

Multi-stakeholder Marine Risk Assessments in Alaska: Updates from Cook Inlet and the Aleutian Islands

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ABSTRACT 299771:

Marine risk assessments are underway for two operating areas of Alaska: one focuses on the most populated region of Alaska and the other on a much more remote area. Both assessments involve a combination of technical analysis and input based on the values and experiences of diverse stakeholders. Collectively, they represent the first implementation of a multi-stakeholder risk assessment process recommended in 2008 by the Transportation Research Board (TRB) of the U.S. National Academies.

The Aleutian Islands Risk Assessment (AIRA) has been underway since 2009, with a total budget of \$3 million from the 2004 *M/V Selendang Ayu* grounding and oil spill settlement funds. A similar, though smaller, risk assessment was initiated for Cook Inlet in 2011. The Cook Inlet Risk Assessment (CIRA) has a total budget of \$900,000. Both assessments seek to identify and evaluate risk reduction options to minimize the risk of oil spills from vessels of 300 GT or larger, or those with at least 10,000 gallons of fuel capacity.

Both projects are being conducted under the guidance of a small Management Team. The Alaska Department of Environmental Conservation and U.S. Coast Guard sit on both Management Teams. The other Management Team members represent the additional relevant funding agencies: for Cook Inlet, this is the Cook Inlet Regional Citizens' Advisory Council (managing part of the funding for this project) and for the Aleutian Islands this is the National Fish and Wildlife Foundation (managing the funds for this project). For each project, there is also a larger Advisory Panel, comprised of representatives of diverse and critical interests in each region, including the shipping and fisheries industries, local government, state and federal agencies, and environmental organizations. Advisory Panel members are selected by the Management team based on their local knowledge, expertise and understanding of the risk posed

by the maritime transportation industry. Opportunities for public comment and engagement are provided, along with websites housing all project documents. There is also a Peer Review Panel for the AIRA project.

Though the AIRA and CIRA are still underway, this paper provides an update on the wide ranging risk reduction options being considered, the types of technical analyses done and, how these analyses have informed project direction and decision-making, and preliminary observations related to the approaches used.

INTRODUCTION:

Within the maritime transport community, risk assessments are used to gain the best possible understanding of what accidents may occur, how likely they are, and the potential impacts. The outcome of a risk assessment is, ideally, the implementation of one or more ways to reduce the likelihood of an accident (typically in a specific location, such as a port or waterway) or minimize the impacts of an accident if it does happen. Achieving this outcome requires having both sufficient information to analyze the risks and sufficient buy-in from the necessary parties that they are willing to change the way they operate (through a voluntary initiative) or change operational requirements (through laws, regulations, or other mandates). Sometimes, substantial costs may be required to implement the measures identified to reduce risk.

The coastal and marine waters off the State of Alaska serve as highways for a wide range of marine vessels engaged in the movement of people, goods, and raw materials. Currently, two significant risk assessment projects are underway: the Aleutian Islands Risk Assessment began in 2009 and the Cook Inlet Risk Assessment started in 2011. Both projects have been designed to engage diverse stakeholders throughout the process as advisors and reviewers. There are also opportunities for public input. Both projects have also relied on analysis of vessel traffic, historical spills, and the impact of weather conditions on the ability to implement different response options.

BACKGROUND:

Following the grounding of the *Selendang Ayu* in the Aleutian Islands in 2004, the Alaska Department of Environmental Conservation and U.S. Coast Guard asked the National Academies' Transportation Research Board (TRB) to recommend a comprehensive risk assessment approach. The result was the 2008 release of TRB Special Report 293, "Risk of Vessel Accidents and Spills in the Aleutian Islands: Designing a Comprehensive Risk Assessment." This report described the state of knowledge at that time about the risks associated with maritime operations in the region and recommended a two-part risk assessment process. The TRB's proposed approach sought to incorporate rigorous scientific study and both breadth and depth of local knowledge. A stated goal was, "to design the assessment with a logical sequence of building blocks so that it could be conducted in discrete steps with input from local stakeholders and technical experts incorporated throughout the process." (TRB, 2008)

The Aleutian Islands Risk Assessment (AIRA) and Cook Inlet Risk Assessment (CIRA) project scopes are defined by both geographic boundaries and vessel type. Both projects focus on

potential oil spills from marine vessel traffic, specifically vessels of 300 Gross Ton (GT) or larger or those with capacity to carry at least 10,000 gallons of fuel oil. There are several key differences between the projects, the first two are: (1) the AIRA began in 2009 and the CIRA began in 2011; and (2) the AIRA has had sufficient budget to follow the TRB's recommended approach as described, while the CIRA has required prioritization of some activities over others (for instance, elicitation of expert opinion was used for the consequence analysis in place of an extensive modeling exercise).

The two geographic areas of focus are different as well. Some of these differences are: (1) a large percentage of vessels pass through the Aleutian Islands are in "innocent passage" and not subject to U.S. or State of Alaska regulations as compared to relatively small and well-known set of vessels operating in Cook Inlet that are subject to both; (2) Cook Inlet is much more accessible than the Aleutian Islands and is home to most of the population of Alaska; and (3) the Cook Inlet Regional Citizens Advisory Council (RCAC) has operated for 20 years with a mission to represent the citizens of Cook Inlet in promoting environmentally safe marine transportation (and oil industry operations) in Cook Inlet but there is no organization in the Aleutian Islands that plays this kind of oversight and coordination role.

MANAGEMENT AND DECISION-MAKING:

Both the AIRA and the CIRA operate under the same project structure. Management Teams oversee both projects. The Alaska Department of Environmental Conservation and U.S. Coast Guard participate on both Management Teams. The National Fish and Wildlife Foundation participates only on the AIRA Management Team and the Cook Inlet RCAC participates only on the CIRA Management Team. Entities represented on the Management Team are providing funding, overseeing the funding agreements, and/or have a role in oversight of laws related to preventing or responding to oil spills from marine vessels in the two focus areas. This group meets via teleconference on a monthly or as-needed basis and makes decisions for the project, reviews and approves project deliverables, and guides the expenditure of project resources. The Management Teams have been formed as *ad hoc* groups expressly for the purpose of achieving a successful outcome of the risk assessment projects; in other words, these entities do not engage together on any other activities through the Management Team and do not represent a new entity that will exist past the duration of the project.

While the Management Team has ultimate project control, two additional and separate groups provide input and guidance: the Advisory Panel and the Peer Review Panel. The Management Teams established charters for, and appointed members to, both the Advisory Panels and AIRA Peer Review Panel. An important difference between these two groups is that Advisory Panel members serve as volunteers (with travel costs to meetings covered as the project budget allows), while the Peer Review Panel members receive an honorarium.

The Advisory Panels are the largest of the groups (20-24 people) and include participants chosen for their knowledge of maritime operations, natural resource use, infrastructure, communities, and environment within each geographic area. Specific seats were assigned to each Advisory Panel to ensure that they include participants familiar with the different resources and commercial operations relevant to the two areas. The Management Teams selected Advisory

Panel members based on their demonstrated experiences and familiarity with the stakeholder group they sought to represent based on applications received from interested parties. The Advisory Panels have met several times during the project, both in person and by webinar.

By contrast, the Peer Review Panel, in place only for the AIRA, was selected by the Management Teams for its high level expertise in risk assessment and related technical areas. Peer Review panel members were invited based on recommendations from TRB staff. The CIRA benefits from the input of a marine risk assessment expert who is volunteering his time. The AIRA Peer Review Panel meets less frequently and primarily to review and discuss technical reports developed for the project.

The projects also incorporate public input. Interested members of the public have provided comments on documents and at in-person Advisory Panel meetings. Finally, the Facilitation Team coordinates among the groups. Nuka Research and Planning Group, LLC and Pearson Consulting, LCC are facilitating both projects.

RISK ASSESSMENT PROCESS:

The TRB conceived of a two-phase process. Phase A relies on semi-quantitative and qualitative analyses to build understanding of the likelihood of different types of incidents that may result in oil spills and spill consequences. Based on an analysis of vessel traffic and past spill histories, plausible scenarios are developed to serve as a focal point for understanding the potential consequences of spills in the region. The goal of this phase is to develop a list of proposed risk reduction options for further analysis and consideration in the second phase of the study. After considering the analyses conducted, and based on their own knowledge, the Advisory Panel recommends the risk reduction options for further evaluation (including benefit-cost analysis where appropriate) in Phase B.

Aleutian Islands Risk Assessment

This project is funded through the National Fish and Wildlife Foundation's management of settlement funds from the 2004 M/V *Selendang Ayu* oil spill in the Aleutian Islands. The first phase of the AIRA was completed in 2011. Phase A started with an analysis of the vessel traffic in a recent year 2008/2009 and expected traffic for 2034 (DNV and ERM, 2010a). Analysts then used modeling to predict the most likely accidents, spills, and spill sizes (DNV and ERM, 2010b) and developed spill scenarios (DNV and ERM, 2010c) to assess the anticipated consequences (DNV and ERM, 2011a). Sixteen high-risk spill scenarios were identified and ranked based on their likelihood and consequences (DNV and ERM, 2011b). Finally, potential risk reduction options are evaluated based on how well they would mitigate risks associated with these scenarios as well as their cost, practicality, and ease of implementation (DNV and ERM, 2011c). The Advisory Panel recommended risk reduction options that required further consideration or effort in Phase B. A summary report provided a high level overview of Phase A and the risk reduction options considered (Wolniakowski et al., 2011).

In addition, some items were recommended for immediate implementation, without need for further analysis. Two of these have been already been implemented: (1) Develop an enhanced vessel monitoring and reporting program and (2) Stage additional Emergency Towing Systems

(ETS) in the region. To enhance vessel monitoring and reporting, the Marine Exchange of Alaska installed additional Automated Identification System (AIS) sites at Adak and Nikolski, adding to their coverage of the Alaska coastline. To address ETS capabilities, an additional ETS was staged at Cold Bay. Additionally, an ETS deployment exercise was held in Unalaska in the fall of 2012, and the ETS training video updated for use statewide. (The Alaska Department of Environmental Conservation works with local partners, in particular the City of Unalaska, to enhance emergency towing by staging ETS and conducting regular training.) There was consensus amongst the groups that these actions provided a clear path forward and supported AIRA objectives.

Cook Inlet Risk Assessment

CIRA, launched in 2011, is primarily funded through the U.S. Coast Guard (under a budget allocation from Congress) and legislative appropriation from the State of Alaska (administered through Cook Inlet RCAC). Tesoro Alaska, the National Fish & Wildlife Foundation and Prince William Sound RCAC provided additional funds. This project followed on several years of discussion and widespread agreement that such an effort was needed. The February 2006 grounding of the T/V *Seabulk Pride*, which broke away from the dock during heavy ice conditions, was just one motivation. Similar to AIRA, the Cook Inlet project began with an updated analysis of vessel traffic (Cape International, Inc., 2012) and a Spill Baseline and Accident Causality Study (The Glosten Associates and Environmental Research Consulting, 2012). While these analyses generally paralleled the studies done for AIRA, a different approach was used to assess the potential spill consequences. With less funding available for quantitative analysis, Nuka Research and Planning Group, LLC and Pearson Consulting, LLC instead convened 15 subject matter experts to characterize the potential impacts to Cook Inlet's environmental and socioeconomic resources from seven marine oil spill scenarios (Nuka Research, 2013a).

In addition to the SME characterizations, risk reduction options were solicited from the public and provided to the Advisory Panel and Management Team in order to review all available information about potential hazards and consequences. Several risk reduction options were identified as warranting immediate or sustained implementation: (1) Establish a harbor safety committee for Cook Inlet, (2) Require Harbormasters and port directors to notify the USCG if a vessel is unsafe or unseaworthy, (3) Update the Coast Pilot based on mariner knowledge, (4) Update NOAA's Automated Wreck and Obstruction Information System (AWOIS) based on local knowledge, (5) Continue to update winter ice guidelines as needed, (6) Fill gaps in cell phone reception coverage on Cook Inlet, (7) Sustain and expand training for mariners, (8) Maintain project depth (especially at Knik Arm Shoal), (9) Encourage the promulgation of the non-tank vessel response plan regulations, (10) Update and enhance the Subarea Oil and Hazardous Substance Contingency Plan, and (11) Seek continuous improvements in oil spill response equipment appropriate to Cook Inlet conditions.

PROJECT UPDATE:

Both the AIRA and CIRA are currently focused on evaluating or building consensus related to specific risk reduction options. In both cases, the Advisory Panel continues to guide

research and decisions, with ultimate decision-making by the Management Team. Final recommendations will be summarized in reports for both projects.

Current Status of Aleutian Islands Risk Assessment

In 2012, at the start of Phase B, the Management Team and Advisory Panel approved a work plan, currently underway, to conduct the following tasks based on Phase A. The work plan is divided into three tasks: (1) Enhancing emergency towing, salvage, and spill response, (2) Updating the Subarea Contingency Plan, and (3) Considering a Particularly Sensitive Sea Area under the International Maritime Organization.

To address Task 1, the Advisory Panel and Management Team are considering contractors' recommendations for the enhancement of emergency towing, salvage, and spill response in the region. (Contractors include Nuka Research and Planning Group, LLC; Pearson Consulting, LLC; Baldwin & Butler, LLC; Moran Environmental Recovery; Moran Towing; Northern Economics, Inc.; and The Glosten Associates.) This task began with a review of the regulatory requirements related to spill prevention and response, including assessing the resources that would be required for compliance in the Aleutian Islands region. The estimated cost to provide emergency towing, salvage, and spill response services in compliance with federal law ranged from \$30.5 million to \$36.9 million in capital costs plus \$37.7 million to \$41.8 million in annual operating costs (Nuka Research and Pearson Consulting, 2013). This is intended as a benchmark for the development of the recommendation: the goal being not to exceed the amount regulated vessel operators would be expected to pay collectively to achieve full compliance. The recommendation will consider the management and funding of a system, in addition to equipment and vessel resources and personnel.

The recommendation will also be based on a response gap analysis that considers how often environmental conditions in different parts of the region would preclude deployment of response-related tactics ranging from emergency towing to aerial surveillance of a spill. The response gap analysis findings (Nuka Research, 2014) support the Advisory Panel's emphasis on the prevention of spills before they happen, as it will be far more likely to be able to deploy a rescue tug than an on-water spill recovery system. A summary of wind, sea state, temperature, and both horizontal visibility and cloud ceiling in different parts of the region was released in early 2013 (Nuka Research, 2013b). The analysis for this recommendation also considers how often tugs of opportunity will be available, both a Best Available Technology tug and a design concept for a purpose-built tug based on local conditions, and options for the location of a dedicated tug.

The second task is to strengthen the Subarea Contingency Plan. The ADEC and USCG are leading this task with support from project facilitators. The plan update involves adding and updating information, as well as incorporating additional Geographic Response Strategies (GRS) and Potential Places of Refuge (PPOR). Meetings to discuss the plan are being held in conjunction with Alaska Regional Response Team meetings. A workgroup, including participants from the Aleutian Islands and Alaska Peninsula, has convened to develop the GRS and PPOR.

Finally, a Particularly Sensitive Sea Area Workgroup (PSSA) of Advisory Panel members has identified routing measures as being the most important protective measure that could be associated with a PSSA designation by the International Maritime Organization. The group is analyzing optimal routing measures for implementation through U.S. federal regulations and possible inclusion in a PSSA. Additional research and planning for the PSSA application is underway, including studying the process and outcomes in the two other such areas in the United States (located in Florida and Hawaii).

Current Status of Cook Inlet Risk Assessment

Based on the risk reduction options identified for immediate or sustained implementation, project resources are being dedicated to support the launch of a HSC as well as the updates to the Coast Pilot and NOAA's AWOIS database in early 2014.

In addition, the Advisory Panel wanted additional information on several other proposed risk reduction options before making their final recommendations. Additional research and analysis of these items, including the implementation of the items mentioned above – ranging from technical or quantitative research to interviews - is now underway for these proposed risk reduction options: (1) Increase rescue towing capability in Cook Inlet, (2) Construct a cross-Inlet oil pipeline (displacing tanker traffic), (3) Enhance situational awareness and communications through a two-way AIS, (4) Improve ice monitoring capability, and (5) Encourage third party inspections or audits of workboats. Similar to AIRA, rescue towing is of high interest. The Advisory Panel will consider the results of current research and analysis on these items before developing their final recommendations in the first half of 2014.

PRELIMINARY OBSERVATIONS:

As both the AIRA and CIRA projects are still underway, this section offers some preliminary observations based on the experiences of the Facilitation Team to date.

- While the projects strive to strike a balance between quantitative analysis and more qualitative factors such as the perspectives and experiences of those familiar with maritime operations in the region, data gaps have compromised analysis in several instances. For CIRA, national data (involving different vessel sizes) had to be used to understand potential spill scenarios because there have been very few significant vessel spills in Cook Inlet. In the Aleutian Islands, understanding the number of vessels that are passing through the region in innocent passage (not subject to U.S. vessel response planning regulations) is critical, yet this information was not available when the vessel traffic study was completed at the start of the project. (Nuka Research and Planning Group has since compiled Marine Exchange of Alaska AIS data from 2012 for transits of Unimak Pass in order to determine this.)
- Some risk reduction options do not require further consideration. In both projects, the Management Team and Advisory Panel identified risk reduction options that they deemed ripe for implementation without further analysis either because the intended benefits were considered so great or because the cost was minimal and/or already secured. In these cases, the Management Team supported implementing actions that fit

within the project scope and budget, or finalizing recommendations, without further study.

- People with the most relevant expertise (or people with relevant expertise) are willing to serve as Advisory Panel members. This is critical: without the right participants, a participatory process would be meaningless, and it cannot be automatically assumed that busy professionals will volunteer their time – and thus their trust – into a process that is relatively new and inherently uncertain in its outcome.
- Local knowledge must be incorporated every step of the way. The engagement of a wide range of stakeholders with local knowledge serves to “ground truth” the findings or recommendations derived from quantitative analysis. This can be particularly important when there are gaps in the available quantitative data.
- Advisory Panel members will interpret results of the quantitative analyses differently based on and their own personal experiences or observations. A challenge for the Facilitation Team is to ensure that a balance is struck between what can be learned from the kind of data that is in spreadsheets and reports, and the kind of “data” that exists in the experiences of those who spend their days working in, or for, the Aleutian Islands or Cook Inlet.
- Overall, a participatory approach takes more time and resources than one in which a team of analysts “goes away” and conducts a purely quantitative risk assessment. The most obvious costs are in the travel expenses for meetings, but costs are also borne in the time spent on soliciting and incorporating comments from the Advisory Panel or public into project deliverables.

CONCLUSION:

The AIRA and CIRA represent the first time that a TRB-proposed marine risk assessment approach is being implemented. While the TRB designed the approach for the Aleutian Islands, its mix of qualitative and quantitative analysis combined with diverse local perspectives can be applied to any area and, as has been done for Cook Inlet, modified based on budgetary limitations. Additional modifications could further reduce budgetary requirements, and at the conclusion of the projects it will be important to consider the relative allocation of resources between the first phase, during which analysis is conducted to inform the selection of risk reduction options, and those risk reduction options. Both projects are slated for completion in 2014, after which the conclusions and recommendations will be documented and disseminated.

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