

Summary of Recommended System to Enhance Emergency Towing, Salvage, and Spill Response in the Aleutian Islands January 20, 2014

I. Background

At the conclusion of Phase A of the Aleutian Islands Risk Assessment (AIRA), the Advisory Panel's recommendation included the following:

- Increase Rescue Towing Capability in the Aleutians
- Increase Salvage and Spill Response Capability in the Aleutians

As these two items are closely related, the work plan for Phase B combined the two recommendations under a single task: to recommend an Optimal Response System that will coordinate the suite of necessary services in a manner that is tailored to the environment and maritime trade of the Aleutian Islands region as well as being both practical and sustainable.

This document describes a response organization that could offer three levels for each service area. These are described as Bronze, Silver, and Gold, and represent a range of resources, services, and costs as these terms imply. Bronze and Silver system components could also be used as phased-in steps towards the "Gold" level system, though it may also require a phased-in approach to achieve even the Bronze level.

A recommendation is also offered for a separate, but supplementary, role for the federal government. This is described in Section V.

II. Purpose of this Document

This document summarizes the Analysis Team's recommendations to the Advisory Panel regarding that optimal system. It describes both overall conclusions and presents options for the Advisory Panel to consider in selecting the recommended system that will be considered in the Benefit Cost Analysis that will conclude this task.

The information included here is based on a combination of research, both qualitative and quantitative analysis, the best professional judgment of the group of experts that comprise the Analysis Team, and outreach to Advisory Panel members and others within the region and in relevant industries.

The Analysis Team's recommendation is described in general terms: the group does not identify *who* might play the role of either the management and funding organization or potential future service providers. The role of the Analysis Team is simply to provide a recommendation about what the system should, or could look like.

III. Context

The Analysis Team considered the following aspects of the overall context.

Geography and Infrastructure – The size and remote nature of the Aleutians Island region represents an inherent challenge to preparing for an implementing an effective response. It is important to consider the large geographic area and relative lack of infrastructure in the Aleutian Islands. The Aleutian Island chain and Alaska Peninsula extend more than 1,000 miles into the Pacific Ocean from mainland Alaska. While some communities have docks, storage, landing strips, and other related infrastructure, these types of resources are sparse as compared to many other parts of the country. As the Advisory Panel noted in Phase A, it will always be challenging to mount a significant response in this area, and preventing an incident should be a priority (Wolniakowski et al., 2011).

Response Gap - Environmental conditions are far more conducive to preventing a spill through emergency towing than cleaning it up. The response gap analysis conducted as part of this task analyzed how often environmental conditions (wind, sea state, visibility, etc.) would preclude the deployment of different types of responses to a vessel emergency (Nuka Research, 2014a). While there are variations across the region and throughout the year, overall emergency towing could be expected to be effective 98% of the time, whereas the deployment of mechanical recovery or dispersant application would be possible only 15-36% of the time.

Table 1. Summary of year-round response gap estimate for four locations across the study area

Response Tactic	Response Not Possible	Response May be Possible
Emergency Towing	2%	98%
Helicopter Lightering	20%	80%
Open-water Mechanical Recovery	72%	28%
Nearshore Mechanical Recovery (daytime only)	71%	29%
Aerial Application of Dispersants	72%	28%
Vessel Application of Dispersants	64%	36%
Air Observations (Fixed Wing) (daytime only)	18%	82%

Vessel Traffic – Of the large vessels passing through the Aleutian Islands area, 1,000 are subject to USCG regulations and more than 800 are in innocent passage each year without any requirements that they ensure emergency towing, salvage, or spill response resources are in place. While U.S. regulations generally rely on large vessel operators to ensure a basic level of preparedness if something goes wrong, roughly half the transits of the Aleutian Islands are made by vessels in innocent passage that are exempt from Vessel Response Plan (VRP) requirements.¹ In 2012, large vessels made 4,615 transits through Unimak Pass, of which 2,462 (53%) transits were in innocent passage.² Table 2 summarizes transits by individual vessel. A

¹ 33 CFR 155.1015(c)(7)

² Based on AIS data from the Marine Exchange of Alaska.

total of 1,045 vessels were subject to VRP regulations for at least one transit during the year. These vessels comprise the regulated group for the purpose of this analysis. There were 853 vessels that transited Unimak Pass only in innocent passage and these vessels comprise the unregulated group. (Nuka Research, 2014b)

Table 2. Summary of vessels making Unimak Passage Transits in 2012

Regulated Status	# of Unique Vessels
Vessels in U.S. trade only, subject to VRP regulations	684
Vessels in <u>both</u> U.S. trade and innocent passage, subject to VRP regulation for at least one voyage	361
<i>Vessels subject to U.S. regulations for at least one transit through Unimak Pass in 2012</i>	1,045
Vessels in innocent passage only	853
Vessels for which regulated status is unknown	63
<i>Total unique vessels transiting Unimak Pass in 2012</i>	1,961

Alternative Compliance - The U.S. Vessel Response Plan requirements are ill suited to the environment and geography of the Aleutian Islands: a future system should be based on alternative planning criteria. The Regulatory Resource Study conducted at the start of Phase B outlined the resources that would be necessary for compliance with U.S. VRP regulations. Emergency towing is essentially not required due to the distance from the port city, though this prevention benefit clearly aligns with the regulatory intent. The regulations require significant spill response resources to be on scene within set time limits that would require the placement of equipment, vessels, and personnel in hubs across the island chain, including in some places where there is no infrastructure or logistical support.

Preventing an accident is always the first priority, and should be even more so when response operations are likely to be compromised by environmental conditions, complex logistics, and the large geographical area. Establishing a long-term alternative planning criteria program for the regulated group of vessels will enable the development of a system that is better suited to the Aleutian Islands region while also establishing more predictable costs. This predictability is important both for the regulated community and to allow a management and funding organization to secure long-term contracts requiring capital investment.

IV. Recommendation for Response Organization Structure, Funding, and Services

This section summarizes the recommended structure, funding, and services (whether contracted or “in-house”) which could be provided by a response organization.

Table 3 presents three levels of service: Bronze, Silver, and Gold. The Advisory Panel is invited to consider these three service levels summarized in Table 3 as described here, or by mixing and matching among the different service categories. The assumption is that the funds that can be secured will be used to establish the best possible service level. Regardless of whether the Bronze, Silver, or Gold level is selected, a phased-in implementation will likely be necessary. This recommendation does not prescribe the specifics of a phasing process.

Organization – management and structure. We recommend that all services be provided – either directly or through contracts – by one non-profit organization. Even if multiple service providers are engaged, a single entity will be the most efficient way to oversee a system that provides for different categories of service. A nonprofit organization is recommended because this structure:

- Ensures a baseline level of transparency (and thereby an incentive to keep costs down).
- Allows for contributions from multiple types of sources, including member and non-member shippers, grants, fines/penalties, and appropriations.
- Allows for flexibility in membership dues structure, including the ability to charge different fees to different vessels as long as they are based on the concept of equity. For example, dues could be different for categories of vessels such as tankers, container ships, and bulk carriers, or could be charged based on barrels of oil capacity on the vessel.
- Allows the organization to designate “members” that receive specific benefits. This is intended to incentivize participation, potentially even from vessel operators that are not required to comply with U.S. regulations. Benefits could include charging a reduced rate for any response services implemented, or licensing use of branding or a seal to show that they are “doing the right thing.”
- Allows the companies funding the system to govern the system on the non-profit board of directors and who direct dedicated staff to accomplish the company’s mission.
- Strikes a balance between serving the public good and retaining flexibility: a non-profit structure reinforces the fact that this entity exists to protect the environment and natural resources; acknowledges that if the market for these services already existed, then services would already be provided by a for-profit entity; and does not require a federal, state, or municipal law to create the entity or dictate its pricing structure (as would be the case for a utility or port authority structure).

This entity would be expected to most likely contract for services needed, though it could also choose to own and operate equipment itself.

We estimate that an annual budget of \$6.7 million (bronze), \$14.1 million (silver), or \$21.9 million (gold) will be required to provide the recommended services at the assumed levels. These expenses can be met through the collection of an annual per-vessel fee from both regulated operators (under an APC) and any unregulated vessels seeking to attain the organizations compliance benefits. As noted above, benefits such as reduced rates for actual response operations could be used to incentivize companies to become members even if they are not subject to U.S. vessel compliance requirements.

Dues should be collected on a per-vessel basis annually. The board of the non-profit organization could choose to prorate dues based on the amount and type of oil carried as cargo or bunker, but such a prorated formula is not specified here.

Commitments of other funding from grants, pollution settlements, vessels that are not subject to the regulations, or other government or private contributions could reduce this amount or further enhance the system without increasing membership dues.

Organization – basic services. The organization that implements this APC system will need to provide several key functions in addition to deploying – or contracting for - response services.

In order to allow maximum time to repair or take a vessel under tow, **offshore routing measures** have been identified as a key element to preventing groundings if a vessel loses propulsion or steering. Recommendations for specific routing measures for vessels not trading in the Aleutians will be made through Task 4 of the AIRA project, but it is also important that they be embedded as a condition of participation in this system as an prevention offset to reduced spill response requirements.

In order to maximize participation in the system and as a complement to USCG enforcement, the managing organization will need to **monitor vessel activity** to identify vessels that are traveling outside the recommended routing, are traveling to or from a U.S. port but are not up to date on their dues, or are in some way compromised or in distress. An Automated Identification System (AIS) monitoring service can accomplish this.

Finally, the organization should provide the service of an **Incident Management Team** for at least the first 48-72 hours of a response.

Enhanced emergency towing capability. Emergency towing is one of the most important aspects of prevention in this region of high winds and large vessel traffic, and also potentially the most expensive aspect of the system. Based on analyses conducted by The Glosten Associates regarding the availability of tugs of opportunity, best available tug technology, a potential purpose-built tug design, and options for tug locations, the group recommends three options for emergency towing. These options represent a range in cost along with a range in the level of service.

The Glosten Associates estimated the minimum requirements for a tug to be able to handle a vessel in prevailing conditions in the Aleutian Islands region. For a 68,000 DWT containership, which was identified as representative of many of the vessels transiting the region today, a minimum 81 MT bollard pull would be required to turn and tow the vessel directly to windward in 40 knot winds and 16 foot waves. (The Glosten Associates, 2013a).

The lowest cost means of enhancing emergency towing in the region would be to enhance the use of vessels that are already there as tugs of opportunity. The Tug of Opportunity Study considered how likely it would be for a tug to be able to assist a distressed vessel in different weather conditions and based on the availability of tugs in 2012. Tugs of opportunity are more likely to be in the eastern Aleutians, and, at least based on 2012 vessel data, could reasonably be assumed to be available in the eastern Aleutians when winds are less than 40 kts and seas are less than 16 ft. However, west of Adak the median response time for a tug of opportunity is much higher - more than 2 days - even when winds and sea states are relatively calm. (When seas increase to the 11 to 16 feet range and winds of 25 to 40 kts, the median response time in the western Aleutians increases to more than 3 days.) Regardless of location, there are few tugs capable of rescuing a distressed ship in seas higher than 16 feet and winds higher than 40 kts. Out of 152 tugs considered in the Tug of Opportunity Study, only one was capable of implementing a save in seas greater than 16 feet and this tug was only available 20% of the time. When the *Alex Haley* is in the Aleutian study area, she was often identified as being the towing-capable vessel that could most often arrive on-scene first, particularly in scenarios where

the sea conditions exceed 12 ft. (Improving the USCG's *Alex Haley's* tow capability by adding a winch would be one option for enhancing tow capability using the current resources. Another would be to improve the ability to identify and direct other tugs of opportunity through real-time monitoring of AIS data.

We recognize and applaud that a privately owned, towing-capable vessel has recently been stationed at Dutch Harbor (although not as a dedicated rescue tug). While this vessel does not have sufficient bollard pull to affect a save of the ships used for this study under all conditions, it is a significant improvement. We have chosen to treat this tow vessel as a vessel of opportunity for the purpose of this recommendation.

Because of the importance of rescue towing and the fact that it is relatively more likely to be successfully implemented than any sort of spill response (based on the response gap analysis), we recommend establishing a dedicated rescue tug in the region. Because tugs of opportunity are more likely available in the area of Unalaska (The Glosten Associates, 2013d), we recommend placing a dedicated rescue tug at Adak, or perhaps relocating it to that location in the winter. In terms of tug design, we asked two questions:

(1) What would be best available technology (BAT) based on vessels in service today? A comparison of existing tugs in the U.S. and Europe resulted in the identification of two vessels that would be considered BAT for the Aleutian Islands based on their capabilities. Considering cost – which is part of both the regulatory definition of BAT and a concern of the Advisory Panel – The Glosten Associates identified a vessel with the following characteristics as BAT for the Aleutian Islands, based on multiple factors, including bollard pull, seakeeping ability, and speed: 136 MT bollard pull, 7,600 kW propulsion, 16 knot speed, and 140 feet long. The cost of building this vessel in the U.S. was estimated to be \$30.3 million. (The Glosten Associates, 2013b)

(2) What features would a tug have that was built specifically for rescue towing service in the Aleutian Islands? Given the large geographic area of the Aleutian Islands, the ability of a tug to reach locations in a timely fashion throughout the islands is of paramount importance, in addition, of course, to what it can do when it gets there. The Glosten Associates developed a design for a purpose-built tug for the Aleutian Islands based on the geographic area, environmental conditions, and current vessel traffic. The features of that vessel include: 110MT bollard pull, 34 knots, and the ability to maintain high speeds in rough weather. The estimated cost to build the vessel in the U.S. is \$87.4 million. (The Glosten Associates, 2013e)

Enhanced salvage capability. The Analysis Team focused on the timely implementation of heavy-lift helicopter lightering, because these services were used in the past in the region and is directly related to pollution prevention. (Recovery of a wreck typically involves a longer planning horizon and can be implemented with resources mobilized from other parts of the country.)

The baseline recommendation is to base a heavy-lift helicopter lightering package and a 40-60,000 bbl. tank (storage) barge in Unalaska. (The barge can also be used to support spill recovery.) The heavy-lift helicopter lightering package would include everything, except the helicopter, to perform a helicopter lightering operation. This would include:

- Pumps and power-packs for onboard a stricken vessel
- Helicopter slings
- Fly away tanks to move oil from the vessel to shore or a barge
- Pumps and power-packs to transfer oil from the fly away tanks
- 40-60 K bbl. barge to receive and store recovered oil. This barge should have a cargo heating system for heavy oil.

Instead of having a helicopter stationed in the Aleutians we recommend establishing a heavy-lift helicopter of opportunity program. This would include:

- Identifying vendors that provide heavy-lift helicopter services
- Establishing a contract and rates with these vendors
- Monthly monitor the location and availability status of each helicopter.
- Developing a logistics plan to mobilize a helicopter to the Aleutians (carrying the helicopter onboard an aircraft or ferrying the helicopter)

A higher level of service would be provided by positioning both a heavy-lift crane barge (which can also be used for logistic support for spill response) and firefighting package in Dutch Harbor.

Enhanced spill response capability. The recommendation for spill response is based on the Nearshore Operations Response Strategy (NORS) recently developed by the Alaska Department of Environmental Conservation (ADEC) as an addition to the Spill Tactics for Alaska Responders (STAR) Manual. NORS describes the resources needed to deploy mechanical recovery tactics with the logistical support that would need to be provided in a remote area. Although any type of spill response is likely to be challenged by environmental conditions, being able to protect sensitive areas is highly critical to a response and some amount of nearshore response capacity needs to be in place.

We recommend a nearshore spill response taskforce be developed for the Aleutians. The recommendation seeks to minimize cost by engaging vessels of opportunity (VOO) for significant roles in implementing a nearshore response. This recommendation also includes developing the logistical support for the nearshore taskforce. The taskforce would be intended to rapidly protect sensitive areas within a limited region using resources available locally. Additional resources would be cascaded in as needed, but due to environment, logistics, and geography, it is important to have some resources in place to start this process before additional resources are likely to be deployed.

The Gold recommendation is to have a nearshore taskforce comprised of 5 strike teams (3 free-oil recovery strike teams and 2 shoreline protection strike teams), but the Bronze level represents a slightly scaled-down version of one strike team and the Silver level essentially has two strike teams. The spill response equipment would be stationed in Unalaska and maintained by an oil spill response organization (OSRO). Major equipment would be dedicated for this purpose and might include:

- Current buster-type enhanced booming systems (Bronze = 4, Silver = 8, Gold = 12)
- Fuzzy disk high-efficiency skimmers (Bronze = 4, Silver = 8, Gold = 12)
- 249 bbl. mini-barges for primary storage (Bronze = 8, Silver = 16, Gold = 24)

- Protected-water boom for shoreline protection (Bronze = 3,300 ft., Silver = 6,600 ft., Gold = 10,000 ft.)
- Snare-boom for shoreline protection (Bronze = 3,300 ft., Silver = 6,600 ft., Gold = 10,000 ft.)

The vessels and crew necessary to deploy the taskforce would be provided through a vessel of opportunity (VOO) program developed and implemented by the OSRO, with additional dedicated vessels (two for the Bronze level, four for Silver, and 8 for Gold). The VOO program is a critical piece of the proposed response infrastructure, as it would ensure the availability of local assets deployed by those with local knowledge in a cost-effective manner. A VOO program sufficient to deploy 5 strike teams would require contracting and training approximately 150 vessels and crew. It would also require insurance and a monitoring program using AIS to facilitate the prompt identification of vessel location when needed.

Additionally, a program to assemble a marine logistics base would be developed to support the taskforce when assigned to a remote area. The logistics base would require contracting and training vessels and crew to provide logistical support, as well as planning for food, fuel, water, and supplies to support the base if it is deployed to a remote area. Without it, no response could be mounted in very remote parts of the region; it essentially serves as a foundation to *any* response system. While some equipment would be dedicated, contracts would need to be in place for any non-dedicated resources. Dedicated equipment might include:

- 40,000 to 60,000 bbl. barge for secondary storage (also available for lightering)
- Pumping systems to transfer oil

Finally, the highest level of resources recommended would be to acquire the equipment necessary to equip a single open water strike team. Vessels for this strike team would come from the Vessels of Opportunity program. This strike team would consist of equipment for a single skimming system to be used in conjunction with the oil barge specified in the salvage recommendation and a large vessel of opportunity.

An **out-of-region spill response mobilization program** would be needed to complement all three levels of resources in the event of a major spill. This requires establishing a means of mobilizing resources from elsewhere in Alaska or the country.

V. Summary of Response Organization Recommendation with Cost Estimates

The Table 3 summarizes the key elements of the recommendation for bronze, silver, and gold levels as described above. It also provides cost estimates for each level based on an annualized cost. Cost figures were provided by the Analysis Team and other sources.

The estimated operating cost breaks down to \$6,439/year/regulated vessel (bronze), \$13,538/year/regulated vessel (silver) or \$21,051/year/regulated vessel (gold) if it is entirely funded by the regulated vessels. The bronze and silver annual costs fall within the approximate

per-day operating cost for some of the types of vessels in question.³ If both regulated and unregulated vessels were to contribute, hypothetically, the annual cost for the bronze option would drop to \$3,431/year per year per vessel (\$7,214 for silver and \$11,218 for gold). Since unregulated vessel operators are not required by U.S. regulation to contribute to support response resources in the region, the lower rate could only be achieved if the federal government or other entity contributed on behalf of the vessels in innocent passage.

Table 3. Summary of Recommendation and Estimated Annualized Costs

Option Pricing	Option Applies			Total Costs		
	Bronze	Silver	Gold	Bronze Cost	Silver Cost	Gold Cost
	Organization - Management & Structure			Organization - Management & Structure		
Staff	x	x	x	\$1,087,309	\$1,087,309	\$1,087,309
Professional Services	x	x	x	\$120,000	\$120,000	\$120,000
Board of Directors	x	x	x	\$67,500	\$67,500	\$67,500
	Organization – Basic Services			Organization – Basic Services		
AIS Monitoring Program	x	x	x	\$910,064	\$910,064	\$910,064
Compliance Program	x	x	x	\$88,728	\$88,728	\$88,728
IMT Program	x	x	x	\$146,516	\$146,516	\$146,516
	Towing Services			Towing Services		
Towing Management Staff		x	x		\$287,012	\$287,012
Tug of Opportunity Program	x			\$109,367		
Towing Winch on Alex Haley	x			\$0		
BAT Tug - Adak		x			\$6,752,053	
New built fast tug - Adak			x			\$13,585,775
	Salvage Services			Salvage Services		
Salvage Management Staff	x	x	x	\$322,421	\$322,421	\$322,421
Helicopter Lightering Package - Unalaska	x	x	x	\$79,572	\$79,572	\$79,572
40-60K bbl. Tank Barge	x	x	x	\$663,968	\$663,968	\$663,968
Helicopter of Opportunity Program	x	x	x	\$20,000	\$20,000	\$20,000
Heavy Lift Barge - Unalaska			x			\$267,821
Fire-fighting Package - Unalaska			x			\$11,921
	Oil Spill Response			Oil Spill Response		
OSRO Staff	x	x	x	\$1,215,080	\$1,215,080	\$1,215,080
NSTF Equipment - Bronze	x			\$994,660		
NSTF Equipment - Silver		x			\$1,483,475	
NSTF Equipment - Gold			x			\$1,917,884
VOO Program	x	x	x	\$562,000	\$562,000	\$562,000
Out-of-Region Mobilization Program	x	x	x	\$16,000	\$16,000	\$16,000
Logistical Support Base	x	x	x	\$325,465	\$325,465	\$325,465
	Total Program Cost:			\$6,728,651	\$14,147,164	\$21,998,685

³ Daily operating costs range from \$4,531 for small containerships to \$10,780 for a very large crude carrier. Daily operating costs for bulkers, which comprise a large portion of the traffic through the region, range from \$5342 - \$7,858. (Source: Presentation by Richard Greiner, Moore Stephens, LLP December 2012.)

VI. Recommendation for Supplementary Federal Role

In addition to recommending the structure, funding, and services that could be provided by a private response organization, we also considered the role of the U.S federal government. The Federal government has a key role to play in the implementation of this system. First and foremost, enforcement of existing regulations will reduce the number of vessel operators that may be out of compliance and encourage them to seek compliance through membership with an organization that implements the agreed upon alternative planning criteria. This organization and its members will also have an incentive to promote compliance, and will monitor vessel traffic as described below. (Costs associated with this role are not calculated or included in the overall estimated cost for the recommended system.)

Additionally, because of the large number of vessels transiting the region are in innocent passage, the U.S. government has a responsibility to contribute to the system for protection of resources from oil spills to marine waters. While this is typically implemented through VRP regulations, U.S. regulations exempt roughly 800 vessels per year from providing any resources or planning in case they have an incident or accident while passing through the U.S. Exclusive Economic Zone near the Aleutian Islands. While the unregulated vessel operator is liable under U.S. and international law for any spill damages and costs of a response, these unregulated vessels do not contribute to any measures to ensure that resources are in place to prevent an incident from becoming an accident or mitigating the impact of an accident. However, the U.S. government's responsibility is not diminished: in accordance with 33 USC § 1321(c and j), which establishes the National Contingency Plan, the Area Contingency Plan, and specifies liability in the event of an oil spill, the U.S. government must be prepared to implement an effective response and mitigate or prevent a substantial threat of discharge. This responsibility legally applies to a potential spill regardless of its source, and essentially means that the U.S. government must have both response resources and personnel in place as well as taking action if there is a substantial threat of discharge. While this burden of preparation can be passed on to the regulated group, the number of unregulated vessels transiting the Aleutian Islands is a unique situation, and uniquely demands action and resources by the U.S. government to ensure that its obligations to take action to protect resources are met in a place where the unregulated vessels represents 45% of the spill risk.

The Federal Government could contribute to response readiness by:

- Direct appropriation to support a response organization,
- Providing response capacity such as towing,⁴
- Directing fines and settlements to support the response organization, and/or
- Employing the response organization.

⁴ At the conclusion of Phase A, the Advisory Panel recommended that establishing towing capability on the USCG cutter *Alex Haley*.

VII. References

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