A Changing Horizon:

Building Community Oil Spill Response Capacity in the Arctic

Joseph Inslee

A thesis

Submitted in partial fulfillment of the

Requirements for the degree of

Master of Marine Affairs

University of Washington

2013

Committee:

Thomas Leschine

Mary Baker

Program Authorized to Offer Degree:

School of Environmental and Marine Affairs

University of Washington

Abstract

A Changing Horizon: Building Community Oil Spill Response Capacity in the Arctic

Joseph Robert Inslee
Chair of the Supervisory Committee:
Thomas Leschine
School of Environmental and Marine Affairs

Multiple environmental changes in northern Alaska are producing conditions that increase the likelihood of a hazardous release such as an oil spill. Currently, the communities in the Northwest Arctic Borough (NWAB) do not feel secure in their or the oil industry's ability to respond to a spill; thus, NWAB residents feel it is necessary to increase their capacity to respond to marine-based pollution threats. This research provides an in-depth overview of the resources available to help NWAB communities increase their oil spill response capacity. A historical analysis of community spill response in Alaska and interviews with spill response experts were the primary research methods used. Common challenges to establishing and maintaining community response are given detailed discussion. Recommendations regarding what can be done to raise spill response framework awareness in the communities are also provided. The research presented demonstrates that increasing Arctic spill response capacity cannot be addressed by simply supplying equipment and training. Rather, the process is incremental and requires significant leadership from within the community. Maintaining a core responder base is a difficult challenge, and substantial oversight is required to maintain personnel. As a result, communities should work with oil spill response organizations and their sub-contractors as the most viable way to increase their number of trained personnel in the community.

Contents

List of Figures

Acknowledgements

During the course of my research I was able to travel to the Alaskan Arctic twice, once to Kotzebue and once to Barrow. I was also able to cold call numerous, well known Alaskan oil spill experts and have in-depth interviews with them. The only way I was able to have such a great research journey was because of the amazing individuals I was able to work with. I would like to express a tremendous thank you to a several key teams.

Team Amazing Informants – Individuals preparing for oil spills in the Arctic are tremendously busy in the face of this rapidly growing threat. But yet when I called, they answered and were more than willing to chat. I cannot express a large enough thank you to those who allowed me to interview them, for they truly allowed this thesis to come together.

Team Rock Star Advisors - My advising team of Professor Tom Leschine and Dr. Mary Baker kept me on course and supported my research journey from day one. Thank you both for allowing me to tap into your wealth of knowledge.

Team SCHMEEEAA – My now lifelong friends at the School of Marine and Environmental Affairs kept my spirits up in the rainiest of days spent in the computer lab.

Team Family and my lady – My thesis topic ultimately started with my love for a clean environment that my family instilled in me. The Arctic has also been a special place for me after my father's years in congress where he helped lead the efforts to prevent drilling in perhaps our greatest national treasure, the Arctic National Wildlife Refuge. Not only did my Emily Ann support me through getting a masters, she got her own at the same time! I could not be more proud of her.

Developing community response personnel is a worthwhile endeavor. However, nothing worth doing is easy. It is expensive and time consuming. To be worthwhile, the effort must be long term or the responders will not be available when needed and the effort will be wasted. Serious liability issues require diligent planning to protect the employees, the OSRO, and its members. This requires staff personnel dedicated to the effort for the long term.

The benefits are plentiful, but we must be realistic about the long-term commitment and the cost. False starts will simply perpetuate the frustration of rural residents. If we are not realistic about the cost and complexity of the task, we will create unrealistic expectations, perpetuate frustration, and widen the urban rural divide. Only if we embark on this endeavor with a realistic commitment to the cost and effort required can we further the ideal of the State slogan, "Bringing Alaskans Together."

- Robert Heavilin, GM Alaska Chadux. From 2005 Alaska Community Oil Spill Response Forum [1]

[1] Nuka Research and Planning Group. (2005). *Community Oil Spill Response Forum Final Report.* Seldovia, Alaska.

Glossary

ACS -Alaska Clean Seas
ADEC - Alaska Department of Environmental Conversation
AMSA - Arctic Marine Shipping Assessment
CRRC - Coastal Response and Research Center
CSRA - Community Spill Response Agreements
C-Plans – Contingency Plans
EPA - Environmental Protection Agency
ERMA - Environmental Response Management Application
FOSC - Federal On-Scene Coordinator
GMS - Gallagher Marine Systems
GRS - Geographic Response Strategies
HAZWOPER - Hazardous Waste Operations and Emergency Response standard
IOSA - Island Oil Spill Association
ITEP - Institute for Tribal Environmental Professionals
LOSC - Local On-Scene Coordinator
NOAA - National Oceanic and Atmospheric Administration
NRDA - Natural Resource Damage Assessment and Restoration
NWAB - Northwest Arctic Borough
OSRO - Oil Spill Response Organization
PENCO - Pacific Environmental Corporation
RP - Responsible Party
RPOSC - Responsible Party's On-Scene Coordinator
RRT - Regional Response Team
RSC - Regional Stakeholder Committee
SCP -Sub-Area Contingency Plan
SOS Team- Seldovia Oil Spill Response Team
SOSC - State On-Scene Coordinator
USCG - U.S. Coast Guard
VRT - Village Response Team

1. - Background: A Growing Need for Arctic Community Response Capacity

As a result of the increased likelihood of a marine pollution incident in the Arctic, including the Bering Strait, the National Oceanic and Atmospheric Administration (NOAA) with support from the Coastal Response and Research Center (CRRC) at the University of New Hampshire, held an oil spill workshop in Kotzebue, Alaska in May of 2012. Kotzebue is the largest city in the Northwest Arctic Borough (NWAB). The goals of this workshop were to address community involvement in spill response and natural resource damage assessment and restoration (NRDA). The workshop included a discussion of how to integrate local community knowledge into an online planning and response tool for the Arctic, the Environmental Response Management Application (Arctic ERMA). This 2012 workshop resulted from a request from the NWAB as a follow up to two earlier CRRC workshops ("Arctic ERMA Workshop", April 5-6, 2011, Anchorage, Alaska, and "NRDA in Arctic Waters: The Dialogue Begins" April, 20-22, 2010, Anchorage, Alaska). NWAB Planning Department representatives asked NOAA and CRRC to consider hosting similar workshops in Arctic communities. The 2012 Kotzebue workshop resulted.

Through my employment with NOAA I was able to attend this two-day workshop in Kotzebue with the role of recorder and general assistant. The workshop participants included more than 50 individuals from all 11 communities of the NWAB, about 20 participants from state and federal agencies that have roles regarding oil leasing or spill response, and also NGOs. A final workshop report was released in the fall of 2012. The executive summary of this

workshop report provides the following information regarding the primary concerns of those who attended this workshop and provides several general recommendations[2]:

Priority Concerns of Workshop Participants:

- Implications of harsh environmental conditions (ice and severe weather) on spill response, restoration and recovery
- Delays in response (e.g., travel distances for spill response equipment)
- Limitations in spill response infrastructure and logistical support (e.g., vessels, fuel, boom and other supplies, equipment maintenance; food, housing, waste management) as well as ports, harbors and U.S. Coast Guard (USCG) facilities
- Disruption to subsistence practices and food security. The subsistence lifestyle in the NWAB is essential for human health, spirituality and maintenance of Inupiaq culture.
- Ecological and long-term effects of oil on local populations, migratory species and sensitive habitats (e.g., lagoons, river mouths, hunting areas)
- Lack of training and infrastructure (e.g., equipment) for the Northwest Arctic villages and existing local spill response teams, especially with respect to off-shore response methods
- Lack of community inclusion in decision making for response, including use of local knowledge

General Recommendations:

- Build local spill response capability
- Incorporate local community and Inupiaq traditional knowledge (subsistence and ecological status) into tools and ensure community oversight in its uses
- Determine baseline conditions of species and habitats likely to be affected by oil spills
- Begin restoration planning now and involve locals (e.g., Northwest Arctic Borough, local emergency planning committee (LEPC's), Economic Development Commissions (EDCs) and Planning Commission in developing specific project ideas)

Currently the communities in the NWAB do not feel secure in their or industry's ability to respond to an Arctic spill. Even if the industry is able to respond to a spill in the region, community members stated that they would not just stand by, rather they would want to have a role in the response. NWAB community members present at the workshop spoke with a strong

[2] National Oceanic and Atmospheric Administration and the Coastal Response Research Center. (2012). *Northwest Arctic Borough Oil Spill Workshop: Natural Resource Damage Assessment (NRDA) and Environmental Response Management Application (ERMA).*

voice about the need to increase the community's capacity to respond to marine-based pollutions threats.

This community concern regarding the lack of spill response capacity can also be witnessed in the 2012 City of Kotzebue Draft Comprehensive plan: the issue of increasing community spill response capacity is mentioned several times. The plan states[3]:

> In response to the new risk from vessel spills, the community may wish to prepare for a possible spill by offering oil spill response training to residents as is currently done in North Slope Borough villages…Encourage funding for a program to train local residents in oil spill response training that would prepare the community for a large oil spill from increased vessel traffic.

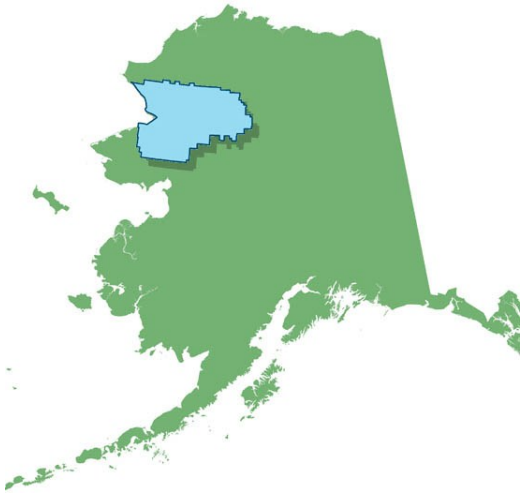


Figure 1 – Location of the Northwest Arctic Borough[4]

[3] Glenn Gray and Associates. (2012, April 6). *City of Kotzebue Draft Comprehensive Plan.* Retrieved July 8, 2012, from from http://www.cityofkotzebue.com/vertical/sites/%7BA001CDF5-7F45-4E0C- 9DFC-D296959501D1%7D/uploads/KotzebueComprehensive_Plan_4-6-12.pdf. p.14

[4] Alaska Department of Natural Resources: Divsion of Coastal and Ocean Management. (2010). *Northwest Arctic Borough*. Retrieved from http://alaskacoast.state.ak.us/District_Pages/NW_Region/NorthwestArcticBorough/index.html

1.2 – Northwest Arctic Borough: An Overview

The Northwest Arctic Borough is a region composed of amazing landscapes and resilient communities who have long relied on the land and sea for their culture and subsistence. The Northwest Arctic Borough is the second largest borough in Alaska and is home to roughly 7,500 people in 11 communities. Residents are primarily Inupiat. Transportation to the NWAB comes in the form of aircraft or ship. The City of Kotzebue is the hub community for the NWAB and is located 33 miles north of the Arctic Circle. It is important to note that Kotzebue's port cannot accept deep draft vessels and is only free of ice three months each year. The largest source of community employment is derived from Tribal Corporations and public service jobs with the Borough. Smaller communities in the Borough rely on subsistence food-gathering and Native craft-making. The Borough also contains the Red Dog Mine, 90 miles north of Kotzebue, which is the world's largest zinc and lead mine[5].

1.3 - Research Questions

The NWAB feels that strengthening its own response capacity will help address the "response gap", the time it would take federal and state response efforts to reach the site of an oil release in the borough. In addition to helping fill this response gap, increased spill response training may also facilitate citizens of the NWAB having a more active role in larger response efforts for larger spills elsewhere in Alaska. In response to this desire the communities express to increase their spill response capacity, I worked with the NWAB to develop a research proposal which would recommend steps the NWAB can take toward increasing response capacity. The central questions which guided this research were the following:

- What is the history of community spill response in Alaska?

[5] Northwest Arctic Borough. (2013). Retrieved from http://www.nwabor.org/index.html

- What resources are available to increase the capacity of communities to respond to oil spills?
- What are the main challenges in increasing community response capacity?
- What recommendations can be provided to Alaskan Arctic communities looking to increase their spill response capacity?

2. - Methods

2.1 -Topic Selection

The topic for this thesis evolved out of my attending the 2012 NWAB workshop in Kotzebue, Alaska, and associated follow-up conversations with representatives from the NWAB Planning Department. Before attending the NWAB workshop I was interested in researching NWAB community opinions about restoration in the event of an oil spill. After attending the workshop, it was very apparent that the desire of the community was to focus on ways to increase their spill response capacity and not on possible environmental restoration. As such I worked with the NWAB Planning Department and received their permission to conduct research which would result in recommendations regarding how they can build spill response capacity.

2.2 - Elite Semi-Directed Interviews

Because the literature regarding building community oil spill response capacity is very limited, interviews with elite informants were essential to this research. By the end of the research I had conducted 20 interviews with selected informants regarding this topic. All interviews were conducted over the phone and averaged approximately 50 minutes. Each interview was recorded with permission of the informant, transcribed, and then coded for analysis. Prior to beginning interviews permissions was received from the Human Subjects Division at the University of Washington.

Interview Informant Affiliation	
Governmental Entity	• Alaska Department of Environmental Conservation – Four informants • North Slope Borough • Village of Eyak
Federal Government	• EPA – Regional Response Team Coordinator • EPA – Federal On-Scene Coordinator • EPA – Brownfields Program • USCG District 17
Private Sector	• NUKA Research • Pearson Consulting • Oil Spill Response Organizations: - SEAPRO - Alaska CHADUX Corporation - Alaska Clean Seas • Island Oil Spill Association (Washington State) • Seldovia Oil Spill Response Team
NGO	• Wildlife Conservation Society • Pew Environmental • Institute for Tribal Environmental Professionals

Figure 2 – Interview Informant Affiliation

Using criteria from Marshall and Rossman (1989), these interviews were considered "elite" interviews as they were conducted with individuals who are considered influential, prominent and/or well informed on the topic of spill response[6]. They were selected on the basis of their expertise and relevance to the problem. These interviews with these elite informants were conducted in the semi-directed format. The semi-directed format is one where the participant or participants are guided in the discussions by the interviewer but the direction and scope of the interview are allowed to follow the associations identified by the participant[7]. This more free-form structure is intended to facilitate a process that is more like a conversation than a

[6] Marshall, C., & Rossman, G. (1989). *Designing Qualitative Research.* Newbury Park: Sage Publications.

[7] Huntington, H., Brown-Schwalenberg, P., Frost, K., Fernandez-Gimenez, M., Norton, D., & Rosenberg, D. (2002). Observations on the Workshop as of Improving Communication Between Holders of Traditional Knowledge and Scientific Knowledge. *Environmental Management*, 778-792.

question-and-answer session[8]. This approach resulted in interviews where informants were able to guide me to new topic areas that were not on my radar.

Base Set of Interview Questions:

- Can you please provide your experience with building community response capacity?
- Where do communities currently go to learn about how to increase their capacity?
- What do you see as the main challenges to building community response capacity?
- What do you think are ways to overcome these challenges?
- What role do OSROs have in building community response capacity?
- Would you be willing to share your experiences with others (including communities) looking to learn about this topic?

2.3 - Coding and Analysis

Once interviews were completed they were transcribed and coded using ATLAS Ti software. Overall I felt my data analysis process was very well captured by Marshall and Rossman who state that:

> Data analysis is the process of bringing order, structure, and interpretation to the mass of collected data. It is a messy, ambiguous, time-consuming, creative and fascinating process. It does not proceed in a linear fashion; it is not neat[9].

The goals of the data collection and analysis were to assess both beliefs regarding what spill response resources exist and the main challenges of building response capacity and to develop a set of suggested steps for building greater capacity where it is found lacking. In my later interviews, I was able to begin discussing these suggested steps forward with informants after I

[8] Huntington, H. (2000). Using Traditional Ecological Knowledge in Science: Methods and Applications. *Ecological Applications*, 1270-1274.

[9] Marshall & Rossman, 1989

had finished my standard interview questions. These discussions with spill response experts allowed for a ground truth of my analysis.

2.4 – Key Deliverable: Resource Guide for Communities

A central goal of this research was summarizing key information which can be delivered to communities to be used in their effort to enhance their spill response capacity. Interviews and analysis of existing workshop reports resulted in a series of detailed chapter sections that cover the history of community spill response, and an overview of the response framework and resources available (see sections 3 and 4). These sections are written for the audience of interested communities and provide discussion regarding how communities access resources.

Numerous informants who have routine interactions with Arctic communities strongly supported this idea of summarizing available resources and offered assistance to help distribute my thesis results. Offers to attend standing calls with Tribes and communities to present my findings have been offered by the EPA. If resources become available, it is highly desirable to deliver the findings of this research in person to the Northwest Arctic Borough.

3. - Background

3.1 - A Changing Arctic

Warming global temperatures are resulting in a vast reduction of sea ice in the Arctic, in both overall thickness and summer extent[10]. In the summer of 2012 the ice in the Arctic set a record; sea ice extent had reached its lowest level since satellite observations began occurring three decades ago[11]. This new low record for ice levels in the Arctic highlights the rapid climatic change that is occurring at the earth's northern pole. Over the last century temperatures in the Arctic have varied but a significant warming trend has been occurring since the 1970's. Arctic air temperatures have warmed about 1.8 F when compared to the "climate normal" (the average from 1961 to 1990). Arctic October-November temperatures have risen a staggering 9 F above the seasonal normal[12]. Over the last three decades the minimum summertime extent of the sea ice has experienced a 13 percent decline per decade. Overall observed warmer temperatures in the Arctic have resulted in the reduction of sea ice extent, thickness and the amount of ice that persists year round[13]. As a result of these drastic changes in the Arctic the academic, government and non-governmental communities are conducting a great number of studies and producing a wealth of reports regarding observed and predicted change. As a result it is highly likely that scientific estimates regarding the changing Arctic will be outdated within a very short period of time.

[10] National Oceanic and Atmospheric Administration. (2012). *Arctic Report Card: Update for 2012*. Retrieved January 29, 2013, from http://www.arctic.noaa.gov/reportcard/exec_summary.html

[11] National Aeronautics and Space Administration. (2012, August 27). *Arctic Sea Ice Shrinks To New Low In Satellite Era*. Retrieved October 17, 2012, from http://www.nasa.gov/topics/earth/features/arctic-seaice-2012.html

[12] O'Rourke, R. (2011). *Changes in the Arctic: Background and Issues for Congress.* Congressional Research Service.

[13] National Aeronautics and Space Administration, 2012

3.1 - Definition of the Arctic

Numerous definitions of the Arctic exist as a result of diverse scientific and legal frameworks tied to disparate needs and practicalities. For this research the definition provided under the Arctic Research and Policy Act of 1984 was used. This legislation defined the Arctic this way:

> As used in this title, the term "Arctic" means all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers [in Alaska]; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain[14].

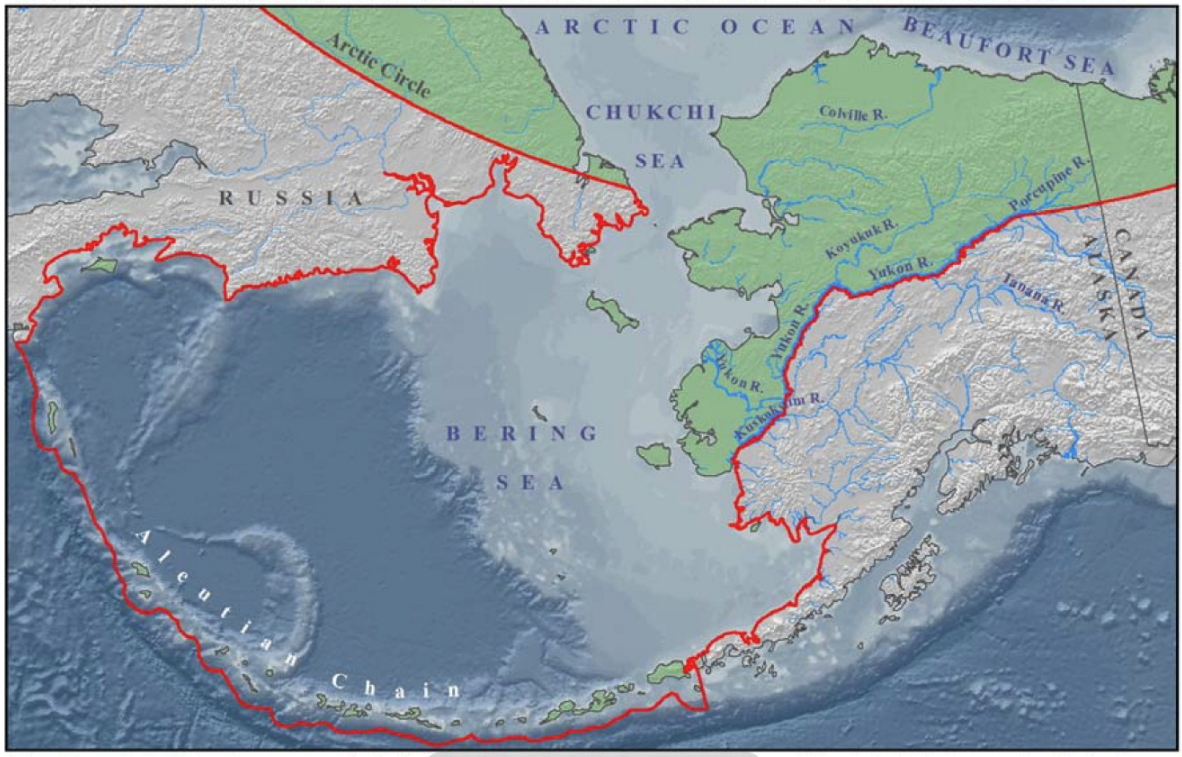


Figure 3 – Arctic Boundary As defined by the Arctic Research and Policy Act[15]

3.2- Increased Offshore Activities

Historically Arctic ice has prevented regular use of northern shipping routes and has made offshore oil and mineral extraction difficult. The recent substantial reduction in sea ice is creating new opportunities for these shipping and mineral extraction activities to occur however.

[14] O'Rourke, 2011, p. 2
[15] Ibid p. 3

The 2004 Arctic Climate Impact Assessment, released by the Artic Council, documented that sea ice extent has been declining for the last five decades[16]. As a result of these observed and predicted climate changes scientists have concluded that by the late 2030s the Arctic will change from an ice covered environment to a recurrently ice free ocean in the summers[17]. As ice coverage is reduced the opportunity for global transportation routes and mineral extraction increases. The 2004 Arctic Council Climate Impact Assessment concluded that "reduced sea ice is very likely to increase marine transport and access to resources"[18].

3.2.a - Increased Shipping

The search for a shorter shipping route from the Atlantic to Asia has been the quest for maritime powers and explorers for centuries. The appeal for the northern shipping routes stems from the possibility of saving several days of sailing between major trading blocs, resulting in substantial reductions in shipping costs. The reduction of Arctic sea ice could potentially open up two trans-Arctic Shipping routes: the Northern Sea Route and the Northwest Passage (see Figure 4. It is estimated that these shipping routes could cut the distance between Europe and Asia by 22% (Northern Sea Route) and by 15% (Northwest Passage)[19]. On a single day in August 2012, 95 ships were detected between Prudhoe Bay and Wainwright Alaska. In regards to quantity of traffic Rear Adm. Thomas P. Ostebo, commander of the USCG District 17 in Alaska stated, "It's kind of spinning a little bit out of control"[20]. Further south in the Bering Strait approximately 150

[16] Arctic Council. (2009). *Arctic Marine Shipping Assessment 2009 Report.*
[17] O'Rourke, 2011, p. 9
[18] Arctic Council, 2009, p. 2
[19] Special Report the Arctic: The Melting North. (2012). *The Economist*, 3-16.
[20] Murphy, K. (2012, October 19). *Arctic Thaw Brings New Security Worries*. Retrieved from L.A. Times: http://articles.latimes.com/2012/oct/19/nation/la-na-arctic-security-20121019

large commercial vessels pass through the Bering Strait during the July-October open water period[21].

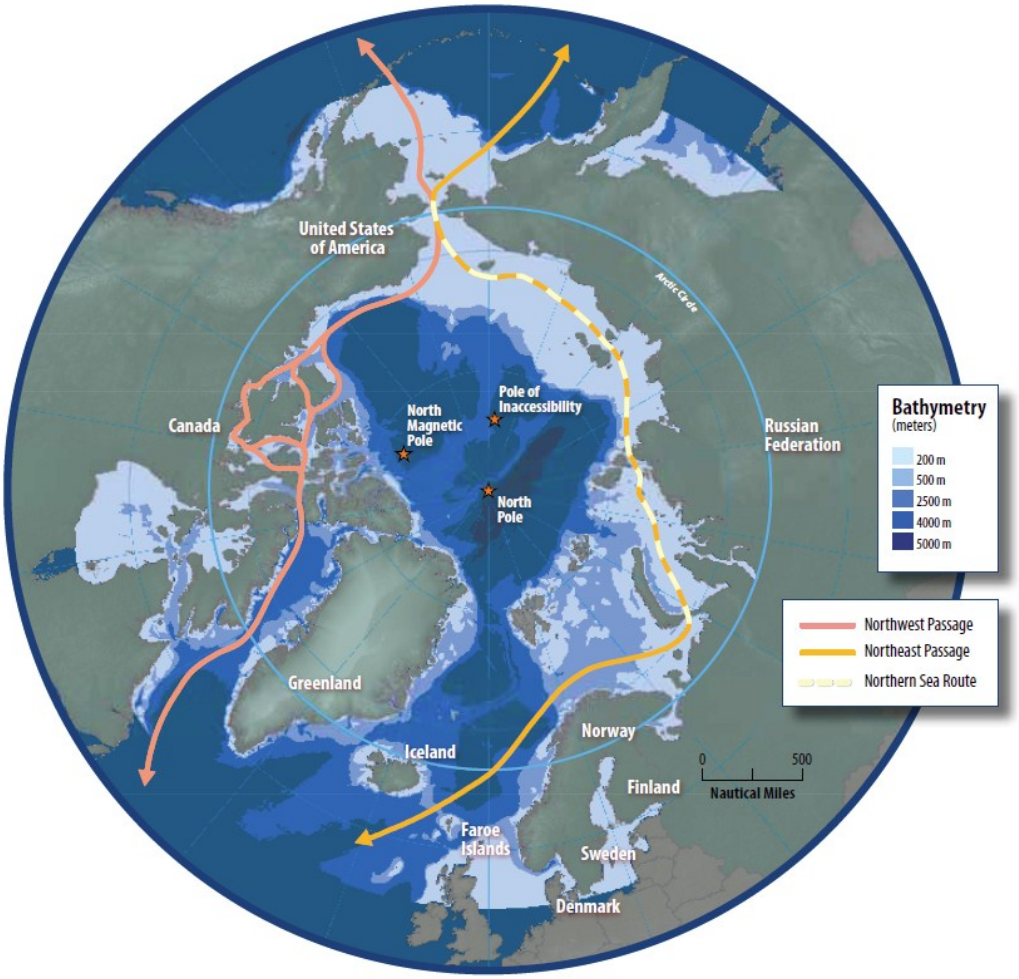


Figure 4 - Opening Arctic Shipping Routes[22]

Currently almost all cargo ship traffic taking place in the region is to transport natural resources from the Arctic or to deliver supplies to natural resource facilities and communities[23]. Along with existing commercial shipping the Arctic is also experiencing a growth in cruise ship

[21] Arctic Council, 2009, p. 109, This figure excludes small fishing vessels and fuel barges serving coastal communities
[22] Arctic Council, 2009, p. 17
[23] O'Rourke, 2011, p. 14

activity. The cruise ship industry considers Arctic voyages to be a vital and especially lucrative part of their international tourism portfolio[24]. In the Arctic marine tourism is highly diversified and poses additional disaster response challenges in comparison to commercial shipping incidents (i.e. large cruise ship passenger volumes increase search and rescue challenges)[25].

It is important to note that although a reduction in sea ice is occurring, and summer oceans may be ice free in the summers, "ice free" does not mean "no ice"[26]. As a result Arctic shipping will encounter unpredictable ice floes and will experience the adverse weather that is unique to the Arctic. Thus while a decrease in ice may open access for Arctic marine traffic, the difficult Arctic environment will continue to create challenging shipping conditions which may result in incidents and oil spills.

Released in 2009, the Arctic Marine Shipping Assessment (AMSA) provides a very thorough examination of the opportunities, challenges and risks which a partially ice free Arctic pose to global marine transportation. This reports finds that although it is highly plausible that reduced Arctic sea ice may result in greater marine access and longer seasons of navigation it does not necessary result in less difficult ice conditions for marine operators[27]. It is these difficult and unpredictable ice conditions, combined with the harsh Arctic marine environment, which will combine to create conditions which could result in shipping accidents. The 2009 AMSA report states, "the accidental release of oil or toxic chemicals can be considered one of the most serious threats to Arctic ecosystems as a result of shipping"[28]. Numerous key findings of this report reflect the concerns of the NWAB, specifically the increased opportunities for oil spills as

[24] Ibid
[25] Ibid p. 14
[26] Ibid p. 15
[27] Arctic Council, 2009, p. 2
[28] Ibid p.136

shipping increases. The report states that Arctic residents have major concerns regarding the possibility of oil spills and disruption of marine species and their hunting practices[29].

The AMSA specifically discusses how a reduction in ice will result in changes in use of the waterway adjacent to the NWAB, the Bering Strait. The AMSA states, "With diminishing summer sea ice in the Arctic Ocean, the Bering Strait region may experience increased destinational traffic to the oil and gas exploration areas in the Beaufort and Chukchi seas, and to the Red Dog Mine in northwest Alaska." [30] As Alaskan coastal currents run northward through the Bering Strait a tanker accident occurring south of Kotzebue would have the greatest effect on the region[31].

3.2.b - Increased Offshore Mineral Extraction

In addition to predicted increased marine transportation in the Arctic another commercial opportunity is opening with the retreat of sea ice, offshore mineral extraction. An estimated 80 billion barrels of oil and 17,000 trillion cubic feet of natural gas exist in the area north of the Arctic Circle[32]. During the summer of 2012 Shell began the process of drilling several exploratory wells off the northern coast of Alaska, in both the Chukchi and Beaufort Seas. It is reported that Royal Dutch Shell PLC has spent $4.5 billion on Arctic drilling preparations since 2005[33]. These recent exploration activities in the Chukchi are located approximately 275 air miles north of Kotzebue, so even though an oil spill would not likely reach the community, it

[29] Ibid p.5
[30] Ibid p.106
[31] Glenn Gray and Associates, 2012, p. 13
[32] U.S. Geological Survey. *90 Billion Barrels of Oil and 1,670 Trillion Cubic Feet of Natural Gas Assessed in the Arctic*. Retrieved January 29, 2012, from http://www.usgs.gov/newsroom/article.asp?ID=1980&from=rss_home.
[33] U.S. Committee on the Marine Transportation System. (2013, Feburary). *U.S. Arctic Marine Transportation System: Overview and Priorities for Action.* Retrieved March 6, 2013, from http://www.cmts.gov/downloads/CMTS_Draft_Arctic_MTS_Overview_and_Priorities_Paper_for_Public_Comment-Feb2013.pdf

could nevertheless impact migratory subsistence species whose routes follow the coastline[34]. This new push for new offshore oil extraction in the U.S. Arctic has been met with a flurry of lawsuits from local communities and national NGO's. These groups believe neither the technology nor the infrastructure are in place to adequately respond to an oil spill resulting in great risks to the unique Arctic ecosystems and the subsistence cultures in the region.

3.3 - Challenges: Spill Response in the Arctic

Increased shipping and mineral extraction activities contribute to a growing risk of hazardous releases in the Arctic, particularly through oil spills. Currently, as a result of the limitations of spill response capabilities in the Arctic, the likelihood of oil persisting in the environment after a spill is high. Challenges in the U.S. current capacity to respond to a marine pollution event in the Arctic include, but are not limited to the following categories:

- A Response Gap Exists-

  The massive geographic scale and harsh weather of Northern Alaska will result in varying levels of limitation for response efforts, there will be times – days to months – when environmental conditions will preclude any response at all[35]. The great distance between where spills could occur and locations of response equipment is a fundamental challenge. As Figure 5 demonstrates the essential oil spill response infrastructure requirements (i.e.: airports, ports) are extremely limited in the Arctic, especially in comparison to other areas of offshore exploration like the Gulf of Mexico.

  According to the AMSA:

[34] Glenn Gray and Associates, 2012, p. 13

[35] Nuka Research and Planning, LLC. (2010). *Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences.* The Pew Environmental Group.

Weather and oceanographic observations necessary to support search and rescue and oil recovery operations are also minimal. Even if a U.S. Coast Guard operating team were seasonally deployed to an Arctic coastal community, weather and distance to an incident site would remain huge challenges. Under present circumstances, vessels in distress must depend on other vessels or local communities in the area for assistance or wait until aid arrives. Few viable salvage vessels are available north of the Aleutian Islands[36].

Oil spill response capacity in the Gulf of Mexico and Arctic

Resources within 500-mile radius	BP Macondo well drilling site	Shell's proposed Chukchi/Beaufort drilling sites
Airports with runways 8,000 feet or longer	95	4
Airports with runways 5,000 feet or longer	347	13
Equipment staging locations (oil spill response cooperatives)	15	5
Coast Guard permanent facilities	30	0
Major public ports	35	0

Sources: Center for American Progress, ESRI, Army Corp of Engineers 2011, NTAD 2011, Alaska DOT

Figure 5 – Comparison of Oil Spill Response Capacity in the Gulf of Mexico and the Arctic[37]

- Oil Spill Equipment is Untested –

  In the 2010 Deepwater Horizon Gulf of Mexico oil spill only 3 percent of the oil was mechanically recovered with skimmers and booms. These rates of recovery will likely be much lower in the Arctic[38]. Efforts to recover oil from Arctic waters will encounter environmental conditions that are very different from standard response efforts that occur in ice-free water where the oil is easier to locate and encounter with boats and equipment.

[36] Arctic Council, 2009, p. 109
[37] Kroh, K., Conathan, M., & Huvos, E. (2012). *Putting a Freeze on Arctic Ocean Drilling.* Center for American Progress.
[38] Nuka Research and Planning, LLC., 2010, p. 8

Boats and boom, a core piece of response efforts, are not very effective in broken ice conditions[39]. Standard oil spill response tactic also include use of in situ burning and use of chemical countermeasures such as dispersants. The effectiveness of these standard tools is also unknown, as questions remain over the ability to burn floating oil in Arctic conditions and regarding dispersant effectiveness and toxicity in the Arctic environment[40].

3.4 - Community Oil Spill Response in Alaska

Alaska's vast size and the remote location of many communities often results in local residents being the first line of defense in responding to an oil spill[41]. Local communities thus play an important role in minimizing the impacts of a hazardous release on the environment and the natural resources the communities rely on. The 1989 *Exxon Valdez* oil spill pushed the need to integrate local community involvement to the forefront of spill response planning and response activities in Alaska. The need for creating local community response became apparent early in the spill response. By season two of the cleanup, funds were directed to communities to continue cleanup efforts after Exxon had shut down their operations for the season on September 15th. Plans and funds were put in place by the State of Alaska to ensure that communities that wanted continue clean up after September could, thus the community response program concept was generated in Alaska[42]. This new role of the local community was advocated for in the 1990 Alaska Oil Spill Commission Report titled 'Spill: Wreck of the *Exxon Valdez*' which stated.

---

[39] National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. (2011, January 1). *The Challenge of Oil Spill Response in the Arctic: Staff Working Paper No. 5.* Retrieved from http://www.oilspillcommission.gov/final-report p. 13

[40] Ibid p. 15

[41] Alaska Department of Environmental Conservation. *Community Spill Response.* Retrieved from Local Response: http://dec.alaska.gov/spar/perp/docs/commun.pdf

[42] (2013, February 5). Pearson Consulting. (J. Inslee, Interviewer)

> A substantive role should be given to the affected communities in any response system. Communities near to the spill and in the shadow of the oil were not given a proportionate role in the response system after the Exxon Valdez accident. Frequently they were ignored. Often they devised their own strategies for response, for instance acquiring or manufacturing boom by themselves. Yet local interests, local knowledge and experience with the ocean often made the community-based work force the most efficient available[43].

As a result of the *Exxon Valdez* spill the State of Alaska and the U.S. Congress enacted legislation (e.g., Oil Pollution Act of 1990), which among its many provisions were to ensure communities potentially impacted by spills, as well as the responsible party, have the resources to respond and ensure communities and the environment are made whole.

3.4.a - Deciding Community Goals and Purpose

There are diverse desires to increase community response capacity in Alaska and communities and individuals reveal an array of logics. These rationales can be condensed into two main themes: 1) protecting the environment and subsistence resources, 2) creating a source of employment for community residents[44]. These themes are not exclusive but it is vital for community planners to clearly understand the difference between the two, as it can play a key role in determining the path forward in increasing community response capacity. Communities should have clear expectations about the type of spills they would like to be prepared for. Would the community like to be able to become integrated into a larger response, or do they just seek the ability to respond to smaller locally generated spills?

---

[43] Alaska Oil Spill Commission. (1990, February). *Spill: The Wreck of the Exxon Valdez.* Retrieved April 3, 2013, from http://docs.lib.noaa.gov/noaa_documents/NOAA_related_docs/oil_spills/spill_wreck_ExxonValdez_1990.pdf p. 163

[44] (2013, January 9). Seldovia Oil Spill Response Team. (J. Inslee, Interviewer)

Addressing these questions about need and the scope of capacity sought is the first step for community leaders desiring to develop a plan of action. This plan may include items such as: strategies to increase capacity, the number of community members that should be trained, and financial requirements. While information regarding what resources are available to help respond to a spill is presented later, the following matrix demonstrates why clearly understanding the desire to increase community response capacity is very helpful in guiding a community forward toward the goal of increasing response capacity.

Type of Incident Seeking to Prepare For

Logic to Increase Capacity (not exclusive)

	Large Spill (i.e: Large Vessel Release)	Small Spill (i.e: home heating tank)
Protection of Subsistence Resources and Environment	Who has expertise to assist with community planning: • RRT • Local OSRO • Communities with Experience (i.e.: Seldovia) Example areas to become involved in: • Response Planning: (i.e.: Geographic Response Strategies) • Spill Drills • Natural Resource Damage Assessment Planning	Who has expertise to assist with community planning: • State • EPA Brownfields • Institute for Tribal Environmental Professionals
Create Source of Employment	Possible companies to contact: • Large OSROs (i.e.: Alaska Clean Seas, SEAPRO) and associated sub-contractors	Who has expertise to assist with community planning: • State • Local OSRO

Figure 6 – Matrix: Community Rationales to Consider in Preparing for Spills

3.4.b - Overview: Recent Efforts

In 2005 the Prince William Sound Regional Citizens' Advisory Council (RCAC) and the Cook Inlet RCAC contracted with Nuka Research to hold a Community Oil Spill Forum. The final report from this forum is a good summary of the resources available to communities, main challenges, and recommendations on how to increase community response capacity in Alaska. Although no follow up has occurred from this workshop the concepts presented at this forum remain very relevant[45].

Both the Prince William Sound RCAC and the Cook Inlet RCAC promote development of the concept of community-based oil spill response (COSR) in their respective regions. COSR is considered to consist of local citizens responding to oil spilled in the waters upon which they rely on for income, recreation, and subsistence[46]. This 2005 Anchorage workshop was comprised of a cross-section of stakeholders (i.e.: state, federal, local) to review the status of COSR teams and share information about past and future COSR related efforts. A key outcome of the forum was an agreement that the current system is inadequate in its response to small spills, which are often associated with unregulated spillers. The group agreed that improved community based response capacity could ameliorate the situation. In their discussion the participants operated under a very general understanding of the term "community based", not necessarily referring specifically to the COSR team model, but rather a combination of resources, including harbor facility staff and local OSRO residents working for OSROs[47]. This broader definition was used for this thesis.

[45] Nuka Research and Planning Group, 2005
[46] Ibid, 3
[47] Ibid

This 2005 Forum was an exchange between agencies and interested communities allowing for discussion and clarification about resources available to the communities. Common primary challenges such as insurance coverage, personnel issues, and training were also discussed. A later section of this paper will demonstrate that these primary challenges remain the same today. The Forum concluded with numerous recommendations including a request for an annual gathering to improve communications and the development of a roster of trained responders throughout Alaska.

Prior to this 2005 Forum Nuka Research was hired by the Prince William Sound RCAC and the Cook Inlet RCAC to produce the report "Combining the Firehouse Model and Community-based Response Teams for an Improved Regional Oil Spill Response System in Alaska", released in 2004[48]. This report discusses the proposed concept of a "Firehouse" model for oil spill and community-based response teams in Alaska. Under the firehouse model, one organization would be designated to respond to all oil spills within a region under a single, joint agency-approved Subarea Contingency Plan (SCP), regardless of the spiller[49]. Overall it was deemed the firehouse model alone was not viable, nor supported in the response community. Under the proposal discussed for the 2004 report this Firehouse model would be combined with community based spill response.

The 2004 report stated:

> If the two concepts, the Firehouse model and the Community-Based spill response model, were combined, there would be one oil spill organization (firehouse) for each region of the state with a network of community-based response teams to distribute the response capabilities throughout the region. The central oil spill

[48] Nuka Research and Planning. (2004). *Combining the Firehouse Model and Community-based Response Teams for an Improved Regional Oil Spill Response System in Alaska.* Seldovia, Alaska.

[49] Ibid p. 6

> organization would be staffed with full-time professionals, while the community-based response teams would be comprised primarily of part-time staff and volunteers[50].

The report provides specifics regarding how such a system would be coordinated during a spill and the requirements it would take to maintain capacity. When interviews were conducted in 2005 with oil spill response experts the responses to this concept were significantly negative, thus the firehouse concept was scratched[51]. While the firehouse model was not embraced by the response community in 2004, there is still support regarding how to increase community response capacity.

3.5 - Overview of Spill Response Framework

The risk and benefits of increased offshore drilling and shipping in Northwest Alaska are not spread evenly across the region[52]. Communities such as Wainwright and Barrow, located on the northern coast, can expect to economically benefit from offshore exploration, whereas communities in the Bering Strait experience the risks associated with increased shipping and drilling with little associated economic growth. As a result of this situation the question arises how this inequality between dispersed risk and concentrated benefits can be addressed. I will not attempt to discuss how the benefits of increased shipping and mineral extraction can be addressed; rather my focus is how to help address the risks to communities.

The first step in the effort to increase local oil spill capacity in the Arctic is to ensure communities understand what the legal frameworks are, what resources exist, and what the community's role in a spill is. After attending the workshop in the NWAB and speaking with

[50] Ibid p. 7
[51] Ibid
[52] Arctic Council, 2009, p. 5

numerous experts it is very apparent that *information asymmetry* exists between what the communities believe exist and what response frameworks and resources actually exist.

3.5. a - Information Asymmetry

According to Clarkson et al. "Information asymmetry exists when a party or parties possess great informational awareness pertinent to effective participation in a given situation relative to other participating parties"[53]. Currently the knowledge of what a community's formal role is in spill response planning, their role in an actual oil spill, and what spill response equipment is available is limited to a small number of individuals within the Borough. This is in contrast to other key players (i.e.: USCG, State) in the spill response community who have a high level of awareness of the resources available both locally and more widely. This results in information asymmetry between what resources and legal framework actually exists, and what the communities are currently aware of. After attending workshops and conducting expert interviews I confidently believe that this situation is strongly contributing to community unease about the limited amount of spill response capacity. While information asymmetry exists to some extent all around the state it is greater in the Arctic a result of the new threat of large oil spills to Arctic communities. These communities have had very little exposure to large or even moderate spills generated offshore where they have had to be involved in the response[54]. With increased shipping and mineral extraction these threats are now real. This extremely limited experience has led to a situation where communities have to learn quickly with limited resources, but they lack the information they need to proceed with planning and preparation on their own.

[53] Clarkeson et al. (2007). Information asymmetry and information sharing. *Government Information Quartely*, 827-839.

[54] (2013, February 15). Alaska Department of Enivonmental Conservation. (J. Inslee, Interviewer)

When interviewing spill response experts about this issue the majority of informants felt that by addressing this information asymmetry by improving community awareness about existing spill response frameworks, communities will have decreased levels of unease and frustration. Informants believed that increasing community awareness about what roles communities have in spill response planning and their roles during a real response will hopefully result in an increased level of empowerment. Increased information flow about spill response will not instantly result in the community being less vulnerable but it lays the foundation for strengthening community response capacity. For instance an improved level of efficacy, through increased awareness in community members, will hopefully result in increased community involvement in response planning efforts.

It is important to note that this issue of information asymmetry is not isolated in the NWAB. In February of 2013 Alaska Sea Grant hosted the Bering Strait Maritime Symposium in Nome. This meeting focused on community concerns regarding increased large vessel traffic in the region, attendees included representation from nine Bering Strait communities. After a presentation given by the State that provided an overview of the response framework in Alaska, the participants were asked if they were aware that these plans existed, approximately one-fourth of those in the room raised their hands[55].

This limited awareness of the existing spill response framework in communities warrants an overview of the response regime. Understanding what currently exists is fundamental to latter recommendations regarding how communities can strengthen their spill response capacity. The following is a brief overview of the spill response framework in Alaska. While this summary is

[55] (2013, February 8). Alaska Department of Environmental Conservation. (J. Inslee, Interviewer)

far from a complete explanation of the spill response framework it reflects items that are of most relevance to a community's role in a preparing for and responding to a spill.

3.5.b- National Oil and Hazardous Substance Contingency Plan (NCP) and Alaska's Unified Plan

Overseeing oil spill response in Alaska is the responsibility of the USCG, the Alaska Department of Environmental Conversation (ADEC) and/or the U.S. EPA (depending on the location and source of the spill)[56]. In the event of spills, both large and small, the National Oil and Hazardous Substance Contingency Plan (NCP) provides the framework for how states and federal agencies respond. In addition to setting up the structure for everyday spill response the NCP establishes national and regional response teams to respond to the various sized spills and designates On- Scene Coordinators[57].

Alaska's Unified Plan serves as the federal regional contingency plan for Alaska under the NCP. Alaska's Unified Spill Response Plan provides a comprehensive pollution response plan that defines the organizational and procedural framework for the oil spill response network[58]. These planning documents come together in the management of a spill through a coordinated spill response via the Incident Command System (ICS). Overall ICS provides a basic structure which remains the same for all incidents; ICS is organized around five major functions.

- Command
- Planning
- Operations
- Logistics
- Finance/Administration

[56] Nuka Research and Planning Group, 2005, p. 5
[57] United States Coast Guard, 2012
[58] Nuka Research and Planning Group, 2005, p. 5

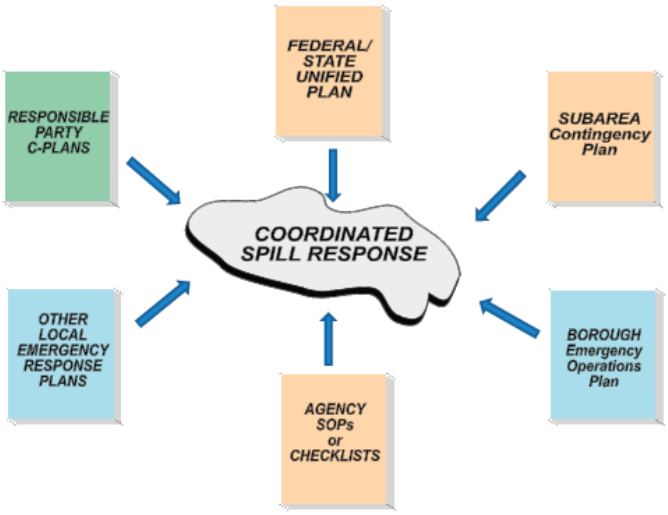


Figure 7 – The Incident Command System in Alaska[59].

The NCP and the AK Unified Plan have designated On- Scene Coordinators to act as ultimate authority for their respective governmental authority. The Unified Plan operates with the Federal On-Scene Coordinator (FOSC) having ultimate authority for incidents under federal jurisdiction and the State On-Scene Coordinator (SOSC) having ultimate authority for incidents not involving federal jurisdiction. Local On-Scene Coordinators (LOSC) are designated by local governments with jurisdiction to direct and coordinate local responses to incidents. The Alaska Unified Plan states:

> For as long as there is an immediate threat to public safety [emphasis added], the LOSC will serve as the ultimate command authority, unless the LOSC requests a higher authority to assume that responsibility. Once the immediate threats to public safety are abated, either the SOSC or FOSC becomes the ultimate command authority for the cleanup operation, depending on jurisdiction and agency response. Local representation to the Unified Command

[59] Iwamoto, L. (2013, February 14). *DEC's Planning, Prevention and Response Initiatives.* Retrieved from http://seagrant.uaf.edu/conferences/2013/bering-strait-maritime/presentations/iwamoto-dec-planning-response-web.pdf

> may then be through the Community Emergency Coordinators on the Regional Stakeholder Committee[60].

The Community Emergency Coordinators mentioned in the excerpt above are designated in Local Emergency Response Plans and may serve as the LOSC or on the Regional Stakeholder Committee (RSC) as outlined in the Subarea Contingency Plans[61]. The RSC is discussed shorty.

The previous passage from the Unified Plan about the role of the LOSC requires further discussion. The Unified Plan states that, "For as long as there is an immediate threat to public safety, the LOSC will serve as the ultimate command authority". The use of the term 'ultimate command authority' is surprising because it implies that the local authority would have the ability to lead the entire response regardless of the FOSC or SOSC presence in the Unified Command, a system which would seem at odds with the traditional structure. As a result of this apparent inconsistency I sought further clarification from the State. The State acknowledges the current language in the Unified Plan does need clarification[62]. Such clarification is being provided in Sub-Area Contingency Plans (SCP) that are currently being updated. The newly updated Bristol Bay SCP provides such clarification:

> In the event of an oil spill or hazardous substance release in the Bristol Bay Subarea, a senior member of the local community with jurisdiction, unless otherwise specified by local plans, will serve as the Local On-Scene Coordinator in the Unified Command. For all spills in the Bristol Bay Subarea in which the ICS is implemented, the LOSC will sit in the Unified Command with the FOSC, SOSC, and Responsible Party Incident Commander, sharing decision-making and oversight responsibilities with the other On-Scene Coordinators. For spills that affect or threaten to affect multiple jurisdictions in the Bristol Bay Subarea, or outside of the subarea, appropriate officials from the affected communities will integrate into the command structure either through a LOSC liaison representing the affected communities or through a Regional

[60] Alaska RRT. (2010, January). *Alaska Federal/State PreparednessPlan for Response to Oil & Hazardous Substance Discharges/Releases (Unified Plan).* Retrieved from http://dec.alaska.gov/spar/perp/plans/uc.htm p. B-7

[61] Ibid

[62] ADEC, Interview. February 8, 2013

Stakeholder Committee (see below). As long as there is an immediate threat to public safety, a LOSC serves as the ultimate command authority if the FOSC or SOSC does not assume the lead role for the response [emphasis added], or the LOSC requests a higher authority to assume that responsibility[63].

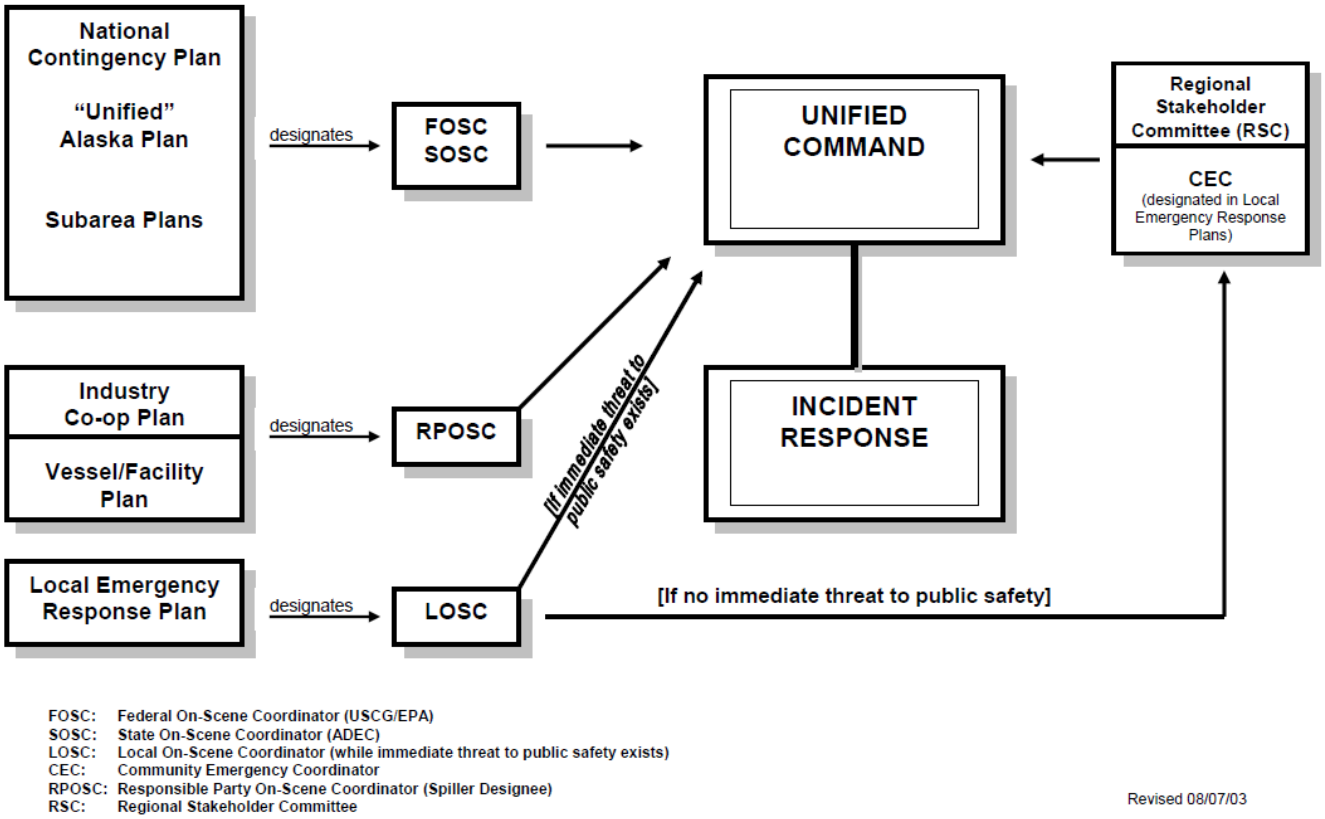


Figure 8 – On-Scene Coordinator's Relationship to Plans[64]

A fundamental role in the Unified Command is that of the Responsible Party (RP), the person(s) responsible for a discharge of a hazardous substance to the water or land of the State. It is important for communities to understand that those who are responsible for the spill have a key role in helping with the response. The framework ensures that those who spill the oil have a

[63] Alaska RRT. (2013, February). *Bristol Bay Subarea Contingency Plan.* Retrieved from http://dec.alaska.gov/spar/perp/plans/scp_bb.htm p. A-11

[64] Alaska RRT, 2010, p. B-8

seat at the decision making table. Like the state and federal governments the RP is given a position in the Unified Command, the Responsible Party's On-Scene Coordinator (RPOSC). This RPOSC works cooperatively with the state and federal agencies to conduct the response. Under State regulations the RPs are responsible to respond to their own release. Similar federal laws require the RP to respond to their spills and oblige the RP to direct its own containment, control and cleanup efforts[65]. These RP's efforts are overseen by state and federal agencies. Under OPA 90 authorizes the USCG and the EPA are to direct the activities of the RP without "federalizing" (taking federal control of) the spill cleanup[66]. Additional frameworks, such as the Oil Spill Liability Trust Fund, are in place for spills where there is no identified RP, or the RP refuses to cooperate[67].

A pivotal role in the Unified Command is the Incident Commander. The Unified Command directs all aspects of incident response (oversight, monitoring, cleanup, etc.), and uses a designated Incident Commander (IC) to carry out containment, control and cleanup operations. The Alaska Unified Plan clearly states that the RP can be given this key leadership position

> The IC is in command of control, containment, removal, and disposal of the spill. At any given time, there can be only one IC. However, the IC can change as the incident changes. The IC will be chosen by the Unified Command (FOSC, SOSC, LOSC, and RPOSC). When the RP is responding and has adequate resources to dedicate to the containment, control, and cleanup effort, the RPOSC will normally be designated the IC by the Unified Commanders. The FOSC and SOSC will make the determination on the adequacy of the RP's containment, control, and cleanup effort[68].

[65] Alaska RRT, 2010, p. B-4
[66] Ibid
[67] United States Coast Guard. (2012, Febuary 22). *The Oil Spill Liability Trust Fund.* Retrieved May 28, 2013, from National Pollution Funds Center: http://www.uscg.mil/npfc/About_NPFC/osltf.asp
[68] Alaska RRT, 2010, p. B-9

3.5.c - Regional Response Team

The Alaska Regional Response Team (RRT) is the interagency planning body that exists all the time, not just during spills, to coordinate and develop plans to be implemented during a response. Formally the AK RRT is an advisory board to the FOSC. The AK RRT is one of thirteen RRTs which exist in the U.S., each representing a particular geographic region. The RRT is composed of State and Federal Response agencies. The four major responsibilities of these RRTs are: (1) response; (2) planning; (3) training; and (4) coordination. These RRTs develop the Regional Contingency Plans such as the AK Unified Plan[69].

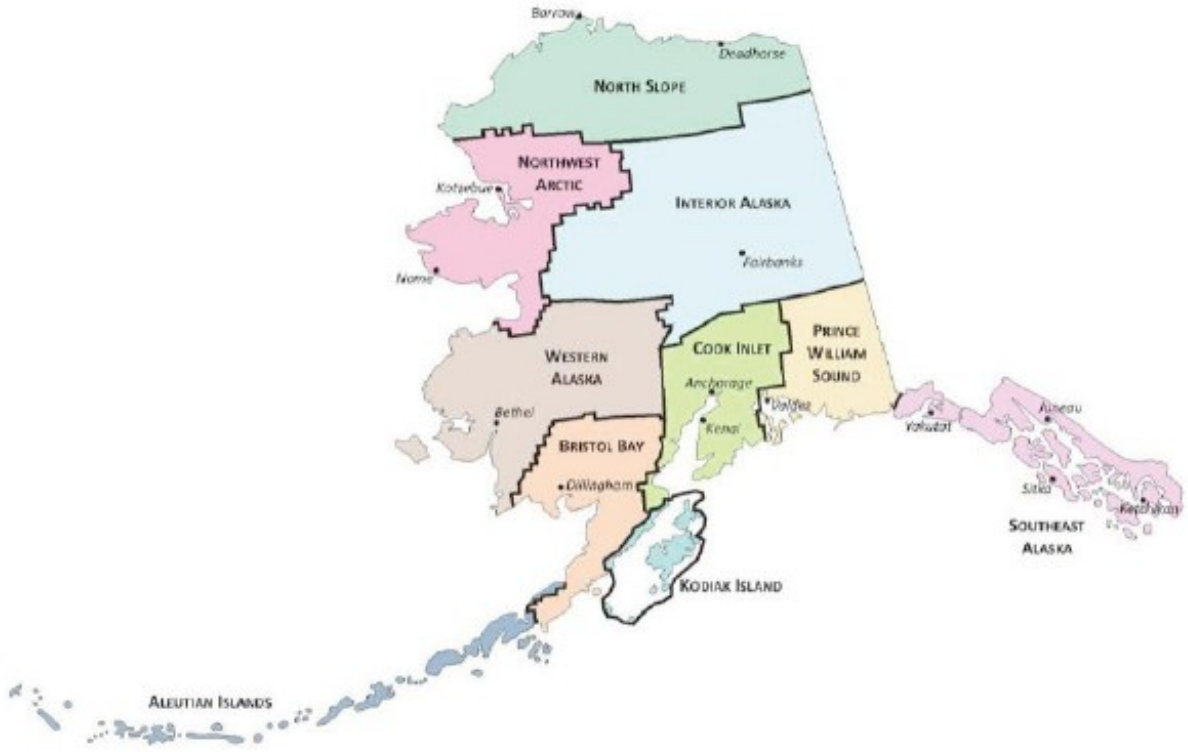
3.5.d - Sub-Area Contingency Plans

Alaska's immense scale and diverse geography have resulted in a unique Unified Plan as it has ten Sub-Area Contingency Plans. Whereas the Unified Plan contains general information for response efforts taking place anywhere in the State of Alaska, a SCP concentrates on issues and provisions specific to its particular subarea[70]. Within each subarea exists a subarea committee to act as a preparedness and planning body for the subarea. The Northwest Arctic Subarea Committee members are comprised of the USCG, EPA, Alaska Department of Environmental Conversation, and local community representatives as necessary. This subarea committee has formed the following work groups:

- Operations
- Sensitive Areas
- Logistics
- Operations

[69] Environmental Protection Agency. *Regional Response Teams*. Retrieved April 2, 2013, from http://www.epa.gov/osweroe1/content/partners/nrsrrt.htm

[70] Alaska RRT. (2012, January). *NW Arctic Subarea Contingency Plan.* Retrieved from http://www.dec.state.ak.us/spar/perp/plans/scp_nw.htm



Northwest Arctic SCP:

- A – Response
- B – Regional Resources
- C – HazMat
- D - Sensitive Areas
- E – Background
- F – Scenarios
- G - Geographic Response Strategies (GRS)
- H – Specific Potential Places of Refuge (PPOR)

Unified Plan:

- Response Organization
- Administration
- Dispersants & ISB
- Wildlife Protection Guidelines
- Statewide Resources
- Hazmat, Radiological
- Health & Safety Guidelines
- Joint Information Center
- PPOR Guidelines
- Volunteer Guidelines

Figure 9 – Alaska Subarea Contingency Plans[71]

3.5.e - Regional Stakeholder Committee

Communities interested in learning about the spill response framework should pay particular attention to the possibility of establishing a Regional Stakeholder Committee (RSC)

[71] Iwamoto, 2013

during a response, under the guidance of the Alaska Unified Plan. If there is more than one community impacted, or potentially impacted, by a spill a RSC can be established. The purpose of the RSC is to ensure local and Tribal governments and other potential stakeholders are closely involved in the spill response. The RSC des not play a direct role in setting incident priorities or allocating resources. However an RSC, when activated, can advise the Unified Command and provide recommendations and comments on incident priorities, objectives, and the incident action plan. Specifics regarding the interaction between the Unified Command and the RSC are located in Appendix VII, Annex B of the Unified Plan. This information flow between the Unified Command and the RSC is done through a Liaison Officer. Overall Unified Plan guidance explains that consistent communication between the RSC and the Unified Command is required and information provided to the Unified Command by the RSC must be taken into consideration for planning purposes[72].

According to the AK Unified Plan, "RSC membership consists of the Tribal council leaders and mayors/city councils, or their designees. Native Corporations would provide a representative as a third member from a convenient community of their choice."[73] The Unified Plan also discusses an alternative to the RSC for communities impacted. This alternative consists of the establishment of a group consisting of senior leaders of impacted communities. This group would have direct access to the ADEC Commissioner or his/her representative[74]. Although the RSC is unique to Alaska it is not a radical departure from what exists in other states. The use of liaison officers to connect interested stakeholders to the ICS is standard; Alaska just has a

[72] Alaska RRT, 2010, p. B-31
[73] Ibid, p.B-30
[74] Ibid, p. B-11

specific protocol for impacted communities via the RSC. The established roles of the RSC contribute to the management of expectations for communities regarding their level of influence.

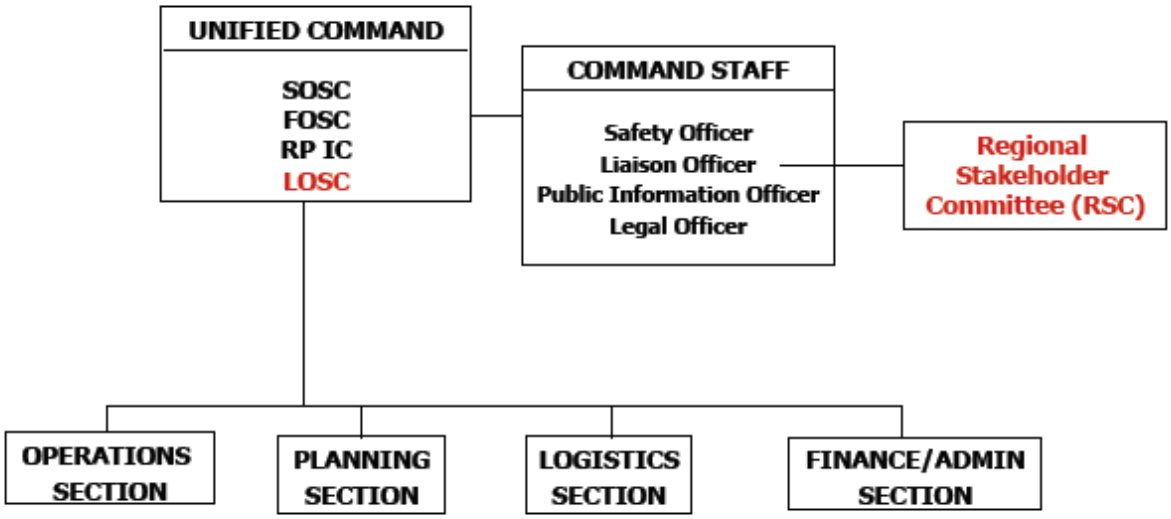


Figure 10 - The Regional Stakeholder Committee in the Response Framework[75].
Content highlighted in red refers to mechanisms for local role in the ICS.

3.5.f - Volunteers

Experience from spills from around the world, very diverse in scale and types of impact, have shown that communities impacted by a spill will seek avenues to help the response efforts. While those who seek to volunteer have good intentions the safety and logistical challenges of spill responses result in a need to have very structured intake methods for volunteers into response efforts. A structure is also needed to respond to the possible large volume of request to volunteer as demonstrated by challenges which occurred during the 2007 *MV Cosco Busan* oil spill in San Francisco, CA. As a result of this need to have a clear standard structure for the use

[75] Iwamoto, 2013

of volunteers the National Response Team published *Use Of Volunteers Guidelines For Oil Spills* in 2012[76].

In Alaska there is a clear message to community's leaders interested in how their residents may volunteer in a response. The State of the Alaska ADEC does not embrace the concept of the use of volunteers for oil and hazardous substance response; they prefer instead the formal act of hiring workers by the RP or other response entities[77]. This preference of hired workers stems from two main issues, liability and the reliability of the workforce[78]. The use of volunteers in a spill can lead to potential liability issues for the State as there may be confusion over the processes to become a formal volunteer, for example, leading some volunteers to believe they have insurance coverage when in reality they do not. The hiring of workers for the response effort also helps ensure a steady flow of work force, as volunteers cannot be fully relied upon day after day. The following excerpt is taken from Annex V of the Unified Plan:

> In the case of a major spill event, the ADEC will direct the responsible party (RP) to train and hire an additional work force (volunteers may be considered, but will be hired only as paid employees) as necessary. If no RP exists (or the RP refuses to hire needed additional workers), then the ADEC will use its term contractors and proceed with emergency hiring of additional workers, as necessary. The agency will bill the RP and cost recover for any and all costs involved in the response, including the agency's costs to bring on additional workers (e.g., paid employees, not volunteers)[79].

[76] U.S. National Response Team. (2012). *Use of Volunteers Guidelines for Oil Spills.* Retrieved from http://nrt.org/Production/NRT/NRTWeb.nsf/PagesByLevelCat/Level2UseofVolunteersMOU?Opendocument

[77] Alaska RRT, 2010,p. V-1

[78] Ibid

[79] Ibid

3.5.g - Geographic Response Strategies

Central components of the SCPs are pre-developed shoreline protection plans which can be implemented in a spill response. These plans, known as Geographic Response Strategies (GRS), are field ready document that outline shore-side and near-shore oil spill response strategies for the protection of pre-selected sensitive areas[80]. The limited awareness that these GRS exist was witnessed at the NWAB workshop. One break group asked "Has the geographic response planning been done in these communities? Have local people been involved in this?"[81]. With over 586,000 square miles of land mass and 33,000 miles of shoreline in Alaska response planners are faced with the large task of preparing to conduct timely and effective responses activities to protect sensitive areas. GRS are the main tool to address this challenge[82].

Limited resources prevent the creation of protective strategies for all sensitive sites, only priority sites are selected for GRS development[83]. A Work Group composed of trustee agencies, response agencies, spill responders and the public use the following criteria for site selection:

- Environmental sensitivity
- Risk of oil spill impact
- Ability to protect the site

In the site selection process the Work Group also seeks public input; sites may be added as a result of this process. Once site selection is finalized a Tactics Workgroup is formed with representatives from industry, response agencies and organizations, and other interested parties. This Tactics Workgroup prepares spill response techniques to be used in the specific GRS which include information on deployment considerations and limitations, and a sketch of

[80] Janes, M. (2013, February 14). *Oil Spill Response Bief Overview.* Retrieved from http://seagrant.uaf.edu/conferences/2013/bering-strait-maritime/presentations/janes-oil-spill-response-web.pdf

[81] Nuka Research and Planning Group, 2005

[82] Mutter, D. Developing Geographic Response Strategies: A Model Approach. *2003 International Oil Spill Conference.*

[83] Ibid

implementation[84]. Generic spill response tactics identified in the GRS include, but are not limited to: deflection booming, diversion booming, exclusion booming, and free-oil recovery[85]. If a spill did occur where GRS implementation is required the most likely use of a community spill response organization would be to implement these GRS[86]. It is important to clearly state that the GRSs do not come with the equipment to implement the response strategies prescribed, they just provide guidance[87].

Ideally each GRS site would be visited by the Tactics teams in coordination with local residents. While site visits occur at times in South-central Alaska they do not occur in Northwest Alaska as the logistical requirements are too high. As ADEC resources are limited, it is a tradeoff between completing more GRS with no site visits or creating a few that have actually been visited[88]. While field testing of GRS is limited, efforts are made to implement them when drills do occur, a common occurrence in Southeast Alaska. When these drills do occur and GRS are implemented local participation is often low; participants are mainly comprised of industry and response agencies and organizations[89].

[84] Ibid, p. 84
[85] Ibid, p. 84
[86] Seldovia Oil Spill Response Team, Interview. January 9, 2013
[87] ADEC, Interview. February 8, 2013
[88] (2013, February 12). Seldovia Oil Spill Response Team. (J. Inslee, Interviewer)
[89] ADEC, Interview. February 8, 2013

Figure 11- The Northern Zone of the Northwest Arctic Subarea
The green boxes are placed in areas where a pre-planned oil spill response strategy has been developed. The red boxes indicate candidate sites that are being considered for development into GRS[90].

The final GRS is a two page product which becomes integrated into the SCP. At the time of this research the GRS for the NWAB are being updated by the contractor Nuka Research. A high priority for the development of GRS is incorporation of local knowledge. To do this Nuka Research is conducting outreach to community residents and Borough planning bodies with the intent to capture local input on proposed GRS sites and knowledge about existing sites. In order to get in with local planning departments Nuka Research noted the great assistance of having a

[90] Alaska Department of Environmental Conservation. *Nothwest Arctic Geographic Response Strategies Northern Zone*. Retrieved March 19, 2013, from Spill Prevention and Response: http://www.dec.state.ak.us/spar/perp/grs/nwa/northern.htm

community leader, a champion, who helps organize meetings with planners and delivers the message regarding how GRS may help the community[91].

A common message from spill response experts is the strong desire for local knowledge to be incorporated as much as possible into response tools like GRS. When GRS were initially being developed response agencies recognized early that local input is pivotal. The residents of the area know the water currents and they know the landscape, whereas someone based in Anchorage developing the plan may be essentially making educated guesses based on charts and other available information[92]. GRS are a great tool but they need to be ground truthed[93]. While there is agreement across the board with response experts that more incorporation of local knowledge into GRS development is needed, the reality of limited time and resources from both the community and the agencies severely hinders such actions. The difficulty of gathering local input on GRS results not only from limited financial resources, but also limited time in the communities as they already have a lot of agencies and researchers reaching out to them[94].

3.5.h – Responder Safety: HAZWOPER Training

The first goal in an oil spill response is to ensure safety of responders. Through my numerous conversations with residents in the NWAB I am very aware of the strong desire of community members to be involved in a spill response, when one does occur. In order to be able to be a part of an oil spill response, responders must have received a particular degree of training. Not every spill response worker needs the same amount of training. Oil spill response training requirement falls under the Hazardous Waste Operations and Emergency Response standard (HAZWOPER). The Occupational Safety and Health Administration published HAZWOPER to

[91] Seldovia Oil Spill Response Team, Interview. January 9, 2013
[92] Pearson Consulting, Interview. February 5, 2013
[93] ADEC, Interview. February 15, 2013
[94] Seldovia Oil Spill Response Team, Interview. February 12, 2013

protect workers involved in hazardous substance emergency response and cleanup operations.[95]. Informants discussed that as each spill is different the Unified Command will require a particular level of HAZWOPER training for responders. As discussed throughout this thesis a central challenge in Alaska is maintaining HAZWOPER trained individuals in Arctic communities.

3.6 - Community Response Organizations

Communities interested in increasing their capacity to respond may have a strong desire to develop their own response organization. Many communities have attempted such developments with varying levels of success. Through interviews with individuals who were involved in such community efforts beyond the region of my study, including Southern Alaska and other States, the following summaries were produced. The history of these efforts to build community spill response organizations in Alaska indicates that the transaction costs are high, and success is limited to only those communities who can sustain interest and financial support. In addition to providing examples from Alaska two non-Alaska examples are provided, one from Washington State and one from Massachusetts. The example from WA is provided because of an express desire to learn more about this organization from the NWAB. Lastly the community spill response model used in Massachusetts is used to provide information on how a state with very a different geography attempts to build community response.

3.6.a - Seldovia Oil Spill Response Team

Seldovia Oil Spill Response Team (SOS Team) is a not-for-profit oil spill response organization located in Seldovia, Alaska, 14 miles southwest of Homer. The economy of Seldovia's 300 residents is rooted in the fishing industry. The organization was pulled together

[95] United States Department of Labor: Occupational Safety and Health Administration. *Training Marine Oil Spill Response Workers under OSHA's Hazardous Waste Operations and Emergency Response Standard*. Retrieved May 15, 2013, from https://www.osha.gov/Publications/3172/3172.html

after the community's experiences during the *Exxon Valdez* incident. Following the 1989 spill community leaders formed the SOS Team with the intent to be prepared to respond to local spills and to protect local resources in the event of another catastrophic spill[96]. Today the SOS exists as the sole community-based spill response organization in Alaska. In order to remain response-ready the SOS Team must conduct training, maintain response equipment and pay for overhead expenses, including insurance[97]. The responder base for the SOS Team is approximately 15 people[98]. The organization has a small cache of response equipment which is supplemented by ADEC response equipment. The costs of maintaining the capacity of the SOS Team to respond are not recouped from the actual response activities. As such the issue of funding has been the largest challenge facing the SOS Team in the last several years[99].

[96] Seldovia Oil Spill Team. (2004). *Non-profit Business Development Plan.* p.2
[97] Ibid p. 3
[98] Seldovia Oil Spill Response Team, Interview. February 12, 2013
[99] Seldovia Oil Spill Response Team, Interview. January 9, 2013

The SOS Team offers the following services:

Response Services

- Rapid and complete response to small oil spills in Seldovia area.
- First response to larger oil spills in the Seldovia area.
- Implementation of sensitive area protection plans such as Geographic Response Strategies (GRS).
- Mutual-aid resources to other response organizations.
- Incident management services to aid local and state agencies.

Readiness Services

- Oil spill response and basic hazardous materials training.
- Incident management team training.
- Response depot maintenance.

Community Services

- Education programs on oil spill prevention and response strategies.
- Serve as an information source on oil and haz-mat spill prevention and response.
- Developmental assistance for other community-based response teams.

Figure 12 – Seldovia Oil Spill Response Team Services[100]

The main source of funding for this organization comes from an agreement with the Cook Inlet OSRO (CISPRI) to have the SOS Team maintain one of the CISPRI response barges in Seldovia. The SOS Team personnel are also paid to attending training with CISPRI. In order to receive funding for response activities the SOS Team has an Emergency Response Basic Ordering Agreement with the USCG. These agreements are "signed with non-governmental entities. The USCG and the entity pre-determine the rates for the cost for the cleanup, allowing for quicker call out of responders and equipment by the USCG"[101] . In addition to the agreement with the USCG the SOS Team uses an agreement with the City of Seldovia. The SOS Team has a simple agreement with the City of Seldovia which allows the City to call upon the SOS Team to respond to local spills. The City of Seldovia is then reimbursed by the State, then Seldovia

[100] Seldovia Oil Spill Team, 2004, p. 5
[101] Nuka Research and Planning Group, 2005, p. 16

reimburses the SOS Team[102]. In the face of these tough economic challenges for the SOS Team, resulting from a limited number of responses and high overhead costs, it is the leadership of a core cadre of individuals with the memory and motivation from the *Exxon Valdez* which keeps the organization going[103].

3.6.b – Native Village of Eyak

One of the community spill response groups highlighted in the 2005 Nuka Community Oil Spill Forum Report was the Eyak Village Tribe located in Cordova, Alaska. The Eyak Village Tribe's community spill response organization was commended at the workshop by a commander in the USGC. In reference to a harbor spill in Cordova, in which the Eyak Village Tribe responded, the USCG commander stated,

> The Eyak COSR team's response beat other potential responses in low cost, speed, strategic location of equipment and personnel, and engaging community involvement to assist the uninsured spiller. Overall it was the best outcome to a bad situation for the community, the individual, and for the USCG[104].

Unfortunately as a result of turnover of staff in the Native Village of Eyak this community spill response organization no longer exists. Currently the Tribe is looking into ways it can reestablish the organization. The Tribe has received EPA Brownfields Program and Institute for Tribal Environmental Professionals spill responder training (see section 4.2 for more information on these trainings) in 2011and is working on reestablishing agreements with the USCG which it had in the past. After receiving the HAZWOPER training in 2011 a main challenge has been finding ways to recertify those who were trained in the ITEP class. The Tribe is looking into the

[102] Seldovia Oil Spill Response Team, Interview. January 9, 2013
[103] Ibid
[104] Nuka Research and Planning Group, 2005, p. 15

resources and insurance costs it would take to establish a subsidiary for response[105]. As will be discussed in section 4.1it is important to note that because ADEC is unable to develop response agreements with Tribes, the community must work with the City of Cordova to establish agreements that will reimburse the Eyak Tribe if and when they do reestablish a response entity[106].

3.6.c - Islands Oil Spill Association

The Islands Oil Spill Association (IOSA) is a non-profit community oil spill response organization in the San Juan Islands of Washington State. The mission of IOSA is to 'provide San Juan County with prompt, effective, local spill response and prevention, which includes spill assessment, oil containment, exclusion & removal and oiled wildlife search & rescue'[107]. IOSA initiated as a result of a community concern after a 1985 spill from an unknown source. Today the organization has a community on-call responder base of 266 as of early 2013 individuals (numbers vary each year), trained in various aspects of an oil spill response. IOSA trains and prepares for responding to smaller spills such as sunken/grounded fishing vessels or smaller releases from recreational and commercial vessels and land-based spills, as well as preparing for geographic response plan deployment (GRP) to prevent oil from entering critical/sensitive areas during a larger spill. IOSA also provides wildlife response services, for both small/moderate sized spill and major spills. To date IOSA has been on scene to over 500 spills and has deployed equipment on over 100 of them. IOSA maintains a cache of spill response equipment including over 9,000 feet of boom, a small barge, and several work skiffs[108].

[105] (2013, January 17). Native Village of Eyak. (J. Inslee, Interviewer)
[106] Pearson Consulting, Interview. January 5, 2013
[107] Islands Oil Spill Association. Retrieved March 27, 2013, from http://www.iosaonline.org/index.htm
[108] Ibid

In order to maintain readiness IOSA conducts several response drills each year, these drills include deployment of GRP. In order to maintain responder HAZWOPER requirements the IOSA coordinators are very diligent in maintaining an organized structure to keep track of who is HAZWOPER trained, when they are due for refreshers, and possible upcoming training opportunities that the individual could attend[109]. IOSA then contacts the individual responders with this information. These trainings are free to IOSA responders. Funding for IOSA is derived from funds recovered from spill responses (ISOA has an Ordering Agreement with the USCG), contributions from members and the community, and several grants. As is experienced in Seldovia a sizeable portion of IOSA funds must be applied to ensuring their large pieces of equipment are insured and maintained. In addition there is a big insurance cost associated with coverage for workers if they are injured while working on the water[110].

Unlike in Alaska, the issue of responder turnover is not present in IOSA. The lack of turnover in IOSA stems from the extreme interest IOSA responders have in keeping the environment of the San Juan's Islands protected from oil and other hazardous spills. While the educations and income levels of IOSA responders vary, all IOSA responders have a great desire to protect the remarkable San Juan marine environment. As a result, IOSA members do not join as a responder with the intent to receive extra income[111].

3.6.d - Massachusetts

In the wake of the 2003 Buzzards Bay oil spill the State of Massachusetts began to strengthen its ability to respond to coastal waters spills. As a result of these efforts the Massachusetts Department of Environmental Protection has provided oil spill response trailers to

[109](2013, March 27). Island Oil Spill Association . (J. Inslee, Interviewer)
[110] Ibid
[111] Ibid

over 70 coastal communities[112]. Funds for these community response efforts are derived from a 5-cent/barrel fee on petroleum products delivered to marine terminals in the State[113].The keys to these trailers are given to local fire chiefs and harbor masters. The distribution of these trailers resulted in the Geographic Response Plans being tailored toward the first response strategies that could be carried out using the equipment in the response trailers. The goal is to have local responders implement the GRP and get protective booming in place to protect priority areas. Once this protective booming is in place oil spill response contractors would then be used to actually come in to conduct cleanup operations. As the local responders are used for protective booming and not actual response cleanup, they currently are required to have less training than full responders[114].

There is an inherent difference in what has been done in Massachusetts and what can exists in Alaska because of access[115]. Anywhere in Massachusetts you are two hours away from a response contractor getting to your location therefore allowing local responders to focus on protective activities. The tremendous logistical challenges in Alaska requires responders to be more mature in their response capacity as they will most likely be the first responders for a prolonged period of time[116].

Another key difference between the response strategy used in Massachusetts and what can be done in Alaska is use of fire departments to respond. In Massachusetts fire departments play a key role in deployment of the GRP. The question therefore arises about the possibility of

---

[112] Massachusetts Department of Environmental Protection. (n.d.). *Massachusetts Oil Spill Prevention and Response Efforts*. Retrieved March 19, 2013, from http://www.mass.gov/dep/cleanup/ospre.htm

[113] Massachusetts Department of Environmental Protection. (2011). *Massachusetts Oil Spill Prevention and Response Act M.G.L. Chapter 21M: Program Activities and Accomplishments 2011.* Retrieved March 27, 2013, from http://www.mass.gov/dep/cleanup/laws/osahl11.pdf

[114] (2013, January 24). Nuka Research. (J. Inslee, Interviewer)

[115] Ibid

[116] Ibid

using local Alaskan fire departments to increase community response capacity. Through conversation with experts it appears this concept will not take hold in Alaska. In most Arctic communities with small populations the local fire departments are volunteer and have limited resources. Asking the fire departments to take on additional training to prepare for oil spill response will require additional resources as it will double training, preparing for oil spills and fires are very different skillsets[117]. Overall it would be expected that these small fire departments would prefer to avoid taking on this new responsibility in order to avoid mission creep[118].

3.7 - Case Study- Selendang Ayu Response

The response to the 2004 *M/V Selendang Ayu* oil spill in Alaska's Aleutian Islands provides essential information to communities interested in increasing their spill response capacity. Providing specific examples from this incident to interested communities will help address the challenge of existing information asymmetry. The *Selendang Ayu* response demonstrated that impacted communities will be hired by the Responsible Party to participate in the response. Currently this key piece of information is not being successfully disseminated through communities. As a result community members are unsure of their roles during a response resulting in unease and frustration.

On December 8, 2004 the 728-foot cargo vessel *Selendang Ayu,* carrying soybeans, ran aground and broke in half off the island of Unalaska, resulting in an estimated release of 254,218 gallons of oil[119]. The response effort took over two years in some of the harshest weather

[117](2013, February 14). Alaska Department of Environmental Conservation. (J. Inslee, Interviewer)
[118] (2013, February 26). Alaska Clean Seas. (J. Inslee, Interviewer)
[119] U.S. Fish and Wildlife Service. *Spill Response and Restoration: Selendag Ayu Oil Spill.* Retrieved March 22, 2013, from Fisheries and Ecological Services: http://alaska.fws.gov/fisheries/contaminants/spill/sa_index.htm

conditions Alaska has to offer[120]. While the Chadux Corporation is the oil spill response organization (OSRO) for the region they decided not to participate in the long-term response efforts as the ship was not from one of its member companies. As a result a de facto OSRO was established to execute the operation with the support of Gallagher Marine Systems (GMS)[121]. As spelled out in the Unified Plan "In the case of a major spill event, the ADEC will direct the responsible party to train and hire an additional work force" as many qualified local people as possible were hired for cleanup[122].

> The general order for hiring of workers was from Unalaska residents first, from Alaska residents next and then from residents of the "lower 48". GMS made 40-hour HAZWOPER training available to local residents to ensure that interested persons had the qualifications needed to do clean-up work.

In addition to providing a key example of the use of local residents the *Selendang Ayu* response provides lessons learned regarding some of the challenges of employing residents as spill responders. First, the response effort demonstrated that just because new responder jobs open up it cannot be assumed that they will be filled by community members as they may have existing jobs that pay more, or individuals may choose not to leave their current employment. During the *Selendang Ayu* response these factors resulted in numerous responders being brought in from outside the community. Second, the response effort demonstrated a clear example of responder turnover between spills. When the *Selendang Ayu* spill occurred the list of responders for the 1997 *M/V Kuroshima* oil spill were dusted off. It soon became apparent however that those who

[120] Gallagher, J., & Gudonis, N. (2008). Unique Logistics Difficulties Encountered During Response to the M/V Selendang Ayu Stranding and Break Up. *International Oil Spill Confrence*, (pp. 1175-1184).p. 1175
[121] Ibid p. 1179
[122] Alaska RRT, 2010

responded to the *Kuroshima* had not kept up with required training, thus training had to be supplied again[123].

Lastly the *Selendang Ayu* response provides an example of the obstacles which can occur in the attempt to utilize local knowledge. For instance one of the key desired roles for local residents to fill was to be small boat captains as they know the local waters better than anyone. But during the response efforts the Unified Command deemed that a six-pack operator license was required to operate such small boats. As a result residents and their local knowledge were kept away from the helm of the boats as locals did not have the license. Replacement captains who had their six-pack license were brought in from the Lower-48. Their inexperience resulted in numerous damages to the boats as the non-resident captains did not know the local area[124]. This same six-pack requirement issue has occurred on other recent spills as well.

4. - Strategies for Increasing Community Response Capacity

For Arctic community planners and leaders, the challenge of increasing their community's ability to respond to the growing threat of oil spills adds another layer of work to an already full job portfolio. Often these same community planners already are being burdened by other climate change–driven challenges. These challenges come in the form of physical threats to the community's environs, such as erosion and melting permafrost. Extra burdens also are coming from the academic, private and government sectors as researchers are flooding to the Arctic to study the impacts of climate change on communities there. Community leaders' limited capacity to explore possible ways to strengthen their spill response capacity necessitates a straightforward resources guide. Therefore, a key deliverable of this research is to outline the

[123] Pearson Consulting, Interview. February 5, 2013
[124] ADEC, Interview. February 14, 2013

resources available to communities seeking to increase response capacity. The goal of the following sections is to help community planners navigate this challenge by providing a straightforward discussion of the resources available and providing recommendations.

4.1 - Alaska Department of Environmental Conservation Community Spill Response System

Background:
Because of the vast size of Alaska and the location of many spills in remote communities the State has established a program to build response capacity for small spills throughout Alaska. This program has gone through several projects and initiatives since it began after the *Exxon Valdez* oil spill in 1989.

The State of Alaska Community Response Program helps ensure that local resources are available to help the SOSC respond to spills including, "orphan spills," those with no identifiable spiller. The State provides equipment and funding agreements to communities to respond to such unregulated spills as well as spills with known RPs[125]. These programs are used to help respond to spills in the entire state, supplementing the 36 spill responders available in ADEC[126].

Services Provided:
Community Spill Response Agreements (CSRA):
These agreements facilitate the reimbursement of a local government for expenses incurred during a response action and may provide equipment and training to locals to ensure adequate response[127]. These agreements may be activated by the SOSC requesting activation of the CSRA to utilize available local resources. These reimbursable costs include staff time and use of equipment (i.e., city-owned heavy equipment)[128]. Under State law if the CSRA is activated by the SOSC, actual expenses for the response, both inside and outside of the local jurisdiction, can be reimbursed.

Community Response Equipment Depot Project:
In conjunction with the CSRA the State has agreements with 56 communities where a trailer of spill response equipment is provided to the community. Not every community that has a CSRA has a State-supplied response trailer[129]. These supply trailers are under the command of the ADEC SOSC but are available at cost to responsible parties, local communities and response action contractors[130]. When the depot is accessed in conjunction with a CSRA, the local

[125] Alaska Department of Environmental Conservation
[126] ADEC, Interview. February 8, 2013
[127] Nuka Research and Planning Group, 2005, p. 14
[128] ADEC, Interview. February 8, 2013
[129] Ibid
[130] Pearson, L. (2005). Alaska Community Response System. *American Bar Association Section of State and Local Government Law: Spring Meeting.*

government is reimbursed for expenses incurred. When equipment is used, the State is required to seek cost recovery from the party responsible for the incident[131].

Currently the NWAB has a CSRA and an ADEC spill response trailer.

Limitations:
Limited training – The State currently provides 56 communities with response equipment, making it infeasible for the State to train each community each year, due to the substantial resources it would require.

Equipment is intended for small spills – The depot project intends to fill the gap in responding to small spills (e.g., home heating tank spills). Communities seeking to strengthen their capacity to respond to large spills may be unimpressed by the limited amount of equipment supplied.

Agreements can only be made with municipalities – Only communities that fall within Alaska's legal definition of a "village" can enter into a spill response agreement with the State. As a result, some Tribal communities are not able to gain access to these State resources.

> AS 46.08.070 authorizes DEC, under certain conditions, to reimburse a "municipality or village" for actual expenses incurred in responding to a spill if the municipality or village has entered into an agreement with DEC under AS 46.04.020(e) or AS 46.09.020(e). The definition of "village" for the purpose of these chapters includes traditional village councils and Indian Reorganization Act councils that have "irrevocably waived, in a form approved by the Department of Law, any claim of sovereign immunity that might arise" in connection with provisions of these chapters[132].

Recommendations for Interested Communities:
Having agreements is a good building block – Building response capacity in a community is not easy, but putting into place these agreements is a key stepping stone in starting the effort. By gaining access to the needed equipment, a community is able to respond to small spills and therefore can work on building a small trained responder base. These efforts lay the ground work for expanding capacity as they allow the community to become familiar with response equipment and the challenges of maintaining a responder base. These agreements also lay the foundation for improved communication between the State and the community, essential for building capacity.

Create plans to maintain responder base – Once the community has an agreement in place with the State, local leaders should create plans to maintain a trained core of responders who are able to respond effectively to a spill.

[131] (2013, February 12). Alaska Department of Environmental Conversation. (J. Inslee, Interviewer)
[132] Pearson, 2005, p. 5

Communities should make inventory lists – Once communities have a CRSA, they should make inventories of the equipment (e.g.,: heavy equipment, pumps, etc.) in the community that may be necessary to use during a response. The goal of this inventory exercise would be to have a clear list of the equipment that may be used and have costs recovered through State reimbursement.

Figure 13 - ADEC Community Spill Response System

4.2 - EPA Brownfields Program and Institute for Tribal Environmental Professional Trainings

Background:
The Institute for Tribal Environmental Professionals (ITEP), based out of Northern Arizona University, has been coordinating efforts with ADEC, the EPA Tribal Indian General Assistance Program and EPA Brownfields staff to deliver oil spill response training in rural Alaska since 2010. Due to limited resources rather than lack of demand, these trainings currently take place only twice a year. Communities with EPA Brownfields grants may apply to use funds to receive this training because adequately responding to oil spills prevents possible Brownfields from developing.

Services Provided:
ITEP works with communities and response agencies to conduct multi-day workshops that are tailored to the needs of the community. Topics of the course may include a HAZWOPER refresher, tactics for small oil spills, ICS overview, and hands-on training (depending on available equipment). Trainings are centered on the needs of the community holding the training, but non-resident participants are invited to attend if conditions permit. Overall participant numbers vary from approximately 20 to 30 individuals[133].

Limitations:
Limited follow-up resources – A planner whose community received this training felt a little discouraged in the years after the initial training because they had not been able to follow up and continue training efforts[134]. This is not an uncommon experience for participants[135]. As a result, many participants who gained HAZWOPER training via the ITEP trainings have not been recertified. Like the State, ITEP has limited resources to organize and conduct only a few trainings a year. Because the State and ITEP can only offer a limited number of trainings they focus on communities who have not received training, rather than continuing training for those who have already received it previously.

Brownfields funds do not cover response actions – Communities interested in using Brownfields funds for training need to be aware that Brownfields funds cannot be used for actual response activities[136].

[133] Institute for Tribal Environmental Professionals. (J. Inslee, Interviewer)
[134] Native Village of Eyak, Interview. January 17, 2013
[135] Institute for Tribal Environmental Professionals, Interview. December 6, 2012
[136] (2013, January 23). EPA Brownfields Cleanup and Redevelopment. (J. Inslee, Interviewer)

Recommendations for Interested Communities:
Receive HAZWOPER before ITEP training – To maximize the focus of the training on spill response tactics, communities who are going to receive this training should concentrate efforts on fulfilling participants' HAZWOPER requirements before the training. By taking HAZWOPER training off the agenda, there will be more time for hands-on training. Hands-on training has been valued very highly by participants in the past. On the other hand, HAZWOPER training is available online, allowing participants to efficiently prepare for the class.

Have plans in place for after training - As communities who receive ITEP trainings are extremely unlikely to receive the training in the following years, a plan should be put in place for how they can continue to leverage the training in the years after. Mechanisms should be implemented to keep responders up-to-date on HAZWOPER requirements. In addition to ensuring training requirements are updated, efforts should be placed toward establishing agreements which will allow trained community members to be employed during a response. As discussed in detail later, OSROs and their subcontractors are a key resource for ensuring this training and possible employment.

Figure 14 – EPA Brownfield and ITEP Professional Trainings

4.3 - Description of Oil Spill Response Organizations

A core component of the oil spill response capacity in Alaska lies with the five existing oil spill response organizations (OSROs). These organizations were established as a result of the Oil Pollution Act of 1990, which required Responsible Parties to submit response plans which identify, among other things, proof that a worst-case discharge can be cleaned up by private personnel and equipment[137]. OSROs were established to help companies meet these new requirements for response capacity. Each OSRO has member companies, such as shipping companies and near-shore facilities, which contract with the OSRO to respond if a spill does occur. If a spill occurs at an OSRO member-company facility the facility leads initial response efforts with employees and equipment located at the site. If the facility needs response assistance, then the OSRO resources are called in[138]. As a result OSROs conduct trainings for their member company personnel to ensure they have the ability to respond.

[137] Shaw, A. *Arctic Pollution Response*. Retrieved March 12, 2013, from http://www.housemajority.org/coms/anw/pdfs/27/Arctic_Pollution_Response.pdf
[138] (2013, February 11). Alaska Chadux. (J. Inslee, Interviewer)

In addition to responding to member-company spills, OSROs have ordering agreements with the USCG allowing them to be called up and help respond at incidents for nonmembers[139]. In order to retain capacity to respond to a spill, OSROs maintain responders throughout communities who are able to report on scene to an incident. Each OSRO has unique methods for maintaining this responder base. These strategies were documented during interviews and are provided below.

Five Alaska OSROs:

- Alaska Clean Seas (North Slope)
- CISPRI (Cook Inlet)
- SEAPRO (Southeast)
- Alaska Chadux Corporation (Western Alaska/Inland)
- SERVS (Prince William Sound)

[139] (2013, January 28). SEAPRO. (J. Inslee, Interviewer)

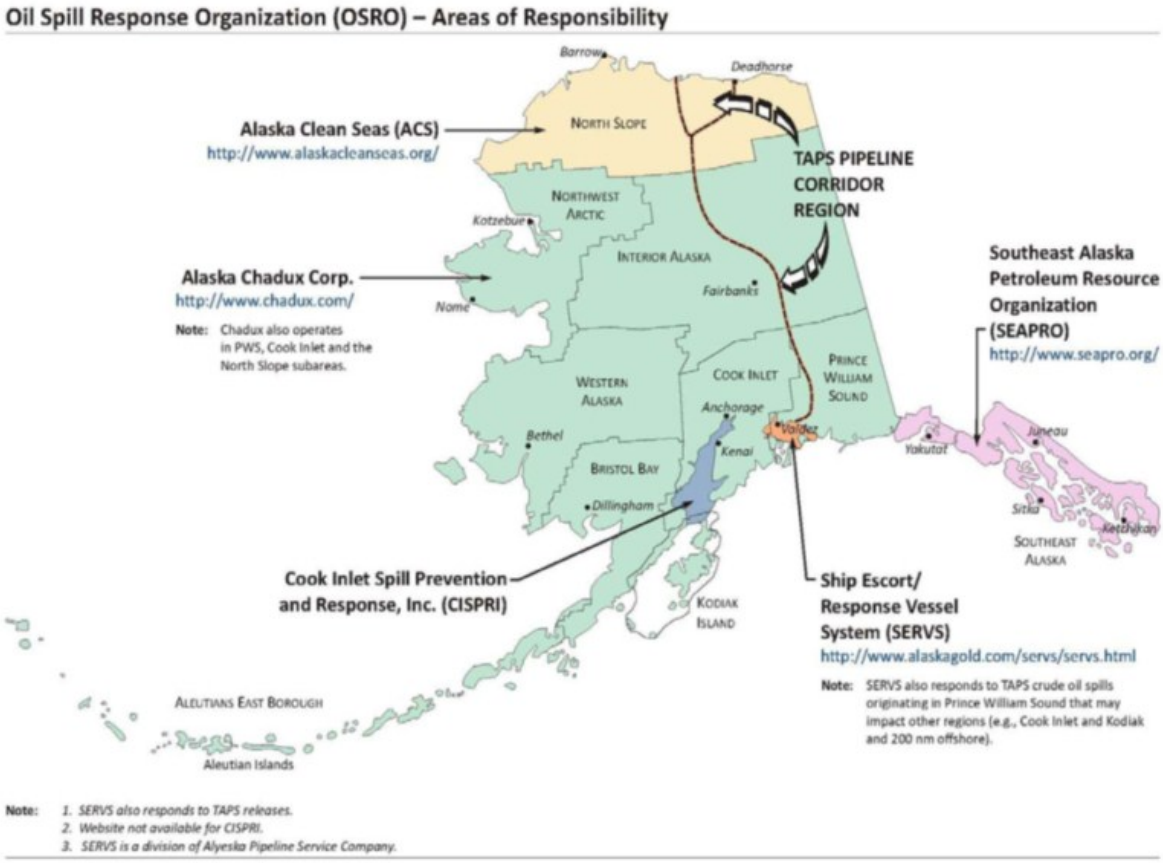


Figure 15 - State of Alaska Oil Spill Response Organizations[140]

According to Robert Heavilin, the General Manger of Alaska Chadux Corporation, the largest OSRO, making use of local residents in these OSROs accomplishes multiple goals:

1. Rural residents acquire marketable job skills.
2. A cadre of responders with local knowledge and a personal interest in protecting the natural resources provides an excellent first response capability.
3. Employment opportunities are improved where severe unemployment exists[141].

In conversations with SEAPRO staff discussing the history of the organization, additional information was supplied regarding the logic of OSROs using community residents as

[140] Alaska RRT, 2010, p. E-26
[141] Nuka Research and Planning Group, 2005

responders. When SEAPRO examined where their responders were located they considered the pros and cons of three options[142]:

1) First, hiring full-time employees throughout Southeast Alaska. It became apparent very quickly that, based on the small number of spills, this was not an ideal model because it would be very expensive and difficult to keep employees supplied with sufficient work.

2) Second, contracting employees and bringing them in from Anchorage or Seattle. While there are some possible benefits to this, it was ruled out because it would not supply the initial surge in capacity needed quickly in a response because of the long distances the responders would have to travel.

3) Third, developing on-call response teams, with responders living in communities throughout the OSRO's designated region. This concept, and the option ultimately chosen, is to train responders local to the area and then have them ready to be called up when a spill does occur nearby.

The following section provides an overview of the three largest OSROs that operate in Alaska and the mechanisms they use to maintain responders throughout communities in the region they serve.

4.3.a -OSRO – SEAPRO

Background:
SEAPRO, a non-tank vessel cleanup OSRO serving Southeast Alaska, was incorporated in 1992 to help their members meet compliance under state and federal law. This member-owned non-profit organization currently has 42 companies which store, transport or transfer petroleum

[142] SEAPRO, Interview. January 28, 2013

products making up the cooperative membership. These members consist of marine transporters, facility operators, non-tank vessel operators and others[143].

How Communities' Become Involved:

SEAPRO maintains responders and equipment in the communities they serve; at the end of 2012 they had 239 people trained in Southeast Alaska[144]. SEAPRO has divided Southeast Alaska into nine geographic zones in which that have pre-positioned response equipment and response teams. These response teams are made up of five people, including a team leader. If these responders are called up to a response they will be paid, but between responses SEAPRO does not supply employment. Because these responders are on call, SEAPRO knows they need to maintain a larger pool of responders to rely upon. They count on the three-to-one-rule; if they need one person to respond they have to have three names to call[145].

The SEAPRO Response Teams are in the following locations:

Zone	Location
1	Ketchikan & Metlakatla
2	Craig & Klawock
3	Wrangell & Petersburg
4	Kake
5	Sitka
6	Pelican-Elfin Cove-Gustavus
7	Juneau
8	Haines & Skagway
9	Yakutat

Figure 16 - SEAPRO Response Team Locations[146]

Individuals interested in becoming an on-call responder begin by filing out a SEAPRO application[147]. If selected, SEAPRO will provide an initial 24 hour HAZWOPER training and 16 hours of additional response training. In addition, SEAPRO ensures that response team member receive an annual 8 hour HAZWOPER refresher training to maintain their certification. SEAPRO does not pay responders to attend these trainings but is providing them with a practical and valuable certification that could be useful in helping these individuals gain full-time employment in related fields. SEAPRO encourages responders to use this HAZWOPER training as a marketable skill when seeking employment elsewhere[148]. If communities are only interested

[143] SEAPRO. *Our Vision Statement*. Retrieved March 14, 2013, from http://www.seapro.org/mission.cfm
[144] SEAPRO, Interview. January 28, 2013
[145] Ibid
[146] SEAPRO. *Response Team*. Retrieved April 2, 2013, from http://www.seapro.org/response_team.cfm
[147] SEAPRO. *Response Team Application* . Retrieved March 14, 2013, from http://www.seapro.org/pdf_docs/Employment_Application_07.30.05.pdf
[148] SEAPRO, Interview. January 28, 2013

in receiving training without joining the OSRO, SEAPRO also offers trainings at-cost to interested communities[149].

Figure 17 – OSRO SEAPRO

4.3.b - OSRO – Alaska Clean Seas

Background:
Alaska Clean Seas (ACS) is a non-profit oil spill response cooperative whose current membership includes oil and pipeline companies that engage in or intend to undertake oil and gas exploration, development, production or pipeline transport activities on the North Slope of Alaska and leased portions of the Outer Continental Shelf. ACS originally formed in 1979 but was restructured in 1990 from an equipment cooperative into a full response organization. The purpose and mission of ACS is to provide personnel, material, equipment and training to its members for responding to oil spills on the North Slope. On average, ACS maintains approximately 85 full-time staff who are available for response operations[150]. To increase capacity in villages, Village Response Teams (VRT) have been established.

How Communities' Become Involved:
At the 2012 Kotzebue workshop participants, mentioned the possibility of using ACS VRT as a model for increasing capacity in the NWAB[151]. The goal of the VRT is to have trained personnel spread out evenly in every village. In reality, however, Barrow ends up with a greater number of responders. VRT are used to respond to spills on the North Slope which are caused by companies that contract with ACS.

ACS contracts with Umiaq (a subsidiary of Ukpeaġvik Iñupiat Corporation) to staff and maintain personnel on the VRT. The teams consist of residents from Aniqtuvit Pass, Atqasuk, Barrow, Barter Island, Nuiqsut, Point Hope, Point Lay and Wainwright. Currently, more than 40 qualified spill responders are available through this program. The VRT program continually is recruiting new members[152]. ACS provides paid HAZWOPER and response training to these responders. ACS also provides yearly trainings and attempts to incorporate VRT into response drills when possible.

In addition to the VRT, ACS maintains contracts with companies outside the North Slope in case additional spill response personnel are needed. These additional responders are hired through CCI Industrial Service, PENCO Environmental Services and SWS Environmental Services[153].

Figure 18 – OSRO Alaska Clean Seas

[149] SEAPRO. *Training.* Retrieved March 16, 2013, from http://www.seapro.org/training.cfm
[150] Alaska Clean Seas. *Yearbook 2013.* Retrieved March 12, 2013, from http://www.alaskacleanseas.org/wp-content/uploads/2010/12/2013-ACS-Yearbook-for-web.pdf p. 12
[151] National Oceanic and Atmospheric Administration and the Coastal Response Research Center, 2012
[152] Alaska Clean Seas, p. 14
[153] Ibid

4.3.c - OSRO – Alaska Chadux Corporation

Background:
Alaska Chadux Corporation is a member-funded non-profit organization based in Anchorage but has equipment stored at 10 sites throughout the state. Chadux membership includes companies in the following categories: marine oil transporters, non-tank vessels, and large and small onshore facility operators. Established in 1993, Chadux provides response services over a larger area than any other OSRO in Alaska[154]. Chadux is registered as a Primary Response Action Contractor and Non-Tank Vessel Cleanup Contractor with the State of Alaska. Chadux was designed to be capable of responding to oil spills throughout the State of Alaska by being able to pull equipment from its various hubs and transporting it to the incident location. This is in contrast to other OSROs whose services are limited to their respective geographic areas[155]. Chadux is looking at the possibility of adding to their current number of response hubs.

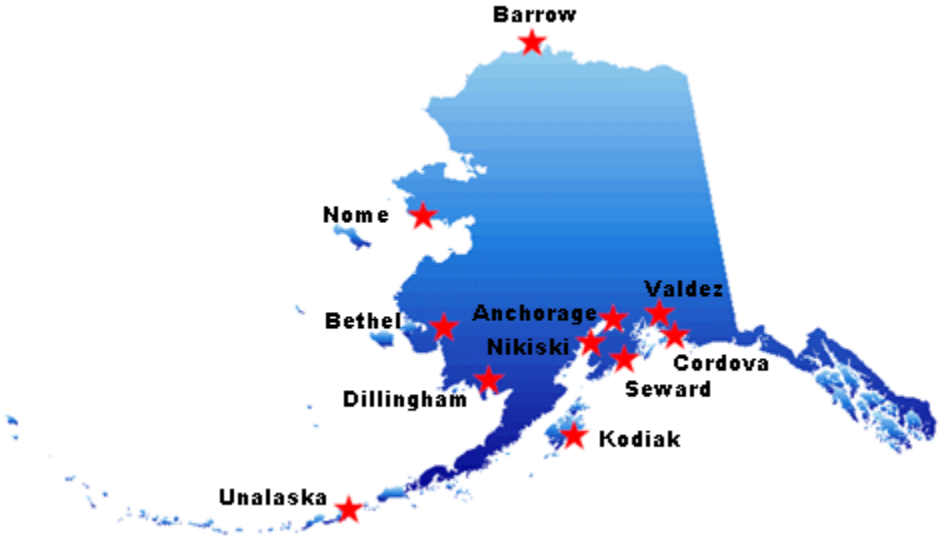


Figure 19 – Chadux Response Hubs[156]

How Communities Become Involved:
Like ACS, Chadux pulls its responders from several subcontractors, the main two of which are CCI Industrial Services and Pacific Environmental Corporation (PENCO). Chadux works with other contractors in Kodiak and is discussing working more with Umiaq on the North Slope. When responders are needed, Chadux calls upon these sub-contractors to provide personnel. If there were a large spill and community members wanted to respond, Chadux would direct them to these sub-contractors, who at that point likely would have already brought human resources staff to the community to deal with such procedures. These sub-contractors then would provide

[154] Alaska Chadux, Interview. February 11, 2013
[155] Alaska Chadux. *Spill Response on a Statewide Scale.* Retrieved from http://www.chadux.com/wp-content/uploads/Dispelling%20the%20Alaska%20Fear%20Factor.pdf
[156] Alaska Chadux. *Equipment*. Retrieved March 14, 2013, from http://www.chadux.com/equipment

training to the new personnel. In a large response Chadux would not directly hire local residents but instead have the subcontractors hire them because the sub-contractors have more appropriate resources to accommodate new personnel[157].

Figure 20 – Alaska Chadux Corporation

5. - Challenges and Strategies

After interviewing representatives from OSROs, the State of Alaska, communities and other oil spill experts, a central challenge to building and maintaining community response capacity in Alaska becomes apparent: maintaining a base of trained responders locally who are eligible for work. Increasing community spill response capacity in an Arctic community is hinged entirely on the ability to maintain a cadre of responders who are committed to meeting training and other requirements to remain an eligible responder. The challenge of increasing community response capacity does not start nor end with simply transporting response equipment to remote communities. The fundamental challenge that must be addressed is retaining trained, able-bodied responders in the community over the long term, between the spills. The following section describes the main challenges which are currently resulting in turnover of trained responders in Arctic communities.

Key Factors Contributing to Turnover of Responders

5.1 - Not Full-Time Employment

When community residents are trained by OSROs or by other entities they are informed that being a spill responder is a possible part time job and they may be called upon to work if a spill does occur. SEAPRO feels it is very important to caution new responders that it is not a full time job and they expect them to have normal day jobs[158]. Although individuals are made aware that this is part-time, as-needed employment, community interest in receiving the initial training

[157] Alaska Chadux, Interview. February 11, 2013
[158] SEAPRO, Interview. January 28, 2013

still remains. It is only after this training when the new responder experiences the reality of the very low number of spills in which on-call responders are needed. As a result of the very limited or complete lack of employment as a spill responder, these initially trained individuals in Arctic communities lose interest in being a responder and do not maintain the required training. In particular, this lack of income generation for newly trained responders is a huge obstacle in the effort to retain eligible responders. When faced with these challenges, the North Slope Borough feels the best possible solution for sustaining eligible responders is finding them full-time employment which also requires staying up-to-date on HAZWOPER training[159].

5.2 - Requirements for Eligibility to Respond

Compounding the challenge of maintaining responders when little or no income is generated is the addition of eligibility requirements to the equation. Informants for this thesis emphasized responder recurrence at annual HAZWOPER training as a critical challenge for building response capacity. When responders first become trained, they must receive their 24 hour HAZWOPER certification. This 24 hour HAZWOPER certification is the standard level needed to be an on-scene responder[160]. In order to maintain this certification, the responders must receive annually an 8-hour HAZWOPER refresher training. This annual refresher becomes a barrier to remaining eligible because responders may not wish to spend their resources completing the annual training in light of the limited response employment they have received in return. Offers to pay responders to attend these HAZWOPER refreshers have not yielded much success.

In addition to being HAZWOPER certified, responders may have to be able to pass a drug test. This requirement is especially true for responders working for the oil and natural gas

[159] (2013, January 29). North Slope Borough Risk Management. (J. Inslee, Interviewer)
[160] Institute for Tribal Environmental Professionals, Interview. December 6, 2012

industry. The unfortunate reality in most Arctic communities is that this drug-free requirement contributes significantly to the turnover of responders. Informants from both inside and outside Arctic communities acknowledged this challenge.

5.3 - Additional Challenges Faced by Community Spill Response Organizations (non OSROs)

Communities interested in starting their own form of a community response organization, such as that established in Seldovia, face numerous other challenges outside of reducing responder turnover. Experience has shown that establishing and maintaining these community organizations have very high transaction costs. In order to establish a community spill response organization insurance of equipment and personnel must be acquired, contracts with response agencies must be established, trainings must be held, and mechanisms to establish funding between spill responses must be secured. These costs are captured in a description of transition costs by Ronald Coase, an economist at the University of Chicago, who stated that:

> In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on[161].

As a result of these many costs, community response groups have had very limited success. According to the Seldovia Oil Spill Response Team, the only current community response team in Alaska, they are having a very challenging fiscal period[162]. The Village of Eyak Tribe response entity, an at-once key example of the community response model in 2005, is no longer in existence. After speaking with representatives of these organizations and other spill response

[161] Coase, R. (1960). The Problem of Social Cost. *Journal of Law and Economics*, 1-44.
[162] Seldovia Oil Spill Response Team, Interview. Feburary 12, 2013

experts, I have produced the following summary of the additional challenges community spill response organizations face in Alaska.

5.3.a - Required Sustained Funding

The ability to respond to a spill requires both equipment and personnel. In order to remain prepared, the equipment must be maintained and insured, and the personnel must be trained and insured. As a result, the community response organizations have to be able to sustain payments for this overhead between the oil spills. This overhead has proven to be a very difficult challenge as a result of the very limited number of spills the community organizations are able to respond to[163]. In response to tough fiscal times the Seldovia Oil Spill Response Team had to sell a response barge due to the high maintenance and insurance costs. Even securing the required base funds is so challenging that the SOS team also requires volunteers to help with administrative duties[164].

5.3.b - Leadership Turnover

Leadership in the establishment and continuation of a spill response organization is absolutely essential. When leadership begins to wane or leadership turnover occurs, it can be a failure point for the community response organization. This was clearly witnessed by the experiences of the Native Village of Eyak Tribe, where representatives informed me that turnover of leadership led to a folding of the community response entity[165]. In conversation with the SOS Team, it was made clear that leadership from those who experienced the *Exxon Valdez* spill is pivotal to the continuation of the organization. Community response organizations are extremely sensitive to leadership; these entities cannot succeed without strong, motivated individuals at the helm. When community leadership changes, so may the priorities for

[163] ADEC, Interview. February 14, 2013
[164] Seldovia Oil Spill Response Team, Interview. January 9, 2013
[165] Native Village of Eyak, Interview. January 17, 2013

community government. As a result, another big challenge to building oil spill response capacity is having local leaders present and engaged long enough to maintain continuity for spill response[166].

5.3.c - No Central Knowledge Source for Assistance

Communities looking to learn about the possibility of starting a community response organization and its corresponding legal requirements currently do not have a central, authoritative source for assistance. No organization or agency has the specific responsibility for assisting communities in establishing a community response organization. As a result, communities face high transaction costs for just trying to learn about the feasibility of starting this type of organization. At present, the Village of Eyak Tribe is experiencing such transaction costs as they attempt to establish new connections with government response agencies.

5.4 - Overcoming the Challenge of Personnel Turnover

There is no silver bullet to prevent responder turnover in Alaska; however, certain tactics are yielding positive results. The best possible solution is finding full-time employment for responders which require them to stay up-to-date on HAZWOPER training. This tactic is being used by the North Slope Borough. The Borough is able to keep a core and qualified base of spill responders by enticing them with permanent work in the Borough-managed fuel storage facilities. In these fuel facility positions, employees are required to maintain HAZWOPER requirements and remain drug-free, therefore allowing them to work as responders for spills outside of the facility if necessary[167]. The central constraint to this solution is the limited amount of full-time positions within a community which require HAZWOPER certification. But it

[166] Pearson Consulting, Interview. Febuary 5, 2013
[167] North Slope Borough Risk Management, Interview. January 29, 2013

demonstrates that building the core cadre of oil spill responders should start ideally with those community employees required to maintain this certification.

Another tactic being used in the effort to maintain a sustained responder base is training fewer but more carefully selected individuals. This technique has been successfully implemented recently by ACS and their sub-contractor Umiaq on the North Slope. In the past when ACS experienced responder turnover, they decided to decrease greatly the number of responders they would train and instead focus efforts on ensuring those trained remain certified. This freed their resources and allowed them to pursue greater follow up, allowing Umiaq and ACS to maintain a smaller but steady and reliable responder workforce[168].

During the course of interviews, the concept of increased follow up and increased communication with responders was mentioned often as a possible way to combat turnover of community-based responders. At present, resources are not available to establish a mechanism for following up with those trained to guarantee they become recertified. Such a mechanism would keep track of those who are trained and when they need to recertify. Then, it would contact the individuals and provide information on available training. Such a mechanism, combined with the current availability of online HAZWOPER certification, would likely provide some increased recurrence of community-based responders. This idea is very similar to what is currently in place with IOSA in Washington State. Most informants felt the best venue for this follow-up mechanism would be the local Borough.

[168] Alaska Clean Seas, Interview. February 26, 2013

6. – Recommendations to Help Communities Increase Response Capacity

The challenge of increasing the capacity of Arctic communities to respond to an oil spill cannot be solved by simply increasing the amount of response equipment present in the communities. Nor can it be solved by having response trainings throughout the communities for a couple of years. In order to build sustained community response capacity, community leaders will need to make it a central priority every year. Alongside increased community leadership, the State and the private sector will need to increase resources dedicated to outreach and dialogue with communities on spill response planning. Arctic community response capacity cannot be established with an initial, substantial investment in effort and funding and then be maintained with little support in the years that follow. Successful and enduring response capacity will require continuous, steady leadership and responder oversight. The following primary recommendations concern strategies for increasing oil spill response capacity in Arctic communities.

6.1 - First Step: Address Information Asymmetry

The first steps for communities interested in increasing their response capacity is increasing their awareness of the role they could play in spill response planning, and the spill response resources currently available to them. As previously discussed currently information asymmetry exists related to what resources and legal framework actual exists, and what the communities are currently aware of. This situation is strongly contributing to community unease about the limited spill response capacity. In order to ensure capacity building decisions are made efficiency and effectively this information asymmetry needs to be addressed. In addition, I believe raising the level of awareness in the community is essential to more community involvement in the planning process. The first step to improving geographic response strategies and other response tools is ensuring communities are aware of them.

6.1.a - Community Leaders Are Required

Raising communities' awareness of the spill response framework and related existing resources is an immense challenge. Efforts have been made by the State to help raise awareness but have been done with limited resources. Through my numerous interviews, it was made extremely clear that the key to increasing a community's awareness is having community leaders who feel spill response capacity is important and who are willing and able to facilitate relationships between the community and outside expertise. A strong and motivated leader in the community may be the most effective way to address the current information asymmetry, someone who can build interest in the problem, him or herself be a conduit of information, and work to bring in others such as federal and state response managers[169]. This local role is key because having ownership in the affected community is required to get things done, such as raising awareness of the spill response framework. Outside agencies cannot go into a small community with the expectation of being able to convey on their own what the problem is and what needs to be done to address it. Instead, the communities need to recognize the problem and find leadership to address the challenge[170]. Finding such individuals is a tough challenge and community leaders are already over-taxed[171]. Still, having leaders with this dedicated role in the community can increase communication among the community, agencies and industry because the local leaders act as an avenue to facilitate communication. Interview informants explained that in order for an outside agency or group to approach a community with the intention of discussing spill response planning, it is essential to have a community leader who helps engage

[169] ADEC, Interview. February 12, 2013
[170] Institute for Tribal Environmental Professionals, Interview. December 6, 2013
[171] Nuka Research, Interview. January 24, 2013

the community on this subject. This frequent communication between communities and agencies is essential and is the only way to build trust[172].

Yet, when these community leaders begin to initiate efforts to raise awareness in the community, they often are met with great challenges because of the sheer technical difficulty of the topic of oil spill response. Learning about spill response does not just involve learning the technical and legal frameworks. For Arctic communities, broaching the topic of spill response can be an especially hard conversation because of the complexity of the relationships Indigenous communities who rely on subsistence have with the landscape. Any oil spill will disrupt the community's subsistence use of natural resources due to fears and perception of contamination of possibly affected species even if scientific evidence suggests there is not contamination. As a result, conversations about spill response can be very emotional and individuals may hear only what they choose. Having an articulate and understanding community leader is essential for navigating these cultural challenges. In summary, having a community leader to initiate efforts to increase the community's awareness of the spill response framework and many players in spill response is pivotal. In addition, having these leaders will prove invaluable in helping the community face the difficult topic of oil spills and their potential consequences.

6.1.b - The Key Message Communities Should Hear

The effort to raise awareness in communities about the spill response framework and the community's role during a response is a large conversation. In order to help alleviate the current unease in communities about the increased threat of larger spills, messages to communities should be focused. After conducting this research and attending meetings in the Arctic, I feel a key message communities should be hearing regarding spill response is the following:

[172] Pearson Consulting, Interview. February 5, 2013

> If there is a large enough oil spill that responders are needed for a prolonged period of time, those who caused the spill will train and hire as many locals as needed. This is a legal requirement and has been implemented in other Alaskan communities.

The intent of this message is not just to communicate to community members that they will get employment if there is a spill. Rather the intent is to communicate to community members that they will have an important role in response activities, allowing them to take actions to help protect the environmental resources they so greatly depend on. Community members speak with a strong voice that they want to have a role in the effort to contain and clean up the oil, this message is a clear way of saying they will have a role in protecting their community and the resources they rely upon for subsistence.

The example of the *Sendang Ayu* is a great example to highlight when communicating this message. It is of interest to note that the AK Unified Plan states "In the case of a major spill event, the ADEC will direct the responsible party (RP) to train and hire an additional work force." I intentionally do not recommend using this exact language in working with communities because of the way it portrays the oil industry. I learned through my interviews that if a spill does occur in Alaska, the RP most likely will be willing to hire as many locals as possible without ever being told to do so. This happened recently in the 2013 *Kulluk* drilling ship grounding incident off the coast of Kodiak Island. As such, industry does not look favorably on the use of the term "direct" in the Unified Plan. Because raising community awareness will require teamwork with industry, messaging language should be crafted in such a way to support collaboration and not create tension. Therefore, I recommend using the messaging which communicates simply and clearly in the case of a major spill that the RP will train and hire local workers. A second key message communities should hear is that there is a role for them in planning and preparing for spills (see section 6.1.c).

6.1.c – Increase Community Involvement in Drills and Contingency Planning

Exposure to hands-on spill drills and planning exercises is invaluable for communities seeking to increase response capacity. From learning how to deploy boom to learning the complexity of the Unified Command, there is no better learning experience than actually taking part in these types of exercises. According to an FOSC, it is during these face-to-face interactions that spill response knowledge is best passed to others[173] . In interviews with spill responders from the ADEC, it was clearly stated that raising awareness in these remote Alaskan communities cannot be done through traditional PowerPoint presentations because community members will not be receptive to this format. Rather, the most effective way to engage community members is to have hands-on activities, such as practicing setting response boom. While this is known to be the most effective way, ADEC is also very upfront about the challenges of implementing such activities when communities may have few or no resources to train with. Funding for the costs of transporting spill response training equipment to such communities is not available. In addition there are limited resources from the State to facilitate the drills. As previously discussed, it would be ideal to have communities train using Geographic Response Strategies because it would allow communities to practice and would help keep response documents up-to-date.

If drills cannot be held in potentially affected Arctic communities, the next best option is to have community members attend drills in other locations. Such drills occur often in southeast Alaska, especially in the Prince William Sound region. ADEC believes such exposure to large drills would be a great mechanism to help Arctic communities learn, giving them firsthand experience observing what the LOSC roles are, public safety issues, and other aspects of spill

[173] (2013, January 22). EPA FOSC Alaska. (J. Inslee, Interviewer)

response[174]. Observing these drills would allow community representatives to increase their awareness of the needs and expected challenges for an oil spill in their own community.

Communities interested in increasing response capacity may want to consider prioritizing efforts to provide input into the development of oil spill contingency plans. As discussed earlier, the State routinely updates Geographic Response Strategies and community input is sought very actively in this process. It may be an efficient approach for community planning boards, such as Local Emergency Planning Committees, to hold discussions with the State during these public input periods to help drum up input from the community. Facilitating increased input from the community will help ensure concerns of the community are used to establish response protection priorities and strategies. Lastly, local communities may want to hold their own version of table-top response drills to make sure the correct players are pre-identified to help contribute to the response decision framework, through such structures as the Regional Stakeholder Committee.

6.2 - Increase Knowledge Sharing Between Communities

Because oil spill response is difficult for communities, the use of peer-to-peer knowledge sharing may offer an efficient mechanism to educate communities about the topic. My initial research included the possibility of establishing a community-to-community knowledge sharing network across existing community response organizations. But as a result of the relative lack of such community response organizations, I turned my research to the history of community spill response in Alaska. My exploration of the challenge of addressing information asymmetry, that is, the great difference that exists between what experts know about oil spills and how they are dealt with compared to what average citizens in Alaskan communities know, led me back to the concept of communities working together to share knowledge.

[174] ADEC, Interview. February 15, 2013

There are communities in Alaska and other states who have been able to sustain a high level of community involvement in the spill response framework and perhaps even have their own response organization. What if those experienced communities could be paired up with Arctic communities looking to learn about oil spill response? When I posed this question to the Seldovia Oil Spill Response Team, the Island Oil Spill Association, and experienced responder leaders in the North Slope Borough, all expressed a willingness to participate in such efforts to share knowledge. There is great opportunity in these offers of assistance.

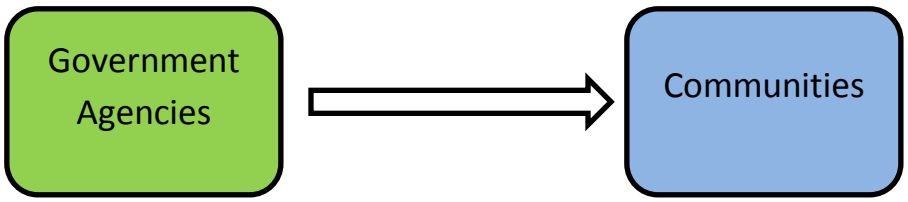


Figure 21 – Current Flow of Information to Communities

The State of Alaska and other response agencies, such as the USCG, have limited resources to conduct outreach to communities in the effort to raise spill response awareness. As previously mentioned, traditional government outreach techniques such as PowerPoint presentations are not well received in communities. The use of community-to-community dialogue may be a viable way to fill this needed outreach gap. The possibility of such a community knowledge sharing arrangement also may provide a key asset in the effort to educate a community about the spill response framework because they would be learning from a peer rather than from an agency. According to Inkpen and Tsang (2005), and Goh (2002) successful knowledge transfer involves developing a high level of trust, a shared vision, and social capital[175]

[175] Inkpen, A., & Tsang, E. (2005). Social Capital, Networks, and Knowldge Transfer. *Academy of Management*, 146-165.

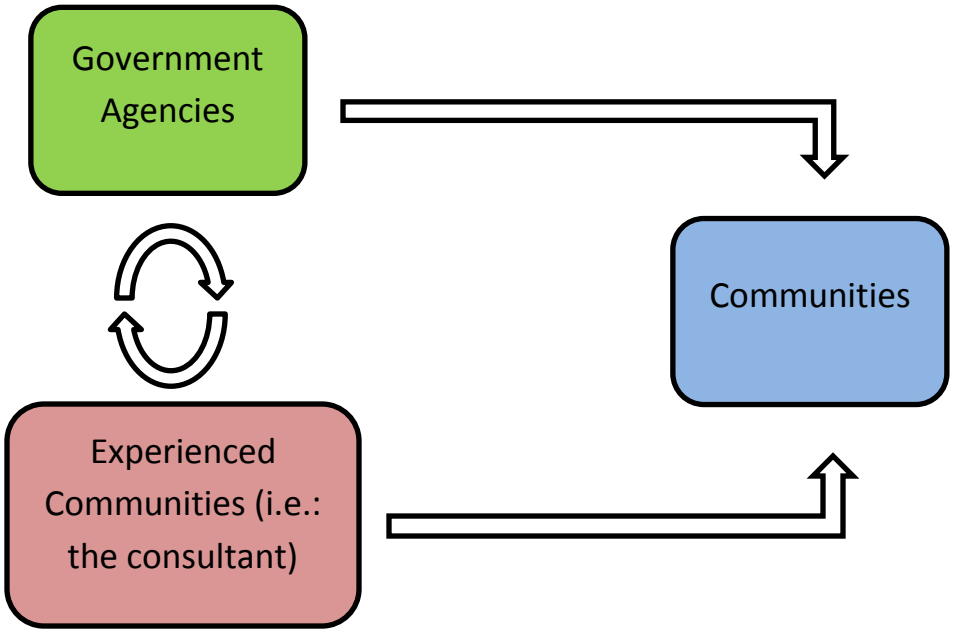


Figure 22 – Possible Information Flow Between Communities

These key factors for transferring knowledge may be more successfully met in the community-to-community relationship, rather than the community to agency relationship. This concept deals with transferring knowledge from a community *with* knowledge to a community looking to *absorb* knowledge and would build relationships allowing one group to serve as a consultant to the other. In this process, one group maintains the power to analyze the information and decide on the best course of action[176]. To ensure the effective transfer of knowledge in such a relationship, the appropriate infrastructure to reinforce and support it is required. In addition to a support structure, the ability to transfer knowledge will be dependent on the absorptive capacity of the recipient community[177].

Goh, S. (2002). Managing Effective Knowldge Transfer: An Integrative Framework and Some Practice Implications. *Journal of Knowledge Management*, 23-30.

[176] Kenn, M. B. (2005). *Social Learning in Environmental Management.* Sterling: Easthscan.

[177] Goh, 2002

During the course of this research I was able to connect two communities using this concept. I was able to facilitate dialogue between the Village of Eyak, which is looking to learn, and the Seldovia Oil Spill Response Team, which is willing to share its experience and expertise. This was just a first step, but it was very encouraging. The SOS Team had a great willingness to share their planning information with the Village of Eyak, which was very grateful. Lastly, it is important to note that this concept of knowledge sharing has already been supported in the response community. A recommendation from the 2005 Community Nuka report was the establishment of an ad hoc community-based response work group[178].

Developing personnel communication with others communities who have more experience with spills will also allow for Arctic community leaders to learn about non-technical challenges with response activities. Communities who were impacted by the *Exxon Valdez* spill may be able to help Arctic communities prepare for the possible social and cultural challenges which result from a spill. The direct environment impacts from the oil are just one possible topic of discussion between communities. Other possible topics include issues of economic impacts, community health and mental concerns, and subsistence food complications.

6.3 - Communities Should Look to OSROs for Building Responder Base

This analysis presents strong evidence that the multitude of challenges and transaction costs that community spill response organizations face will limit their success. According to Alaska response experts, the OSROs are the ones maintaining the sustained response base in Alaska[179]. Therefore, it is my recommendation that communities seeking to increase their spill response capacity should not undertake efforts to build their own community response organization, rather they should work with OSROs and the local membership companies in the

[178] Nuka Research and Planning Group, 2005
[179] ADEC, Interview. February 14, 2013

OSROs to increase the number of trained responder personnel in Arctic communities. Community residents should build these connections with OSROs before a spill occurs to develop the capacity to quickly respond to an incident.

Following my analysis of OSRO resources and interviews with informants, it is my belief that these organizations, for example CHADUX, SEAPRO, ACS and their associated sub-contractors, are able to provide the required sustained training and oversight which is critical to building response capacity. In many communities OSRO membership companies such as Crowley Marine are present. Informants stated that initiating communication between local emergency planners (or appropriate position) and representatives from these local OSRO membership companies is a great first step in working toward expanding the number of OSRO responders in the community[180]. Avenues for increasing a specific OSRO presence in a community and the hiring of residents before a spill were previously discussed in section 4.3. Communities interested in finding spill on-call response employment for its residents could consider focusing on the OSRO sub-contractors such as CCI and Umiaq as positions with these companies will allow individuals an increased opportunity to respond to spills that are not local. As a result they may be called out on a response more often, increasing the possibility of being maintained as a trained on-call responder. Lastly, I would like to note that as the likelihood of remote spills is increasing, OSROs may need to establish new response hubs in such communities as Kotzebue in order to meet the changing response demands in the Arctic.

6.4 - Lay the Groundwork for NRDA in Communities

The hard truth for oil spill response in the Arctic is that in the event of a large oil release, the vast majority of the oil will not be recovered from the water and land. Regardless of this fact,

[180] Ibid

communities are still courageously leading efforts to increase their capacity to respond. While their response may only make a small difference in the impact of the spill, they will be extremely motivated to protect the resources which are essential to their culture and subsistence.

In light of this known limited response capacity, NOAA introduced a concept, the Natural Resource Damage Assessment (NRDA) process, at the 2012 workshop in Kotzebue. The intent of this process is to identify injuries to natural resources and lost public uses resulting from a hazardous release spill and then conduct restoration to compensate for these injuries[181]. The process requires natural resource trustee agencies, including NOAA, the Department of the Interior, and state agencies, to link the release of oil, its fate and transport in the environment, the exposure of natural resources to the oil, and the oil's effects on biota and human uses[182] . NRDA will be very significant in the Arctic in light of the limited response capacity. Because the response will be limited the need to assess and restore the damage from the spill will be great.

The ultimate goal of the NRDA process is to restore the environment back to the way it was before the oil spill occurred. For instance if a wetland were oiled, the goal would be to conduct restoration projects that equal the ecological services provided by the injured wetland. NRDA also requires that the lost cultural and recreational uses that resulted from the spill also be restored. In the lower 48 these human lost use categories are typically things such as lost recreational fishing or kayaking and result in restoration projects such as new boat ramps or fishing piers. In the Arctic, however, a large question mark exists regarding how to restore the environment and the community use of the environments.

---

[181] National Oceanic and Atmospheric Administration. *Gulf Spill Restoration: Damage Assessment*. Retrieved April 2, 2013, from http://www.gulfspillrestoration.noaa.gov/assessment

[182] National Oceanic and Atmospheric Admistration and the Coastal Response Research Center, 2010

The Arctic is a new frontier for NRDA and ecological restoration. As a result, there is an opportunity for Arctic communities to work with the agencies involved with NRDA and start thinking about what type of restoration can be done in the Arctic. Rather than waiting for a spill and then figuring how to restore the environment and the loss of services to the community, communities should discuss potential restoration project ideas before an incident occurs. By starting to generate these planning activities, it will allow consensus to be formed now, rather than trying to form it in the emotion-charged aftermath of a spill. Raising awareness of NRDA before a spill may help communities deal with the difficultly of the incident because residents will know how their voice and ideas can be incorporated into the NRDA process. Although I believe NRDA planning efforts should begin now, the workshop meeting in Kotzebue made clear that this concept of NRDA was too far down the road for that community at that time. Before the community can begin to work with agencies on preparing for a NRDA, they want to spend their resources focusing on building spill response capacity. This position, which focuses on prevention, is fully understandable because feeling secure in a community's response capacity allows for the discussion about the environmental injuries which will occur. But as a key finding of this research is the existing information asymmetry, I feel compelled to make a recommendation regarding NRDA as it will be essential in the long-term recovery of a community impacted by a large spill.

As a result of the expected significant role NRDA will play in the event of a large Arctic spill and the challenge of educating Arctic communities about the process, I strongly recommend that communities interested in increasing their response capacity ensure NRDA is on their radar. The learning curve for the NRDA process in Arctic communities is going to be very steep. NRDA is a legal process which needs to scientifically quantify injuries to the environment and

conduct corresponding restoration. These subsistence communities are going to have a difficult time in the injury quantification and restoration planning processes due to the fact that their culture relies heavily on the natural resources of their immediate surroundings. As a result of these challenges, the level of knowledge regarding NRDA in the community will be an important influence on efforts to restore the environment. In the effort to address information asymmetry regarding NRDA, communities, if possible, should ensure they increase their NRDA awareness alongside their knowledge of the spill response framework.

6.5 – Increase Financial Resources

This research demonstrates that the challenge of increasing oil spill response capacities will not be solved by simply supplying funds to communities. Increased fiscal resources toward this effort, however, can play a key role. Many of the challenges on the road to increasing community spill response capacity, such as limited equipment to train with in the communities and limited ADEC resources to conduct outreach, can be reduced by an injection of increased fiscal resources. As previous mentioned Shell has already spent an approximate $4.5 billion on Arctic drilling preparations since 2005. This enormous figure is a key demonstration of the high cost of doing business in the Arctic. In the near future I see a great opportunity for the oil and gas industry to spend more resources toward helping communities increase their experience with the spill response framework, and assisting them in increasing the number of trained responders in the community.

7 - Conclusion

When looking forward at the challenge of increasing community oil spill response capability in the Arctic, there is a great chance that the wheel will be reinvented, over and over. With the growing threat of oil spills in the region, numerous communities will be trying

independently to increase their response capacity. The intent of this thesis is to try and help ensure these communities are made aware of both the challenges and the resources that exist to help them move forward and build capacity. This research will hopefully bring an increased level of efficiency to these communities' efforts to meet these challenges and acquire the necessary resources for a sustained effort to maintain response readiness.

Summary - Challenges to Building Arctic Community Response Capacity

- Existing Information Asymmetry
  - Limited awareness in communities of existing response resources and response framework
  - State of Alaska has very limited resources to conduct outreach and trainings to communities
- High Responder Turnover
  - Only part-time employment for responders
  - Requirements for eligibility to respond (i.e., HAZWOPER training)
- Required Sustained Funding
- Community Leadership Turnover
- High Transaction costs
  - Personnel and equipment insurance
  - No central knowledge source for assistance

Figure 23 - Summary - Challenges to Building Arctic Community Response Capacity

In the face of the growing likelihood of oil spills in this region, residents are appropriately worried about the potential impacts a spill can have on the environments which they rely on for their subsistence, culture and identity. Raising awareness in these communities about the spill response framework will help facilitate community involvement in the planning process. By raising awareness in these communities that in the event of a large spill local residents will be trained and hired, it will help address some of the community unease about

what their role is during a spill. These first steps of raising awareness and addressing the current information asymmetry which exists are crucial to laying the groundwork for increased community participation in the spill planning process.

Summary - How to Increase Community Response Capacity	
Address Information Asymmetry:	• A champion in the community is key • Provide key messages to communities • Increase community involvement in spill drills • Increase knowledge sharing between communities
Increase Awareness of Spill Response Framework:	• Community members will by hired in the event of large incident (volunteers are discouraged) • Regional Stakeholder Committee may be established in the event of spill • Geographic Response Strategies exist and community input is actively sought
Communities Should Look to OSROs:	• OSROs who maintain the sustained response base in Alaska • CHADUX, SEAPRO, and ACS and their associated sub-contractors are able to provide the required sustained training and oversight which is critical to building response capacity • Communities should begin working with OSROs through the local OSRO membership companies located in their community (e.g., Crowley Marine)

Figure 24 - Summary - How to Increase Community Response Capacity

This research demonstrates that increasing Arctic spill response capacity cannot be addressed by simply supplying equipment and training. The process is incremental and requires significant leadership from within the community. The challenge of maintaining a core responder base is difficult and significant oversight is required to maintain personnel. As a result, communities should look to work with oil spill response organizations and their sub-contractors as the most viable way to increase the number of trained personnel in their community.

Increasing awareness and involvement in drills, contingency planning and other spill planning efforts will improve the likelihood that community concerns about the effects of oil on subsistence and cultural uses of natural resources will be heard. The result should be a more effective response and faster and more complete restoration and recovery of the environment.

Works Cited

(2012, December 6). Institute for Tribal Environmental Professionals. (J. Inslee, Interviewer)

(2013, February 11). Alaska Chadux. (J. Inslee, Interviewer)

(2013, February 26). Alaska Clean Seas. (J. Inslee, Interviewer)

(2013, February 15). Alaska Department of Environmental Conservation. (J. Inslee, Interviewer)

(2013, February 8). Alaska Department of Environmental Conservation. (J. Inslee, Interviewer)

(2013, February 12). Alaska Department of Environmental Conversation. (J. Inslee, Interviewer)

(2013, February 14). Alaska Department of Environmental Conservation. (J. Inslee, Interviewer)

(2013, January 23). EPA Brownfields Cleanup and Redevelopment. (J. Inslee, Interviewer)

(2013, January 22). EPA FOSC Alaska. (J. Inslee, Interviewer)

(2013, March 27). Island Oil Spill Association . (J. Inslee, Interviewer)

(2013, January 17). Native Village of Eyak. (J. Inslee, Interviewer)

(2013, January 29). North Slope Borough Risk Management. (J. Inslee, Interviewer)

(2013, January 24). Nuka Research. (J. Inslee, Interviewer)

(2013, February 5). Pearson Consulting. (J. Inslee, Interviewer)

(2013, January 28). SEAPRO. (J. Inslee, Interviewer)

(2013, January 9). Seldovia Oil Spill Response Team. (J. Inslee, Interviewer)

(2013, February 12). Seldovia Oil Spill Response Team. (J. Inslee, Interviewer)

Alaska Chadux. *Equipment*. Retrieved March 14, 2013, from http://www.chadux.com/equipment

Alaska Chadux. *Spill Response on a Statewide Scale.* Retrieved from http://www.chadux.com/wp-content/uploads/Dispelling%20the%20Alaska%20Fear%20Factor.pdf

Alaska Clean Seas. *Yearbook 2013.* Retrieved March 12, 2013, from http://www.alaskacleanseas.org/wp-content/uploads/2010/12/2013-ACS-Yearbook-for-web.pdf

Alaska Department of Environmental Conservation. *Community Spill Response.* Retrieved from Local Response: http://dec.alaska.gov/spar/perp/docs/commun.pdf

Alaska Department of Environmental Conservation. *Nothwest Arctic Geographic Response Strategies Northern Zone*. Retrieved March 19, 2013, from Spill Prevention and Response: http://www.dec.state.ak.us/spar/perp/grs/nwa/northern.htm

Alaska Department of Natural Resources: Divsion of Coastal and Ocean Management. (2010). *Northwest Arctic Borough*. Retrieved from http://alaskacoast.state.ak.us/District_Pages/NW_Region/NorthwestArcticBorough/index.html

Alaska Oil Spill Commission. (1990, February). *Spill: The Wreck of the Exxon Valdez.* Retrieved April 3, 2013, from http://docs.lib.noaa.gov/noaa_documents/NOAA_related_docs/oil_spills/spill_wreck_ExxonValdez_1990.pdf

Alaska RRT. (2010, January). *Alaska Federal/State PreparednessPlan for Response to Oil & Hazardous Substance Discharges/Releases (Unified Plan).* Retrieved from http://dec.alaska.gov/spar/perp/plans/uc.htm

Alaska RRT. (2012, January). *NW Arctic Subarea Contingency Plan.* Retrieved from http://www.dec.state.ak.us/spar/perp/plans/scp_nw.htm

Alaska RRT. (2013, February). *Bristol Bay Subarea Contingency Plan.* Retrieved from http://dec.alaska.gov/spar/perp/plans/scp_bb.htm

Arctic Council. (2009). *Arctic Marine Shipping Assessment 2009 Report.*

Clarkeson et al. (2007). Information asymmetry and information sharing. *Government Information Quartely*, 827-839.

Coase, R. (1960). The Problem of Social Cost. *Journal of Law and Economics*, 1-44.

Environmental Protection Agency. *Regional Response Teams*. Retrieved April 2, 2013, from http://www.epa.gov/osweroe1/content/partners/nrsrrt.htm

Gallagher, J., & Gudonis, N. (2008). Unique Logistics Difficulties Encountered During Response to the M/V Selendang Ayu Stranding and Break Up. *International Oil Spill Confrence*, (pp. 1175-1184).

Glenn Gray and Associates. (2012, April 6). *City of Kotzebue Draft Comprehensive Plan.* Retrieved July 8, 2012, from from http://www.cityofkotzebue.com/vertical/sites/%7BA001CDF5-7F45-4E0C-9DFC-D296959501D1%7D/uploads/KotzebueComprehensive_Plan_4-6-12.pdf

Goh, S. (2002). Managing Effective Knowldge Transfer: An Integrative Framework and Some Practice Implications. *Journal of Knowledge Management*, 23-30.

Huntington, H. (2000). Using Traditional Ecological Knowledge in Science: Methods and Applications. *Ecological Applications*, 1270-1274.

Huntington, H., Brown-Schwalenberg, P., Frost, K., Fernandez-Gimenez, M., Norton, D., & Rosenberg, D. (2002). Observations on the Workshop as of Improving Communication Between Holders of Traditional Knowledge and Scientific Knowledge. *Environmental Management*, 778-792.

Inkpen, A., & Tsang, E. (2005). Social Capital, Networks, and Knowldge Transfer. *Academy of Management*, 146-165.

Islands Oil Spill Association. Retrieved March 27, 2013, from http://www.iosaonline.org/index.htm

Iwamoto, L. (2013, February 14). *DEC's Planning, Prevention and Response Initiatives.* Retrieved from http://seagrant.uaf.edu/conferences/2013/bering-strait-maritime/presentations/iwamoto-dec-planning-response-web.pdf

Janes, M. (2013, February 14). *Oil Spill Response Bief Overview.* Retrieved from http://seagrant.uaf.edu/conferences/2013/bering-strait-maritime/presentations/janes-oil-spill-response-web.pdf

Kenn, M. B. (2005). *Social Learning in Environmental Management.* Sterling: Easthscan.

Kroh, K., Conathan, M., & Huvos, E. (2012). *Putting a Freeze on Arctic Ocean Drilling.* Center for American Progress.

Marshall, C., & Rossman, G. (1989). *Designing Qualitative Research.* Newbury Park: Sage Publications.

Massachusetts Department of Environmental Protection. (2011). *Massachusetts Oil Spill Prevention and Response Act M.G.L. Chapter 21M: Program Activities and Accomplishments 2011.* Retrieved March 27, 2013, from http://www.mass.gov/dep/cleanup/laws/osahl11.pdf

Massachusetts Department of Environmental Protection. *Massachusetts Oil Spill Prevention and Response Efforts*. Retrieved March 19, 20113, from http://www.mass.gov/dep/cleanup/ospre.htm

Murphy, K. (2012, October 19). *Arctic Thaw Brings New Security Worries*. Retrieved from L.A. Times: http://articles.latimes.com/2012/oct/19/nation/la-na-arctic-security-20121019

Mutter, D.. Developing Geographic Response Strategies: A Model Approach. *2003 International Oil Spill Conference.*

National Aeronautics and Space Administration. (2012, August 27). *Arctic Sea Ice Shrinks To New Low In Satellite Era*. Retrieved October 17, 2012, from http://www.nasa.gov/topics/earth/features/arctic-seaice-2012.html

National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. (2011, January 1). *The Challenge of Oil Spill Response in the Arctic: Staff Working Paper No. 5.* Retrieved from http://www.oilspillcommission.gov/final-report

National Oceanic and Atmospheric Admistration and the Coastal Response Research Center. (2010). Natural Resource Damage Assessment in Arctic Waters: The Dialogue Begins. Durham: University of New Hampshire.

National Oceanic and Atmospheric Administration. (2012). *Arctic Report Card: Update for 2012*. Retrieved January 29, 2013, from http://www.arctic.noaa.gov/reportcard/exec_summary.html

National Oceanic and Atmospheric Administration and the Coastal Response Research Center. (2012). *Northwest Arctic Borough Oil Spill Workshop: Natural Resource Damage Assessment (NRDA) and Environmental Response Management Application (ERMA).*

National Oceanic and Atmospheric Administration. *Gulf Spill Restoration: Damage Assessment*. Retrieved April 2, 2013, from http://www.gulfspillrestoration.noaa.gov/assessmentNorthwest Arctic Borough. (2013). Retrieved from http://www.nwabor.org/index.html

Nuka Research and Planning. (2004). *Combining the Firehouse Model and Community-based Response Teams for an Improved Regional Oil Spill Response System in Alaska.* Seldovia, Alaska.

Nuka Research and Planning Group. (2005). *Community Oil Spill Response Forum Final Report.* Seldovia, Alaska.

Nuka Research and Planning, LLC. (2010). *Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences.* The Pew Environmental Group.

O'Rourke, R. (2011). *Changes in the Arctic: Background and Issues for Congress.* Congressional Research Service.

Pearson, L. (2005). Alaska Community Response System. *American Bar Association Section of State and Local Government Law: Spring Meeting.*

SEAPRO. *Our Vision Statement*. Retrieved March 14, 2013, from http://www.seapro.org/mission.cfm

SEAPRO. *Response Team*. Retrieved April 2, 2013, from http://www.seapro.org/response_team.cfm

SEAPRO. *Response Team Application .* Retrieved March 14, 2013, from http://www.seapro.org/pdf_docs/Employment_Application_07.30.05.pdf

SEAPRO. *Training.* Retrieved March 16, 2013, from http://www.seapro.org/training.cfm

Seldovia Oil Spill Team. (2004). *Non-profit Business Development Plan.*

Shaw, A. *Arctic Pollution Response*. Retrieved March 12, 2013, from http://www.housemajority.org/coms/anw/pdfs/27/Arctic_Pollution_Response.pdf

Special Report the Arctic: The Melting North. (2012). *The Economist*, 3-16.

State of Alaska. (2002, November). *Alaska Incident Management System Guide for Oil and Hazardous Substance Response.* Retrieved from http://www.dec.state.ak.us/spar/perp/docs/AIMS_Guide-Complete(Nov02).pdf

U.S. Committee on the Marine Transportation System. (2013, Feburary). *U.S. Arctic Marine Transportation System: Overview and Priorities for Action.* Retrieved March 6, 2013, from http://www.cmts.gov/downloads/CMTS_Draft_Arctic_MTS_Overview_and_Priorities_Paper_for_Public_Comment-Feb2013.pdf

U.S. Fish and Wildlife Service. *Spill Response and Restoration: Selendag Ayu Oil Spill.* Retrieved March 22, 2013, from Fisheries and Ecological Services: http://alaska.fws.gov/fisheries/contaminants/spill/sa_index.htm

U.S. Geological Survey. *90 Billion Barrels of Oil and 1,670 Trillion Cubic Feet of Natural Gas Assessed in the Arctic.* Retrieved January 29, 2012, from http://www.usgs.gov/newsroom/article.asp?ID=1980&from=rss_home.

U.S. National Response Team. (2012). *Use of Volunteers Guidelines for Oil Spills.* Retrieved from http://nrt.org/Production/NRT/NRTWeb.nsf/PagesByLevelCat/Level2UseofVolunteersMOU?Opendocument

United States Coast Guard. (2012, Febuary 22). *National Response Framework and Disaster Funding*. Retrieved February 2, 2013, from National Pollution Funds Center: http://www.uscg.mil/npfc/About_NPFC/nrf.asp

United States Coast Guard. (2012, Febuary 22). *The Oil Spill Liability Trust Fund.* Retrieved May 28, 2013, from National Pollution Funds Center: http://www.uscg.mil/npfc/About_NPFC/osltf.asp

United States Department of Labor: Occupational Safety and Health Administration. *Training Marine Oil Spill Response Workers under OSHA's Hazardous Waste Operations and Emergency Response Standard*. Retrieved May 15, 2013, from https://www.osha.gov/Publications/3172/3172.html