



Aleutian Islands

RISK ASSESSMENT PHASE B



Final Program Report

March 2016



Nuka Research and Planning Group, LLC
Pearson Consulting, LLC

Aleutian Islands Risk Assessment – PHASE B Final Program Report

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1. INTRODUCTION

This is the final program report for Phase B of the Aleutian Islands Risk Assessment (AIRA). The report references project deliverables for most tasks. A greater level of detail is provided on the tasks not already documented through other reports.

1.1 Project Overview

The AIRA was conducted as a direct result of a 2004 oil spill and subsequent plea agreement. The *M/V Selendang Ayu*, a Malaysian-flagged bulk carrier traveling from the U.S. to China, suffered engine failure, drifted 100 miles through stormy seas, and grounded near Unalaska Island in the Aleutian Islands archipelago. Six crew members died when a U.S. Coast Guard helicopter engaged in the rescue operation was struck by a wave and crashed near the grounded vessel. Shortly thereafter, the ship broke apart and spilled approximately 336,000 gallons of fuel oil and diesel (NTSB, 2006) and 132 million pounds of its soybean cargo. In addition to the loss of life, the accident resulted in the closure of local fisheries, 86 miles of shoreline oiled, and more than 1700 birds killed (NOAA, 2016). The resulting plea agreement for \$3 million funded the development of a risk assessment methodology and the implementation of the AIRA and associated projects (*Selendang Ayu Settlement*, 2007).

The National Fish and Wildlife Foundation (NFWF), the U.S. Coast Guard (USCG), and the Alaska Department of Environmental Conservation (ADEC) initiated the AIRA to assess the risks and potential mitigation measures associated with maritime transportation in the Aleutian Archipelago. The project was conducted in two phases according an approach designed specifically for the AIRA by the Transportation Research Board (TRB) of the National Academies (also with *Selendang Ayu* settlement funds).

Phase A of the AIRA was conducted from May 2009 –September 2011, resulting in recommended risk reduction options. This report focuses on Phase B, conducted from July 2012 – July 2015, which included both further analysis and implementation of the recommendations from Phase A. A Management Team comprised of NFWF, ADEC, and USCG oversaw both phases of the project, with input from a diverse Advisory Panel. A Technical Peer Review Panel provided feedback at key milestones. An Analysis Team conducted technical analyses and provided input based on their expertise.

Nuka Research and Planning Group, LLC (Nuka Research) and Pearson Consulting, LLC facilitated the project. Appendix A lists the individuals involved with each of these groups during Phase B.

1.2 Project Scope

The AIRA focused on vessels of 300 gross tons (GT) or greater, or those with at least 10,000 gallons of fuel capacity, that travel through the Aleutian Islands and western Alaska Peninsula (see Figure 1).

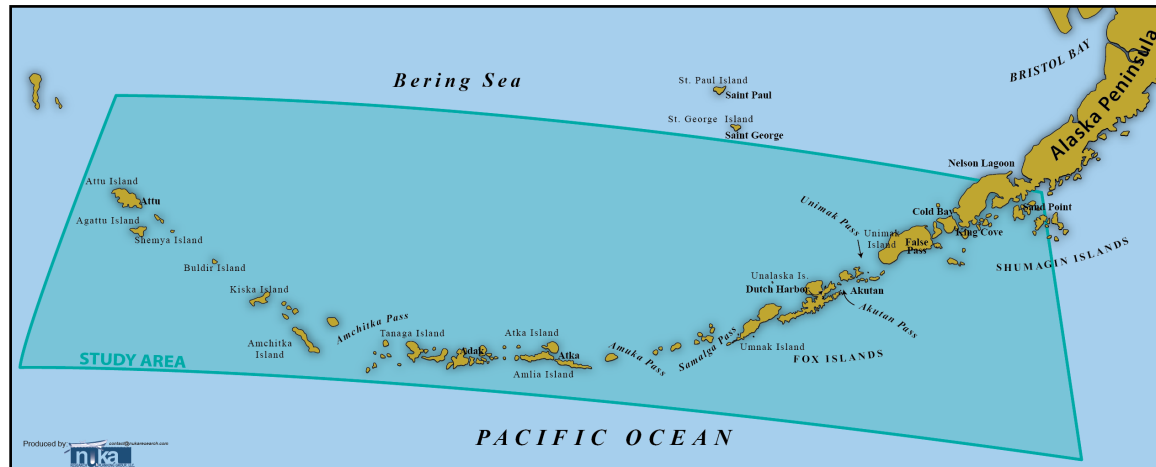


Figure 1. AIRA study area

1.3 Transportation Research Board Recommendation

The TRB developed Special Report 293, “Risk of Vessel Accidents and Spills in the Aleutian Islands: Designing a Comprehensive Risk Assessment” (2008), which recommended a two-phased approach to the AIRA: a Preliminary Risk Assessment (Phase A) followed by a Focused Risk Assessment (Phase B). This effort was conducted using settlement funds from the *Selendang Ayu* oil spill and at the request of the ADEC and USCG, who sought a risk assessment framework that consisted of discrete steps and incorporated input from stakeholders and technical experts.

1.4 Purpose of this Report

This document serves as the Final Program Report required in the contract between NFWF and Nuka Research to conduct Phase B of the project. It summarizes the activities undertaken and results achieved.

2. PHASE A

Phase A of the AIRA involved the establishment of a management structure comprised of four groups: a Management Team, an Advisory Panel, an Analysis Team, and a Technical Peer Review Panel.

Phase A began with a risk report analyzing the likelihood of spills based on vessel traffic through the Aleutians. Next, a risk matrix was created to analyze the potential consequences of spills from vessels. Finally, Phase A concluded with a qualitative assessment and recommended risk reduction options in 2011. In all, six technical reports were developed:

- 1) **Semi-quantitative Traffic Study Report.** *DNV and ERM (2010a)*. Analyzes vessel traffic in the Aleutian Islands for 2008/2009 and includes a forecast for 2034.
- 2) **Marine Spill Frequency and Size Report.** *DNV and ERM (2010b)*. Estimated the frequency of marine accidents and provided marine spill scenarios for both a baseline year (2008/2009) and future year (2034).
- 3) **Baseline Spill Study Report.** *DNV and ERM (2010c)*. Presents six hypothetical spill scenarios based on vessel traffic analysis and potential spill frequency and size.
- 4) **Consequence Analysis Report.** *DNV and ERM (2011a)*. Considers potential consequences from 16 hypothetical spill scenarios.
- 5) **Accident Scenario and Causality Study Report.** *DNV and ERM (2011b)*. Presents additional information and analysis regarding the 16 scenarios developed in the Consequence Analysis Report.
- 6) **Risk Reduction Options Evaluation Report.** *DNV and ERM (2011c)*. Summarized the outcomes of two workshops held in the fall of 2010, during which the Advisory Team, Management Team, Risk Analysis Team and Facilitation Team reviewed and prioritized potential risk reduction options.

These reports were summarized in a final Phase A report in 2011, available at: http://www.aleutiansriskassessment.com/documents/110826AIRA_SummaryReportvFINALr.pdf

Phase A resulted in a set of recommended Risk Reduction Options (RRO). The four RRO identified in Phase A requiring additional study were: (1) increase rescue tug capabilities in the Aleutian Islands; (2) increase salvage and spill response capabilities in the Aleutian Islands; (3) strengthen the Aleutian Islands Subarea Contingency Plan; and (4) determine the boundaries of potential IMO Particularly Sensitive Sea Areas (PSSA) and propose recommendations for associated protective measures.

The scope of work for Phase B, discussed in Section 3, was based on the Advisory Panel's recommendations from Phase A.

Figure 2 lists the recommendations from Phase A and their status upon completion of Phase B.

RECOMMENDATION @ End of AIRA Phase A	STATUS <small>(Items in bold were part of Phase B workplan)</small> @ End of AIRA Phase B
ENHANCED VESSEL MONITORING AND REPORTING <ul style="list-style-type: none"> Monitor all vessels in region to detect anomalous activity & ID vessels to support rescue Monitor compliance with routing measures Expand AIS coverage in region 	<ul style="list-style-type: none"> Vessels subject to US VRP regulations currently monitored via USCG-approved alternative compliance AIS sites added at Nikolski and Adak Vessels in innocent passage not monitored unless voluntarily
EMERGENCY TOWING SYSTEMS (ETS) <ul style="list-style-type: none"> Stage additional ETS in Aleutians Continue annual training & exercises 	<ul style="list-style-type: none"> ETS added in 3 locations (2013) Training exercises conducted in 2012 and 2014
ENHANCE TOWING CAPABILITIES ON USCG CUTTERS <ul style="list-style-type: none"> Replace Acushnet (decommissioned in 2011) with vessel with towing capability Increase cutter presence Ensure all cutters in AK have best available ETS 	<ul style="list-style-type: none"> Not completed due to lack of funding; also not deemed to be in accordance with current USCG mission and priorities
INCREASE SALVAGE & SPILL RESPONSE CAPABILITY <ul style="list-style-type: none"> USCG promulgate Non-tank VRP rules Conduct response gap analysis Recommend additional resources needed in SCP for salvage, spill response for largest vessels transiting in innocent passage 	<ul style="list-style-type: none"> USCG promulgated Non-tank Vessel Response Plan rules (2013) Response gap analysis completed Salvage, spill response needs identified (focus on nearshore)
INCREASE RESCUE TUG CAPABILITY <ul style="list-style-type: none"> Consider options to add rescue tug capability (dedicated, non-dedicated, seasonal, tug of opportunity) Determine necessary capabilities Determine management & funding 	<ul style="list-style-type: none"> Tug capability analyzed for 75th percentile tanker/non-tank vessel spill Recommendation developed for optimal response system, including rescue tug, salvage, spill response, management / funding, and vessel monitoring (intended as alternative compliance)
STRENGTHEN ALEUTIANS SUBAREA CONTINGENCY PLAN (SCP) <ul style="list-style-type: none"> Emphasize prevention measures and systems ID spill response & salvage resources needed Develop additional GRS Conduct additional PPOR planning USCG ensure vessels required to have VRP maintain resources in SCP Seek OSLTF funds to support planning and prevention 	<ul style="list-style-type: none"> Updated SCP finalized in 2015 20 new GRS developed; deployment exercise in Adak PPOR updated Equipment added to Unalaska and Adak OSLTF funds intended for response Current USCG-approved alternate compliance systems do not include all elements of recommended optimal response system
INITIATE PROCESS TO ESTABLISH IMO PARTICULARLY SENSITIVE SEA AREA <ul style="list-style-type: none"> Determine boundaries Recommend protective measures, considering areas to be avoided, ship routing, ship reporting, recommended tracks, and traffic separation in Unimak Pass 	<ul style="list-style-type: none"> Areas to be avoided & preferred routes adopted by IMO in 2015 (modified from PSSA) Additional protective measures such as routing, reporting, etc. can still be considered

Figure 2. Summary of recommended risk reduction measures at conclusion of Phase A and the status of each at the conclusion of Phase B

3. PHASE B

The Advisory Panel discussed the work plan for Phase B at an in-person meeting in Unalaska and subsequently approved by the Management Team prior to implementation. This second phase of the project picked up where Phase A ended, focusing on further analysis where needed or implementation of predetermined courses of action based on the risk reduction options recommended in Phase A. Table 1 shows the tasks and outcomes.

Table 1. Key technical tasks and outcomes from Phase B

TASK	PHASE B OUTCOME
<p>Task 1-2. Recommend optimal response system for Aleutian Islands based on consideration of operating environment, logistics, costs and benefits, and potential organizational structure.</p> <p><i>The Advisory Panel originally recommended two separate, but related, risk reduction options: one for salvage/spill response, and one for emergency towing. These were combined into one task.</i></p>	<p>Report issued in February 2015 based on 14 supporting analyses recommends the organizational structure, spill prevention, emergency towing, salvage, and spill response elements of an optimal response system for the region.</p>
<p>Task 3. Update Subarea Contingency Plan (SCP), including developing and updating Geographic Response Strategies (GRS) and Potential Places of Refuge (PPOR).</p>	<p>SCP update approved in April 2015 following a public comment period. Twenty new GRS developed. GRS deployment exercise held in Adak. PPOR information updated.</p>
<p>Task 4. Initiate application to International Maritime Organization (IMO) for protective measures.</p>	<p>In June 2015, the IMO approved recommended routing measures for vessels transiting the Aleutian Islands, which will require ships to stay 50 nm offshore except when using an approved pass.</p> <p>Application prepared for Particularly Sensitive Sea Area.</p>
<p>Task 5. Facilitate coordination among Management Team, Advisory Panel, and subcontractors. Quarterly reporting.</p>	<p>The Management Team and/or Advisory Panel convened more than 30 times either in person or via teleconference. Email updates were used between meetings. Quarterly reports were submitted.</p>
<p>Task 6. Update and sustain Emergency Tow System (ETS) deployment in the Aleutian Islands.</p>	<p>ETS deployment exercise conducted from Unalaska in October 2012. Training manual updated.</p>
<p>Task 7. Communicate project progress to public, convene project kick-off and wrap-up meetings, and coordinate with peer review panel.</p>	<p>Project websites for the public and project participants were developed and maintained at: <i>aleutianislandsriskassessment.com.</i> Peer review comments on Optimal Response System report received in fall 2014. Two in-person meetings held.</p>

4. TECHNICAL TASKS AND OUTCOMES

This section described the results of the key technical tasks (Tasks 1-2, 3, 4, and 6) conducted during Phase B.

4.1 Task 1-2: Optimal Response System

Task 1-2 recommended an optimal response system for the Aleutian Islands. The recommendation is described in *Recommending an Optimal Response System for the Aleutian Islands: Summary Report*.

The recommendation was developed by an Analysis Team, which met both remotely and in person, and considered by the Management Team and Advisory Panel. The final recommendation, summarized in Section 4.1.2, represents near-consensus from the Advisory Panel. The Summary Report clearly stipulates areas of agreement and, for those few issues where consensus was not reached, the reasons given for any objections to the recommendation.

The Analysis Team included: Baldwin and Butler, LLC (organization and funding), Glosten Associates (emergency towing), Moran Environmental Recovery, LLC (spill response), Moran Towing (salvage), and Northern Economics, Inc (benefit-cost analysis). Nuka Research and Pearson Consulting, LLC facilitated the team and contributed research and analysis as well.

The report was also released for public comment and reviewed by the Technical Peer Review Panel, whose comments are included as an appendix to the final version.

4.1.1 SUPPORTING ANALYSES

The Analysis Team considered options across four tracks: emergency towing, salvage, spill response, and management and funding. The benefits and costs of their preliminary recommendation were analyzed prior to finalization. Figure 3 summarizes the process that the Analysis Team used to develop the recommendation.

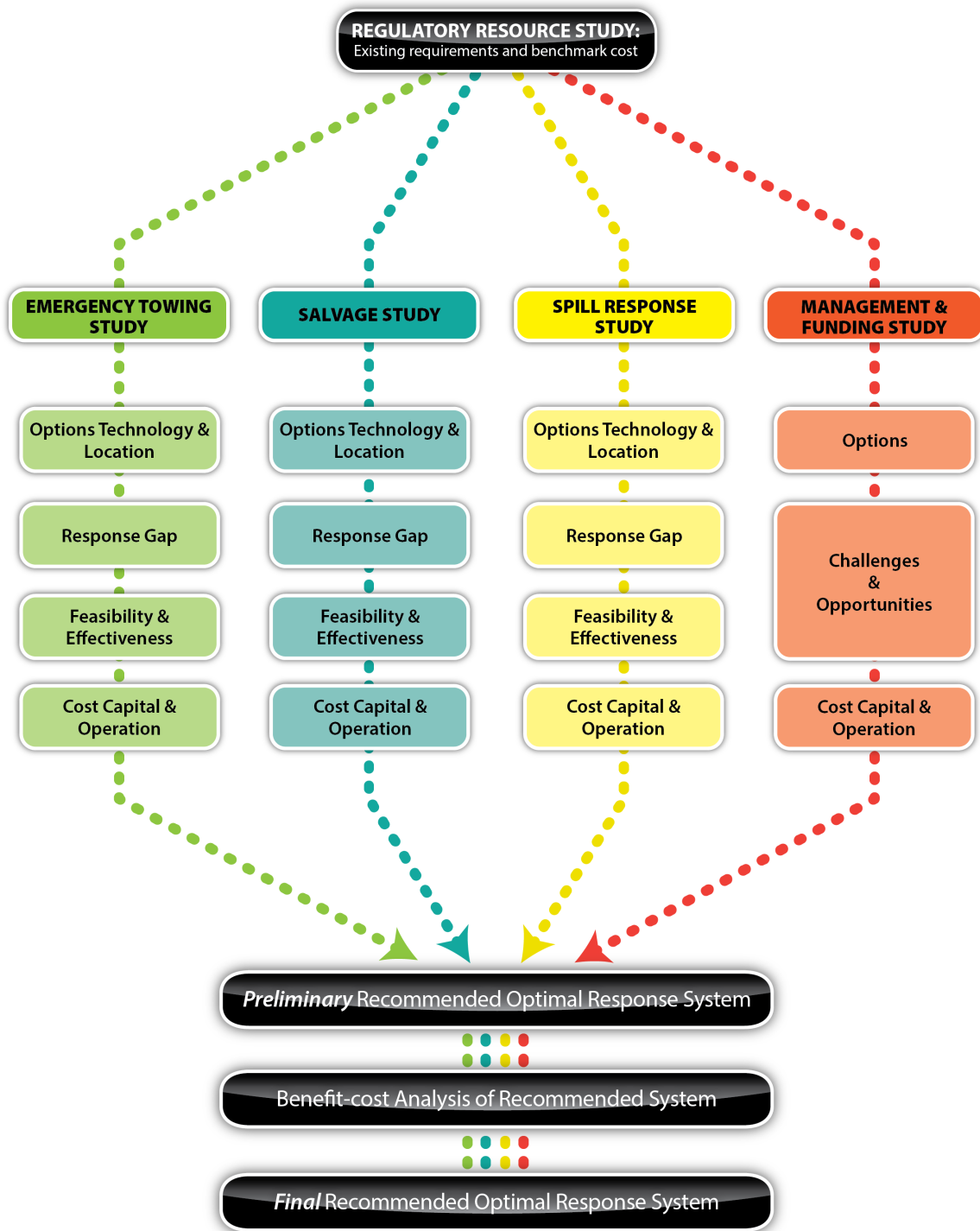


Figure 3. Analysis Team approach to developing recommended optimal response system. Not shown here is the extensive input provided by the Advisory Panel through discussions via webinar and during in-person meetings.

Fourteen supporting reports were completed to document the research and reasoning for the ultimate recommendation. These are heavily referenced throughout the Summary Report and are listed here.

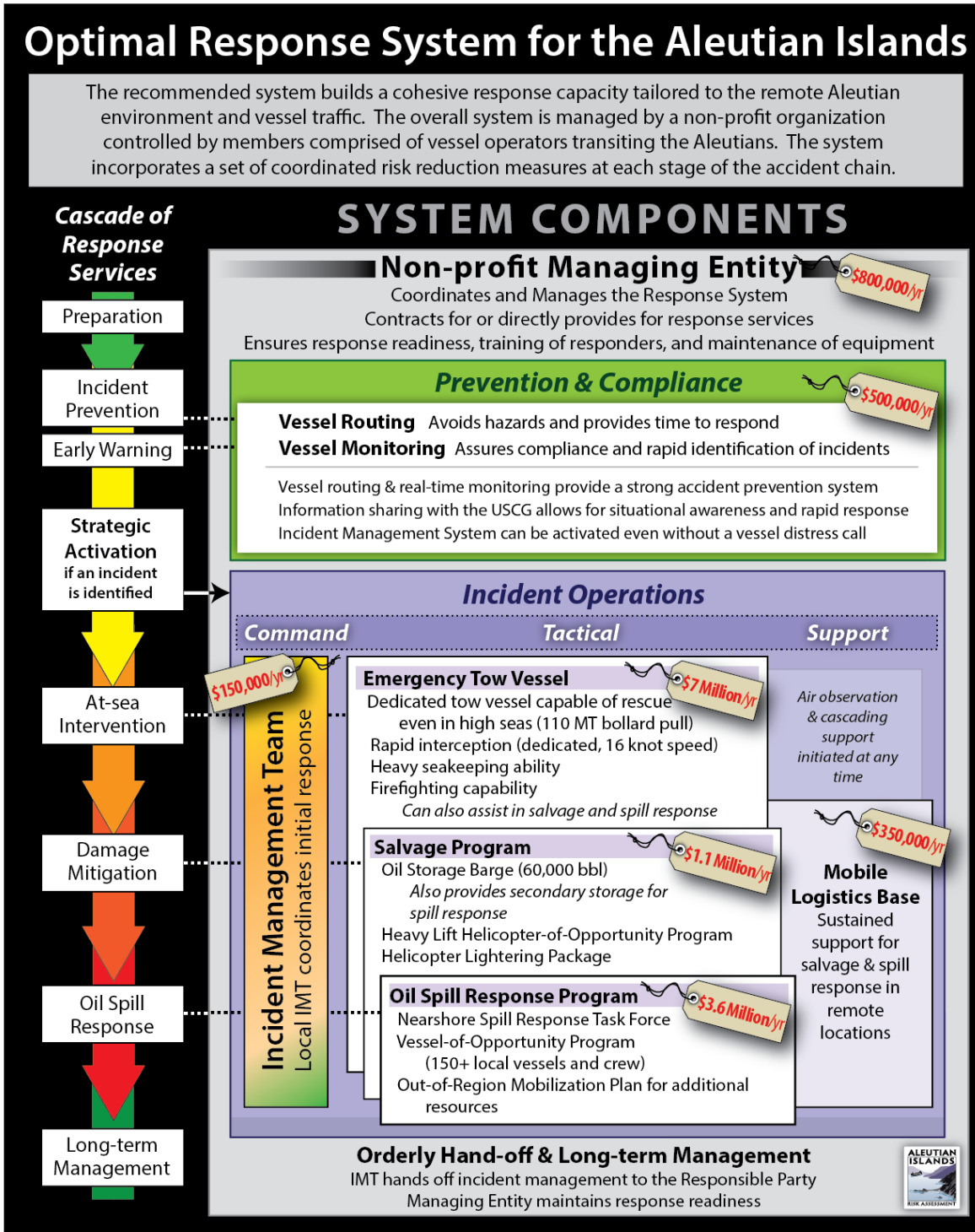
- 1) **Aleutian Islands Risk Assessment Regulatory Resource Study.** *Nuka Research and Planning Group, LLC & Pearson Consulting, LLC* (2013). Overview of regulatory requirements related to salvage and oil spill prevention and response applicable to the Aleutian Islands region, and estimated cost of resources required for full compliance of regulations as written.
- 2) **Impact of Environmental Conditions on Vessel Incident Response in the Aleutian Islands: A Response Gap Analysis.** *Nuka Research and Planning Group, LLC* (2014a). Characterizes how often environmental conditions alone would preclude or significantly impede a range of emergency and oil spill response operations in the region.
- 3) **Characterizing Environmental Conditions in the Aleutian Islands.** *Nuka Research and Planning Group, LLC* (2013b). Summarizes weather data used in response gap analysis and towing analyses.
- 4) **2012 Transits of Unimak Pass.** *Nuka Research and Planning Group, LLC* (2014). Provides an update to previous traffic studies and determines the percentage of deep-draft vessels using Unimak Pass in 2012 that were in innocent passage, and therefore would not be subject to U.S. response plan regulations. Used as proxy for “current data” to inform per-vessel cost estimates.
- 5) **Minimum Required Tug for the Aleutian Islands.** *The Glosten Associates* (2014). Calculates the minimum tug bollard pull needed to control and turn a containership that of the 75th percentile size of those transiting the Aleutians in 2012.
- 6) **Minimum Required Tug.** *The Glosten Associates* (2013a). First study of minimum tug bollard pull required, based on slightly smaller vessel sizes from 2010 data. Used for Regulatory Resource Study.
- 7) **Tug of Opportunity Study.** *The Glosten Associates* (2013b). Calculates the ability of tugs of opportunity in the region to reach various scenario locations and rescue a large ship.
- 8) **Estimated Response Times for Tugs of Opportunity in the Aleutians.** *Nuka Research & Planning Group, LLC* (2014). Building off of analysis by The Glosten Associates, concludes that tugs of opportunity may often be available to aid relatively small vessels in fair conditions, but not larger ships or any ships in poor conditions.
- 9) **Best Available Technology.** *The Glosten Associates* (2013c). Identifies best available technology tugs (one U.S. and one foreign) based on review of existing vessels and a set of criteria applicable to Aleutian Islands operations.

- 10) **Purpose Designed Towing Vessel.** *The Glosten Associates* (2013d). Present design and cost estimate for towing vessel intended to maximize features such as speed and seakeeping for Aleutian Islands operations.
- 11) **Tug Location Study.** *The Glosten Associates* (2013e). Presents geographic areas that can or cannot be reached by tugs based at different locations in the Aleutian Islands.
- 12) **Benefit-cost Analysis of Risk Reduction Options for the Aleutian Island Risk Assessment.** *Northern Economics, Inc.* (2014). Concludes that predicted benefits of recommended system exceed costs of system implementation.
- 13) **Considering Options for the Management & Funding of an Optimal Response System in the Aleutian Islands.** *Baldwin & Butler, LLC and Pearson Consulting, LLC.* (2014). Describes approach used to identify non-profit model for recommended system.
- 14) **Considering Options for Salvage & Oil Spill Response in an Optimal Response System.** *Nuka Research & Planning Group, LLC, Pearson Consulting, LLC, Moran Environmental Recovery, & Moran Towing* (2014). Describes approach used to identify spill response and salvage resources and system components for recommended system.

4.1.2 RECOMMENDATION

The recommended system (Figure 4) includes oil spill prevention through routing measures and real-time vessel monitoring, along with emergency towing, salvage, and oil spill response components. It also recommends an organizational structure and estimates annualized costs.

The Advisory Panel agreed with the Analysis Team’s recommendation that the U.S. Coast Guard should approve the optimal response system, managed by some future Managing Entity, as compliant with federal Vessel Response Plan regulations for deep draft tank and non-tank vessels under the alternative compliance option granted in federal regulations. This approach is considered to be much better suited to the region than compliance with the regulations as written.



4.2 Task 3: Aleutian Islands Subarea Contingency Plan Update and Enhancement

Oil spill response for Alaska is organized around a Unified Plan and regional SCP. The Alaska Regional Response Team convenes Subarea Committees for each subarea to guide revisions and updates to their SCP. The Aleutian Islands SCP includes GRS and PPOR, both of which were updated as part of Phase B of the risk assessment.

The most recent previous update to the Aleutian Islands SCP – Change 1 – was in 2010 and focused on incorporating lessons learned from the *M/V Selendang Ayu* oil spill; however, some parts of the plan remained incomplete or had become outdated.

4.2.1 SUBAREA CONTINGENCY PLAN UPDATE

The Subarea Committee was reconvened as part of Phase B to revise and update the Subarea Contingency Plan. The same organizational structure was used for this update as for previous ones, with an Executive Committee comprised of agency co-chairs (the USCG, ADEC and the U.S. Environmental Protection Agency) and two workgroups: Response/Logistics and Sensitive Areas.

The Executive Committee established a schedule for convening the Subarea Committee to update the plan, ultimately using the following process:

- **February 2013:** Initial Subarea Committee meeting in Anchorage, with funds from the risk assessment used to support in person participation by local and tribal government representatives from the region. Provided background on the SCP update process and schedule.
- **April 2013:** Government-to-government consultation and coordination was initiated, announcing the revision of the SCP and seeking community input regarding response resources, infrastructure changes, and sensitive areas. The Sensitive Area section of the SCP updated to conform to a new format, requiring multiple solicitations for input from the resource agencies. This section required updated content on endangered species, changes to certain land sensitivities, and links to the Pribilof Islands Wildlife Protection Guidelines. The information provided by communities either through the Subarea Committee or by individual contacts was incorporated into the Response Section (Part 1) of the SCP.
- **January 2014:** Subarea Committee meeting held to review draft updates and solicit additional input.
- **August 2014:** Subarea Committee meeting held to review draft updates and discuss inclusion of Optimal Response System recommendation (from Task 1-2) in the plan. The Executive Committee decided to add the recommendation following this meeting, adding a new subsection entitled, “Marine Response and Salvage Recovery.” That section included:

- Background
 - Weather Characterization
 - 2012 Transits of Unimak Pass
 - Emergency Towing System (ETS)
 - ETS Deployment and Operations
 - Response Times for Tugs of Opportunity
 - Consideration for Response Tugs
 - Oil Spill Response and Salvage
 - Special Procedures
 - Dutch Harbor Severe Weather Plan
 - Recommended Routing Measures
 - References: Annotated bibliography of all fourteen AIRA reports with web links
 - Alternative Planning Criteria Annex
- **March 2015:** Final meeting of Subarea Committee. Public comment period held for 30 days, with no comments received.
 - **May 2015:** Change 2 of the Aleutian Islands SCP finalized and posted on the following website: <http://dec.alaska.gov/spar/perp/plan.htm>

The SCP is on a five-year review cycle with the next revision scheduled for 2020.

4.2.2 GEOGRAPHIC RESPONSE STRATEGIES

Twenty new GRS were developed as part of Phase B, and a GRS deployment exercise was conducted in Adak. GRS, included in the SCP, are oil spill response plans for coastal areas designed to protect specific sensitive site from impacts following a spill. These response plans can save time during the critical first few hours of an oil spill response by showing responders where sensitive areas are located and where to place oil spill protection resources.

For the purposes of GRS development, the Aleutian Subarea is divided into five zones to make the selection of sensitive sites more manageable and facilitate outreach and survey activities (see Figure 5). Forty-three GRS had previously been developed in the West A and B Zones, including five that memorialized the tactics deployed during the *Selendang Ayu* response.

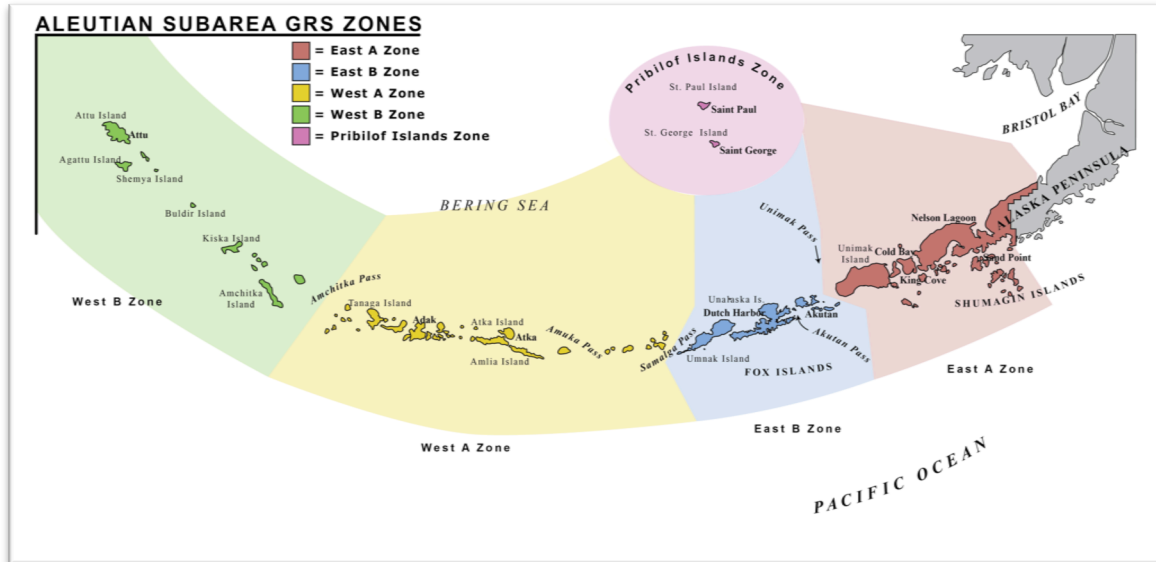


Figure 5. Aleutian Islands Subarea GRS zones

In February 2012, the GRS workgroup reconvened to develop additional GRS for the Aleutian Islands area as part of the effort to update the SCP overall. The work group again focused on the West A and West B Zones, identifying 15 sites in the West A Zone during the initial meeting. Selecting sites in the West B Zone proved more challenging because of the environmental conditions, the location of the most sensitive resources, limitations of oil spill response equipment, and remoteness of the area. After gathering input from resource agencies and locals to identify sensitive sites where a response could be effective, five West B sites were selected (See Figure 6).

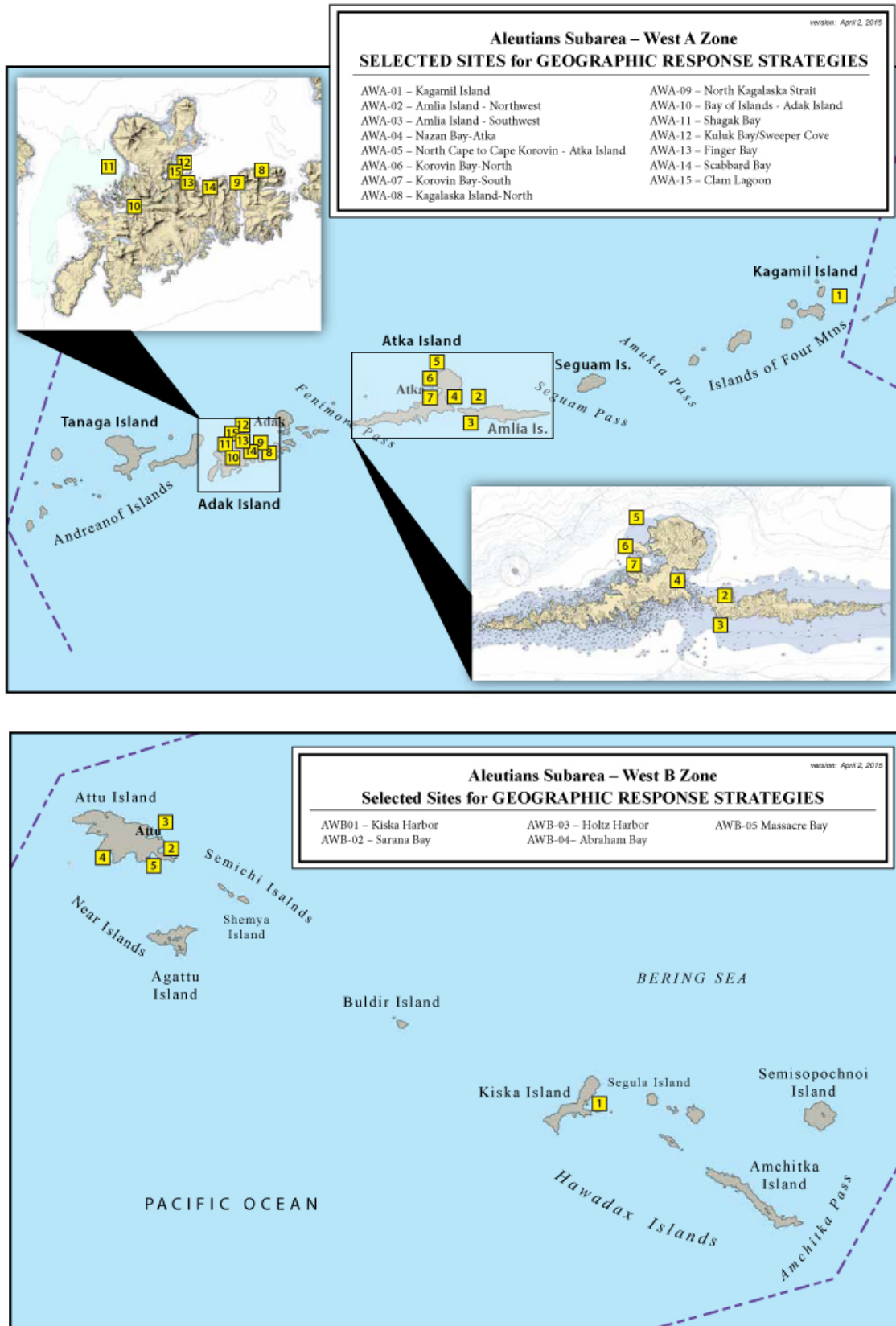


Figure 6. GRS sites selected in West A and West B zones as part of Phase B

Field Deployment

In July 2014, Tactics Committee members traveled to Adak to gather information about conditions on-site, reach out to local stakeholders for input on local protection priorities, and observe and evaluate first responders while implementing a GRS during a scheduled deployment exercise. A community meeting was held at the Adak City Hall on July 22, 2014 and attended by local officials and community members. Presentations were given by ADEC regarding the SCP and GRS program. Community members confirmed the selection of sites for GRS and added other areas they deemed high priority sites.

On July 23, 2014 the local fuel distributor, Aleut Enterprise, provided response equipment, vessels, and trained response personnel to conduct GRS field deployment in nearby Clam Lagoon. These responders collaborated with the local fire department, EMS, and police to simulate an actual response for the village. Approximately 25 people were involved in the exercise.

Clam Lagoon is a relatively large lagoon, typical in Western Alaska. With an extensive intertidal area, the lagoon supports salmon runs and provides a critical habitat for nesting and migrating waterfowl. The lagoon's entrance is a narrow channel with significant tidal currents. The GRS drafted for that location called for 250 feet of exclusion booms in front of the entrance to keep any oil from entering the lagoon.

After responders attended an exercise briefing, the boom was deployed at the end of the outgoing tide. The anchoring systems were set at slack tide. As the crews readjusted the anchors, the tide began to flood. Given challenging the tidal conditions, the boom was dismantled before the GRS was fully deployed (see Figure 7). The GRS may have been effective if boom had been properly anchored initially.



Figure 7. Crews had difficulty with shore anchor systems

The GRS was modified based on the field deployment (see Figure 8). Additional boom was specified and tidal sealing boom was added in addition to a requirement for oil collection at shoreside sites. Beyond demonstrating the importance of testing draft tactics, the GRS deployment revealed the importance of training for local first responders. Even with assistance from the fuel company's trained personnel, who deploy containment tactics at fuel depots and tank farms, additional training may be warranted for the deployment of certain GRS tactics.

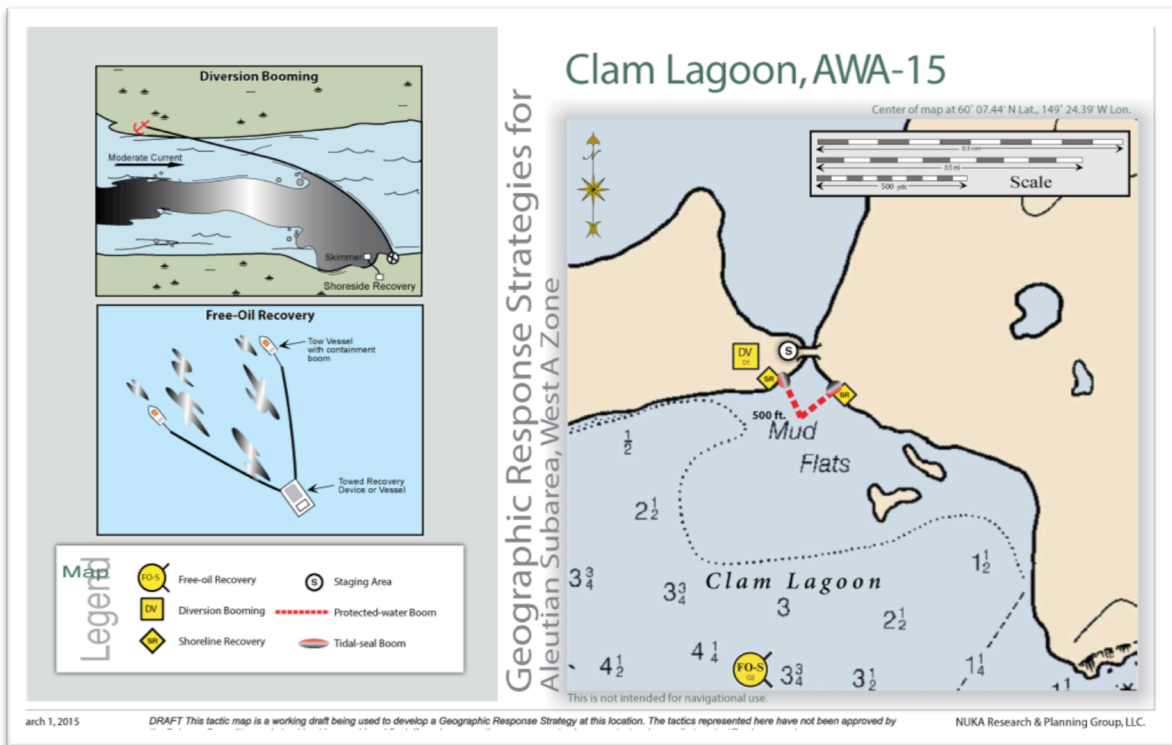


Figure 8. GRS map page for the tactics as revised after the exercise

Field Survey

Surveyors from ADEC and Nuka Research conducted a field survey from a vessel provided by Aleut Enterprises. An employee with extensive local knowledge guided the survey of eight nearby sites to gather information and develop protection tactics for these sensitive areas. Access to local knowledge gave surveyors insight into seasonal conditions and additional resources that had not been identified prior to the survey.

Tactics Committee Meeting and Workgroup Review

The Tactics Committee, comprised of representatives from the Alaska Chadux Corporation, USCG, ADEC and Nuka Research, met after the survey to review the 20 GRS that had been drafted. After examining the draft plans and the long distances from population centers and equipment depots, the group felt the need to address the logistical challenges to response in these areas. For example, the use of lightweight and easily transportable absorbent booms prior to the arrival of containment boom was incorporated into many GRS to enable a faster community

response. Although not ideal, this measure could offer some protection before more adequate equipment arrived. In other areas smaller-sized containment boom was specified to reduce weight and increase the amount of boom that could be delivered to a site. After the tactics were reviewed and approved by the Tactics Committee, the GRS were posted to the project website for the workgroup's review. In May 2015, the GRS were considered approved by the workgroup and forwarded to the Subarea Committee for inclusion in the SCP. GRP are available at: <http://dec.alaska.gov/spar/perp//grs/ai/home.htm>

4.2.3 POTENTIAL PLACES OF REFUGE

A place of refuge is a location where a vessel needing assistance can be directed or moved to where actions can then be taken to stabilize the vessel, protect human life, reduce a hazard to navigation, and/or protect sensitive natural resources and other uses of the area (e.g., subsistence harvesting, commercial fishing, recreational boating). These places may include constructed harbors, ports, natural embayments, or offshore waters. *Potential* Places of Refuge (PPOR) plans in Alaska catalog and describe sites that may be accessed by vessels in distress. Actual designation of a place of refuge will always be an incident-specific decision made by the USCG's Captain of the Port for Western Alaska. The more information that is available to decision makers, the more likely they will be able to make the best decision possible.

The plans are developed with a workgroup process similar to that used to develop GRS. A workgroup consisting of professional mariners, resource agencies, local, state and federal government representatives, and community stakeholders oversees and directs the development of the plans.

PPOR Development in the Aleutian Subarea

The development of the PPOR for the Aleutian Subarea coincided with the development of GRS there. Many workgroup members were involved with both efforts, which increased efficiency. The Subarea is divided into 10 areas to allow for the production of detailed maps and information about PPOR. Potential Place of Refuge Plans reflect the best available knowledge at the time they are produced, but conditions, resources, facilities, and response resources are always changing. The workgroup reviewed and updated PPOR maps and information for the Aleutian Islands Subareas for inclusion in the SCP.

Changes to the Risk and Asset Map included:

- Production of a map for the locations of Automatic Identification System towers and coverage in the area (see Figure 9)
- Update of the information on oil spills in the area
- Production of a map that illustrated the locations of the Emergency Tow Systems in the area

Changes to individual maps included:

- Document and include any changes to infrastructure in the area
- Change Rat Island to Hawadax Island to reflect the new name

In June 2015, the International Maritime Organization (IMO) approved the U.S. government’s proposal to establish five areas to be avoided (ATBA), 50 nm offshore of the Aleutian Islands. This measure takes effect in January 2016. Although technically “recommendatory,” it establishes a standard of care that applies to all ships passing through the region, including those in innocent passage. (Vessels engaged in local trade are not affected.)

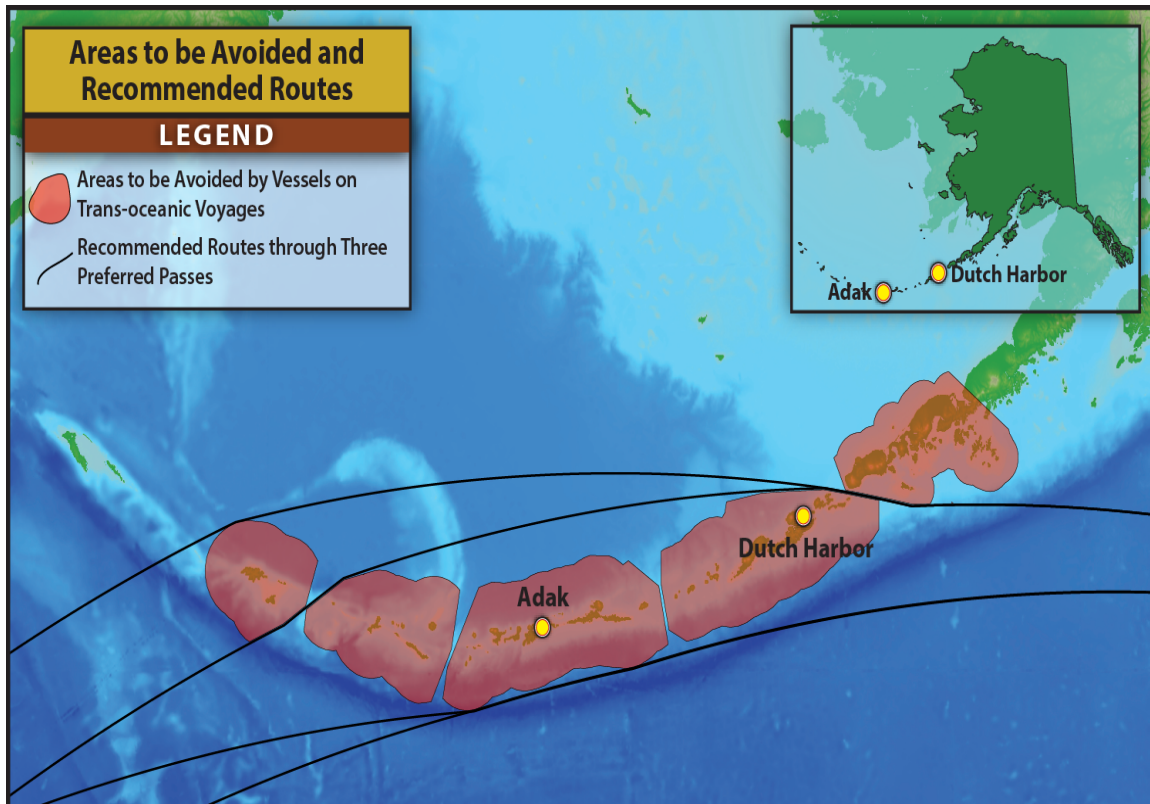


Figure 10. Recommendatory areas to be avoided established by IMO for the Aleutian Islands area

In December 2012, Pearson Consulting, LLC and Cape International convened a workgroup of Advisory Panel members to consider the potential for establishing a Particularly Sensitive Sea Area (PSSA) in the Aleutian Islands. This group met five times on the issue between 2012-2014, in addition to full Advisory Panel discussions.

The pursuit of the PSSA was driven by an interest in establishing ATBA in the area. After further research and discussions with the U.S. National Oceanic and Atmospheric Administration (NOAA), which advocates for the U.S. at the IMO on these issues. With input from the Advisory Panel as well as USCG and NOAA officials familiar with the procedures, the AIRA Management Team decided to take the approach of pursuing routing measures such as ATBA without a PSSA designation.

The routing measures proposal included:

- General description of the region
- Unique or rare features, including environmental sensitivities
- Critical habitat
- Productivity
- Vulnerability
- Economic benefit
- Cultural significance
- Subsistence significance
- Scientific and research value
- Other considerations, such as vessel traffic and state of navigational aids and hydrographic surveys
- Natural factors
- Vulnerability to international shipping
- Domestic measures
- Shipping considerations
- Aim of the proposed ATBA
- Impact on shipping
- Action requested

The Advisory Panel reviewed and approved a draft application to the IMO for proposed ATBA (routing measures) in October 2014. The application was presented to and endorsed by the Navigation Safety Committee in March 2015, and enacted by the full IMO in June 2015 to take effect in January 2016.

An application for a PSSA, which includes much of the same information, was also prepared to adhere to the original project scope of work.

4.4 Task 6: ETS Exercise and Training Materials

ADEC has an ongoing project to station Emergency Towing Systems (ETS) around Alaska and maintain this capability through periodic exercises supplemented by a training manual and DVD. The Mayor of Unalaska initiated this program following the near grounding of a ship off their coast in 2007.

With the benefits of the ETS widely recognized, funds from the *M/V Selendang Ayu* settlement were used via Phase B of the AIRA to facilitate a 6th Annual ETS Exercise in Unalaska in 2012. They were also used to update the existing auxiliary training manual and develop a training video, made publicly available by the state. The video is available at: <https://dec.alaska.gov/spar/PPR/ets/index.htm>.

An ETS training exercise was conducted on October 3, 2012 in Unalaska Bay, north of Amaknak Island. The exercise objectives were to familiarize local responders with the ETS and capture information to update the training manual and video. Twenty-

one representatives from the AIRA Advisory Panel and local operators (Port of Unalaska, Dunlap Marine, and Harley Marine) participated, along with representatives from ADEC and U.S. Coast Guard’s Sector Anchorage and Marine Safety Detachment Unalaska. The After Action Report is available at: http://www.aleutiansriskassessment.com/images/121102_ETS_AAR_v1.pdf.



Figure 11. ETS deployment being prepared during October 2012 exercise in Unalaska Bay

5. FACILITATION AND PROJECT MANAGEMENT

In addition to the activities described in Section 4, project facilitation and management included:

- Facilitation of 27 Management Team teleconferences (in addition to Advisory Panel meetings).
- Facilitation of six Advisory Panel meetings, including webinars and in-person meetings in Unalaska and Anchorage, Alaska.
- Management of seven subcontracts, including facilitating review and approval of all subcontractor deliverables.
- Management and reporting for a separate fund used to facilitate participant travel for in-person meetings.
- Development and maintenance of email lists for the Management Team, Advisory Panel, and interested members of the public.
- Development and distribution of project newsletters with updates, meeting and comment period announcements, and links to project deliverables.
- Development and maintenance of project websites, including one for the public and password-protected sites for the Advisory Team and Management Team. (The public website will be static, but maintained for two years following project completion.)
- Presentations or briefings about the project delivered to: BC-Pacific States Oil Spill Task Force (2013), Arctic and Marine Oil Spill Program (2013), Arctic Circle Conference (2013), Arctic Research Commission (2014), Office of the Governor and Alaska Department of Environmental Conservation (2014), City Council of Unalaska (2014), USCG Sector Anchorage (2014), Aleutian Islands Subarea Committee (2014), members of the press and public (via webinar, 2014), and Clean Pacific Conference (2015).
- Quarterly and final reporting.
- Budget management and updates for the Management Team.

6. CONCLUSION

The seas surrounding the Aleutian Islands present some of the most challenging and dangerous waters traversed by marine shipping in the United States. Over four thousand vessels transit these waters each year. There have been numerous marine casualties resulting in oil spill, environmental damage, and human fatalities in these waters in the past 100 years. One such casualty, the grounding of the *M/V Selendang Ayu* in 2004, led to the Aleutian Island Risk Assessment.

The Aleutian Island Risk Assessment utilized a combination of peer-reviewed technical analysis and expert knowledge from a diverse group of stakeholders to evaluate the risks of marine accidents and oil spills in the Aleutian Islands and make a series of recommendation in both prevention and response measures to improve safety. Some of these recommendations have been implemented, while policymakers were still considering others at the time of this report.

Hopefully history will show that this project reduced the frequency of marine casualties and the consequences of accidents that inevitably occur. The methods used for this risk assessment are readily replicable for other regions where there are oil spill risks from marine shipping and a shared commitment to identifying and mitigating those risks.

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APPENDICES

Appendix A – Phase B Project Participants

APPENDIX A – PHASE B PROJECT PARTICIPANTS

PEER REVIEW PANEL			
Name	Organization	Position	Phase
Dr. CJ Beegle-Krause	Environmental Research for Decision, Inc.	President	A
David Bovet	Norbridge, Inc	Partner	B
Dr. Paul S Fischbeck	Center for the Study and Improvement of Regulation Department of Social & Decision Sciences Carnegie Mellon University	Director	A & B
Dr. Beverly Huey, <i>Panel Coordinator</i>	The National Academies of Science, Transportation Research Board	Senior Program Officer	A & B
Dr. John D Lee	University of Wisconsin, College of Engineering, Department of Industrial and Systems Engineering	Professor	A & B
Dr. Thomas M Leschine	University of Washington School of Marine Affairs	Director	A & B
Mr. R Keith Michel	Herbert Engineering Corp	Chairman of the Board	A & B
Dr. Ali Mosleh	University of Maryland, Mechanical Engineering	Professor	A & B

ADVISORY PANEL				
Name	Organization	Primary/Alternate	Stakeholder Category	Phase
David Arzt	Alaska Marine Pilots' Association	Primary	Mariner, Pilot	A & B
Louis Audette	K-Sea Transportation	Primary	Mariner, Oil Barges/Tankers	A & B
Mike Baker	Aleut Enterprise, LLC	Alternate	Mariner, Oil Barges/Tankers	A
Catherine Berg	Alaska Maritime National Wildlife refuge	Alternate	Resource Manager	A & B
Reid Brewer	AK Sea Grant Marine Advisory Program UAF	Primary	Subsistence	A & B
Douglas Burn	USFWS	Alternate	Resource Manager	B
Cheryl Fultz	Delta Western Inc.	Alternate	Mariner, Oil Barges/Tankers	B
Tom Gemmell	Marine Conservation Alliance	Primary	Fisheries	A & B
David Gregory	Community member; OC employee; City Council; LEPC Member;	Alternate	Subsistence	A & B

ADVISORY PANEL, continued				
Name	Organization	Primary/ Alternate	Stakeholder Category	Phase
Pete Garay	Alaska Marine Pilots' Association	Alternate	Mariner, Pilot	A
Layla Hughes	Consultant	Alternate	NGO / Environmental	A & B
Frank Kelty	City of Unalaska	Alternate	NGO – Local (A) Fisheries (B)	A & B
Simon Lisiecki	Retired	Primary	Mariner, Innocent Passage	A & B
Eugene Makarin	American President Lines, Ltd	Primary	Mariner, Containerships	A & B
Karol Kolehmainen	Aleutians West Coastal Resource Service Area	Primary	NGO-Local	A
Shirley Marquardt	City of Unalaska	Primary	Local Government	A & B
Ed Page	Marine Exchange of Alaska	Primary	Mariner, General	A & B
Brent Paine	United Catcher Boats Association	Primary	Fisheries	A
Tom Robinson	Qawalangin Tribe of Unalaska	Primary	Subsistence	B
Tom Rueter	Alaska Maritime Agencies	Alternate	Marine, General	A & B
Mike Ruiz	American Marine Corporation/PENCO	Alternate	Marine Salvor	A & B
Whit Sheard	Pacific Environmental	Primary	NGO / Environmental	A & B
Marc Smith	Private Consultant	Primary	Mariner, Trumper	A & B
Bob Umbdenstock	Resolve Marine Group	Primary	Mariner, Salvor	A & B
Mike McGlothin	American President Lines, Ltd	Alternate	Mariner, Containerships	A
Richard Wilson	American Marine Corporation/PENCO	Alternate	Marine Salvor	A
Jeff Williams	Alaska Maritime National Wildlife Refuge	Primary	Resource Manager	A & B

MANAGEMENT TEAM		
Name	Organization	Phase
CAPT Scott Bornemann	USCG District 17	B
LT Jason Boyle	USCG Inspection/Investigation Division	
LT Eugene Chung	USCG, Waterways Management Chief / Sector Anchorage	B
LT Kion Evans	USCG Planner, Sector Anchorage	B
LT Robert Fields	USCG, Inspections/Investigations Branch	A
Gary Folley	ADEC/SPAR	A & B
LT Mike Franklin	USCG Inspection/ Investigation Division	A
LCDR Gary Koehler	USCG Inspection / Investigation Division	A & B
LT Matt Mitchell	USCG Planner, Sector Anchorage	B
CDR Shane Montoya	USCG Planner, Sector Anchorage	B
Matt Odeum	ADEC/SPAR	A
CDR James Robertson	USCG, Chief, Inspections/Investigations Branch	A
CDR Patrick Ropp	USCG Inspection / Investigation Division	A & B
CAPT Adam Shaw	USCG Inspection / Investigation Division	A & B
Crystal Smith	ADEC	A&B
Krystyna Wolniakowski	NFWF	A & B
Jay Wright	NFWF	A & B