



THEN & NOW

**35 Years After the
Exxon Valdez Oil Spill**



"What we have learned and what is very important is that we can make a difference, and that we have made a difference."

Stan Stephens, 2013



Members of the Council's Board of Directors in Homer, Alaska, September 2023

"Because the further we get away from that event, the more complacency builds. Stan Stephens often said 'the biggest threat isn't another spill, it's complacency.'"

Bill Walker, 2023



Those interested in reading more about the history of the Exxon Valdez oil spill and the creation of the Council can check out these and other publications by scanning the QR code on the left or by going online: www.tinyurl.com/PublicationsHistory

Cover, left: Tangled boom, now useless, drifts in Prince William Sound after the Exxon Valdez oil spill, June 4, 1989.

Cover, right: Boom is successfully deployed during annual training for Alyeska's Ship Escort Response Vessel System, or SERVS, contracted fishing fleet in 2023.

Cover, background: An Alyeska/SERVS contracted fishing vessel practices deploying boom during annual training.

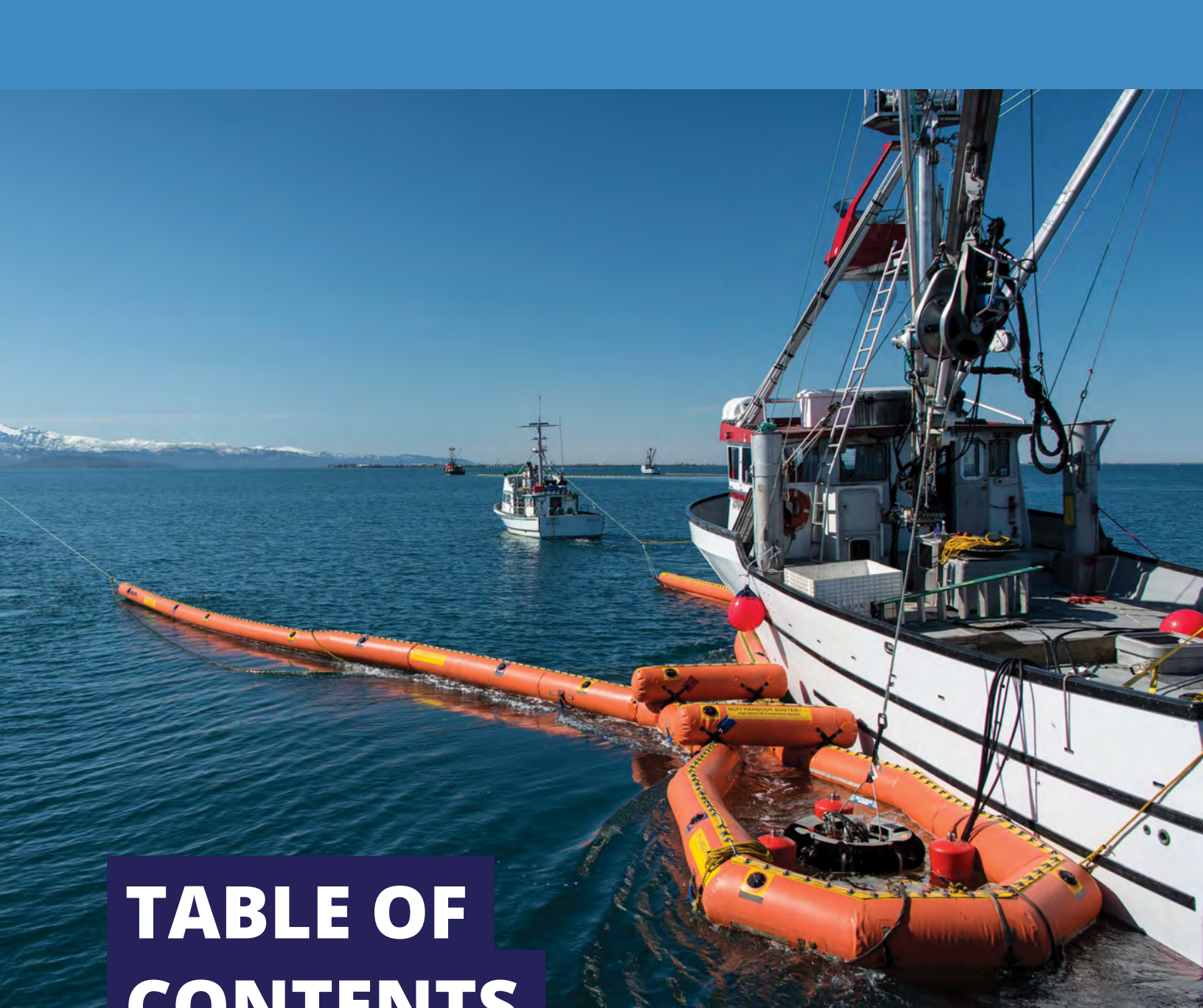


TABLE OF CONTENTS

Local fishing vessels practice pulling oil spill boom in proper formation during annual training in Homer.

- | 02 | About the Council
- | 04 | Fighting Complacency
- | 06 | Changes in Laws and Regulations
- | 10 | Preventing Oil Spills
- | 16 | Cleaning Up Spilled Oil
- | 24 | Environment
- | 30 | Valdez Marine Terminal
- | 34 | What is Left to Improve?
- | 38 | Continuing the Mission

ABOUT THE COUNCIL



Prince William Sound, Alaska.

Those with the most to lose from oil pollution must have a voice in the decisions that can put their livelihoods and communities at risk.

| Our Mission |

The Prince William Sound Regional Citizens' Advisory Council is an independent, nonprofit corporation whose mission is to promote the environmentally safe operation of the Alyeska Pipeline Service Company's Valdez Marine Terminal and associated oil tankers. The Council derives its authority from the federal Oil Pollution Act of 1990 and from a contract with Alyeska. The contract with Alyeska guarantees the Council's independence from industry while also providing the operating funds for the organization.

The Council works to observe, verify, advise, and inform government, citizens, and industry about the

safety of crude oil transportation through Prince William Sound. Our member organizations represent communities impacted by the Exxon Valdez oil spill, as well as Alaska Native, aquaculture, commercial fishing, environmental, recreation, and tourism interests.

| How Does the Council Work? |

The Council would not be able to fulfill its mission without many dedicated volunteers who work endless hours on our Board and committees. Our volunteers are interested local citizens and technical experts who participate in our work to keep the environment and our communities safe from a future spill.



Why Does the Council Work?

Over the last 30 years, we have concluded that several elements are critical to making citizen oversight work:

AUTHORITY

Every citizen oversight group needs clear authority to monitor and oversee oil industry operations. In our case, that authority comes from the federal Oil Pollution Act of 1990, as well as from our contract with Alyeska.

FUNDING

Our mission is to minimize the environmental impacts from the oil terminal and tankers transiting the Sound. Conducting technical research, monitoring tanker and terminal operations, and evaluating industry and government proposals are costly undertakings. Thus, adequate funding, provided by the industry that has the potential to spill or otherwise cause environmental damage, is another key element to successful citizen oversight.

INDEPENDENCE

The internal structure of governance and control of its budget must be left up to the oversight group. Council Board members are appointed by our member entities. None of the Council seats are appointed by the oil industry, or by any agency or elected official of the state or federal government, and the Council's budget is developed at the Board's discretion.

ACCESS TO INFORMATION

The group must also have access to industry facilities, personnel, and, ideally, records on the same basis as regulators. It must also have the ability to hire experts to cover subjects as it sees fit.

The Council is a voice for the people, communities, and interest groups in the region oiled by the Exxon Valdez spill.

The Council monitors, reviews, and makes recommendations on:



Oil spill prevention and response plans prepared by Alyeska and by operators of oil tankers



Environmental protection capabilities of Alyeska and the tanker operators, as well as on the environmental, social, and economic impacts of their activities



Government policies, permits, and regulations relating to the oil terminal and tankers

FIGHTING COMPLACENCY



Responders clean a beach after the Exxon Valdez oil spill.

On March 24, 1989, the Exxon Valdez struck Bligh Reef, resulting in the worst oil spill from a tanker in U.S. history.

The super tanker had departed Valdez, left the tanker lanes to avoid icebergs from Columbia Glacier, and failed to return to the lanes. Shortly after midnight, it struck Bligh Reef, less than 30 miles from port. An estimated 11 million gallons of North Slope crude oil poured into the pristine waters of Prince William Sound, fouling beaches and marine life as far away as the Alaska Peninsula. The disaster devastated the environment and local communities and sent local economies into a tailspin.

While the immediate cause of the spill lies with the tanker's captain and crew, complacency on the part of the oil industry and regulatory agencies played a part in the disaster. Regulatory agencies failed to establish proper oversight measures and industry

failed to ensure a prompt and effective cleanup. While some citizen activists were calling for safety improvements in Prince William Sound long before the grounding of the Exxon Valdez, their voices were largely ignored.

| Improvements Began Soon After the Spill |

In 1989, the few measures in place were inadequate to prevent the spill and the available response resources were inadequate to contain and clean it up.

Much has improved in the intervening decades. In the years following the spill, regulatory agencies, industry, and citizens worked together to make sure the painful memories and hard lessons of the Exxon

Valdez were not forgotten. Changes were enacted to reduce the chances of another spill and to prepare for an effective and efficient cleanup if another should occur. A few of those changes you will read about in this retrospective are:

- The tanker fleet has switched to double hulls, greatly reducing or eliminating the potential for spills resulting from low energy groundings or collisions.
- Loaded tankers are escorted from Valdez to the Gulf of Alaska by two powerful tugs designed to keep a disabled tanker off the rocks and begin cleanup if there is a spill.
- Detailed contingency plans for preventing and cleaning up spills are now mandatory.
- Measures are in place to reduce the risk of a human-caused error.
- Citizens are guaranteed a voice in safety planning and in oversight of the Prince William Sound oil transportation industry.

| Formation of the Council |

Of all the changes in Prince William Sound since 1989, perhaps the most innovative and significant was the establishment of permanent, industry-funded citizen oversight. The Prince William Sound Regional Citizens' Advisory Council was formed as a nonprofit corporation in December 1989, nine months after the spill. Two months later, Alyeska signed a contract guaranteeing funding for the Council, establishing its responsibilities, and guaranteeing its independence. The Oil Pollution Act of 1990 was signed into law in August of that year. It included citizen-oversight provisions that bolstered the Council's authority and responsibilities.

Throughout the world, most oil development still takes place without citizen involvement. In Prince William Sound, many of the safety improvements now in place are a direct result of partnerships between industry, regulators, and citizens.



An escort tug practices emergency towing maneuvers during an exercise.



The oil impacted approximately 1,300 miles of shoreline, up to 460 miles from the spill site.

| The Voices of Citizens Fight Against Complacency |

Despite many improvements, much remains to be done. As we move past the 35th anniversary of the spill, constant vigilance is needed to prevent a return to the complacency that allowed the Exxon Valdez spill to happen. This report details not only the progress that has been made, but also areas where work is still needed so that history will not repeat itself.

CHANGES IN LAWS AND REGULATIONS



Responders prep oil spill boom for deployment during an exercise.

Many of the changes enacted after the spill are now required by law. Regulations have been strengthened to protect our region.

| Changes to Alaska's Laws and Regulations |

Prior to the Exxon Valdez spill, the oil spill contingency plans for Prince William Sound lacked detail and were not effectively implemented. Spill response duties were assigned to personnel with other day-to-day operational tasks, and equipment was not adequately maintained and available.

As a result, the initial response in 1989 was slow, ineffective, and poorly coordinated.

The potential size of a spill determines the amount of resources and equipment that must be available for response. Alyeska's 1987 contingency plan said a spill of 8.4 million gallons (three quarters the size of the Exxon Valdez spill) was highly unlikely. It stated, "Catastrophic events of this nature are further reduced because the majority of tankers calling on Port Valdez are of American registry and all of these are piloted by licensed masters or pilots." Since then, state and federal agencies have expanded plan requirements and changed some assumptions.

Now, both federal and state laws require more comprehensive planning for larger spills and require more spill response equipment to be immediately available.

| Oil Pollution Act of 1990 |

Soon after the Exxon Valdez spill, it became apparent that response resources, especially federal funds, were lacking and that federally required compensation to those affected was not enough. One of the most important results of the oil spill was the enactment of the federal Oil Pollution Act of 1990, or OPA 90, which addressed both of these deficiencies.

OPA 90 addressed a wide range of problems associated with preventing, responding to, and paying for oil pollution incidents in U.S. waters:

- Amended the Clean Water Act
- Addressed issues with liability and compensation for damages from spills
- Significantly increased federal oversight of maritime oil transportation
- Required drug testing
- Defined manning standards
- Provided greater environmental safeguards throughout the country

Several requirements were specific to Prince William Sound:

- All tankers calling in Prince William Sound were required to have double hulls
- All tankers must install a specialized set of equipment for towing
- Established two regional citizens advisory councils to provide oversight of the oil industry in Cook Inlet and Prince William Sound by local citizens, those with the most to lose from oil pollution



The Oil Pollution Act of 1990 was signed into law by President George H.W. Bush.

The Governor of Alaska issued an emergency order two weeks after the Exxon Valdez spill. That order gave Alyeska 38 days to develop and implement a system that could handle another similar spill or else risk shutdown of the Trans Alaska Pipeline System, including the terminal.

An unlikely alliance of regulators, politicians, oil industry executives, and international spill response experts came together to answer this challenge and reimagine oil spill preparedness and response for Prince William Sound.

Their story is documented in a Council report: www.bit.ly/ExxonValdezLegislation



An orca swims through Prince William Sound, Alaska.

| Major Changes from OPA 90 |

CITIZENS COUNCILS

OPA 90 required regional citizens' advisory councils to be funded by the oil industry in two regions with heavy oil transportation in Alaska. The Prince William Sound Regional Citizens' Advisory Council was designated as one and the Cook Inlet Regional Citizens Advisory Council was established as the other. These councils are designed to promote partnership and cooperation among local citizens, industry, and government, and to provide citizen oversight of environmental compliance by oil terminals and tankers.

REGULATORY OVERSIGHT

The U.S. Coast Guard, Bureau of Land Management,

Modern oil spill contingency plans don't just deal with cleaning up oil spills, they also focus on preventing spills from occurring in the first place.

Read more about Alaska's oil spill contingency plan on page 19.

and the Alaska Department of Environmental Conservation have the primary responsibilities of regulatory oversight and monitoring of Prince William Sound's terminal and tanker operations.

After the spill, the U.S. Coast Guard and the Alaska Department of Environmental Conservation were

Oil Pollution Act of 1990's Purpose for Citizen Oversight Councils



To promote partnership and cooperation among local citizens, industry, and government



To build trust



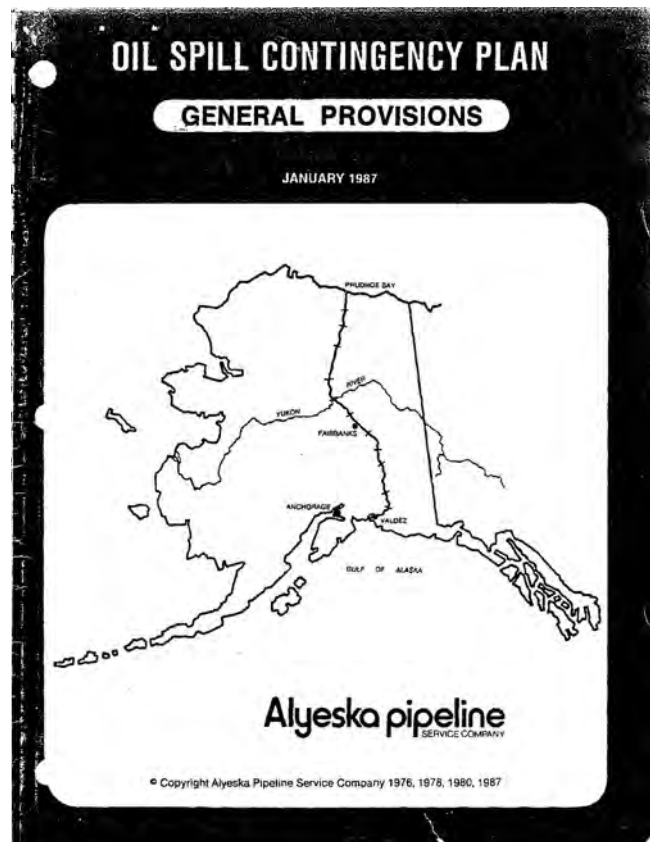
To provide citizen oversight of environmental compliance by oil terminals and tankers

criticized for failing to implement and enforce proper prevention and response measures. Many improvements have been made since the spill to address these shortcomings. At the federal level, the U.S. Coast Guard has been given a more direct role in spill prevention and response with greater regulatory oversight. The Alaska Department of Environmental Conservation now has the authority to regulate terminal and tanker operations and the agency formed the Division of Spill Prevention and Response to oversee oil-related functions. Its responsibilities include oversight of spill responses, and industry drills and exercises; conducting facility inspections; and reviewing contingency plans from Alyeska and individual tanker companies.

"We realized that there had to be better, more robust state legislation and federal legislation."

Rick Steiner

Hear Rick's story on Exxon Valdez Project Jukebox:
www.tinyurl.com/EVOSHstory



The first oil spill contingency plan for Prince William Sound was created by Alyeska in 1976. By 1989, the plan had been revised several times, most recently in 1987. That version was 191 pages, and included the pipeline, terminal, and tankers. (Cover of 1987 oil spill contingency plan.)

PREVENTING OIL SPILLS



Preventing an oil spill is the most effective way to protect human health and the environment. Since 1989, safety improvements have drastically reduced the risk of another spill like the Exxon Valdez.

One of the powerful tugs that escort oil-laden tankers through Prince William Sound.

| Double-Hulled Tankers |

The Exxon Valdez, a single-hulled tanker, was carrying a full load of North Slope crude when it ran aground on Bligh Reef. A U.S. Coast Guard study found that a double hull could have cut the size of the estimated 11-million-gallon spill by 60-80%. Double-hulled tankers have two steel skins separated by several feet of space, reducing the chances of a spill even if the outer hull is penetrated in a collision or grounding. Double-hulled tankers cannot prevent all oil spills, but they are widely regarded as one of the most effective tanker design features for reducing the number and size of spills. Citizens were calling for their use in the Prince William Sound tanker fleet long before 1989.

In 2001, the first double-hulled tanker designed and constructed specifically for the Prince William Sound oil transportation industry entered service. Commissioned by Phillips Petroleum, now called Polar Tankers, the 895-foot-long Endeavor carries just over 40 million gallons of oil.

OPA 90 required the phase-out of single-hulled tankers by 2015; this transition was completed ahead of schedule for the Prince William Sound tankers.

| Alyeska's Ship Escort Response Vessel System |

The Ship Escort Response Vessel System, known as SERVS, was developed after the Exxon Valdez spill as Alyeska's oil spill prevention and response system.

SERVS maintains a fleet of escort tugs, keeps trained response crews on duty around the clock, and has spill response equipment ready to respond.

TWO TUGS ESCORT OIL-LADEN TANKERS THROUGH PRINCE WILLIAM SOUND

Before the Exxon Valdez spill, each loaded tanker leaving Valdez was escorted by a single conventional tug that turned back several miles short of Bligh Reef. Thus, the Exxon Valdez was unescorted when it ran aground. Now, loaded tankers are escorted by two tugs until they leave Prince William Sound

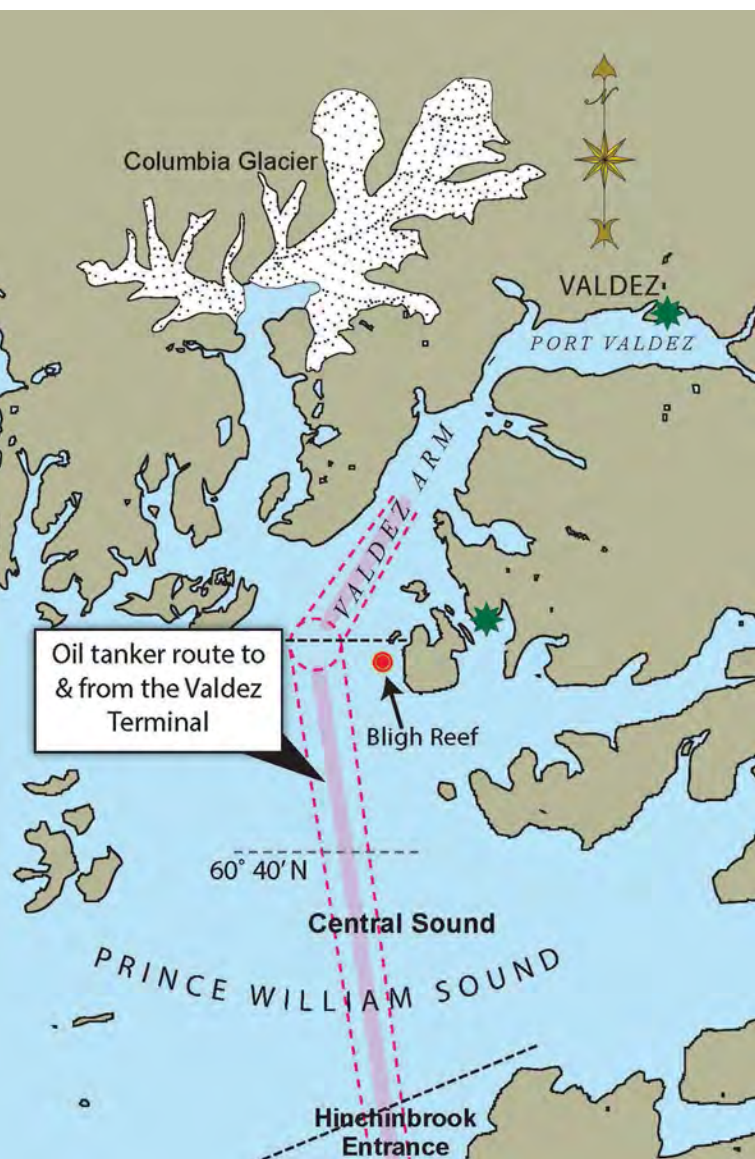
through Hinchinbrook Entrance and pass into the Gulf of Alaska.

The present escort system resulted from a risk assessment study initiated in the mid-1990s by a partnership of citizens, industry, and government. The study reviewed the escort system in existence at the time, as well as practices in waterways management and vessel management. The study concluded that the escort system was the single most effective risk reduction measure in Prince William Sound. The study also recommended improvements to the escort tugs.

EXTENDING REQUIREMENTS FOR ESCORTS TO DOUBLE-HULLED TANKERS

OPA 90 required dual tug escorts only for single-hulled tankers laden with crude oil. This provision was due to sunset with the phase-in of double-hulled tankers. In 2006, the Council called for preserving the two-tug escort requirement for all loaded tankers, whether single or double-hulled, and for a limit of two loaded tankers in the system at any one time. The requirement for dual escort tugs was institutionalized in the U.S. Coast Guard Authorization Act of 2010, due to continued Council pressure. Now, regardless of hull configuration, two tugs escort every laden oil tanker transiting Prince William Sound.

The SERVS mission is to prevent oil spills by helping tankers navigate safely through Prince William Sound and to begin immediate response if there is a spill.



Under current practices, both tugs must remain within a quarter mile of a laden tanker in northern Prince William Sound. Tankers passing through Valdez Narrows and into the Valdez Arm are limited to a speed of 10 nautical miles per hour (knots). They must also have an escort tug tethered to their stern due to limited room for maneuver if there is a problem. In the more open waters of the central Sound, the speed limit for loaded tankers increases to 12 knots (about 14 miles per hour). In this area, one escort tug must remain near the tanker. A limit of 10 knots is set for transiting Hinchinbrook Entrance to the Gulf of Alaska. One tug must stay near Hinchinbrook Entrance until the loaded tanker passes into the Gulf of Alaska and is at least 17 miles out to sea. (Map of tanker lanes.)

IMPROVEMENTS TO TUG TECHNOLOGY

The Council has dedicated significant resources to evaluate the escort tugs. These efforts include:

- Participation in the international Safe Tug project to study the performance of tugboats assisting large vessels while operating in areas exposed to significant wind, wave, and currents.
- Research on escort tug winches, towlines, and tethering systems.
- A study that verifies class standards for escort tugboats.
- A study of the best technology for escort tugs in use around the world.
- Research on devices used to deploy messenger lines between rescue tugs and tankers in distress.
- An assessment of the best design and equipment for a rescue tug stationed at Hinchinbrook Entrance.

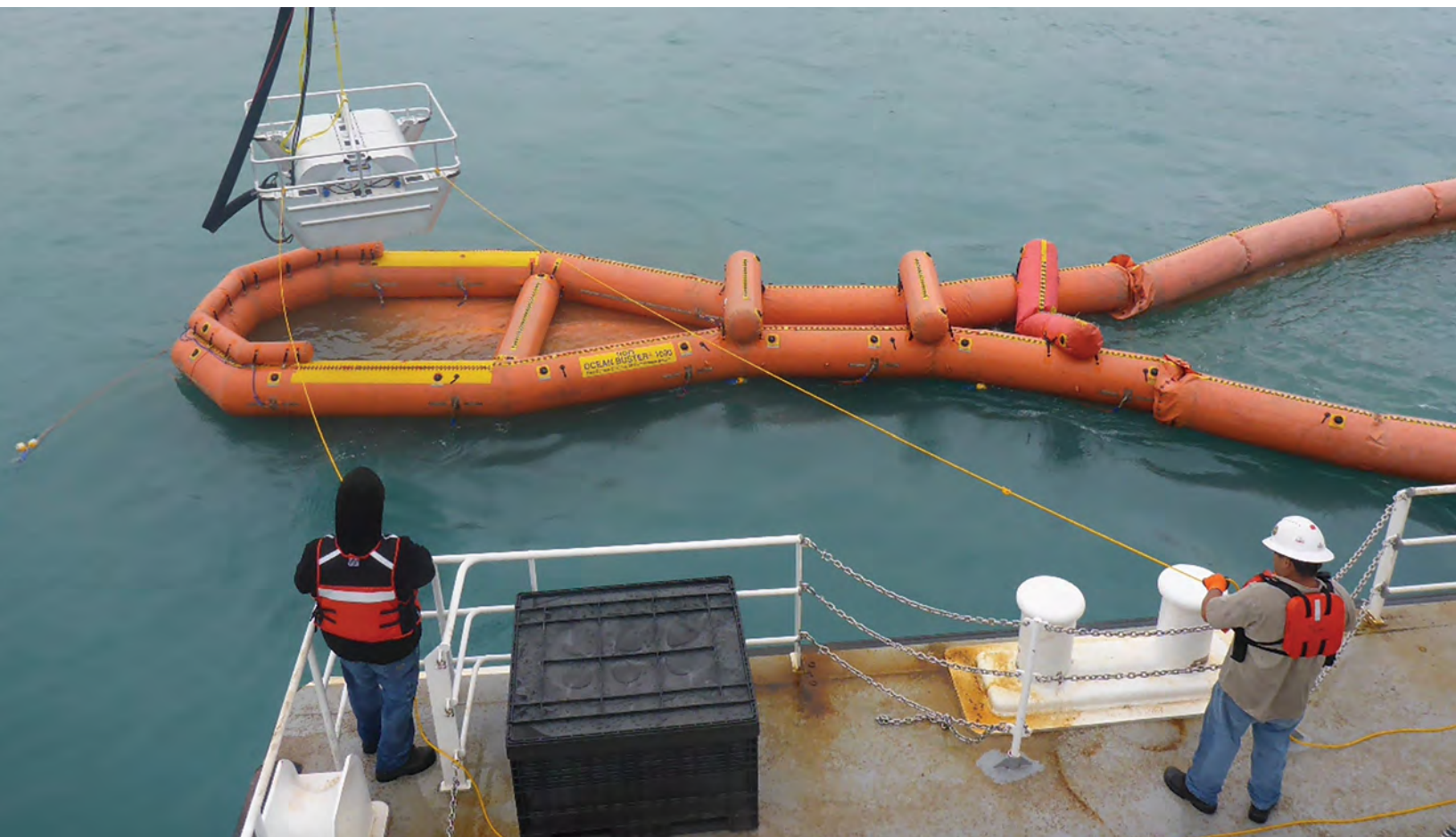
NEW TECHNOLOGY

New Escort Vessels:

In 2018, Alyeska selected a new spill prevention and response contractor, Edison Chouest Offshore. The change included five new escort tugs, four new general-purpose tugs, a utility tug, and four new open-water response barges, representing a significant improvement for the oil spill prevention and response system. In some cases, new general-purpose tugs replaced conventional tugs that were over 40 years old. In 2023, a new purpose-built lightering/open water recovery barge was added.

Winches:

The new vessels are equipped with “render/recover” winches. These winches automatically maintain constant tension on a line, improving safety and performance.



The combination of the new Crucial skimmers with Buster boom systems have increased oil skimming efficiency since 1989.

Skimmers:

The barges now carry “coated disc skimmers.” These oleophilic, or oil-loving, skimmers pick up far less water, leading to greater oil recovery efficiency overall and less storage requirements.

Oil Spill Boom:

Modern “Buster” boom systems help contain and control spilled oil with minimum loss at low speeds and in varying sea states. The Busters separate and temporarily store the oil, helping responders gather more oil in one place for more efficient skimming.

HUMAN FACTORS: IMPROVING PROCEDURES

A navigational mistake, not a hardware malfunction, was the primary cause of the Exxon Valdez spill.

While the tanker left the shipping lane to avoid ice that had drifted from Columbia Glacier, the captain, who was intoxicated according to the National Transportation Safety Board, failed to make sure that the tanker corrected its course in time to avert the grounding.

While double hulls and other technological improvements can reduce the frequency and severity of spills, they may not affect the chain of human errors at fault in many accidents. Some of these safety improvements may give a false sense of security, which can lead to complacency.



New purpose-built tugs and response barges were introduced in 2018 by SERV'S new marine services contractor, Edison Chouest Offshore.

Efforts to reduce the likelihood of human error include:

- Now, all captains are given breath tests an hour before sailing and any crew member suspected of consuming alcohol is tested. Tanker captains were not subject to alcohol tests prior to 1989.
- Each tanker leaves port with a state-certified pilot, who stays aboard until the tanker passes Bligh Reef. In 1989, the pilots departed from the tankers at Rocky Point, 10 miles shy of Bligh Reef.
- Today, crews receive more training and work hours are limited in an effort to reduce fatigue-related accidents.

In 2009, the SERV'S tug Pathfinder was conducting a standard scouting operation looking for Columbia Glacier ice when it ran aground on that same Bligh Reef. The Pathfinder sustained extensive damage along its keel and two center fuel tanks, releasing an estimated 6,410 gallons of diesel fuel into Prince William Sound. An investigation determined that the captain and first mate disregarded policy and procedure, causing the crew to lose situational awareness.

Corrective actions initiated after the 2009 incident include:

- A new focus on safety culture and individual practices and habits.

- Training to improve communication between crew members responsible for navigation and training with the entire crew as a group.
- Increasing training using computer simulations.
- Highlighting the need for situational awareness.
- Promoting a work environment that encourages crew members at all levels to speak up if they see a safety problem.

Now, the U.S. Coast Guard tracks tankers and other vessels in Port Valdez and much of Prince William Sound with better technology, including an Automatic Identification System.

Course on Shiphandling Customized for Alaska:

In 2022, the Council commissioned AVTEC Maritime Training Center in Seward, Alaska, to develop a shiphandling course specific to our region. The scenarios are based on real activities and use high-resolution data previously funded by the Council. Both the basic and advanced shiphandling courses received approval by the U.S. Coast Guard and were added to the AVTEC schedule.

MONITORING VESSEL TRAFFIC

Before the Exxon Valdez spill, only limited radar coverage of tanker operations existed in Prince William Sound. The U.S. Coast Guard's radar did not detect the grounding at Bligh Reef, less than 30 miles from the agency's Vessel Traffic Center in Valdez. Now, the U.S. Coast Guard tracks tankers and other vessels in Port Valdez and much of Prince William Sound with better technology, including an Automatic Identification System, or AIS. This system helps reduce accidents by monitoring the navigational status of large ships in real time, including speed and direction of travel.

Alyeska also upgraded its reporting and communications by installing repeater towers to improve communications between tankers and the terminal.

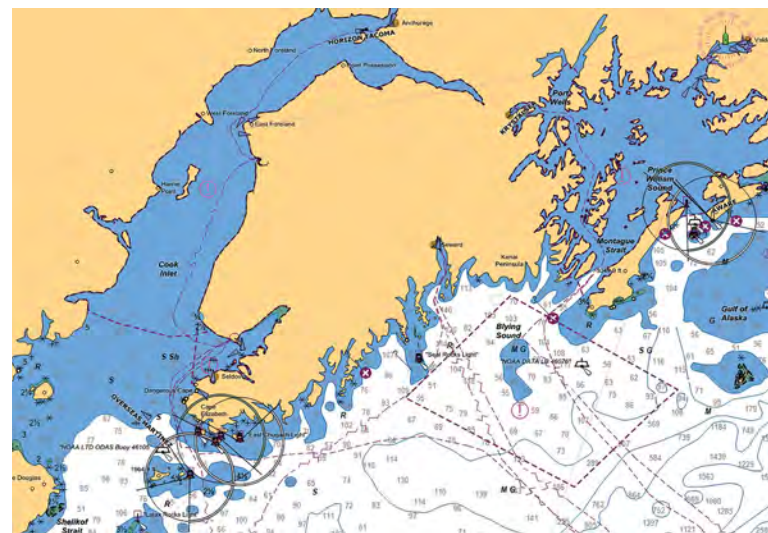
The Council maintains a subscription to the AIS which allows staff and volunteers to monitor vessel movements.

ICE FROM COLUMBIA GLACIER

Columbia Glacier ice caused another accident in 1994, when the tanker Overseas Ohio struck an iceberg and suffered about \$1 million in hull damage. Luckily, the Ohio was inbound at the time and not carrying crude oil. It is likely that the iceberg was mostly submerged and therefore invisible to the crew.

In the 1990s, ice from Columbia Glacier was considered one of the most significant risks to crude oil tankers. However, Council studies completed between 2012-2015 show that the glacier has now retreated far enough that much of the ice melts before it reaches the shipping lanes.

To help avoid the ice that does make it to the shipping lanes, tankers and escort tugs now carry equipment on board that can detect ice in the water, both day and night, and ice navigation procedures have improved.



Vessel movements are tracked through AIS, an online map-based monitoring system.

CLEANING UP SPILLED OIL



1989

Spill prevention is the highest priority for the safe transportation of crude oil, but even the best prevention measures are not completely fail-safe. Thus, a top-notch response system is also vital.

Industry and regulatory agencies must be prepared with adequate equipment ready, people trained, and plans in place to mount an immediate, large-scale response in the event of a spill.

Today, systems are in place to coordinate industry and government roles and responsibilities in a spill response, including training and equipment requirements.



Not only was the cleanup after the Exxon Valdez oil spill difficult and expensive, it was impossible. There are still pockets of oil just under the surface of a few beaches in Prince William Sound. An early and fast response would be critical if another spill of this size were to occur. Top photo: Oil from the Exxon Valdez on a beach shortly after the spill. Bottom: Lingering oil from the Exxon Valdez on Eleanor Island.



Tom Copeland was frustrated by the ineffective and slow cleanup response after the Exxon Valdez oil spill. He took matters into his own hands and collected oil in 5-gallon buckets.

| Alyeska's Response System |

Alyeska's SERVS must be ready to clean up an oil spill at any time. They maintain equipment on board escort tugs and response barges, and in strategically placed locations around Prince William Sound. They also ensure that local fishing vessel crews are trained and prepared to help respond quickly.

PROTECTING SHORELINES

Since 1989, more emphasis has been placed on protecting shoreline and wildlife from spills. Economically important hatcheries and important natural and cultural resources are identified ahead of time, and special strategies are developed for protecting these areas.

The term "nearshore response" describes efforts to protect shorelines threatened by spilled oil that escapes initial containment. Nearshore cleanup tactics differ from those used in open water because the oil is spread out and thin, as opposed to thick oil that is usually found near the initial spill site. More task forces are needed to find and collect the scattered oil.

"[Commercial fishermen] are professionals at leaving port, going out into the wilds of the coastal sea, collecting vast amounts of organic material, and bringing it back to town. That's our specialty. It's just like going seining. Every way you look at it, it's much easier than salmon. We don't see it as a 'mission impossible' to go out there and collect a major oil spill."

Tom Copeland

Hear Tom's story on Exxon Valdez Project Jukebox
www.tinyurl.com/CopelandEVOS

Industry groups, regulatory agencies, and the Council have worked cooperatively to develop and refine nearshore response plans.

FISHERMEN TRAINED TO HELP

Crews of fishermen and other local mariners from approximately 400 vessels around Prince William Sound, the Kenai Peninsula, and Kodiak Island are now under contract with Alyeska and trained to help with nearshore response. During the Exxon Valdez oil spill, local fishermen's knowledge of their regional waters proved incredibly valuable.

Alyeska conducts annual training for these crews on equipment operation and tactics for collecting oil. The fishermen have a chance to physically handle and use state-of-the-art response equipment. They also participate in spill exercises and drills throughout the year.

The oil industry is much better prepared today for nearshore response than it was 35 years ago, but there is still room for improvement. Ongoing training, better technology, and vigilance are required to maintain readiness.



Contracted fishing crews now receive training every year to ensure they are ready to help respond to a spill.

The response to the Exxon Valdez spill was widely criticized as poorly coordinated and largely ineffective. The weather was ideal for spill response for three days after the grounding, but the equipment and responders were not ready.

EQUIPMENT READY TO GO

Alyeska's SERVS is now considered one of the best-equipped oil spill response forces in the world and is responsible for ensuring that adequate response equipment is ready for use against a spill.

In 1989, there were only 13 oil-skimming systems in Alyeska's response inventory; today there are 90 with a total recovery capacity calculated to achieve over 12 million gallons in 72 hours. Only five miles of containment boom were available in 1989; today, approximately 40 miles are on hand.

Storage capacity for recovered oil was a huge problem in the 1989 recovery effort. Only one 500,000-gallon

barge was available at that time to store recovered oil and the water that comes with it. Boats would pick up the emulsified oil (oil that has mixed with seawater into a substance that sometimes resembles chocolate mousse), only to find there was nowhere to put it. Alyeska now maintains storage capacity for over 37 million gallons of recovered oil and water mixture, much of it on barges. Many of the newer skimmers that Alyeska has brought on in recent years are designed to pick up less water.

Alyeska maintains depots of spill response equipment and materials at communities throughout the Sound, including Valdez, Cordova, Whittier, Tatitlek, and Chenega, as well as at five

salmon hatcheries. In addition, response barges are anchored at remote locations in the Sound and crewed 24 hours a day for rapid action.

If a large spill were to occur, more equipment would need to be brought in from other regions. In 2022, the Council sponsored a study looking at how much equipment would be needed, where this equipment would or could come from, and what sharing agreements are in place. The researchers found that storage equipment for recovered oil could be limited during a large spill, due to various factors.

A response will be successful only if equipment is ready, personnel are trained, and all parts of the system are effectively coordinated

IMPROVED COMMUNICATIONS AND COORDINATION DURING A SPILL

Responders in Prince William Sound use the Incident Command System. This standardized organizational management structure was developed in the 1970s by firefighters in California to coordinate management, resources, and roles during fire response. The system engages the U.S. Coast Guard, the State of Alaska, and the party responsible for the spill in a Unified Command structure that expands according to need. The system is practiced and tested extensively during drills.

RESOURCES TO SUPPORT REGIONAL STAKEHOLDER COMMITTEE

In 2021, the Council created web-friendly materials to support a Regional Stakeholder Committee, which is unique to Alaska. During a large spill, the Unified Command may set up this committee and invite stakeholders affected by the incident to participate. Members get an opportunity to meet with the response decision-makers to discuss local concerns and help identify resources that could be useful to the response. The materials and associated toolkit were developed to help make the process more consistent and productive.

| Spill Contingency Plans |

Anyone who transports oil in bulk must have a government-approved contingency plan in place for

Alyeska's Response Inventory Today



90

Oil Skimmers



37M

Gallons of Storage for Recovered Oil



~40

Miles of Containment Boom

preventing and responding to spills.

Those who are required to have contingency plans must provide assurances that personnel are being trained, equipment and resources are available and ready to be mobilized quickly, and all participants have practiced their roles in preparation for an actual spill.

Requirements vary based on location, the type of vessel or facility, and the amount and type of cargo involved. Contingency plan holders must have enough equipment to clean up a spill of 12 million gallons (or 300,000 barrels) within 72 hours.



Starting around 2003, a series of towlines broke during training exercises. Crowley Marine Services, which operated the tugs for Alyeska at that time, worked with the towline manufacturer to understand and address the problem. These failures underscored the importance of exercises and showed the need for continued close monitoring of the system.

PLANS SPECIFIC TO PRINCE WILLIAM SOUND

Alyeska maintains its own contingency plans for the terminal. The shipping companies maintain a joint plan, supplemented by individual plans tailored to each shipper's vessels.

The tanker owners and operators contract with Alyeska to provide the initial response for up to the first 72 hours after a spill. After that, management is transferred to the company responsible for the spill as long as the U.S. Coast Guard and the Alaska Department of Environmental Conservation agree that they or their representative is ready to take over.

ENSURING PLANS KEEP IMPROVING

By law, these contingency plans are required to be reviewed and updated every five years. Changes

or improvements may be made during this regular cycle. The Council participates when any of the Prince William Sound plans are updated by providing comments and recommendations on the technical documents to regulating agencies for consideration.

A System of Collaboration:

During the early 2000s, when Alyeska began work on its five-year contingency plan renewal for the terminal, controversial issues arose. A working group was created with regulators, industry, and the Council to tackle these issues. This collaborative process addressed and resolved some issues, and produced an improved plan to prevent and respond to spills.

Over the years, the working relationship between Alyeska, regulators, and the Council has ebbed and flowed. While the Council aims for collaborative

problem solving, sometimes this is simply not possible. However, the Council continues to regard this working group as a mechanism to try to ensure the kind of collaboration and cooperation needed to maximize the safety of crude oil operations and transportation in Prince William Sound.

Documenting Planning History for Tankers:

In 2022, the Council commissioned a report that documented the history of the contingency plan for Prince William Sound oil tankers. The comprehensive report chronicles the long-term history of how contingency planning issues were identified and addressed during approvals, how contentious issues were resolved, and what issues remain outstanding.

Room for Improvement:

Contingency plans have helped ensure that measures are in place to prevent and respond to a spill, but there is room for improvement. For example, the plans do not well define how a response would proceed if a spill should once again spread outside of the Sound.

Exxon Valdez oil reached communities as far away as the western beaches of Kodiak Island and the eastern shores of the Alaska Peninsula. Communities in these downstream areas do not have the same response systems or equipment as is stationed in Prince William Sound. If another spill sent oil in their direction, the necessary equipment for protecting hatcheries, salmon streams, beaches, wildlife, and other local resources might not be readily available.

The Council supports developing plans for downstream communities, including a timeline for when oil might reach them and estimates of the personnel and equipment that would be needed to respond.

PRACTICING AND TESTING DURING DRILLS AND EXERCISES

Before 1989, few drills were held to test prevention and response plans for tanker companies and the Alyeska terminal. Today, contingency plan commitments, and State and Federal regulations drive a variety of exercise and training activities. In 2023, Alaska regulations were changed to require

Alaska's requirement for using best available technology helped lead to a number of oil spill prevention improvements, such as:



Leak Detection Technology



Improved Tug Escorts for Tankers



Tank Overfill Controls



Corrosion Control



Tanker docked at the Valdez Marine Terminal.

one exercise for every five-year planning cycle, though contingency plan commitments and training equate to far more activity than just that alone.

These drills allow response personnel to learn about equipment and procedures for cleaning up a spill. They also coordinate the efforts of Alyeska, regulatory agencies, contracted fishing vessels, tanker owners and operators, and the Council.

INCORPORATING TECHNOLOGICAL ADVANCES

Alaska law requires that best available technologies are used in the prevention and response system in Prince William Sound. First passed in 1980, the law has been updated several times since the Exxon Valdez spill to define how new technologies are incorporated into contingency plans. The oil industry is now required to review technologies every time a contingency plan is renewed.

GEOGRAPHIC RESPONSE STRATEGIES

Prince William Sound has thousands of miles of shoreline that support clamming beaches, salmon streams, hatcheries, and other environmentally fragile areas that could be threatened by spilled

oil. Important coastal cultural sites are also found throughout the area.

The Council has worked cooperatively with industry and regulatory agencies to develop detailed Geographic Response Strategies. These strategies are site-specific and describe tactics responders can use to protect the areas most sensitive to oil. They are developed in advance to save time during the critical first few hours of an oil spill response.

Strategies have been developed for Prince William Sound, Cook Inlet, and Kodiak Island. These strategies are continually tested during exercises and updated.

PLACES OF REFUGE

The Council began studying the issue of tankers in distress following the 2002 tanker Prestige spill of 4 million gallons off northwest Spain. The Council subsequently participated in a process initiated by the Alaska Department of Environmental Conservation that resulted in the creation of a “places of refuge” matrix and detailed plans being incorporated in the contingency planning process. A place of refuge is an area where a disabled tanker could take shelter while repairs are made.

While the expertise of ship captains and licensed pilots were systematically included in this effort, there is little actual experience in using these places of refuge. In 2016, the Council had the opportunity to use a high-fidelity ship bridge simulator at the AVTEC Alaska Maritime Training Center in Seward to test these refuge sites. The simulator allows this to be done in a zero-risk environment.

SHOREZONE MAPPING

In an effort to improve response planning, the Council participated in a partnership project to video map the shoreline—or shorezone—of Prince William Sound in the summer of 2004. Researchers shot aerial video of shorelines during low tides. The video, along with detailed maps, forms a database of the nearshore environment for planning and conducting oil spill response, as well as education and research.

In 2009, the Prince William Sound and Cook Inlet Councils were two of several partners to receive the Coastal America 2009 Spirit Award for the collaborative Alaska ShoreZone Mapping and Imagery Project.

PROTECTING REGIONAL SPECIES FROM OIL SPILLS

In 2016, the Council worked with the Prince William Sound Science Center to complete a biological resource inventory of winter species in the Sound. The goal of this project was to develop a detailed bibliography documenting the presence of all wildlife studied in the Sound during the winter since 1989. This project also identified gaps in knowledge regarding the Sound's winter species to be filled by future researchers.

Separate multi-year surveys of forage fish (2019-2022), and marine birds and mammals (starting in 2021) were completed. "Forage fish" are species that are preyed on by larger predators, and include Pacific herring, Pacific sand lance, capelin, and candlefish. The at-sea marine bird and mammal surveys identified important wintertime nearshore habitat and areas of high bird density for protection.

This work provides valuable, scientifically accurate information that can be used by the Council and

others to identify sensitive biological resources. This helps spill responders and spill drill participants improve contingency plans to protect these species and their habitats.

MARINE FIREFIGHTING

A shipboard fire occurring at the terminal or on a vessel at a port in Prince William Sound could cause a major oil spill or loss of life. In light of requirements established by OPA 90 for marine salvage and firefighting contractors, it is important for local, state, and federal entities to train with industry representatives on how to respond to a fire on a tanker or other ship. Over the years, the Council has sponsored nine Marine Firefighting for Land-Based Firefighter Symposiums. Firefighting experts partner with industry stakeholders to present training curriculum that provides an excellent, hands-on experience for all involved.

MONITORING WEATHER TO HELP PREDICT THE PATH OF SPILLED OIL

Weather is an important factor in preventing, containing, and cleaning up oil spills. The Council has advocated for and helped fund projects to study wind, ocean currents, and other environmental factors near the terminal, in Prince William Sound, and in the Gulf of Alaska. This information can also be used to develop and update models to predict the trajectory of spilled oil.

The Council supports three weather stations in our region. Information is collected via the Prince William Sound Weather Station Network, developed and maintained by the Prince William Sound Science Center, and co-funded by the Council. Data is available through the Alaska Ocean Observing System (AOOS).

The Council also maintains two weather buoys in Port Valdez: one near the terminal, the other near the Valdez Duck Flats. The Council works with the AOOS and the National Oceanic and Atmospheric Administration's (NOAA) PORTS® (Physical Oceanographic Real Time System) to share the data. The Council has been analyzing the data to look for weather trends.

ENVIRONMENT

The Exxon Valdez spill brought devastation to Prince William Sound, but tanker spills are not the only threat the crude oil trade poses to the region's environment and residents.

Tatitlek, Alaska, is the closest community to the 1989 spill site. Many residents of coastal communities like Tatitlek depend on food harvested from a clean ocean.



| Less Pollution from Tanker Emissions |

In 2015, a Council study found that the low-sulfur fuel used in oil tankers has resulted in far less air pollution from these vessels than just a few years before.

The study evaluated the air pollution from tankers that traveled through Prince William Sound during 2014, looking at three air pollutants: nitrogen oxides, particulate matter, and sulfur oxides. These pollutants are produced by internal combustion engines and released in a vessel's exhaust. Each of the pollutants can have negative impacts on human health, contributing to heart and lung disease.

STUDY RESULTS

By using 0.1% sulfur fuel, tankers in the Sound reduced emissions by approximately 426 tons of sulfur oxides, 33 tons of particulate matter, and 29 tons of nitrogen oxides annually compared to using 2.7% sulfur fuel. Those changes represent an annual reduction of 96% in sulfur oxides, 80% in particulate matter, and 6% in nitrogen oxides.

REGULATIONS BRING ABOUT CHANGE

These reductions are a result of regulations developed by the International Maritime Organization. To limit these substances, the regulations mandate that large ships either use technologies such as exhaust scrubbers or cleaner fuel to reduce emissions. The tankers in Prince William Sound are complying by burning fuel with a low sulfur content.

| Impacts on People |

Communities affected by the Exxon Valdez spill suffered severe social and economic disruptions in the aftermath of the disaster. The Council-sponsored study of these effects found that man-made, or technological, disasters affect people very differently than natural disasters. These disasters tend to produce a corrosive community characterized by high levels of tension, conflict, litigation, and chronic psychological stress.

Annual tanker emissions reduced by switching to a fuel with lower sulfur levels



426 Ton Reduction in Sulfur Oxide Emissions



33 Ton Reduction in Particulate Matter Emissions



Sulfur Oxide



Annual emissions from approximately

444,000

heavy-duty diesel trucks

From this study, the Council produced “Coping with Technological Disasters – A User-Friendly Guidebook,” which won a Legacy Award from the Pacific States/British Columbia Oil Spill Task Force in 2000. The guidebook, last updated in 2021, offers ways to cope with the economic, social, and personal hardships from a human-caused disaster, such as an oil spill.

The guidebook has been used in other communities following technological disasters, most notably in the Gulf of Mexico following BP’s Deepwater Horizon oil spill in 2010.

The Council developed a peer listener training manual as part of the guidebook to help members of impacted communities learn the skills of active listening to provide peer-to-peer support in the event of an incident. The peer listener manual was adapted by the Mississippi-Alabama Sea Grant Consortium in 2018, and the Council conducted an update to the materials in 2023.

| **Monitoring the Environment for Pollution** |

When oil from the Exxon Valdez hit Prince William Sound, little data was available about the pre-spill environmental conditions that could be used to gauge the impacts of the spill. In 1993, the Council launched its Long-Term Environmental Monitoring Program to compile such information.

The goal of the program is to monitor for oil pollution and any resulting impacts from the operation of oil tankers and the terminal. This is done by analyzing the tissue of mussels and sediments collected from Port Valdez and Prince William Sound.

Laboratory tests “fingerprint” the mussel tissues and sediments to identify the source of any crude oil in them. Exxon Valdez hydrocarbons have been found at several of the sites, but they have declined to almost undetectable levels. Results from 2019 showed that oil contamination in the Sound and Gulf of Alaska had reached all-time low values since monitoring began.

In recent years, the Council has been exploring ways to improve sampling methods, including studying the genetic effects of mussels exposed to hydrocarbons.

The Council also deployed passive sampling devices in Port Valdez to monitor for lower levels and different kinds of hydrocarbons.

This monitoring program provides the longest continuous record of regular hydrocarbon sampling in the region. If there is ever another spill, this data will allow for before-and-after comparisons to help determine its impacts.

| **Recovering Habitats and Species** |

The Council is often asked if Prince William Sound in general, and specifically its wildlife, has recovered since the spill. The Exxon Valdez Oil Spill Trustee Council was created through OPA 90 to oversee the restoration of injured ecosystems after the spill, and they worked with partners to help answer this question.

The spill’s civil settlement helps fund a variety of research and restoration projects in the Sound. Since 1990, the Trustee Council has tracked how different resources have recovered, both naturally and through restoration efforts. As of 2014, most of the species that were obviously damaged by the spill have recovered, as have most of the habitats. Pacific herring, one pod of orcas, and two seabird species, pigeon guillemots and marbled murrelets, are still struggling. The ecosystem seems to have recovered a great deal, but scientists also agree that it is a changed ecosystem since the spill.

| **Lingering Oil** |

Exxon Valdez oil can still be found on the spill’s most heavily oiled beaches. This lingering oil, which has persisted for decades largely unchanged, has been tested and confirmed as Exxon Valdez oil. If disturbed, this lingering oil can be released back into the marine environment.

| **Oil Spill Dispersants** |

Dispersants are chemicals designed to break up floating, spilled oil into droplets that are then scattered into the water column. When conditions are right, this can reduce the amount of oil coating the shoreline, birds, or marine mammals.



Lingering oil can have toxic effects on species such as salmon and herring at much lower levels than previously thought. A Council-sponsored study looked at the effects of crude oil exposure on the embryos of Pacific herring and pink salmon. The fish in the top images were in a control group that was not exposed to oil. The bottom embryos show the physical effects of exposure to very low levels of crude oil, as low as 10-45 parts per billion.

Dispersants are also intended to speed up the natural biodegradation process of the oil.

The use and effectiveness of chemical dispersants in oil spill response have long been a matter of debate.

Industry and some government regulators maintain that dispersants could be a useful tool for dealing with oil spills in Prince William Sound or the Gulf of Alaska, despite the fact that they proved ineffective when tested during the Exxon Valdez response.

The Council has sponsored research to better understand how chemically dispersed oil behaves in the water column and how it affects different species in Alaska. Over the years, the Council has continually done extensive reviews of the latest scientific research on dispersants. Results of our studies have

shown the following:

- To work, dispersants require a considerable level of wave activity to mix the dispersant into the oiled water.
- Dispersants are less effective in cold or less salty waters, such as those in Prince William Sound.

Resurfacing can occur when oil that has been broken apart coalesces and returns to the surface.

In 2005, a National Research Council committee issued a report concluding that the decision to use dispersants after an oil spill should be determined by which part of the marine ecosystem should be protected, either surface waters and shorelines, or water column and sea floor. This committee



The SERVS tug Commander practices spraying water as a substitute for liquid dispersants during an exercise in 2023.

recommended further study on the effectiveness of dispersants on different types of oil in various environmental conditions. It also suggested study of the acute and long-term toxicity of dispersed oil.

The Council has funded projects over the years that found:

- Ultraviolet radiation (a component of sunlight) significantly increases the toxicity of oil to marine organisms.
- Oil becomes two to 450 times more toxic when dispersed and exposed to sunlight. Ninety percent of Pacific herring larvae,

After years of observing dispersant trials, dispersant effectiveness monitoring, advising and sponsoring independent research regarding chemical dispersant use, it is the position of the Prince William Sound Regional Citizens' Advisory Council that dispersants should not be used on Alaska North Slope crude oil spills in the waters of our region.

Until such time as chemical dispersant effectiveness is demonstrated in our region and shown to minimize adverse effects on the environment, the Council does not support dispersant use as an oil spill response option.

Mechanical recovery and containment of crude oil spilled at sea should remain the primary methodology employed in our region.

an important commercial and subsistence fish species formerly plentiful in Prince William Sound, exposed to crude oil during the study were killed or injured.

- Exposing juvenile pink salmon and Pacific herring to chemically dispersed crude oil during their embryonic stage causes enlarged hearts and reduced aerobic performance (swimming speed).
- Dispersants are toxic to the cells and genes of two Pacific whale species.
- Adding dispersants increases exposure of lifeforms in the water column to the oil.

GUIDELINES FOR USING DISPERSANTS IN ALASKA

For years, the Council participated in a working group with the Alaska Regional Response Team (a group of state and federal agencies in charge of oil spill response that guide policy in Alaska) to address questions about dispersant toxicity, effectiveness, and planning.

In 2016, the Alaska Regional Response Team made significant changes to the guidelines for how dispersants are used in Alaska. The updated guidelines improve decision making procedures by requiring tribal and stakeholder input, as well as additional testing and monitoring before and after dispersants are used. The guidelines also eliminate the preauthorization of dispersants in Prince William Sound, which the Council believes is a positive step.

OFFICIAL COUNCIL POSITION ON DISPERSANTS

In 2022, the Council updated its position on the use of chemical dispersants in Prince William Sound and the Exxon Valdez oil spill affected region. This was done following a thorough review of the latest peer-reviewed scientific research on dispersants, an assessment of the most recent dispersants application guidelines for our region, and several workshops guided by experts in the field.

The evidence-based position promotes the use of mechanical recovery and opposes the use of

chemical dispersants on Alaska North Slope crude oil spills in the waters of our region. The Council has long endorsed mechanical recovery (e.g., boom and skimmers) as the primary response tool as, unlike dispersant use, it removes oil from the water. The known harms and potential risks caused by dispersants, in addition to a lack of proven effectiveness and safety, preclude the Council from supporting dispersants. The full position can be found on the Council's website: www.tinyurl.com/2022DispersantsPosition

Oil spill prevention remains the Council's top priority because once oil is spilled there will always be adverse impacts to human health and the environment.

| In-Situ Burning |

In-situ, or "in-place," burning of an oil slick while it is still on the water is another much debated method of treating oil spills. Two attempts at in-situ burning took place on the second day of the Exxon Valdez cleanup. The first attempt ignited 15,000 gallons of crude oil, which burned with high efficiency. Efforts to ignite a second slick were unsuccessful and the strategy was abandoned. The oil had emulsified, making it resistant to burning, and toxic smoke from burning oil could have drifted into the community of Tatitlek.

Burning converts oil from water pollution to air pollution, which still stays in the environment. In December 2004, the Council adopted a position advocating in-situ burning only after mechanical recovery has been ruled out.

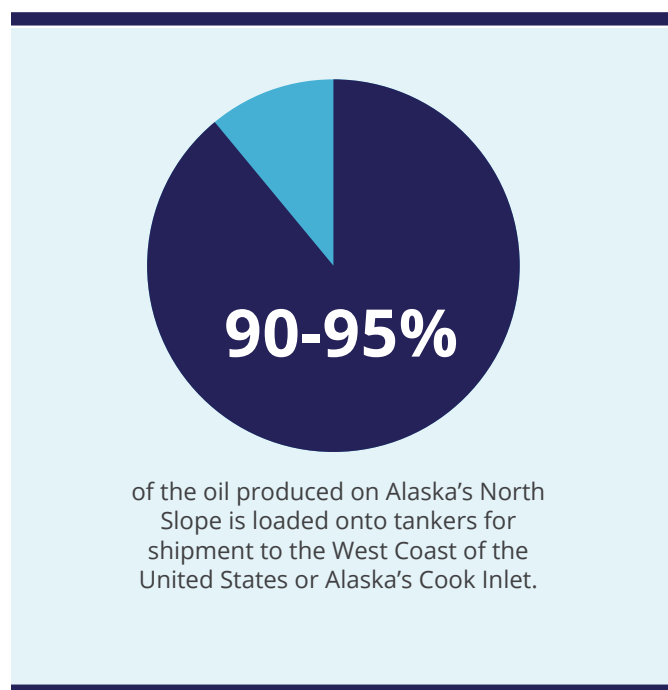
In-situ burning has been useful in certain situations, such as oil spilled onto pack ice or in a contaminated marsh. During the BP Deepwater Horizon spill in 2010, responders found that burning oil in marshes caused less damage than foot traffic from responders. The roots are not damaged and the plants can grow back. Citing concern for the effect of burn residue on sea life, while also recognizing that sometimes burning may be the least damaging or most feasible spill response option, the Council determined that continued research into the method is necessary.

VALDEZ MARINE TERMINAL



Responders practice with oil spill boom near the Valdez Marine Terminal.

The Trans Alaska Pipeline System ends at the terminal facility in Valdez. There, most of the oil produced on Alaska's North Slope is loaded onto tankers for shipment to the West Coast of the United States or Alaska's Cook Inlet (which has one small refinery). The rest of the oil is taken out of the pipeline by a refinery in Valdez.



In the late 1980s, North Slope production peaked at about 2 million barrels of oil (over 84 million gallons) each day. Flow through the pipeline has declined since then, averaging 483,415 barrels (about 20 million gallons) per day in 2022.

Building the 800-mile pipeline from Prudhoe Bay to Prince William Sound cost \$8 billion, took three years, and employed some 70,000 people. Since 1977,

Alyeska Pipeline Service Company has transported oil through the pipeline for over 45 years. In this time, the system has moved more than 18 billion barrels of oil (over three quarters of a trillion gallons).

These impressive statistics serve as a reminder that while the Trans Alaska Pipeline System, including the terminal, is aging, it is still moving large volumes of crude oil that could cause severe damage to the environment if spilled. Constant vigilance of this aging infrastructure is needed to ensure that the necessary inspection and maintenance is performed to assure continued safe operations.

| Controlling Pollution from the Terminal |

On the day the Valdez Marine Terminal began operation in 1977, it was labelled as a Major Source of Hazardous Air Pollutant (HAP) and Volatile Organic Compound (VOC) emissions. While the exact estimate of VOC emissions at the terminal varied across industry, regulators, and independent scientists, all experts agreed it was a Major Source of HAPs.

These emissions are of critical concern, especially benzene, a known and dangerous human carcinogen. The most significant emissions sources in these early years were: 1) uncontrolled tanker loading at the berths; 2) venting from the crude oil storage tanks, to accommodate pressure changes; and 3) the Ballast Water Treatment Facility.

Shortly after its creation, the Council began advocating for terminal emission control and air pollution monitoring programs. Thanks in part to these advocacy efforts, emission controls have been installed and operational for tanker loading, crude oil storage tanks, and the ballast water facility, substantially reducing terminal air pollution. Today, the Council continues to ensure that air pollution levels from the terminal remain at or below current thresholds into the future.

Routine operation of the terminal also still creates ongoing pollution, mostly at low levels, such as from oil residues released into the water. While these emissions are permitted by regulation, they are still a continuing concern for the Council, which strives to reduce associated environmental impacts of the terminal to the minimum feasible levels.

IMPROVED SYSTEM FOR LOADING OIL ONTO TANKERS

For the first 20 years of terminal operations, the most serious pollution came during tanker loading. Each year approximately 43,000 tons of VOCs were vented into the atmosphere from the Valdez Marine Terminal, threatening the health of terminal workers and Valdez residents.

The Council opposed this practice and, after a series of scientific studies, called for a system to capture these vapors. In 1995, the Environmental Protection Agency agreed that a capture system should be required. By 1998, Alyeska had installed and was operating vapor control systems at two loading berths, eliminating nearly all crude oil vapor-related air pollution from tanker loading operations.



Vapors from crude oil are captured and converted into energy that helps power the terminal.

BETTER BALLAST WATER TREATMENT

Contaminated ballast water, used for tanker stability and carried in crude oil tanks, must be cleaned before being discharged into the environment. While vapors from tanker loading operations came under control in 1998, the nearby Ballast Water Treatment Facility continued to release unregulated hydrocarbon vapor emissions into the atmosphere for decades.

The ballast water facility was originally designed to process up to 30 million gallons of unsegregated, or contaminated, ballast water per day, but now handles just under 3 million gallons per year on average. Additionally, the facility processes storm

water run-off from the terminal grounds. The amount has declined because the double-hulled tankers that now make up all of the Prince William Sound fleet rarely use oil tanks to carry ballast water. Also, with less oil flowing through the pipeline, fewer tankers load at the terminal. The Council long urged for the capture of vapors from the ballast water facility. In 2009 and 2010, Alyeska implemented vapor controls at the facility, substantially reducing the ballast water oil-related emissions that were previously released into the Port Valdez airshed.

| Earthquake Resistance |

In an effort to understand the structural integrity and seismic resilience of the terminal, the Council studied the engineering standards used to design and build the facility in the 1970s. The terminal was designed to withstand an earthquake equaling the 9.2 magnitude earthquake that struck Prince William Sound in 1964, which devastated Valdez and many other coastal communities in Alaska.

We now know that the earthquake was more severe than originally thought, which raises the importance of understanding the earthquake resistance of the terminal. The Council has analyzed the stability of containment dikes around storage tanks, slope stability, earth and rock under storage tanks, and structural integrity of oil-handling components and recommended re-engineering in weak areas.

| Upgraded Secondary Containment Wastewater System |

The terminal was constructed with large oil storage tanks, each of which can hold about 500,000 barrels (about 21 million gallons) of crude oil coming in from the pipeline. Should a tank fail and release oil, a secondary containment system is in place, consisting of berms, walls, valves, piping, and a liner. The system also catches freshwater runoff and moves that potentially contaminated water through a wastewater system to the Ballast Water Treatment Facility.

The pipes, manholes, and catch basins that make up that wastewater system were found to be leaking in 2008. This system is buried outside the secondary containment system and could therefore be a

source of environmental contamination. Repairs were initially unsuccessful, however, in 2014, Alyeska began installing high density polyethylene components into one of the secondary containment areas to replace the old, leaking system. This repair proved highly successful. By 2017, Alyeska had completely replaced the wastewater systems in the remaining containment areas. The success of these repairs and the robustness of the material should ensure that leaks should not develop in these important systems for the foreseeable future.

| Better Technology for Inspecting and Repairing Aging Crude Oil Piping |

Starting in 2005, and again in 2012, the Council sponsored studies to look at corrosion in pipes and other oil handling assets at the terminal. Around the same time as the 2012 study, Alyeska found and repaired corrosion under insulation on girth welds on pipes that feed oil to the tankers. Protective coatings, which may have prevented the corrosion, were not used when the terminal was originally built. In some locations, more than 60-70% of the thickness of the pipe had been lost due to corrosion.

Of greater overall concern, the 2012 study found that almost all of the piping (either buried or insulated above-ground) at the terminal had not been externally or internally inspected for corrosion since the terminal's construction in the late 1970s.

Since 2012, Alyeska completed a program to externally inspect all the insulation-covered girth welds and piping over water. The pipe wall was found to have corroded nearly 80% in one location and was subsequently repaired by Alyeska.

The results of the Council's corrosion studies, along with several pipeline incidents, indicated a need to inspect all terminal piping used to move crude oil. Some of this piping was originally deemed to be "uninspectable" because it is buried in concrete or difficult to access for inspection purposes.

The Council conducted studies of inspection technologies between 2012 and 2014, part of which indicated that new technologies were commercially available that could address the needs at the terminal. They also evaluated Alyeska's current



Robotic crawlers such as this one are now used to examine the interior of the pipes.

and planned inspection programs and provided appropriate recommendations. Alyeska developed a sufficient internal inspection program for the terminal's crude piping that would use appropriate inspection technologies.

Between 2016 and 2017, Alyeska began internally inspecting sections of buried and above ground crude oil piping, including over-water piping, with robotic crawler tools. In 2018, Alyeska used more conventional, "free floating," in-line inspection tools to evaluate the condition of the last significant segments of crude oil piping that had not yet been internally inspected since the terminal was built in 1977. The information gained from these internal inspections is vastly increasing the data Alyeska has available to ensure the integrity of crude piping at the Valdez Marine Terminal is adequately maintained now and in the future. No significant corrosion or mechanical damage necessitating repair was found during these internal inspections.

WHAT IS LEFT TO IMPROVE?

Even though Kodiak Island's beautiful shores are hundreds of miles from the site of the 1989 spill, some shorelines were oiled after the spill.

The spill prevention and response system in Prince William Sound has come a long way since 1989, but that doesn't mean that the risk of a spill has been eliminated completely.

| Fighting Complacency |

As more time passes since the Exxon Valdez spill, the Council's concern about complacency setting in grows. Our job is to combat complacency to ensure the system remains one of the greatest spill prevention and response systems in the world.

The Council has become increasingly concerned about rollbacks or weakening of state and federal regulatory agencies. Accordingly, time and resources are allocated to monitoring and commenting on potential changes in laws and regulations that might negatively impact the safe storage and transportation of oil.

RISKS AND SAFETY CULTURE AT THE TERMINAL

In 2023, the Council released an assessment of risks and safety culture at the Valdez Marine Terminal. This report was initiated in response to safety concerns brought to Council staff by current and former Alyeska employees.

The main conclusion of the report is that there currently is an unacceptable safety risk to the terminal. Pressure to reduce budgets was a common theme. The report credits the integrity, knowledge, and skill of the Alyeska workforce for holding together an aging infrastructure.

Government budget pressures and staffing reductions have also contributed to the problems, including at the Bureau of Land Management and the Alaska Department of Environmental Conservation.

The Council stands ready to support Alyeska, and state and federal regulatory agencies, in our role as an advisor, and will continue to push for these issues to be resolved.

FOREIGN TANKERS IN PRINCE WILLIAM SOUND

Since 2016, more foreign tankers have been loading oil from the terminal. These vessels may increase the risk of an accident or oil spill as crews may be unfamiliar with the harsh Alaska weather, or the prevention and response systems that protect our unique region.

In 2021, the foreign tanker *Stena Suede* arrived ahead of its scheduled loading time and dropped anchor in the Gulf of Alaska, about 20 miles outside of Prince William Sound. Weather conditions and damaged equipment resulted in the tanker dragging its anchor for more than 30 hours. Many expert marine operators in our region, including the Southwest Alaska Pilots Association, say there is no safe anchorage in the Gulf of Alaska.

Due to these concerns, the Council continues to monitor the use of foreign flagged tankers in our region.

STANDARDS FOR TRAINING MARINERS

The Council believes that incoming mariners must be adequately trained on new equipment and on the overall system in Prince William Sound such that they are ready to navigate Alaska's often hostile waters.

After the Exxon Valdez spill, Hinchinbrook Entrance closure conditions were reduced to 45 sustained knots of wind or 15-foot seas as an oil spill prevention measure. In 1998, the Alaska Department of Environmental Conservation required additional modeling, as well as escort and disabled tanker towing exercises, to improve their Hinchinbrook Entrance Best Available Technology (BAT) Assessment. This assessment verified the Alyeska tug contractor's ability to adequately control and tow a disabled tanker up to closure conditions and to ensure safe travel through the Valdez Narrows.

In January 2018, the Council's Board passed a resolution stating that oil tankers and escort vessels should not be permitted to transit through Prince William Sound and into the Gulf of Alaska in weather conditions which Alyeska and the oil shippers have determined to be unsafe for training. The Board's position, which restated a similar position taken by the Board in 2003, argued that limits of safe operation for vessels and crews should be clearly



Valdez is the snowiest city in the United States. The average snowfall is over 25 feet per winter, something the SERV fleet, terminal, and associated tankers must manage.

delineated and that transit in conditions exceeding those limits should not be allowed. If it is unsafe to train personnel, it is unsafe to transport oil.

The Council continues to work with Alyeska and the regulatory agencies to help ensure the training is complete and thorough.

RESPONSE GAP

The Alyeska terminal contingency plan indicates that SERV response operations can work in winds up to 40 miles per hour (35 knots) and seas up to 10 feet. However, studies by the Council have shown that the ability to respond and clean up a spill is not possible in these extremes. When loaded tankers can sail, but cleanup is not feasible, conditions are said to be in the "response gap."

The Council has conducted studies of winds, waves, temperature, sea currents, and visibility to determine how often local conditions fall within the response gap, and therefore could affect a vessel transit if one is happening. For both mechanical cleanup (primarily with booms and skimmers) and non-mechanical cleanup (dispersants and in-situ burning), the response gap conditions represent about 30% of the year in central Prince William Sound and at Hinchinbrook Entrance, or about 110 days per year.

The gap is smaller in the summer, occurring about 10% of the time, and larger in the winter, when immediate response is largely impossible over 50% of the time.

GOVERNMENT FUNDING FOR SPILL RESPONSE

Federal: OPA 90 required more comprehensive funding to cover costs associated with oil spills. Another of the Council's top federal legislative priorities has been reauthorization of the Oil Spill Liability Trust Fund, a financing rate on petroleum products that provides the main source of funding for government response to spills. The financing rate was reauthorized through December 31, 2025, and the Council continues to work on the long-term sustainability of the fund.

State of Alaska: The state of Alaska has its own oil spill response fund to ensure that funds are available for initial response to a spill and to oversee cleanup operations.

The response portion of the fund is financed by a 1 cent per barrel tax on crude oil produced in Alaska. The fund also supports the day-to-day operations of Alaska's prevention and response programs.

Prevention and response programs at the Alaska Department of Environmental Conservation are supported by an additional 4 cents per barrel tax on crude oil produced in Alaska. As the volume of oil produced in Alaska has fallen over time, this funding mechanism has proven to be inadequate to support the level of spill prevention and response functions needed to protect the environment and the local economy. The Council has consistently advocated for the state legislature to recognize and address this funding shortfall, including providing support for an increase to the refined fuels surcharge to help fill this funding gap.

| Remote Control of Terminal Assets |

In 2007 and 2008, Alyeska moved the control center for the operation of the terminal from Valdez to Anchorage.

In 2009, after control system failures frustrated Alyeska's efforts to prevent a spill at Pump Station 9, the Council sponsored a study to find out whether the move adversely affected the ability of controllers to control terminal assets.

The study revealed that the remote operator's inability to "see" the controlled assets and process alarms may have been a factor in that incident. "Alarm floods" (many alarms in a short period of time) were frequent in the years immediately following the control center move to Anchorage and may have been another factor in the incident at Pump Station 9. The extent to which the alarm floods have been addressed remains undetermined.

| Secondary Containment Liner |

The buried secondary containment liner system installed at the Valdez Marine Terminal acts like a bathtub – designed to capture and hold oil spilled in the event of a leak from the crude oil storage tanks. However, this system was originally installed during terminal construction in 1977, with now-obsolete asphalt technology. These buried liners have not been regularly or comprehensively inspected for degradation or damage for nearly five decades. Seeing damage is difficult as the liner is covered with five feet of gravel. Over the years, when gravel fill has been removed to visually inspect the liner, holes or cracks have been found about 20% of the time.

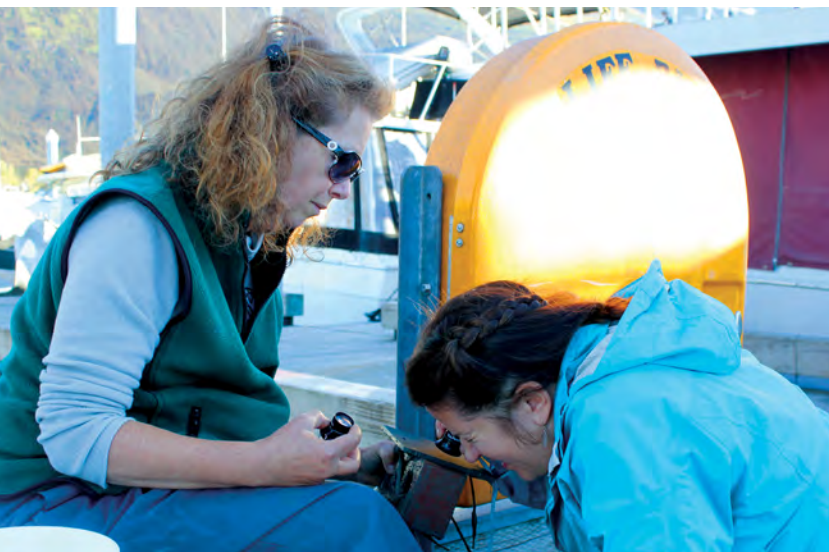
Removing the fill to inspect and repair the liner would be expensive, and the excavation equipment could cause further damage. To help identify solutions, the Council commissioned research on non-destructive methods to evaluate the integrity of the liner, releasing a report in 2023 recommending electrical leak location surveys be conducted.

The report also determined that at least 20% of the liner would need to be tested to have confidence that it will reliably hold spilled oil, though 100% would need to be tested to find all the actual damage.

| Marine Invasive Species |

In addition to spills, tankers pose another potential environmental and economic problem—the introduction of marine invasive species.

Empty oil tankers take on seawater as ballast for navigational stability, engine cooling, and fire suppression. Small organisms are known to travel in this water, as well as attached to vessel hulls.



In 2016, the Council and the Smithsonian Environmental Research Center co-sponsored a bioblitz in Valdez. During the two-day event, scientists trained local citizens in techniques to survey and identify these invaders. One invasive species was found in Tatitlek - Schizoporella japonica, a marine bryozoan that was already known to be in Alaska.

Beginning in 1996, the Council made the issue of non-indigenous species a priority by pursuing two tracks—research and legislation.

In 2022, the Council released a study to help improve invasive species monitoring. Over 200 samples of zooplankton were collected from three locations in Port Valdez across different seasons, tidal stages, and time of day. Identifying species while they are floating as larvae in the sea currents can be more efficient and costs less than monitoring for adult specimens.

After collection, a technique called DNA metabarcoding was used to identify different species. The project added to existing knowledge of zooplankton species already in Prince William Sound, which will help researchers better identify invasive species in the future.

CITIZEN SCIENCE MONITORING

The Council and invasive species experts are mostly concerned about known ballast water invaders such as the European green crab and tunicates. Past Council-sponsored research found the European green crab could easily establish itself in the waters of Prince William Sound and the Gulf of Alaska.

In 2000, the Council established a citizen monitoring effort to look for European green crab along the shores in our region including Port Valdez, Cordova,

and Kodiak. In 2022, this invasive crab was detected in Alaska for the first time by the Metlakatla Indian Community on Annette Island in Southeast Alaska.

SUPPORTING LAWS AND REGULATIONS

In addition to its research, the Council monitors and advises regulators and legislators on invasive species.

At present, the tankers in the North Slope crude oil trade are exempted from U.S. Coast Guard requirements to exchange and treat their ballast water at sea, although exchange and treatment is required by the Environmental Protection Agency. Several tankers within the fleet arriving at the Valdez Marine Terminal have now installed and use ballast water treatment systems for the management of invasive species.

In 2018, the Vessel Incidental Discharge Act was signed into law. The intent of this legislation was to standardize rules for discharges incidental to the normal operation of a vessel, including ballast water, across the country. In 2020, the U.S. Environmental Protection Agency released proposed standards of performance and the Council provided comments that pertain to the operation of crude oil tankers.

At the state level, the Council has expressed support for invasive species legislation and for the establishment of a state-wide Invasive Species Council.

CONTINUING THE MISSION



The Council is working with Alyeska's SERVS to share the realities of oil spill prevention and response with communities throughout the region. Through chartered public boat tours that began in 2016, people in the communities of Cordova, Homer, Seward, Valdez, and Whittier have had the opportunity to go out and experience annual on-water oil spill training by local contracted commercial fishing fleets (with Kodiak planned for future years). By seeing the SERVS oil spill response equipment in action and hearing from Council and SERVS staff about the region's nearshore oil spill response system, local residents can better understand the importance of preventing oil spills.

In 1990, after an investigation into the cause of the Exxon Valdez oil spill, the Alaska Oil Spill Commission recommended the formation of a series of regional citizens advisory councils to act as a voice for local citizens and prevent the complacency that set in before the 1989 spill.

Those with the most to lose from oil pollution must have a voice in the decisions that can put their livelihoods and communities at risk.

The Alaska Oil Spill Commission's final report noted that those living closest to a danger and having the most to lose are the most likely to ensure that readiness and alertness are maintained.

Prince William Sound now has a world-class oil spill prevention and response system. The Council educates and informs others about this system as part of the mandates set out in OPA 90 and to ensure the system continues to be held to the highest standards.

| Preserving History |

In the decades since the Exxon Valdez spill, many voices among those who experienced the tragedy firsthand have been lost. Those who responded to the spill will never forget it, though many may wish to. The Council has documented many stories and materials related to the spill.

PERSONAL STORIES FROM THE SPILL

In 2009, the Council published a book, "The Spill: Personal Stories from the Exxon Valdez Disaster," including personal stories of some of those that lived through the spill. Thousands of copies of this book have been shared with partners, libraries, schools, and the public.

In 2013, the Council partnered with the University of Alaska Fairbanks Oral History Program to build a digital oral history archive for the Exxon Valdez disaster. Each narrator has a unique perspective which helps expand our understanding of the diverse and lasting effects of technological disasters.



The Exxon Valdez spill is no longer the biggest oil disaster in United States history. On April 20, 2010, the BP Deepwater Horizon oil rig exploded in the Gulf of Mexico, killing 11 workers. Over the next 87 days, an estimated 4.9 million barrels (over 200 million gallons) leaked from the well into the Gulf of Mexico.

After the explosion, Gulf citizens, pictured above, turned to Alaskans for help. Those who had experienced the Exxon Valdez spill firsthand became an invaluable resource for community leaders and citizens who had no previous experience with oil spills. After that disaster, the Council and our institutional memory played a big part in connecting Gulf citizens with resources to cope with what had occurred. Others from across the U.S. and around the world have used the Council as a resource after their own technological disasters.

ARCHIVING HISTORICAL DOCUMENTS

Over the years, the Council has accumulated a vast collection of historical documents and information related to the oil spill prevention and response system in our region. The Council's analytical work on oil transportation safety and policy is highly reliant upon this repository.

| Inspiring Tomorrow's Advocates |

The Council also helps educate future generations about our unique marine environment and the ongoing need to protect it from the threat of oil spills. Since 2010, the Council has helped support partners in educating youth of all ages through various types of hands-on, oil spill-related science projects and firsthand experiences.

In 2013, the Council began to involve secondary and college-level students as interns to help complete projects that fulfill specific needs. These internships have included analyzing vessels in the SERVS fishing fleet, and the physical and chemical properties of crude oil being transported through Prince William Sound; educating youth in remote Council



Students of all ages learn about oil spills and the Council's mission through the educational programs developed by the Council.

communities; and monitoring for marine invasive species in Prince William Sound. These interns gain valuable skills and a deeper understanding of the need to continue the Council's mission into the future.



Valdez intern Joshua Duong sets a trap for green crab.

LESSON PLANS FOR EDUCATORS

The Council has sponsored and maintained the Alaska Oil Spill Lesson Bank since 1990. The K-12 lessons are available through a searchable, online database and meet state and national science standards. This free resource is focused on teaching students about the importance of preventing pollution from crude oil through content in science, math, literature, engineering, and art. Lesson Bank materials can be found on the Council's website: www.pwsrcac.org/lessons

INTO THE FUTURE

As memories of the Exxon Valdez disaster fade with time, complacency can return, increasing the risk of another disaster. Thus, despite all of the valuable safety improvements in our region, continued vigilance over terminal and tanker operations is as imperative as ever. It is hoped that the long-term partnerships the Council has worked diligently to establish will help prevent further backsliding, identify and mitigate risks, and facilitate improvements designed to prevent another accident.



Photo Credits

Cover, left: Charles M. Ehler/ARLIS; right: Brooke Taylor, PWSRCAC; background: Jeremy Robida, PWSRCAC

Inside cover: Amanda Johnson, PWSRCAC

P1: Cathy Hart

P2: Amanda Bauer

P3: Amanda Johnson, PWSRCAC

P4: ARLIS

P5: Jeremy Robida, PWSRCAC

P6: Jeremy Robida, PWSRCAC

P8: Cathy Hart

P9: PWSRCAC document archives

P10: Jeremy Robida, PWSRCAC

P12: PWSRCAC

P13: Jeremy Robida, PWSRCAC

P14: Jeremy Robida, PWSRCAC

P16, top: Charles M. Ehler/ARLIS; bottom: David Janka

P17: Kathy Halgren

P18: Robert Glassmaker

P20: Jeremy Robida, PWSRCAC

P22: Amanda Johnson, PWSRCAC

P24: Brooke Taylor, PWSRCAC

P27: Mark Carls

P28: Roy Robertson, PWSRCAC

P30: Jeremy Robida, PWSRCAC

P32: Amanda Johnson, PWSRCAC

P33: Courtesy of Alyeska

P34: Brooke Taylor, PWSRCAC

P35: Jeremy Robida, PWSRCAC

P37, left and right: Nelli Vanderburg, PWSRCAC

P38: Amanda Johnson, PWSRCAC

P39: Amanda Johnson, PWSRCAC

P40, left: Amanda Johnson, PWSRCAC; right: Jessica Young, Prince William Sound College

P40: Danielle Verna, PWSRCAC

P41: Danielle Verna, PWSRCAC



Citizens promoting
the environmentally
safe operation of the
Alyeska Pipeline
marine terminal
and the oil tankers
that use it.

| Anchorage |

3709 Spenard Road, Suite 100
Anchorage, AK 99503
907-277-7222
Fax: 907-277-4523
Toll-free: 800-478-7221

| Valdez |

P.O. Box 3089 / 130 S. Meals, Suite 202
Valdez, AK 99686
907-834-5000
Fax: 907-835-5926
Toll-free: 877-478-7221

www.pwsrcac.org

