the judgment that is involved in risk assessments (Stewart & Leschine 1986) leaves the technical aspects of risk assessments open to influence as well.

As noted above, a fundamental aspect of the risk assessment process is the determination and communication of uncertainty (NRC 1996). While uncertainty in the risk assessment process is well recognized as an extensive and challenging issue (Bailar & Bailer 1999; Merrick and van Dorp 2006; NRC 1994), it is frequently left out or minimized in risk assessments (Paté-Cornell 1996). This practice of leaving out an effective discussion of uncertainty may be the

result of a number of pressures. The NRC (1996) suggests that cultural and social factors affect how uncertainty is characterized, describing situations in which consensus-building leads to its suppression, and high levels of political discord lead to its highlighting. In an article examining two risk assessments that reached divergent conclusions, van Zwanenberg and Millstone (2000) point out a possible connection between the high burdens placed on scientific analysis in U.S. politics and the robustness of uncertainty characterization in its governmental risk assessments. However, it has also been argued that the high potential political value of a definitive, quantitative presentation of risk provides additional pressure for some studies to understate uncertainty (Stirling 2007).

Though a deeply technical process, risk assessment, both through its relatively recent shift towards stakeholder engagement and the analytic deliberative process as well as the challenges and temptations involving the characterization of uncertainty, has shown itself to be as political and cultural as it is technical and scientific. Indeed, the political aspects of risk assessments are not limited to the risk assessment process, the use of risk terminology and theory itself has its own controversy.

The well-known critiques of Ulrich and Slovic on the theory of risk assessment point to some of the controversy that lies behind risk assessment processes. Like many fields, risk assessment has its share of detractors, though their existence should not negate its possible utility. However, to ignore their existence, and to ignore the validity of their critiques would do nothing to help the field. To examine carefully the ways in which risk assessment can become a tool of the powerful (Slovic 1999) or a symbol of a dangerous new era (Beck 1992), is a way to shed light on ways that risk assessment should be used or not used, and ways in which it can be improved.

2.5 Theories of When and How the Risk Assessment Process Can be Externally Influenced

The role that expert-based information like risk assessments has in the policy process has attracted widespread attention in the literature (e.g., Sabatier 1987; Jasanoff 1987; Montpetit 2011; Weible 2008). Researchers want to know the extent of the influence of this type of information (Weiss 1977a), as well as how the larger political context affects its structure and use (Sabatier 1987).

In a well-known edited work (Weiss 1977a), Weiss makes an argument that the use of academic research in policy is more complicated than one might imagine. While people may generally think of “using” research as a linear process in which a problem is discovered, research is undertaken and reviewed, and a solution is found and implemented, this describes very little of the actual use expert-based information and research is put to (Weiss 1977a). Describing her work as an examination of research utilization, Weiss lists at least five different categories of use: instrumental use, knowledge use, interactive use, political ammunition use, and miscellaneous uses. The instrumental use refers to the type of linear process described above while the knowledge use describes a process by which decision makers use research to learn about a problem, perhaps before beginning to frame it in their minds. Weiss describes the interactive use as one where research forms part of larger multi-faceted search for information en route to a policy decision. The political ammunition use is perhaps the easiest to envision, representing those situations where positions around a policy decision have already been cemented, and new research is only welcomed if its conclusions are supportive (Weiss 1977a). In an article published the same year, she went further, describing research as providing an “enlightenment function” in policymaking (Weiss 1977b). Similar to the knowledge use, research is described as enlightening

policymakers through expanding their knowledge on a topic, and gradually, over time shifting the policy conversation.

These early discussions of research in policy paved the way for policy process theories that emphasized the role of expert-based information in the formulation and realization of policy. The Advocacy Coalition Framework (ACF), first introduced in a paper by Sabatier (1987), is one such framework. The ACF is formed around an acknowledgement of the importance of research and expert-based information in policy, in particular in its enlightenment role (Sabatier 1987). The framework is based in part on study by Heclo (1974), in which the author concluded that policy is driven in large part by “interaction of specialists within a specific policy area, as they *gradually learned more about various aspects of the problem over time* [emphasis added] and experimented with a variety of means to achieve their policy objectives” (Sabatier 1987). This recognition of the enlightenment function of research is part of the core of ACF.

In a recent review of research utilization theories, Weible (2008) brings together a number of policy process frameworks, among them ACF, that explain the use of what he refers to as expert-based information. Taking ACF, the Multiple Streams Theory, the Punctuated Equilibrium Theory, and the Social Construction Theory, Weible (2008), argues that,

“Expert-based information serves political uses from reinforcing social constructions of target populations to fortifying arguments of advocacy coalitions. Science often shapes policy indirectly by modifying policy images and by changing beliefs through learning. . .the role of science is dependent on the policy-making context.”

This refined approach to looking at how expert-based information is used in public policy in different contexts forms an inviting arena within which the use of risk assessments in Puget Sound maritime policy can be examined.

The academic literature points to the challenges of completing risk assessments that are scientifically rigorous, transparent with respect to their own judgments, and contribute to the success of the policy process. With that in mind, this thesis seeks to add to the discussion around the relationship between political contexts and the structure and use of risk assessments. While Busenberg (2000) and others make a case that a collaborative process like that suggested by the NRC (1996) may be the key to imbuing risk assessments with a higher likelihood of instrumental use, Weible's framework points out that larger forces than just the involved stakeholders are at play in the policy process. The recent history of oil spill prevention-based risk assessments in the Puget Sound area provides an appropriate study arena to examine Wieble's framework in context.

Wieble's framework elaborates a series of summarizing propositions that aim to describe the effect the political context has on use of expert-based information, both in terms of its use in policy and its influence on the conclusions of experts involved. The propositions lay out an effective analytical structure for reviewing a specific political context and the expert-based information used within it. Using the propositions developed by Weible, I attempt to describe the influence of the political context of oil spill prevention in Puget Sound on the trends in use and structure of Puget Sound maritime risk assessments. To do so, I use this Advocacy Coalition Framework-based framework developed for the analysis of policy process, coupled with research into the use and structure of Puget Sound maritime risk assessments.

3.0 Framing: Using the ACF to Examine the Relationship between Political Context and Risk Assessments

Having reviewed the literature on the topic, and selected Weible's ACF-based framework as an analytic framework for exploring the relationship between political context and risk assessment structure and use, this next section explores the specifics of that framework. The specifics are necessary to set the stage for the hypotheses and analyses that make up the bulk of this thesis. The three summarizing propositions Weible establishes regarding the use of expert-based information in policy are built around a few key concepts. This next section introduces those concepts, and defines key terminology, setting the stage for the elaboration of specific research questions and hypotheses. The first fundamental concept concerns the definition of "political context." In order to determine a relationship between the political context and risk assessment, there must be a way to determine what exactly is meant by the concept, and a way to characterize different types of political contexts. This next section delves into that discussion.

As the analytic framework under examination here is the Advocacy *Coalition* Framework (italics added), it is no surprise that another concept that must be addressed is the nature of coalitions, their constitution, and their role in the policy process. Additionally, though the literature review included some discussion of the nature of "use" of expert-based information in policymaking, this next section will narrow that discussion to just three different types of use. Finally, as a portion of this thesis deals with potential influence on the "structure" of risk assessment, the role that structure plays in Weible's propositions is examined and defined.

3.1 Defining the Political Context as a Type of Policy Subsystem

The phrase “political context” is non-specific enough that it may lend itself to fairly divergent definitions. In order to avoid the confusion that can come from using non-specific terminology, this thesis will use the ACF-derived concept of a policy subsystem, as a more specific stand-in for the concept of a political context.

A policy subsystem, as defined by the ACF is composed of “semiautonomous decision-making networks of policy participants that focus on a particular policy issue usually within a geographic boundary” (Sabatier 1987, cited in Weible 2008). In other words, the policy subsystem is the formal and informal network of people who are interested in, and working on, a particular political issue, in a particular place. In order to compare policy subsystems, a level of categorization is helpful. I rely on a three-part distinction developed by Weible (2008). Weible proposes that political contexts can be summarized into three distinct subsystems, the unitary subsystem, the collaborative subsystem, and the adversarial subsystem. The unitary subsystem is dominated by a single, powerful coalition. Under a collaborative subsystem, coalitions are more cooperative, and there are moderate levels of conflict. An adversarial subsystem has high levels of conflict between coalitions (Weible 2008).

Each of these policy subsystems is further defined by Weible with five descriptive characteristics: the role of coalitions within them, the view of the policy image, the degree of centralization and independence of the policy debate, the venues used, and the policy designs. An exploration of each of these concepts follows.

Fundamental to the distinction between policy subsystems is the nature of the coalitions within them. As defined by Jenkins-Smith et al. (1991), policy subsystems are “made up of those institutions and actors that are directly involved in the policymaking process.” Those actors

cluster into competing or cooperating coalitions that are made up of “representatives of business, interest groups, trade associations, executive agencies, and relevant legislative committees, as well as elected officials, scholars and members of the press that regularly track and seek to influence the course of public policy in the issue area” (Jenkins-Smith et al. 1991).

The second determining characteristic of policy subsystems is the view of the policy images. The policy images are “projected social constructions...that frame events (Weible 2008). Coalitions “project and defend policy images to...attract positive or negative attention to the policy subsystem” (Wieble 2008). In other words, a policy image is the way in which a public policy issue is viewed and discussed by the public. With respect to the different subsystem types, unitary subsystems have *undisputed* policy images, collaborative subsystems have *reconciled* policy images, and adversarial subsystems have *disputed* policy images.

The third characteristic of policy subsystems is the level of centralization present in the policymaking arena. In unitary subsystems, the centralization of authority benefits the existing dominant coalition. In collaborative subsystems, decision making authority is more likely to be decentralized, and tension mitigated. In adversarial subsystems, coalitions compete for access to fragmented decision making authority (Weible 2008)

The fourth characteristic of policy subsystems involves the venues that are used for policymaking. The venue refers to the arena within which coalitions attempt to move their views forward and receive favorable policy changes. In unitary and adversarial subsystems traditional venues like the legislative process, the courts, and agencies tend to dominate. Collaborative subsystems use these venues as well, but also usually include a “consensus-based institutional venue that fosters communication and cooperation between coalitions” (Wieble 2008).

The fifth policy subsystem characteristic centers on policy design. The policy designs describe the nature of the policies enacted that are relevant to the policy subsystem. Policy designs can be coercive, voluntary, and/or flexible. They can also vary in the way that they distribute benefits and costs. In unitary subsystems, benefits are distributed to the dominant coalition. In collaborative subsystems policies are voluntary and flexible, while in adversarial subsystems policies are coercive and prescriptive (Weible 2008).

The five descriptive characteristics and their relationships to each of the subsystems are summarized in Figure 2.

	Unitary Subsystems	Collaborative Subsystems	Adversarial Subsystems
1. Coalitions	Single coalition with high intra-coalition belief compatibility and high intra-coalition coordination	Cooperative coalitions with intermediate inter-coalition belief compatibility and high inter and intra-coalition coordination	Competitive coalitions with low inter-coalition belief compatibility and high intra-coalition and low inter-coalition coordination
2. Policy images	Single	Reconciled	Debated
3. Degree of centralization and interdependence	Authority is centralized and interdependence with other subsystems is ignored	Authority is decentralized, fragmented across policy subsystems, or both. Coalitions share access to authority.	Authority is centralized but fragmented within the policy subsystem, fragmented across policy subsystems, or both. Coalitions compete for access to authority
4. Venues	Coalition influences decisions in one or two amiable venues (legislature, agencies)	Coalitions use a variety of venues, including ones based on consensus-based institutions	Coalitions seek to influence decisions in any amiable venue (courts, legislatures, agencies)
5. Policy designs	Policies distribute benefits to single coalition	Policies are voluntary, win-win, and flexible in means	Policies are coercive, win-lose, and prescriptive in means

Figure 2 | Subsystem Types and their Characteristics (Weible 2008)

3.2 The Use and Structure of Risk Assessments under Different Policy Subsystems

As previously noted, there is an entire scholarship on research utilization (Sabatier 1987; Weiss 1977a). Weible argues for a simplified set of three primary uses, the *learning use*, the

political use, and the *instrumental use*. The learning use, first popularized by Weiss (1977a), is the process by which scientific research gradually shifts the understanding and knowledge of policymakers. This is an indirect use, affecting change gradually and over a long time span. The political use is when policymakers utilize research to rationalize or justify decisions that have already been made. This category of use also encompasses the selective employment of research as well as its deliberate distortion. The instrumental use is when the recommendations provided by the expert-based research are both the impetus for and form the basis of resulting policies. This is the type of use implied by international risk assessment guidelines (see Figure 3).

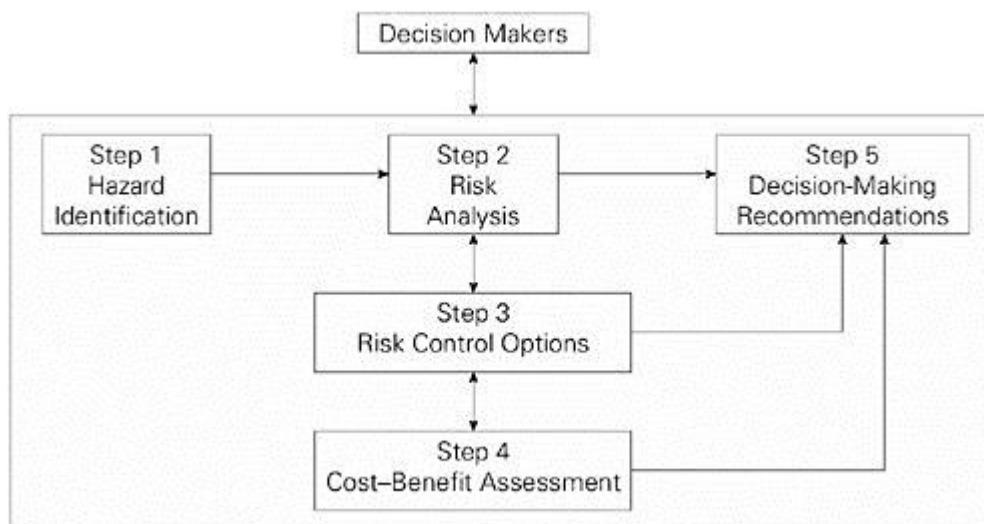


Figure 3 | Instrumental Use in the Risk Assessment Process (NRC 2008)

Weible describes a number of ways expert-based information like risk assessments can vary under different political contexts. He selects four attributes of expert-based information that respond to shifts in the policy subsystem. Three of the four attributes can be described as relating to the structure of the information, while the fourth is better described as an aspect of use. The first, analytic compatibility, refers to “the extent that experts active in a policy subsystem share

similar theories and methods in understanding and explaining phenomena” and suggests that in an adversarial subsystem, coalitions will have divergent analytical approaches (Weible 2008). As analytic compatibility relates to risk assessments it can be described as relating to the development of risk assessments. The development is the process by which choices about methodologies, data and judgments, are made. As posited by Weible, the way these choices are made is directly related to the effect the larger political context has on the analytical compatibility of the experts involved.

The next attribute, the treatment of uncertainty and risk, directly correlates to the process of the characterization of uncertainty in risk assessment. The process of uncertainty characterization has been accepted as a key structural aspect of any risk assessment (Merrick & van Dorp, 2006). Weible’s discussion of uncertainty and risk as attributes of expert-based information revolves primarily around the notion that coalitions can either emphasize unknowns to raise anxiety and fear in the public or conversely, suppress them in order to allay fears. The political implications of either can be deeply influential. This notion has attracted considerable attention in the technical dispute and risk assessment literature (Mazur 1981; NRC 1998; Stirling 2007). There can be political incentive to understate uncertainty, just as there can be incentive to overstate it, and as a result both tendencies can be considered attributes of expert-based information developed in adversarial subsystems (Leschine 2002).

The third attribute that Weible (2008) describes refers to the relationship between experts and coalitions. He argues that in adversarial subsystems, experts will become bonded to coalitions, and will tend to be used as primary allies, while in unitary and collaborative subsystems experts have a more auxiliary role.

The fourth attribute of expert-based information discussed by Weible (2008) is policy-oriented learning. This attribute is less structural, and more related to expert-based information use. Weible is in line with Sabatier and Jenkins-Smith (1999; 23), who define it as “relatively enduring alterations of thought or behavioral intentions that result from experience and /or new information and that are concerned with the attainment or revision of policy objectives.”

The four attributes are summarized in Figure 4 below.

	Unitary Subsystems	Collaborative Subsystems	Adversarial Subsystems
1. Analytic compatibility	Experts agree on theory, data, and methods	Experts reconcile differences in theory, data, and methods	Experts disagree on theory, data, and methods
2. Treatment of uncertainty and risk	Uncertainty used for political gains	Uncertainty acknowledged and decisions proceed adaptively	Uncertainty used for political gains
3. Experts and coalitions	Experts serve as auxiliary allies	Experts serve as auxiliary allies or opponents	Experts serve as principal allies or opponents
4. Policy-oriented learning	High intra-coalition learning and no inter-coalition learning	High intra-coalition learning and high inter-coalition learning	High intra-coalition learning and low inter-coalition learning

Figure 4 | *The Structure of Expert-based Information under Different Subsystems (Wieble 2008).*

That concludes the summary of the nature of unitary, collaborative and adversarial subsystems; the different ways expert-based information can be used; and a review of four attributes of expert-based information that can be influenced by policy subsystems. With this basic understanding in hand, it is time to establish the specific research questions and hypotheses that guide this thesis.

4.0 Research Questions, Hypotheses and Methods

As previously discussed, my research attempts to elucidate the ways in which the nature of the larger political context affects the use and structure of Puget Sound maritime risk assessments. After a thorough review of the literature, and the identification of a suitable framework for guiding an inquiry, the following research questions have been selected:

Has the nature of the larger political context influenced the use and structure of Puget

Sound maritime risk assessments? If so, in what ways have they been influenced?

This general inquiry will be guided by the ACF-based framework described previously. The framework allows the Puget Sound oil spill prevention policy subsystem, and the risk assessments undertaken within it, to be evaluated against three propositions created by Weible (2008) and these propositions are adopted as hypotheses for this project. They create specificity for the research questions and establish a basis for analysis.

The first proposition made by Weible (2008) is that “the political use of expert-based information will be highest in adversarial subsystems.” Weible argues that the high level of conflict in these systems will make expert-based information an appealing political weapon. The second proposition posits that “the instrumental use of expert-based information will vary from the highest in collaborative, to an intermediate level in unitary, and the lowest in adversarial policy subsystems.” The third proposition states that, “Learning will occur within coalitions or among experts with similar analytical approaches in all subsystems and will most likely occur across coalitions or across experts with dissimilar analytical approaches in collaborative subsystems.” The proposition argues that within collaborative subsystems, learning will be widespread. In contrast to that, within unitary and adversarial subsystems learning will only occur between those who already share analytical or political bonds. Each of these propositions suggests particular ways that expert-based information will be used under different political subsystems.

In order to evaluate these propositions, in the context of the overall research questions, this thesis takes a three-part approach.

- 1) Evaluation of the nature of the Puget Sound oil spill prevention policy subsystem using three categories: unitary, collaborative, and adversarial. These follow the definitions laid out in Figure 2.
- 2) Evaluation of the use of Puget Sound risk assessments, with respect to the learning, political, and instrumental use.
- 3) Evaluation of Puget Sound risk assessments with respect to the structural attributes of expert-based information described in Figure 4.

4.1 Methods

As described above, this thesis has three main thrusts. First, it investigates the larger political context within which decisions about oil spill prevention are made in the Puget Sound. To do so it uses the definition of policy subsystems established by Weible (2008), and shown in Figure 2 to characterize the oil spill prevention policy subsystem in the Puget Sound. Second, it evaluates the use of maritime risk assessments within that policy subsystem, matching the uses to one of the three use categories described by Weible (2008). Third, it evaluates the analytic compatibility; the treatment of uncertainty and risk; and the role of experts and coalitions in the risk assessment process (see Figure 3). Finally, it evaluates how those uses and attributes match up with the uses and attributes predicted by Weible (2008) under the various policy subsystems.

The execution of the three parts of the study was supported by document review and interviews. Risk assessments produce, at a minimum, a final report detailing their data, methods,

and conclusions. Some produce minutes, draft reports, calls for participation, among other documents. All of these possible sources were considered in the document review.

4.2 The Use of Elite Interviews

The interviews take the form of “elite interviews.” Elite interviews consist of interviews with those directly involved in the policymaking process (Beamer 2002). They are a good way to delve into the complexities of the political process (Dexter, 1970) and are considered an especially useful way of engaging with people who may have “specific insight into the casual processes of politics” (Beamer, 2002).

As described by Beamer (2002), the use of elite interviews should be systematic, and should follow four basic steps.

- 1) Identify the constructs of interest and develop observable measures and instrumentation to tap into them.
- 2) Develop sampling procedures to maximize the validity of the data.
- 3) Conduct interviews and collect corroborative data.
- 4) Analyze data.

The primary constructs of interest for the interviews are the different types of information use, as well as the nature of the policy subsystems. In keeping with Beamer (2002), who notes that academic constructs may be confusing or unfamiliar to the interviewee, the interviewer will pose questions that bring these uses into view, instead of describing the different uses and subsystem types outright.

With respect to sampling, I relied on existing lists of risk assessment participants as an initial pool of possible respondents. To complement this initial approach, I used snowball sampling to acquire referrals from my initial respondents. Though snowball sampling introduces potential biases, the resulting reduction in generalizability should be offset by an increase in the depth of information collected (Beamer, 2002).

A total of 13 semi-directed interviews were completed in person and via telephone. Most of the interviews were recorded and professionally transcribed. In the instances where audio recording was not possible, interview transcription and write up was completed soon after each interview so as to avoid interviewer bias as suggested by Beamer (2002). The interview questions are available as Appendix A.

4.3 The Selection of Risk Assessments for Review

A main component of this thesis is the review and evaluation of the use and structure of risk assessments completed on the topic of maritime oil spill prevention in the Puget Sound. There are many studies that have been completed since the earliest use of risk assessment in the 1970s that relate in some way to maritime risk in the Puget Sound. In order to select which ones to evaluate, it is necessary to develop selection criteria.

The risk assessments selected are all projects that attempt to gauge and assess both the level of hazard present in the system and potential mitigation measures. In other words they have a focus on evaluating the system for the purpose of improving it. It is also important that they are oriented around the discussion of oil spill prevention. Since this thesis is structured around a policy subsystem that deals with the same, that continuity is important. Finally, as mentioned previously, policy subsystems usually have a geographic scope. Although the term Puget Sound

has been used fairly generally up until this point, the following definition of the Puget Sound Partnership is used to geographically constrain the risk assessments selected:

“Puget Sound and related inland marine waters, including all salt waters of the state of Washington inside the international boundary line between Washington and British Columbia, and lying east of the junction of the Pacific Ocean and the Strait of Juan de Fuca” (Wash. Rev. Code § 90.71.010), see Figure 5. It may also be that risk assessments other than those selected exist that meet these criteria. However, due to the time limitations inherent in any study, and the robustness of the studies ultimately selected, this thesis opted to continue with the five studies identified below. Also below is the complete list of risk assessments considered.



Figure 5 | The Strait of Juan de Fuca and Puget Sound (Adapted from Merrick 2012)

The following is a partial list of risk assessments, or risk assessment-like studies completed since the late 1970s in the Puget Sound area. Each of these studies was considered for inclusion based on the aforementioned criteria.

- Comparison of Oil Spill Risk in Greater Puget Sound (1980)
- Dupont Comparative Oil Spill Risk Analysis (1981)
- Puget Sound Tanker Size Optimization (1981)
- Improving Maritime Traffic Safety: A Technology Assessment (1982)
- Volpe Scoping Risk Assessment: Protection against oil spills in the marine waters of

- northwest Washington State (1997)
- The Washington State Ferries Risk Assessment (1999)
- North Puget Sound Long Term Oil Spill Risk Management Panel (2000)
- West Coast Offshore Vessel Traffic Risk Management Project (2002)
- Port and Waterways Safety Assessment Haro Strait / Boundary Pass (2002)
- Cherry Point Vessel Traffic Risk Assessment (2006)
- JLARC Review of Oil Spill Risk and Comparison to Funding Mechanism (2009)
- Vessel Traffic Risk Assessment 2010 (In Progress)

From that list, the following risk assessments were selected for evaluation as part of this thesis:

- Puget Sound Tanker Size Optimization (1981)
- Improving Maritime Traffic Safety: A Technology Assessment (1982)
- Volpe Scoping Risk Assessment: Protection against oil spills in the marine waters of northwest Washington State (1997)
- North Puget Sound Long Term Oil Spill Risk Management Panel (2000)
- VTRA 2010 (In Progress)

These five risk assessments all attempt to pass analytic judgment on Puget Sound oil spill hazard levels and mitigation measures, and thus they satisfy the basic selection criteria.

However, out of the larger list of risk assessments undertaken in Puget Sound, they are not alone in this regard. The selection of these five was ultimately made because they collectively span the entire oil spill prevention time frame. They were also individually designed to inform key questions of their time period. As a result, each is something of an analytical embodiment of specific political debates. These five risk assessments provide a cross-section of analytical methods, areas of focus, and political contexts. As such, they make a good starting point for evaluating the influence of potentially shifting policy subsystems on a variety of individual risk assessments.

4.4 An Introductory Description of the Selected Risk Assessments

The Puget Sound Tanker Size Optimization project (Rath 1981) was commissioned by the USCG to evaluate the benefit of the 125,000 deadweight ton (dwt) tanker size limitation created by the Magnuson Amendment. The project, contracted to the Oceanographic Institute of Washington, sought to determine whether tanker size was in fact a valid exposure variable (that is, something with a statistically significant effect on spill risk), and if so, what size tankers would result in the lowest risk for Puget Sound (Rath 1981).

Improving Maritime Traffic Safety: A Technology Assessment (Wenk, 1982), while not technically a risk assessment, shares many characteristics of a risk assessment. It may be more properly defined as a technology assessment, described in Wenk (1975) as “concerned with analysis of the impacts of technological delivery systems on the social structure and physical environment,” and therefore is another type of expert-based information that relies on the estimation and characterization of risk. Wenk (1975) goes on to write that, “technology assessment can serve as a means for managing risk.” The assessment was undertaken by Wenk independently, in response to perceived risk on the Puget Sound. He sought to characterize ecological and human risks presented by marine traffic, as well as provide policy recommendations (Wenk 1982).

The Volpe Scoping Risk Assessment was mandated by a 1996 action plan issued by the US Secretary of Transportation, and was designed to provide a “review of the overall marine safety regime to determine whether...hazards...warrant consideration of specific mitigation measures” (Dyer et al. 1997, xii). Officially, the study was undertaken over concerns about an influx of foreign tankers, but it took place during the middle of a heated debate over the placement of a rescue tug at Neah Bay, and its neglect of that option was highly relevant.

North Puget Sound Long-Term Oil Spill Risk Management Panel was set up by the Coast Guard and tasked by Washington's Governor and the US Secretary of Transportation with establishing a long-term oil spill risk management plan for Puget Sound (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000). The panel was to use as its analytic structure the risk assessment completed as part of the Volpe Risk Assessment (Dyer et al. 1997).

Unlike the prior risk assessments, the Vessel Traffic Risk Assessment 2010 study (VTRA 2010) does not come with an analogous mandate. The VTRA 2010's mandate comes from the Puget Sound Action Agenda, which calls for a generalized identification of safety gaps and related risk reduction measures (Puget Sound Partnership 2012). Similar to the Improving Maritime Traffic Safety study, it was developed as a general exploration of possible safety improving mitigation measures (van Dorp & Merrick 2013), though it is being completed in the context of a potential expansion of cargo traffic, of both bulkers and tankers, in Puget Sound. The study is methodologically distinct from the preceding, relying on a sophisticated and complex simulation. In addition, the study is explicitly attempting to follow a "collaborative analysis" approach, an analytic-deliberative process which requires the collaborative involvement of stakeholders in the analytical process (van Dorp & Merrick 2013).

5.0 Analysis and Results

The outputs of the analysis undertaken in this thesis consist of the establishment of the nature of the oil spill prevention policy subsystem in the Puget Sound, an evaluation of the use and structure of the risk assessments completed during that time, and an analysis of the influence of the former on the latter.

The interviews and document review suggest that the oil spill prevention policy subsystem in the Puget Sound was primarily adversarial from the early 1970s until the mid to late 2000s. During that time, the risk assessments that were completed showed a primarily political use, with low levels of cross-coalition learning. Structural aspects of the risk assessments also showed political influence, though with a lesser degree of uniformity. Analytical compatibility was low and methods were contentious. Uncertainty and risk were frequently used for political gain, and risk assessments were structured in such a way as to lend themselves to that use. Beginning in the mid to late 2000s, the interviews and document review suggested the beginnings of a shift in the policy subsystem toward the collaborative type. Coalitions became more cooperative, and inter-coalition beliefs were more compatible. Policy images appeared to stabilize. Instead of the fight being framed as coalitions wanting no limiting regulation against those wanting to curtail the transport of oil—as the 1980s were described (Interview Charlie 2013)—a less contentious image of spill prevention was formed. At the same time, the use of coercive, prescriptive policies declined. Under this collaborative policy subsystem, the lone risk assessment undertaken during this time, though still unfinished, showed some level of political influence through reconciled analytical methods and acknowledged uncertainty.

The following sections discuss these results in more detail, starting in the 1970s, and evaluate the relationship between subsystem and risk assessment structure and use. Each section begins with a historical background, which is then followed by an analysis of the policy subsystem, and a description of the risk assessment or risk assessments completed during that time frame.

5.1 Historical Context: Alaskan Oil Comes to the Puget Sound

The Torrey Canyon disaster off the coast of Britain in 1967 brought international attention to the issue of supertanker oil spills (Millard 1993). Shortly thereafter, in 1969, the blowout of an oil well off the coast of Santa Barbara brought the issue closer to home for Puget Sound residents (Vagners 1972). Finally, in early 1971, a Union Transportation barge spilled 242,000 gallons of fuel at an Anacortes, Washington dock, causing one of the first major marine oil spills in Puget Sound area history (Vagners 1972). This spill, coupled with the increased potential for crude transport as a result of the Prudhoe Bay discoveries in 1968 put oil spill prevention in the spotlight in the Puget Sound in the early and mid-1970s (Neel et al. 1997). The reason the Prudhoe Bay discoveries were so relevant to the Puget Sound was because the proposed Barrow to Valdez Trans-Alaska Pipeline (TAPS) route included tanker shipments that were likely to terminate in Puget Sound (Kirkey 1998). Signed into law in 1973, TAPS was completed in 1977.

Prior to the completion of the pipeline, and in response to a predicted increase in supertanker arrivals, the Washington State Legislature passed the Washington Tanker Safety Act in 1975 which limited tankers in the Puget Sound to 125,000 dwt (Neel et al. 1997). This law was challenged in court by a local oil refiner, Atlantic Richfield Co. (ARCO), the only Puget Sound refiner with a terminal capable of handling a vessel of over 125,000 dwt. The case went to the Supreme Court as *Ray v. Atlantic Richfield Co.* and resulted in the law being overturned on grounds of federal preemption. The court ruled that the state did not have the authority to regulate certain aspects of maritime trade, and that those aspects were specifically the purview of the federal government and the USCG (*RAY v. ATLANTIC RICHFIELD CO.*, 435 U.S. 151 1978). This tension over the ability of the state to regulate marine commerce remained an

underlying theme for years afterwards. In the late 1990s, a similar court case, now referred to as the Intertanko decision, tackled similar jurisdictional conflicts.

The court battle over the tanker size limitation led to the now well-known 1977 Magnuson Amendment. A brief amendment slipped into a renewal of a federal law by Washington Senator Warren Magnuson in order to avoid debate and scrutiny, it not only limited tankers entering Puget Sound to 125,000 dwt, but prohibited the development of additional crude oil handling facilities east of Port Angeles (Oldham 2003). This prohibition, and the discussion of its adoption by the USCG, is one of the issues addressed by the risk assessments reviewed in this thesis.

These rapid developments and controversial regulatory measures set the stage for two of the assessments evaluated by this thesis, The Puget Sound Tanker Size Optimization project and an assessment called Improving Maritime Traffic Safety: A Technology Assessment.

5.2 The Policy Subsystem at the Time of the Tanker Optimization and Technology

Assessment Studies

Interviews were completed with participants in both of these assessments, two from the optimization study and one from the technology assessment. All three described the political climate as adversarial. Interviewee “Charlie,” an academic involved in the Tanker Optimization Study, described the politics surrounding the study as a “polar process with no middle ground.” A maritime professional, interviewee “Delta,” who participated in Wenk’s technology assessment had a similar view saying, “There were those that were for it, and those who were against it, but there wasn’t a lot of mediation or negotiation. At least now there is dialogue, in those days there was a superficial dialogue...” These descriptions correspond to some of the

characteristics of an adversarial policy subsystem, matching the description of coalitions as competitive and having low inter-coalition belief compatibility. A debated policy image is illustrated by Interviewee Charlie's comment that "Environmentalists said that no spill was too small and no movement of oil was acceptable, and advocacy groups wanted the economic development and [that] no regulation [to] constrain it was acceptable."

In the adversarial subsystem, policies are usually "coercive, win-lose, and prescriptive in means" (Weible 2008). As seen above, this is a more appropriate description than the alternative of "flexible, win-win, and voluntary" policies. The tanker size limitation, first attempted legislatively at the state level before being struck down, and ultimately being instituted through a federal backdoor without discussion (Oldham 2003), was highly prescriptive, and concentrated costs on one coalition. Additionally the limitation was win-lose to such an extent that it invited a lawsuit from the oil industry (Neel et al. 1997).

At this early stage in oil spill prevention policymaking in the Puget Sound area it seems that an adversarial subsystem dominated. The state and industry were at odds over oil transport, the Coast Guard was left out of decisions about tanker size, and environmentalists were experiencing some early successes. Indeed, this early setting has had long-term effects, with one journalist describing the early 2000s in maritime politics as being "beset by feuds that date back 25 years to [the] law that banned supertankers from Puget Sound" (Connelly 2002).

5.3 The Structure and Use of the Tanker Size Optimization Study

The Oceanographic Institute of Washington's Tanker Size Optimization Study follows the attribute and use characterization of adversarial policy subsystems. While there is no clear indication of experts disagreeing on the analytical methods undertaken by the study's authors,

their choice to apply worldwide data sets to a local problem has been a controversial issue in maritime risk assessment (NRC 1998; Merrick et al 2002). Additionally, the political climate at the time was such that political figures were announcing their opposition to any statistical methodology whatsoever. Washington Senator Warren Magnusson was quoted in the Seattle Times saying, “When it comes down to real accidents in the real world, probability studies become meaningless” (Pryne & Katz 1979). He goes on to further disparage studies for relying on “world tanker casualties,” which he describes as “not applicable to the specific conditions of Puget Sound” (Pryne & Katz 1979).

The political use of uncertainty and risk in the Tanker Optimization Study is consistent with Weible’s definition of an adversarial subsystem. Though the study authors go to great pains to repeatedly emphasize the limitations of their study, e.g. that the results are not predictive, and that only tanker characteristics were considered as risk variables (Rath 1981), the study’s output contained enough uncertainty that coalitions with opposing beliefs were able to interpret the results to their benefit.

The study was tasked with determining whether a limit on tanker size in Puget Sound would result in a reduction in spill risk, and if so, what size that limit should be. Instead, the study concluded that only average vessel size could be optimized to reduce spills, and average vessel size is only partially controlled by an upper tanker size limit (Rath 1981). This malleable conclusion led many in the environmental coalition to predict that the study would be used by the Coast Guard as justification for lifting the tanker size limit (Katz 1982). However, the Coast Guard ultimately made the size limit permanent, and cited the conclusions of the tanker size risk assessment as a major reason (Katz 1982). The study’s conclusions were sufficiently ambiguous in their application to Puget Sound and were thus able to suit either conclusion. This allowed for

predominantly political use of the risk assessment.

The relationship between experts and coalitions involved in the study appears to correlate less with Weible's predictions. While an adversarial subsystem is predicted to lead to experts being treated as core allies, study authors described their relationship with the Coast Guard as much more distant, saying, "What we never knew as the research team was the Coast Guard's motivation...we had our suspicions, but we were blissfully unaware of that. We were really just trying to mine the best information we could out of what was available" (Interview Charlie 2013).

Comments like the one made by Senator Magnusson about the minimal value of statistical studies are an indication of how little policy-oriented learning might be expected from this study. The political use of the study conclusions by different groups suggests that minimal cross-coalition learning took place. Cross-coalition learning, if it occurred, was likely to be on the technical aspects of the problem, not fundamental values change.

As noted above, the study was used in fundamentally political ways, which is in agreement with Weible's model. This is consistent with findings in other reviews that one situation in which expert-based information will be utilized is if it is "perceived to support the decision-maker's perception of the agency's best interests" (Oh, 1996 cited in NRC 2005). The Tanker Optimization study authors came to a conclusion that was partially ambiguous, and the Coast Guard and others used its results to justify political positions and decisions that at times were conflicting.

5.4 The Structure and Use of Improving Maritime Traffic Safety on Puget Sound

Waterways: A Technology Assessment

The Maritime Traffic Safety study (Wenk 1982) differs in two fundamental ways from the Tanker Optimization Study. First, this study was undertaken without a defined mandate. No particular policy was being evaluated. Second, the Maritime Traffic Safety study was not oriented around any particular risk, or any particular risk variable. The study focused instead on the overall safety of maritime activity in the Puget Sound (Wenk 1982). However, these differences notwithstanding, as previously noted, the study still partially fits within Weible's model as explained below.

With respect to analytical compatibility, again, there is no indication of a battle of methodology between experts, although the study does take a completely different approach than that undertaken in the Tanker Optimization study. The Maritime Traffic Safety study avoids the use of global data, and to deal with shortcomings in local data seeks to incorporate expert judgment and hypothetical accident scenarios (Wenk 1982, v). Similarly, it is hard to determine if the study authors were closely allied with a particular coalition. One study participant suggested that the study lead author was in fact drawn to the project partially for personal reasons. He said about the lead author, "A lot of his initial interest in this was because he was a small boat owner and he had seen near collisions, and he had been in situations himself where he perceived that it wasn't going the way it should" (Interview Delta 2013). Though this is not an indication of the coalition membership one way or another, it does reflect the independent nature of the study. Undertaken by an academic, outside of any specific policy debate, the lack of adversarial type attributes may be related to the study's outsider status. Another non-adversarial type attribute of the study is that the study lead author Edward Wenk participated in other studies

as an expert (Dyer et al. 1997). Though it is impossible to know Wenk's personal motives, he may well have simply been trying to shine an analytical light on the public debate. Unaffiliated or otherwise politically neutral experts are sometimes motivated by a belief in the value of good analysis, in the name of good government (Weimer & Vining 2005, 41). This may have been the case for Wenk in this instance.

However, regardless of these less adversarial qualities, the study neglects to characterize uncertainty, saying only that the study should "supplement, not replace, the judgment of decision-makers (Wenk 1982, 188). More tellingly, the use of the study's findings and recommendations is not an instrumental use, but rather a predominantly learning use.

According to an issue paper published by the state water quality authority, by 1989, seven years after the publication of the study, none of the top six recommendations made in the study had been implemented (Puget Sound Water Quality Authority 1989). However, the fact that the issue paper used the study recommendations as a foundation for its own recommendations shows the learning use. Although by 2013 some of the study recommendations have been accomplished, like increased training for mariners, as well as improved weather forecasting, it is hard to see much correlation between the report and the changes.

Ultimately, the Maritime Traffic Safety Study did not demonstrably influence policy makers in the short run although it seemed to result in a fair amount of learning. Its recommendations were ultimately unable to influence policymakers outside of generalized learning. This may be an indication that though its independence from the adversarial climate was enough to allow it to avoid being structured with adversarial attributes, the recommendations made by the study were still released into an adversarial world. And there, they were not able to be used instrumentally, only for learning within coalitions that held similar values.

5.5 Historical Context: High Profile Spills

In the mid to late 1980s there were a number of high profile oil spills in the Puget Sound and nearby areas. In 1984, the SS Mobil Oil grounded, spilling 200,000 gallons of fuel oil into the Columbia River. In 1985, the Arco Anchorage grounded off Anacortes and spilled 239,000 gallons of crude oil. In 1988, the barge Nestucca, parted its tow after crossing the Grays Harbor bar off the West Coast of Washington and spilled 231,000 gallons of fuel oil after a subsequent collision with its tug. Finally, the massive and ecologically catastrophic Exxon Valdez spill in Prince William Sound occurred in 1989, spilling over 11 million gallons of crude oil (Neel et al. 1997).

These spills taken together functioned like a focusing event, that is, “an event that is sudden, relatively uncommon, can reasonably be described as harmful or revealing the possibility of potentially greater future harms; has harms that are concentrated in a particular geographic area or community of interest; and that is known to policy makers and the public simultaneously” (Birkland 1998). The Nestucca spill off the Washington coast in particular spurred legislative action and precipitated a number of local changes (Etkin & Neel 2001, Lynch and Neel 2000), while the Exxon Valdez spill drove federal legislation in the form of the Oil Pollution Act of 1990 (OPA 90). In the introduction to the Volpe Center Scoping Risk Assessment, completed in 1997, the authors write that in the “aftermath of the Exxon Valdez...the International Maritime Organization (IMO), the United States, and Washington State put a panoply of significant new safety regulations in place” (Dyer et al. 1997).

Local changes included the establishment of the Pacific States/British Columbia Task Force in 1988 (Hoang 2007) and the passing of the Vessel Oil Spill Prevention and Response Act in 1991 (Broom 1991). In addition to establishing a cleanup trust fund and requiring spill

prevention and response plans from shippers, the Act established the State Office of Marine Safety (OMS) (Savelle 1991a). The OMS was created as an independent entity, separate from the Department of Ecology, and tasked with promoting “the safety of marine transportation in Washington” (Washington HB 1027 1991).

These new laws and new agencies came at an emotional time in Puget Sound. The Exxon Valdez spill had been given extraordinary treatment in the press. Throughout 1989, “no topic other than the politics of Eastern Europe and the Soviet Union commanded as much sustained U.S. press attention as did the oil spill of the Exxon Valdez” (Daley & O’Neill 1991). And in the Puget Sound, there was a consistent parallel between Prince William Sound and the Puget Sound being drawn in the press (Leschine 1990). The resulting operative question for the public and for policy makers was “Could the same thing happen here?” At the time, Leschine (1990) pointed out that the analogy was flawed, and that it was quite possible that the Puget Sound would benefit the most from risk mitigation measures different from those undertaken in Prince William Sound.

5.6 Historical Context: The Rescue Tug Comes of Age

The comparison of Prince William Sound to the Puget Sound might have been the impetus for some of the first discussions of establishing a rescue tug west of Port Angeles. Almost immediately after the Exxon Valdez spill, an escort and rescue tug system was established in Prince William Sound, with portions of it federally mandated by OPA 90. West of Port Angeles, there was no such system, which the Washington State Legislature attempted to address in its Vessel Oil Spill Prevention and Response Act of 1991 by mandating that “an emergency response system for the Strait of Juan de Fuca shall be established by July 1, 1992”

(Washington HB 1027 1991). Though it does not specifically mention a rescue tug that is the interpretation taken by the Washington State Department of Ecology in its history of the rescue tug debate (Lynch & Neel 2000). Regardless of whether the legislature was thinking about a rescue tug when they wrote those lines in House Bill 1027, the rescue tug quickly became one of the most important and contentious components of the spill prevention debate.

In 1993 the Regional Marine Safety Committee for the Strait of Juan de Fuca/Northern Puget Sound issued a preliminary recommendation for the placement of a rescue tug at Neah Bay. (Lynch & Neel 2000). This was followed in 1994 by a formal recommendation, in which the Committee was joined by the OMS' Emergency Towing System Task Force (Lynch & Neel 2000). These studies and recommendations were the beginning of a long fight over whether a tug should be placed at Neah Bay, and if so, who should pay for it.

The fight raged during the 1990's with multiple studies on the topic being proposed and completed, with varying results. When asked to describe the political climate of the mid 1990's in Puget Sound, interviewee "Foxtrot" a retired Department of Ecology official commented that, "There were certainly two camps. There was the maritime industry that was, I believe trying to hold off the establishment of a dedicated rescue tug here in Puget Sound that the state of Washington was pursuing." The tension was heightened with the signing of the Alaska Power Administration Asset Sale and Termination Act (APAASTA) in 1995, authorizing foreign exports of Alaskan North Slope crude oil (Dyer et al. 1997). Concerns were raised about the possibility that Puget Sound might see an increase in foreign tankers as a result of more Alaska oil being exported. Interviewee "Hotel" an environmental activist had the following to say about it: "I mean, lifting the export ban on Alaskan North Slope crude, I think that's what [the Volpe Scoping Risk Assessment] was actually in response to. We made the argument that...if you drain

[Alaska] quickly...we're going to see the advancement of foreign tankers coming to the Puget Sound that much [more] quickly.”

With the debate charged by APAASTA, players in the maritime industry developed an alternate proposal. Called the International Tug of Opportunity System (ITOS), it proposed to improve knowledge of and communications with existing tug resources by installing transponders on working tugs (USCG 1995). ITOS was the industry-backed alternative to the rescue tug idea and the maritime industry expended a lot of energy in order to place it under consideration (Foxtrot Interview 2013). Concern over a possible influx of foreign tankers led President Clinton to require a review of both the ITOS proposal and a comprehensive risk assessment of the Puget Sound (Dyer et al. 1997). That risk assessment was called the “Scoping Risk Assessment: Protection Against Oil Spills in the Marine Waters of Washington State,” and is one of the risk assessments evaluated in this thesis.

Described as a “tremendous waste of resources” (Hotel Interview 2013), the Scoping Risk Assessment steered clear of the question of the rescue tug at Neah Bay. Interviewee Hotel suggested that the goal of the study was to “burn more time” and that the study was a “Coast Guard driven document” that asked the wrong questions in the wrong ways (Hotel Interview 2013). Another interviewee suggested that the “environmental advocacy side of the maritime community [was] never really satisfied that the Volpe study was good enough” (Interview Foxtrot 2013). Unsurprisingly, the results of the study did nothing to quiet the interests and desires of the environmental coalition for a rescue tug at Neah Bay.

5.7 Historical Context: Renewed Conflict between State and Federal Regulators

The establishment of the new state Office of Marine Safety in 1991 was also controversial. Prior to the inclusion of the OMS in what was then just a proposed bill, the Seattle Times ran various quotes criticizing the bill for failing to establish an OMS-like entity (Savelle 1991b). Shortly thereafter the Times ran an editorial praising the legislature for adding language creating the OMS to the bill writing, “Creation of a vigorous, independent Marine Safety Office would be a significant achievement. It should not be watered down by a timid charter or humble financing” (Seattle Times 1991).

The OMS was given a mandate to review the Coast Guard’s vessel inspection program and if it determined that the “tank vessel inspection programs... [were] not adequate to protect the state's waters, it [should] adopt rules for a state tank vessel inspection program” (Washington HB 1027 1991). Not only did its name match that of a Coast Guard department with a similar mission, the OMS mandate included a heavy jurisdictional overlap as well. The office was not well received by the Coast Guard and prompted comments like the following from interviewee Golf, a former USCG official: “At the end of the day, the state decided to create an Office of Marine Safety in large part [in order to] compete with the Coast Guard.” Another interviewee, Alpha, also formerly of the USCG, described the OMS’ first director as a “polarizing person” and said that the OMS [implied] that the Coast Guard inspectors were incompetent.

The OMS was stripped of its independence in 1997 and placed under Department of Ecology control. By that time, the OMS had been the target of numerous attempts to dismantle it, including a last minute deal with State Senate Democrats in 1995, whose possible unconstitutionality so angered some environmentalists that they filed suit over it (Murakami 1995, see Gwinn 1995 for more attempts). As the office was described by an interviewee as

“hated” by industry (Interview India 2013), the end of the OMS was unsurprisingly described as a victory for industry (Simon 1997). The dissolution of OMS also shifted the relationship between the USCG and the state. In an interview, Foxtrot reported that “during the time the Office of Marine Safety was operational, there was some strong adversarial positioning on the part of the Coast Guard,” but that when “the Office of Marine Safety’s duties were shifted to Ecology and there was a little bit of different relationship at that point. I think a softening of the adversarial relationship at that point.”

5.8 Historical Context: Bringing in the Stakeholders

After the Volpe Scoping Risk Assessment failed to settle the rescue tug issue, the Coast Guard set up the North Puget Sound Long Term Oil Spill Risk Management Panel. The panel’s charter did not mention a rescue tug, yet many of the panel participants came to the table with a rescue tug as their primary concern, and it was described as a constant “bone of contention” throughout the panel’s tenure (Anderson 2000). A San Juan County commissioner described the panel as being primarily composed of “veterans of the long debate over stationing a dedicated oil spill prevention tug on year-round duty at the entrance of the Strait of Juan de Fuca” (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000).

The panel was deeply contentious, with one member commenting that “we fought in the risk management panel for a half hour to an hour every meeting about process and you only argue about process if you are afraid somebody is going to set something in contrary to the outcome you want” (Interview Alpha 2013). Indeed, another member, from environmentally oriented local government, described their participation as primarily strategic, commenting that their decision to stand aside (not vote) during all votes was “a calculated move” (Interview Juliet

2013). “We knew where we wanted to go, and we knew what we needed to get. This was how to do it” (Interview Juliet 2013).

One view that panel participants seem to have shared is the notion that other panel members came to the table with pre-conceived and fixed goals and opinions. One interviewee called it a “predetermined view of where [they] wanted to go” (Interview Golf 2013) while another described it as a “solution looking for a problem approach,” whereby advocates would select a desired measure, and then push for a study that would include that measure as needed (Interview Alpha 2013). Rescue tug advocates saw something similar, but with a twist, saying, “they didn’t want the tug to be the issue (Interview Hotel 2013) and accused panel management of refusing to address the tug question and attempting to bury the discussion in caucus (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, Clallam County Commissioner’s Minority Report).

The panel produced a final report that declined to recommend placing a tug at Neah Bay. The decision was omitted from the executive summary of the report, and only discussed on the 95th page under the heading “Other measure considered No. 5” (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000). The report was accompanied by six scathing minority reports, representing the six (of twenty total) panel members who declined to endorse the findings of the final report. Each of the minority reports focused on the lack of a recommendation for a rescue tug, with one dissenter calling the tug a “no-brainer” (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, San Juan County Board of Commissioners Minority Report).

One of the underlying issues it seems was not whether a rescue tug would improve safety in the outer Strait, but who would end up footing the bill for such a tug. One interviewee

described the (non-tank) shipping industry interests as against paying any fee for a tug, while tanker interests were deeply opposed to any additional fee that solely targeted tankships without including the non-tank vessels (Interview India 2013). The USCG was also worried that it would end up paying for the tug out of their own budget (Interview Foxtrot 2013). With one interviewee suggesting that the USCG would “never agree that this tug was necessary for the safety of the region,” since to do so would put the agency in line to fund it, saying, “So you are never going to get that kind of support from the Coast Guard, I think, unless there is an identified source of funding that will guarantee it won’t affect the Coast Guard’s operating budget” (Interview Foxtrot 2013).

Unable to put the tug question to rest, this panel became just another one of “many, many, many discussions around the value of tugs and specifically the value of tugs at Neah Bay” (Interview India 2013). Ironically, during the tenure of the Panel, a tug was temporarily installed in Neah Bay on a trial basis with funding from the Navy, the Makah Tribe, and the State of Washington, but its placement certainly was not in response to recommendations on the part of the panel. If anything, this legislated action was the result of the continued now decade-long stalemate between adversarial coalitions.

5.9 Historical Context: The State Preempted – The Intertanko Decision

The argument over the rescue tug was taking place at the same time as another court battle over federal and state jurisdiction over maritime trade. The suit was between the tanker industry, in the form of the International Association of Independent Tanker Owners (Intertanko), an international oil tanker owner’s consortium, and Washington State. The legal action, initiated in 1995, had by the year 2000 reached the US Supreme Court (Garry 2001). At play were issues

of possible state preemption of federal supremacy in maritime safety legislation. Specifically, Intertanko argued that the State's inspection program, first established under the State's Office of Marine Safety, was unconstitutional. The argument was based on the Supremacy Clause of the constitution which establishes that when state and federal laws conflict, federal laws "preempt" state laws (Garry 2001). Two decisions in lower courts were found in the State's favor but this last and final decision found for the tanker industry and the federal government. The court concluded that Washington State's regulations concerning crew training, language proficiency, navigational watch requirements and accident reporting were preempted by federal law (Garry 2001).

While the Intertanko decision was welcomed by industry as a return to regulatory efficiency, and bashed by environmental interests for increasing the Puget Sound's risk of a spill, the decision was also another step towards reconciliation between the Department of Ecology and the Industry interests. As noted previously, the establishment of the OMS was a hard pill to swallow for both the USCG and Industry (Interview Foxtrot 2013). When OMS's mandatory inspection-based prevention regime, at that time operated by the Department of Ecology, was overturned in the Intertanko decision, the relationship between the State and Industry improved measurably. "The Intertanko decision...[led to] a voluntary inspection system. There was really not any great deal of practical difference, other than it softened any vitriol that industry might have had for the state" (Interview Foxtrot 2013).

5.10 The Policy Subsystem at the Time of the Volpe Scoping Risk Assessment and the North Puget Sound Long Term Risk Management Panel

Similar to the 1970s and 1980s, the 1990s and early 2000s were a time of competing

coalitions that struggled with very low belief compatibility. The challenge of inter-coalition communication was described by interviewee Golf, “the biggest frustration was folks that came in [with] a predetermined notion that it is unsafe, that there is an Exxon Valdez trying to happen every day.”

Policy images were hotly debated, as is demonstrated by the above quote. The Exxon Valdez had drawn in sharp relief the nature of the problem for the public, but industry voices still argued that the waterways were fundamentally safe for tankers and other vessels. Venues were highly varied, as befits an adversarial subsystem. The courts, legislature, agencies, and press were all heavily involved in the policymaking struggle. The policy designs as well were in keeping with an adversarial system, consisting of many prescriptive measures (e.g. tanker size limitations and mandatory escorting), and pitting agencies against one another for jurisdiction.

In keeping with the statements of most of the interview participants, this time period represented an adversarial subsystem in oil spill prevention. There was one lone dissenter amongst the interviews, the environmental activist Hotel, who instead suggested that the subsystem was better described as unitary. A unitary subsystem is one in which one coalition is manifestly dominant. Though, for the reasons listed above, this subsystem is clearly not best described as unitary, the interviewer’s perspective is still relevant, and speaks to the challenge of influencing a policy debate from an activist’s position. Even while environmental interests may seem to be enjoying a policy window due to Exxon Valdez, there is still a feeling among some of them of marginalization in the face of other more politically entrenched interests.

5.11 The Structure and Use of the Volpe Scoping Risk Assessment

Though methodologically similar to the Maritime Traffic Safety study, the political

mandate and context of the Volpe study align it more closely with the Tanker Optimization study.

The analytical compatibility of this study is as hard to determine as it was in the previous studies. The Volpe study's methodological approach shares features with the Maritime Traffic Safety study by using local data, and blending expert knowledge, accident data, and model outputs. One significant shift was towards a determination of relative versus absolute risk. This concept allows the study authors to draw conclusions only about the risk levels associated with various geographic segments of the Puget Sound compared to the other segments. Though it perhaps seems like a small change, the use of relative versus absolute risk allows for statements to be made about the "highest" level of risk in the Puget Sound. Since the relativity of these comments is not grounded in a discussion of the absolute value of risk, this is only moderately useful instrumentally, and lends itself handily to the political use. An example of this is a reference to the study made in a National Marine Sanctuary report. The report reprints the Volpe Scoping Risk Assessment's list of the three types of oil spill causing accidents most likely to occur in sanctuary waters (Galasso 2000). As the Volpe study's results were relative and give no indication of the absolute level of risk, it only communicates that collisions are more likely than drift groundings. It is a perfect example of the political use of risk as it is described by Weible: "The political power of risk is the ability to link a cause with an effect--no matter how probable or improbable" (Weible 2008).

The Volpe Scoping Risk Assessment did not reach any formal recommendations. Instead, it highlighted areas where mitigation might be most useful, writing, "these finding do not recommend specific new measures, but point out where risk is high and what kind of mitigation strategy is suggested by the analysis" (Dyer et al. 1997). The resulting recommendations were,

in striking similarity to the Tanker Optimization Study, easily adapted to fit the political agenda of different coalitions. In response to the study, the US Secretary of Transportation wrote that,

Based on the findings in the Volpe Center's report, I hereby determine that the many existing elements of the region's marine transportation system comprise a safe system. While there are always areas for improvement—and we should always be looking into means for improving safety—the Volpe report shows that the Puget Sound area has an excellent system now.

(North Puget Sound Long-Term Oil Spill Risk Management Panel 2000)

And yet, in large part due to the use of relative risk, the same study lent itself to a contrasting portrayal by an environmentally oriented coalition in a Seattle Times editorial, writing that the study, “determined that an oil spill is most likely to occur off the Olympic coast or west side of Vancouver Island, and that collisions were the incidents most likely to cause these oil spills” (Felleman & Fletcher 2000).

The divergent representations made by the environmentalists in the editorial and the Secretary of Transportation in his review are not the result of simple overzealous misrepresentation. The conclusions they emphasize can both be arrived at from the study. The study found the Puget Sound to be mostly a pretty safe place, and, as part of its relative risk based evaluation, formulated comparative risk characterization that had the Olympic Coast at higher relative risk than other segments of the Sound. As suggested in Weible's model, the Volpe Scoping Risk Assessment, undertaken in a deeply adversarial political climate, was used primarily for political gain. In addition, the study itself, through its non-specific recommendations and reliance on a model of relative risk, allowed different coalitions to use the same study results to support divergent opinions.

5.12 The Structure and Use of the North Puget Sound Long Term Risk Management Panel Final Report

The adversarial nature of the oil spill prevention policy subsystem is perhaps most clearly reflected in the process and output of the North Puget Sound Long Term Risk Management Panel. The panel was created in 1999 through a Memorandum of Understanding signed by the US Secretary of Transportation and Washington State's Governor and tasked with "systematically identifying risk, establishing acceptable risk levels, and developing appropriate risk mitigation strategies" (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000). However, as previously discussed, the process was beset at the outset by conflict between participants, and the panel's final report concluded that it was ultimately unable to conduct a full risk assessment (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000).

The level of conflict was visible in the low level of analytic compatibility present during the panel process. As noted in the final report, some panel members were highly critical of previous studies (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, 3), and disagreement over the "technical substance" of the material presented and studied was widespread (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, 5). One presentation consisted of a focused critique of the Volpe Scoping Risk Assessment calling its use of data flawed, and asking panel participants "not to rely on the Volpe Study" in their deliberations (Corey 2000).

The level of analytical incompatibility was such that much of the panel's early meetings were given over to an attempt to bridge gaps in analytical approaches and understanding through educationally oriented technical presentations (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, 16). However, the presentations did not appear to close gaps in

understanding between panel members, instead, “each Panel member used the information presented to shape the formulation of his or her own recommendations and concerns” (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, 17). The expert presentations were used by panel members to pit expert opinion against expert opinion, a manifestation of a lack of analytic compatibility, low levels of cross-coalition learning, and an adversarial relationship.

The treatment of uncertainty and risk is unique in this study relative to the other risk assessments considered. The risk assessment process was barely able to get off the ground due to the highly combative nature of the Panel which resulted in the study becoming a political battle, not a risk assessment. As such, the output was discussed in term of political results, not risk. The result was unlike other studies reviewed here. The output of the panel did not include explicit consideration of uncertainty, so uncertainty could be exploited for political gain. Instead, the political arguments centered on the process. An example of this is visible in a quote from a representative of the environmental advocacy group People for Puget Sound, “There is a huge fear that this report will mask the fact that a majority of this panel voted to put a rescue tug at Neah Bay” (Anderson 2000).

The disagreement and discord over expert representations is unsurprising given the relationship between coalitions and experts during this study. The experts giving the presentations were primarily people with affiliations that placed them firmly within particular political coalitions. Experts from People for Puget Sound and Ocean Advocates gave presentations on past risk assessments and the state of Puget Sound’s marine environment, while experts from the Alaska Tanker Company, Crowley Marine Services, and American President Lines presented on tanker and barge routing and safety and systemic safety systems (Corey

2000). This close linking between experts and coalitions is just what Weible suggests will take place under adversarial conditions.

The use of the panel's final recommendations is consistent with Weible's theory in that the instrumental use is almost nonexistent. The 24 recommendations made by the panel primarily consist of asking for more studies, expressing support for existing efforts, and deferring to other bodies (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, Washington Environmental Council Minority Report). The recommendations that actually suggest substantive changes are all proposed changes to the Harbor Safety Plan, a set of voluntary practices developed by the local Harbor Safety Committee. Out of the seven voluntary recommendations, only one, a recommendation to have an English-speaking crewmember on watch, was actually included in the most recent Harbor Safety Plan while the rest were excluded (Puget Sound Harbor Safety Committee 2013).

Weible suggests that political use will be highest in an adversarial subsystem. While direct evidence is hard to find for actual political use of the panel's recommendations, it is clear that the recommendations were not used instrumentally either. As mentioned previously, it was the failed process that lent itself most to the political use. The panel was deeply divided, and in the end, six of the seven dissenting opinions attached as minority reports cited the voting rules as a major aspect of the panel's final report, with one stating, "The rescue tug recommendation was defeated only because of the Panel's bizarre procedural rules and peculiar makeup" (North Puget Sound Long-Term Oil Spill Risk Management Panel 2000, People for Puget Sound Minority Report). These types of process-based arguments were used by many coalition members, and found their ways into the press coverage as a result (see for example, Anderson 2000).

5.13 Historical Context: A Hint of Reconciliation amidst Challenges

A shift in the spill prevention policy subsystem in Puget Sound began in the early 2000s. In 2001, the Department of Ecology and the USCG began working together more successfully.

[They] created a set of working protocols that covered the gamut of operations that the Coast Guard and the Department of Ecology did together, including vessel inspection, incident investigations, pollution response, contingency preparedness, facility inspections, plan reviews, and we enjoyed, perhaps...a pretty collaborative relationship for [at least five years after that] (Interview Foxtrot 2013).

The rescue tug, though still a point of contention with respect to its permanence and funding source, was on duty in Neah Bay and finally made permanent by the Legislature in 2008 with industry-supplied funding. By the end of the decade, industry--in the form of both tank and non-tank vessels--was paying for the tug at Neah Bay, and did not seem to mind too much. "Over the nine years or so [the tug] was funded by the state...it had garnered up at least acquiescence on the part of the maritime industry that they could come up with a [payment] system to provide for that" (Interview Foxtrot 2013)².

The decade was not all rosy however. A relatively small oil spill in 2004 referred to as the "Dalco Pass mystery spill" reawakened public interest in spill prevention and led the Legislature to establish an Oil Spill Advisory Council (OSAC 2007). OSAC's first report, released in October of 2006, touched on many of the topics heard in previous reports. It also reawakened some of the former conflict. Writing a minority report in response to the first report, a Council member criticized the Council for what he perceived as a competitive relationship between OSAC and the Department of Ecology (Moore 2006). He goes on to describe a shift towards collaborative relations between the Department of Ecology and Industry:

² In addition to perhaps seeing the political writing on the wall after 9 years of effective tug response at Neah Bay, interviewee Foxtrot suggested that overdue federal regulations on marine firefighting and salvage may have played a role in prompting industry to agree to fund the tug. Those regulations were expected to require emergency towing resources as part of tank vessel and non-tank vessel contingency plans.

DOE and industry have worked hard to enhance productive communications focused on risk and facts – though we don't always agree, DOE has developed an increasingly open dialogue between all parties to explore the issues, thus incorporating the expertise and knowledge not previously considered. This cooperative process enhances decision making and contributes to improving what is an already excellent marine safety system with oil spill rates that lead the nation if not the world. (Moore 2006)

Moore wasn't the only one to see potential negatives in what was perceived by some as adversarial posturing on the part of OSAC. Washington State's Governor Gregoire attempted to have OSAC placed under the Department of Ecology, just one and a half years after its creation, and two months after its first report, commenting that, "Our preferred approach will be collaborative...and informed by the advice from industry, citizens, and experts" (McClure 2006).

Court battles were also underway in the 2000's. Ocean Advocates, an advocacy group, had been challenging the construction of a second dock at BP's refinery at Cherry Point since 1997. After a series of court cases, the 9th Circuit Court of Appeals found, among other things, that the Army Corps of Engineers had not fully evaluated oil spill risk with respect to the new dock. This decision eventually led to a comprehensive risk assessment led by George Washington University, which in turn made possible for undertaking of the final risk assessment evaluated by this thesis, the Vessel Traffic Risk Assessment 2010 (VTRA 2010).

5.14 Describing the Policy Subsystem at the Time of the Vessel Traffic Risk Assessment 2010

As described above, the 2000's were a time of increased collaboration between coalitions in the Puget Sound oil spill prevention policy subsystem. Interviews with policy elites seem to confirm the observation, with collaboration a common theme with respect to the latest risk assessment.

- “There is a lot less friction and a lot less anxiety” (Interview Golf 2013).
- “I don’t think it’s perfect but there is less assumption that industry is always trying to cut a corner and that the Coast Guard is somehow not doing their job...maybe it’s because not as many people are all hysterical about oil spills” (Interview Golf 2013).
- “I think it is much more collaborative...though I know there are still issues between the agencies” (Interview Alpha 2013).
- “I think [the political situation] is a little more collaborative. I also think that there’s more collaboration and more of a give and take, versus just hunkering down and saying, that’s our position” (Interview Bravo 2013).
- “I think it is much more collaborative now than it had been” (Interview Charlie 2013).

However, all of these elites quoted above come from federal and state agency backgrounds, or have industry affiliations. The environmental interests had a different perspective, saying, “I’m not as close to it [now] as I should be, but I don’t perceive [the political climate] has shifted” (Interview India 2013). Another, more involved stakeholder suggests that while environmental interests may have more respect at the table, the reason is not a change in the political climate, but the nature of this particular study:

[The VTRA 2010] is not tied to some direct regulation, there’s, I think, a sense of less risk for industry participation. The politics can occur after the fact. I mean although you can see that the Coast Guard, while they provided the data, have not exactly been vocal. And so that’s political. They have all sorts of insights to share that they are choosing not to.

(Interview Hotel 2013)

This claim of an underlying adversarial climate is further bolstered by one interviewee’s comment that “[environmental interests] are still pushing their agenda, and when they don’t get

their way through the collaborative process, they work it through the back door through the legislature” (Interview Alpha 2013).

Bringing into view Weible’s framework for determining the nature of a policy subsystem, there are aspects here of both a collaborative and an adversarial subsystem. The dominant coalitions appear to be collaborating as well as sharing a modest level of belief. The outlier here is the environmental coalition, though Golf’s comments above about the lack of “hysteria” seem to indicate some level of belief sharing there as well (Interview Golf 2013). The policy image appears to be primarily reconciled, with consensus about scope and nature of the problem seemingly within reach. This is also indicated by one of Golf’s comments, about reduced distrust of industry and the USCG (Interview Golf 2013). The OSAC’s prescriptive and win-lose policy recommendations point to an adversarial subsystem (OSAC 2007). Similarly, the environmental coalition’s continued use of judicial and legislative venues suggests an adversarial approach.

Overall, it appears as if the policy subsystem in the Puget Sound may now be shifting towards one more characteristic of a collaborative subsystem. This may be due to a number of factors, including the reconciling of state and federal agencies and a lack of recent attention-grabbing spills. Though the environmental coalition may be somewhat outside of the collaboration, and still holding more adversarial tactics close to the chest, it too is participating in VTRA 2010 in a more cooperative manner than seen in prior participatory processes.

5.15 Historical Context: From Adversarial to Collaborative, a Shifting Policy Subsystem

As shown in the above section, the policy subsystem of oil spill prevention in the Puget Sound has been predominately adversarial since the 1970’s. Coalitions could not see eye to eye, and fought deeply emotional battles. The scope of this thesis precludes a formal coalition

analysis, but generally speaking, the coalitions consisted of actors promoting more oil movement, those content with the status quo of prevention levels, those focused on preventing a catastrophic spill, and those trying to incrementally improve the system. Win-lose venues like the courts were used regularly to settle disputes, and prescriptive legislation was commonplace. The adversarial nature did not spring only from distrust or displeasure with industry, state agencies were at odds with the Coast Guard over prevention strategies, to the point of taking actions that led to two separate Supreme Court cases.

Today, in 2013, it appears the adversarial history has been softening for the last 10 years or so. Beginning with the resolution of the Intertanko case in 2000, and perhaps ending with the permanent establishment of a rescue tug at Neah Bay, coalitions appear much more in line with one another. An additional piece of context is the lack of high-profile marine oil spills since 2005. As noted above, in some venues the environmental coalition still orients somewhat adversarially to industry and federal and state agencies. However, the influence of the environmental coalition's adversarial behavior may be even less with the recent dissolution of a main coalition actor, People for Puget Sound. The policy subsystem seems to be shifting towards something better described as a more collaborative policy subsystem than in the past.

5.16 The Structure and Use of the Vessel Traffic Risk Assessment 2010

Though this risk assessment has yet to be completed, which makes the evaluation of its ultimate uses impossible, it is possible to complete a partial evaluation of the structural attributes. However, due to its ongoing nature, even the structural attributes are difficult to characterize. A final report has not been issued, and coalition actors outside of the stakeholder process have yet to weigh in on their interpretation of the study. Regardless, the opinions and actions of the

involved stakeholders have value as proxy coalition members, and serve to inform the following analysis.

A unique aspect of this risk assessment, compared to the others analyzed for this thesis, is the complex nature of the simulation-based methodology that is at its heart. Built through a combination of GPS-based vessel routes (acquired via the relatively new Automatic Identification System), expert-elicitation, a traffic rule simulation and an oil outflow simulation, the model is highly technical (van Dorp & Merrick 2013). With such a complex model it is even more notable that the analytical methods are generally accepted, and have been reconciled by participating stakeholders (VTRA Minutes 2013). Additionally, with respect to uncertainty, the flaws or limitations of the model are acknowledged. The draft final report states that “one should always bear in mind that any model is an abstraction of reality in which simplifying assumptions are often necessitated to maintain computational efficiency” (van Dorp & Merrick 2013). Though its basic functionality is not in question, this is not at the expense of a nuanced appreciation of its limitations. In addition, the VTRA 2010 study participants affirmed that a moderate level of cross-coalition learning has taken place during the study (Hass et al. 2013). These characteristics all buttress the notion that the collaborative policy subsystem is influencing the way the risk assessment is structured.

5.17 Summary of the Results

The analysis suggests that an adversarial subsystem dominated the oil spill prevention subsystem in the Puget Sound from the early 1970s to the mid to late 2000s. The risk assessments that were completed during throughout the 1970s, 1980s, and 1990s showed a primarily political use, with low levels of cross-coalition learning. Virtually none of the

recommendations made by the four risk assessments completed during the adversarial time period were implemented. Structural aspects of the risk assessments also showed political influence, though with a lesser degree of uniformity. Analytical compatibility was low and methods were contentious. Uncertainty and risk were frequently used for political gain, and risk assessments were structured in such a way as to lend themselves to that use.

Beginning in the mid to late 2000s, the interviews and document review suggest the beginnings of a shift in the policy subsystem toward the collaborative type. Policy images appeared to converge and the use of coercive, prescriptive policies declined. Under this collaborative policy subsystem, the lone risk assessment undertaken during this time to date, though still unfinished, has shown some level of political influence through reconciled analytical methods and acknowledged uncertainty.

Though the use of the VTRA 2010 results is not yet possible, since the study is not yet complete, the analysis of the structural aspects suggest that the VTRA 2010 study has a higher likelihood of creating actionable recommendations and those recommendations have a higher likelihood of being implemented instrumentally compared to the earlier studies reviewed in this thesis.

6.0 Discussion

This review of the oil spill prevention policy subsystem in the Puget Sound and the risk assessments undertaken within it has brought into focus a number of interesting aspects of the system. First, the almost nonexistent instrumental use of risk assessment recommendations during the adversarial period is highly salient. It reveals the challenge of using expert-based information to inform policymaking in adversarial contexts. This finding is consistent with the

literature on the topic, for example Jasanoff (1993) who wrote that “the opinions of technical experts may not be convincing to the public in an adversarial context.”

Second, though the structural influence of the political context appeared to be less pronounced, there was in fact evidence that the political context was continuing to influence study structures and results. This finding is also consistent with the literature on the topic (e.g. Sabatier 1987; Weible 2008; see also Wada et al. 1998 for discussion of political influence on social science research).

To review, the hypothesis stated that the political use will be highest in adversarial subsystems, the instrumental use will be highest in collaborative, and lowest in adversarial subsystems and that learning will most likely occur across dissimilar coalitions in collaborative subsystems. The results seem predominantly supportive of the hypotheses. However, there is also evidence that suggests the collaborative analysis approach used by the VTRA 2010 study may be, as designed, reducing the level of cross-coalition distrust, and improving the level of discourse between participants. It is difficult to determine what level of structural influence was due to the procedural changes, and what was due to the independent emergence of a more collaborative policy subsystem, as discussed above.

Finally, an aspect of the policymaking context that has been an underlying theme throughout much of this thesis has been the powerful effect of actual oil spills on the process. Many coalition members and policy actors cited oil spills as major drivers of policy, and many cited the lack of oil spills as directly contributing to a calmer, more collaborative current subsystem. This suggests that though relationships may appear more collaborative today, a large oil spill might be able to quickly return the coalitions to more adversarial stances.

7.0 Conclusions

Risk assessment can be a helpful tool for the organization, framing and comparison of risk and risk reduction measures. However, when used to bridge the gap between adversarial parties, or as part of an adversarial political discussion, the results of this analysis suggest that its utility is minimized. Instead of becoming a tool for fostering creativity, identifying previously unrecognized problems, and evaluating novel solutions, it becomes just another weapon in the arsenals of political coalitions. Every aspect of the risk assessment process can be affected, from the initial framing, to uncertainty characterizations, to final recommendations. Under such conditions the results of risk assessments are therefore skewed by this influence.

Not only are risk assessments completed within adversarial policy subsystems used primarily for political ammunition, their embodied analyses are weakened as well. Many of the valuable aspects of risk assessment like objectivity, transparency, and the ability to distill options from complex systems appear to be lost when the supporting studies take place within an adversarial policy subsystem. However, the validity of the results is hardly the concern it might otherwise be, as recommendations in adversarial contexts are rarely used instrumentally. The drawbacks associated with using risk assessments within adversarial political contexts suggest that such tools may be better suited for use in more collaborative political contexts.

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Appendix A

Influence of Puget Sound maritime vessel risk assessments on public policy Semi-Directed Interview Questions

Interview Introduction:

I am a graduate student at the University of Washington in the School of Marine and Environmental Affairs. I am writing a thesis on the history of the use of marine traffic and oil spill risk assessments in Puget Sound and their influence on public policy. In particular I would like to speak to you today about your experience working with or on risk assessments and your perception of how risk assessments have influenced marine traffic policy. I am not only interested in laws, rules, and standards of care, but also more subtle or indirect ways that risk assessments may have influenced policy.

I expect this interview will last approximately 30-60 minutes. Each interviewee that I speak with will be asked the same questions, though follow up questions may vary.

Please feel free to make any comments “off the record.” If you do so, these will remain confidential and will not be cited in the thesis or any derivative works. Once the interview has concluded, I will ask you if you feel comfortable having your name associated with the answers and information you have given. If you do not feel comfortable having your name associated with your responses, I will make sure that your answers remain anonymous.

Also, I will be making an audio recording of our conversation. Only I will listen to the recording, and it will be destroyed at the completion of the research.

Do you have any questions or concerns before we start?

Questions:

Out of the following list of risk assessments, which three were you most involved in, or which do you know the most about?

- Puget Sound Tanker Size Optimization (1981)
- Improving Maritime Traffic Safety: A Technology Assessment (1982)
- Volpe Scoping risk assessment: Protection against oil spills... (1997)
- North Puget Sound Long Term Oil Spill Risk Management Panel (2000)
- West Coast Offshore Vessel Traffic Risk Management Project (2002)
- VTRA Update (2012 – In Progress)

[Ask the following for each of the risk assessments given as answers to the first question]

How familiar are you with this risk assessment?

What role did you play in this risk assessment?

What key points do you remember about this risk assessment?

At the time this risk assessment was being completed, how would you describe the political climate around oil spill prevention in the Puget Sound?

More specifically, would you characterize interactions between different groups as primarily collaborative, adversarial, or was one group manifestly dominant?

Do you feel that this is something that has changed over time? How so?

In what way did this risk assessment influence spill prevention policy in the Puget Sound?

What rules, policies, or waterways management actions were enacted, if any?

What changes were there in the beliefs and knowledge of policymakers, if any?

Some suggest that tools like risk assessments may be used to justify political decisions after the fact; did you find that to be the case with this risk assessment?

[Return to reading questions from the list]

Are there any other risk assessments you are aware of that particularly influential with respect to spill prevention policy in the Puget Sound?

Which ones, and what influence did they have?

Can you suggest any other experts who could help shed light on any of the topics that we have addressed here today?

Is there any other information regarding to risk assessments in Puget Sound that you think is relevant to this inquiry?

Are there any parts of this interview that you do not want to have associated with your name?