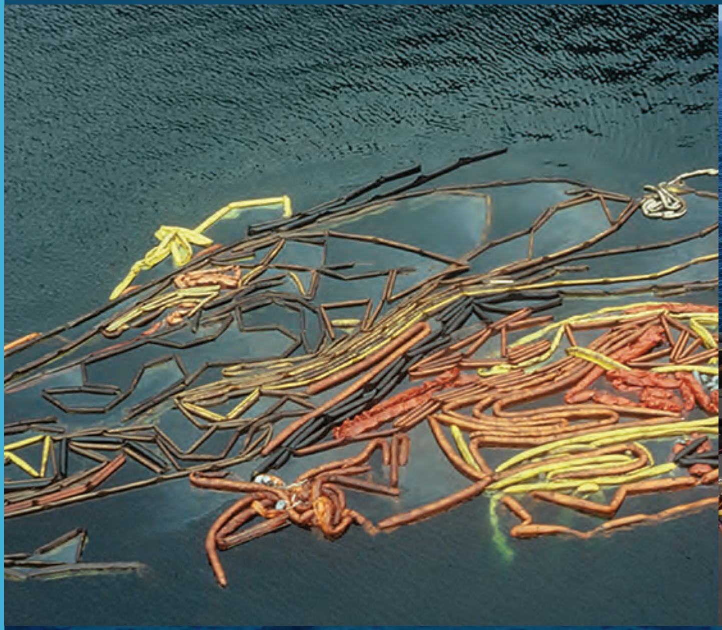
Prince William Sound
RCAC
Regional Citizens' Advisory Council

THEN & NOW

30 Years After the Exxon Valdez Oil Spill



A Publication of the Prince William Sound Regional Citizens' Advisory Council

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About the Council

Citizens promoting the environmentally safe operation of the Alyeska terminal and associated tankers.

| Our Mission |

The Prince William Sound Regional Citizens' Advisory Council is a non-profit corporation that derives its authority from the Oil Pollution Act of 1990 and from a contract with Alyeska Pipeline Service Company. 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 18 member organizations represent communities impacted by the Exxon Valdez oil spill, as well as Alaska Native, aquaculture, commercial fishing, environmental, scientific, 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 advisory 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.

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

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 oil tankers traveling the Sound and from the terminal where they load. Conducting the technical research, monitoring tanker and terminal operations, and evaluating industry and government proposals are costly undertakings. Thus, adequate funding, provided by 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 18 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.

Fighting Complacency

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. At least 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, regulatory agencies, and the public 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 past three decades, however. 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 non-profit 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.

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

Many of the safety improvements now in place in Prince William Sound are a direct result of partnerships between industry, regulators, and citizens. In many parts of the world, oil development still takes place without citizen involvement, but there is growing international interest in the Alaska model of citizen oversight.

The Voices of Citizens Fight Against Complacency

Despite many improvements, much remains to be done. As we move past the 30th 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 in Prince William Sound.

Changes in Laws and Regulations

Many of the changes enacted after the spill are now required by law. Regulations have been strengthened to protect Prince William Sound. The transformation of the system began almost immediately.

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 was signed into law by President George H.W. Bush in August of that year.

OPA 90 addressed a wide range of problems associated with preventing, responding to, and paying for oil pollution incidents in United States 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 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 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

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, incorporated the previous December, was designated as one and 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, 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.

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.

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

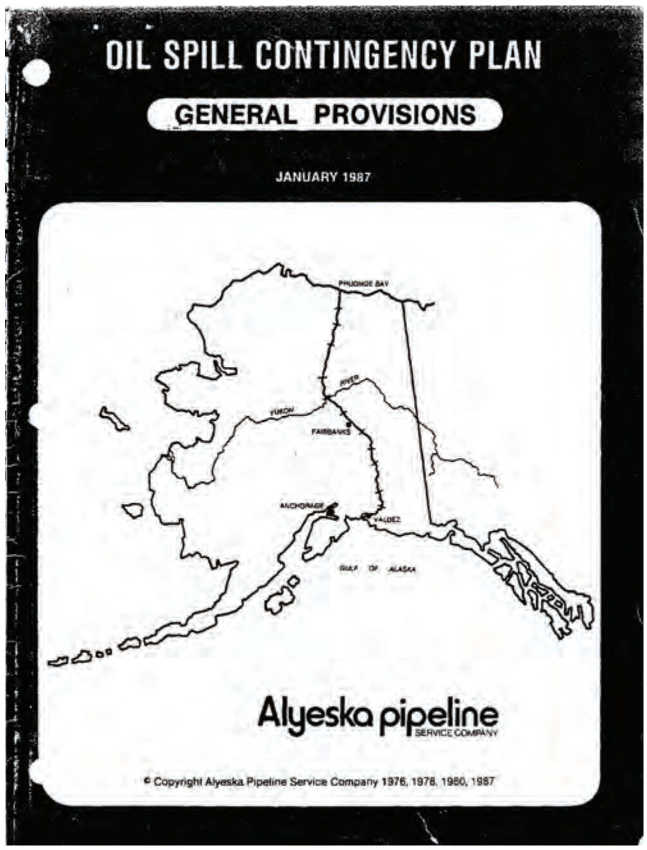
To promote partnership and cooperation among local citizens, industry, and government

To build trust

To provide citizen oversight of environmental compliance by oil terminals tankers

"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.bit.ly/ExxonValdezJukebox



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.

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

Preventing Oil Spills

The best oil spill is one that never happens. Since 1989, safety improvements have drastically reduced the risk of another spill like the Exxon Valdez. In the past 30 years, the Prince William Sound crude oil transportation industry has phased in double-hulled tankers, developed a robust escort tug system, and initiated numerous other prevention improvements.

| 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 11 million gallon spill by 60 to 80 percent. 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.

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

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 Endeavor was built in Louisiana at a cost of over $200 million. The tanker is 895 feet long and carries just over 40 million gallons of oil. It is equipped with two independent engine rooms, twin propellers, and twin rudders. Now all tankers calling on the Valdez Marine Terminal are double-hulled.

| Alyeska's Ship Escort/Response Vessel System |

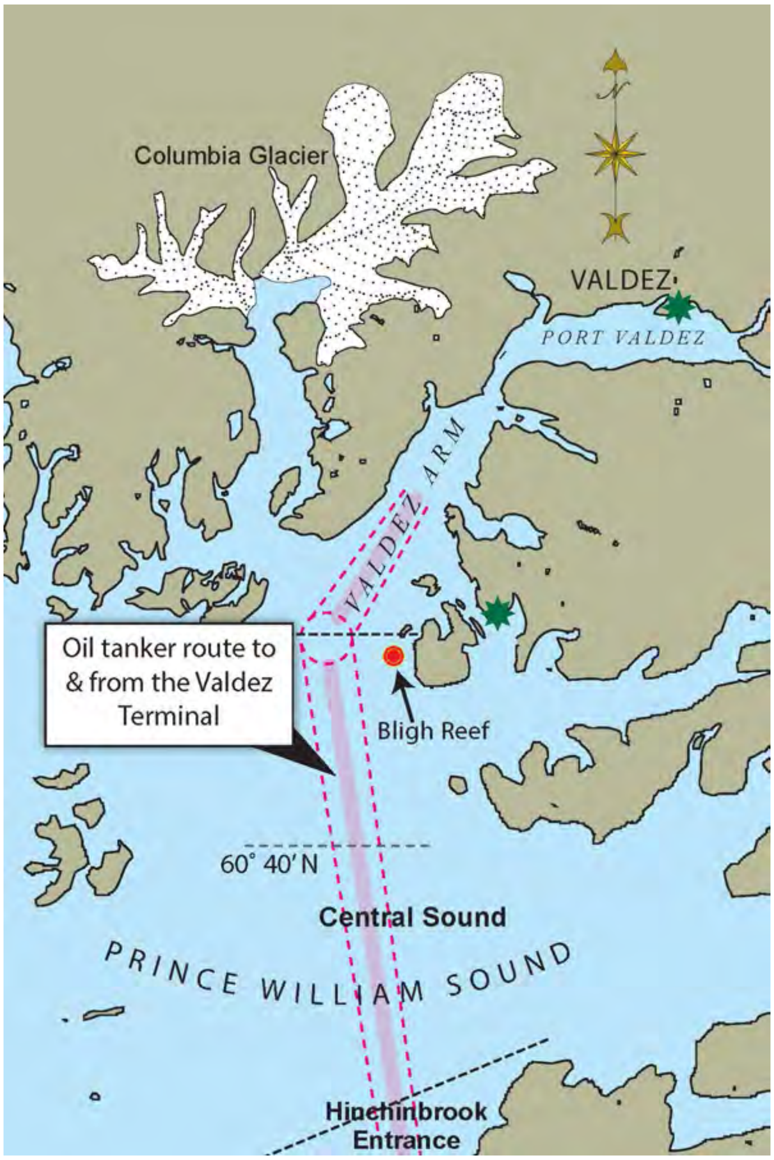
The Ship Escort/Response Vessel System, known as SERVS, was developed after the Exxon Valdez spill as Alyeska's oil spill prevention and response system. The SERVS mission is to prevent oil spills by helping tankers navigate safely through Prince William Sound and to begin immediate response if there is a spill. SERVS maintains a fleet of large escort tugs, keeps trained response crews on duty around the clock, and has spill response equipment ready to respond.

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.

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, leading to today's system.

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



Under current practices, both tugs must remain within a quarter mile of a laden tanker in northern Prince William Sound. In narrow areas, one tug is tethered to the tanker. Waters in this area are more confined and there is less room to maneuver if there is a problem. Tankers passing through Valdez Narrows and into the Valdez Arm are limited to a speed of ten nautical miles per hour (knots) and must have an escort tug tethered to their stern. 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.

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.

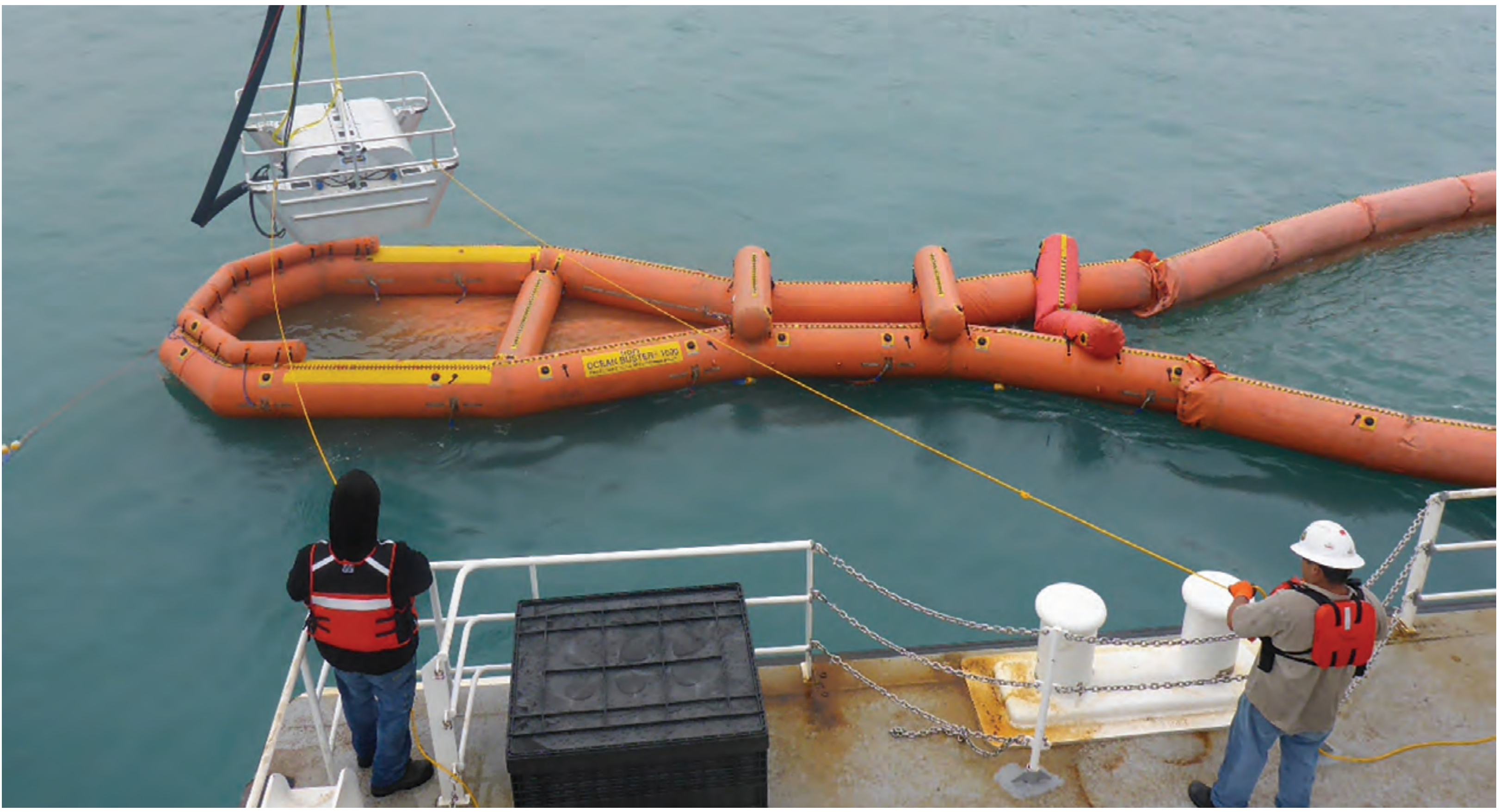
Improvements to Tug Technology The Council has dedicated significant resources to evaluate the escort tugs. These efforts include:

- 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.
- Research on 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.

New Escort Vessels in 2018 In 2018, Alyeska replaced their spill prevention and response contractor. Edison Chouest Offshore was chosen to provide these services, which include operation of escort tugs, oil recovery storage barges, and associated personnel. All of these resources are key oil spill prevention and response assets for Prince William Sound.

To fulfill their contract, Edison Chouest built nine new tugs and four spill response barges. The five new escort tugs, four new general purpose tugs, a utility tug, and four new open-water response barges represent 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.

New Technology Winches: The design of winches, oil skimmers, and oil spill collection boom have all improved in the last 30 years. The new vessels are equipped with "render/recover" winches. These



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

winches automatically maintain constant tension on a line, improving safety and performance.

Skimmers : Response equipment has also improved. The barges will carry new "coated disc skimmers." During testing, these oleophilic, or oil-loving, skimmers collected crude oil more efficiently than older skimmers, which means less water mixes with the oil as it is skimmed off the water. The addition of the new skimming systems increases oil recovery efficiency rates by 20-35 percent over the old systems.

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 Buster boom comes in several sizes, larger for ocean conditions and smaller for use in harbors. 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.

Icebergs calve from nearby Columbia Glacier throughout the year and occasionally drift into the nearby vessel traffic lanes. The ship left the shipping lane to avoid the ice and 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.

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

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.

Efforts to reduce the likelihood of human error include:

- Tanker captains were not subject to alcohol tests prior to 1989. Now, all captains are given breath tests an hour before sailing and any crew member suspected of consuming alcohol is tested.
- 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, ten 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 SERVS 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

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

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.

| **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 and with an Automatic Identification System. 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 Automatic Identification System which allows staff and volunteers to monitor vessel movements. The system is displayed on monitors in the public areas of the Council's Anchorage and Valdez offices.

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. Studies at the time showed that the ice flow from the glacier was increasing as the glacier melted.

However, the Council's more recent 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. This study showed that this trend is expected to continue and the ice should become less of a threat to tanker traffic over time.

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.

Cleaning Up Spilled Oil

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.

| **Alyeska's Response System** | Alyeska's SERVS must be ready to clean-up an oil spill at any time. They maintain equipment onboard 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

Fishing crews receive training every year to ensure they are ready to help respond to a spill.

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.

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

Fishermen Trained to Help Fishermen and other local mariners from Prince William Sound, the Kenai Peninsula, and Kodiak Island are trained to help with nearshore response. During the Exxon Valdez oil spill, local fishermen's knowledge of their regional waters proved incredibly valuable to the response.

Now, crews from approximately 400 boats are trained and under contract with Alyeska to help respond quickly if there is a spill.

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

"Of all the people on this planet, there is only one group that thinks recovering oil off the sea is an easy task, not a hard task. And that group are commercial fishermen. We don't see it as a 'mission impossible' to go out there and collect a major oil spill and bring it back to town. That's what we do for a living."

Tom Copeland

Hear Tom's story on Exxon Valdez Project Jukebox www.bit.ly/ExxonValdezJukebox

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 properly trained responders were not ready.

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 30 years ago, but there is still room for improvement. Ongoing training, better technology, and vigilance are required to maintain readiness.

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 over 100 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 50 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, much of it on barges, for over 34 million gallons of recovered oil and water mixture.

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 staffed 24 hours a day for rapid action. 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.

| **Spill Contingency Plans** | Anyone who transports oil in bulk must have a government-approved contingency plan in place for preventing and responding to spills.

Those who are required to have contingency plans must provide assurances that personnel are being trained, that equipment and resources are available and ready to be mobilized quickly, and that 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.

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 shippers' vessels.

Alyeska's Response Inventory Today

100
Oil Skimmers

34M
Gallons of Storage for Recovered Oil

>50
Miles of Containment Boom

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.

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.

Ensuring Plans Keep Improving By law, these contingency plans are required to be reviewed and updated every five years. Changes are 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 model of the kind of collaboration and cooperation needed to maximize the safety of crude oil operations and transportation in Prince William Sound.

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, the oil industry must conduct two major drills each year, plus a variety of smaller drills and training exercises in communities throughout the area affected by the Exxon Valdez spill.

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.

Alaska's requirement for using best available technology has resulted in a number of oil spill prevention improvements, such as:

Leak Detection Technology

Improved Tug Escorts for Tankers

Tank Overfill Controls

Corrosion Control

Improved Maintenance Practices

Tanker docked at the Valdez Marine Terminal.

Alaska's requirement for using best available technology has resulted in a number of oil spill prevention improvements in Alaska, such as:

- Improved Tug Escorts for Tankers
- Leak detection technology
- Corrosion control
- Tank overfill controls
- Improved maintenance practices

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 ahead of time and can 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 In November 2002, the tanker Prestige suffered structural damage off northwest Spain and leaked just over four million gallons of its cargo of heavy fuel oil into surrounding waters. Winds pushed the oil onto the Spanish and French coasts, after which the vessel was towed offshore while the Spanish government decided what to do.

This spill was an example of the dangers of being unprepared. The Council began studying the issue of tankers in distress, and we participated in a process initiated by the Alaska Department of Environmental Conservation. As a result, a "places of refuge" matrix and detailed plans have been 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, form a database of the nearshore environment. Besides being a tool for planning and conducting oil-spill response, this database is also available for education and research.

The Council helped co-fund mapping of Prince William Sound. In 2009, the Prince William Sound and Cook Inlet Councils were two of several partners to receive the Coastal America 2009 Spirit Award for being part of the team involved in the collaborative Alaska Shorezone Mapping and Imagery Project.

Protecting Winter Wildlife 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 allows this information to be shared with anyone working or visiting the region.

The resulting paper also identifies gaps in knowledge regarding the Sound's winter species to be filled by future researchers. It provides valuable, scientifically accurate information that can be used by the Council and others to identify sensitive biological resources which informs oil spill contingency plans and helps spill responders and spill drill participants better consider winter species when protecting sensitive areas from harm.

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. Every few years, the Council sponsors a Marine Firefighting for Land-Based Firefighter Symposium. Firefighting experts partner with industry stakeholders to present training curriculum that provides an excellent, hands-on experience for all involved. Past symposiums have included tours of oil tankers, roundtable discussions with response organizations, and training with live fire.

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.

Weather equipment has been installed in Valdez Narrows, at Bligh Reef, in central Prince William Sound, and at Hinchinbrook Entrance to monitor wind speed, direction, barometric pressure, temperature, and wave action. Through a partnership with the Oil Spill Recovery Institute, the Council helped monitor ocean currents in Prince William Sound for several years beginning in the fall of 2003. The goal of the project was to use data collected from remote weather stations and ocean sensors to develop models that could predict the trajectory of spilled oil.

Environment

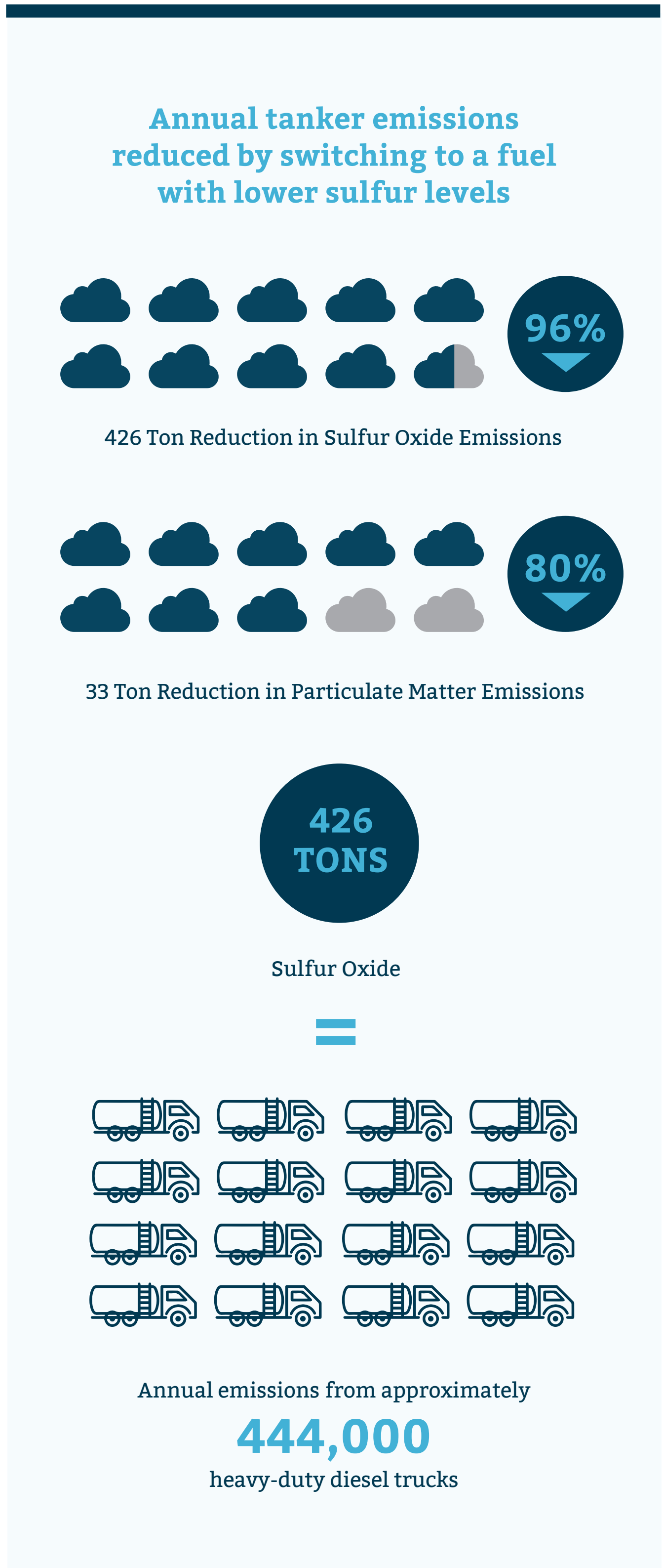
The Exxon Valdez spill brought devastation to Prince William Sound but tanker spills are not the only pollution threat the crude oil trade poses to the region’s environment or residents.

Effects on the Environment | Oil spills are not the only effect the oil transportation industry has on the environment of Prince William Sound. Day-to-day operations of the tankers and the terminal create pollution. Small leaks and spills of crude oil and other petroleum products, as well as permitted and regulated discharges, find their way into the air and waters of Port Valdez. The Council is also concerned about the risk of invasive species reaching Prince William Sound in tanker ballast water.

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 crude oil tankers than just a few years before.

The study evaluated the air pollution from tankers that traveled through Prince William Sound during 2014. The study looked 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. Researchers calculated the amount of each of these pollutants that would have been released if the tankers had been using fuel with a sulfur content of 2.7, 1.0, or 0.1 percent. The results were then compared to determine the amount reduced.

Study Results The study found that both particulate matter and sulfur oxide emissions are substantially reduced and nitrogen oxide emissions are somewhat reduced. By using 0.1 percent 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 percent sulfur fuel. Those changes represent a 96 percent reduction in sulfur oxides, an 80 percent reduction in particulate matter, and a 6 percent reduction in nitrogen oxides each year.



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.

From this study, the Council produced "Coping with Technological Disasters," a guidebook for communities. The Council won a Legacy Award from the Pacific States/British Columbia Oil Spill Task Force for the guide in 2000.

The guidebook, updated in 2018, offers ways to cope with the economic, social, and personal hardships from a human-caused disaster, such as an oil spill. The guide has been used in other communities, most notably in the Gulf of Mexico following BP's Deepwater Horizon oil spill in 2010.

The Council developed a peer-listener training program, available on DVD, as part of the guidebook. Training sessions have been presented in many communities, most recently in 2016, where residents learned to be peer counselors and referral agents for those who may not seek professional services or may not know that help is available. The peer listener manual was updated by the Mississippi-Alabama Sea Grant Consortium in 2018.

| 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.

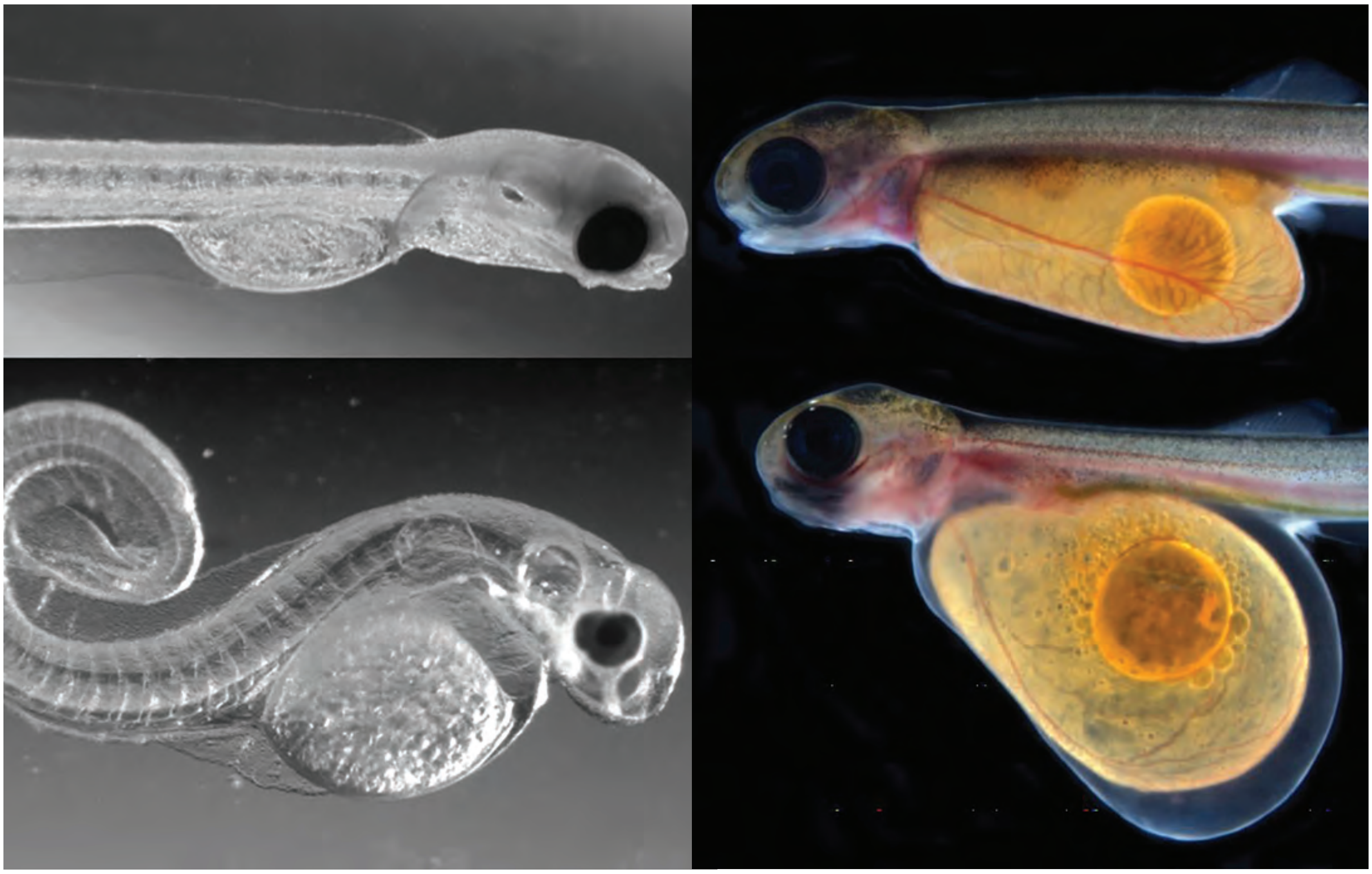
The goal of the program is to monitor for oil pollution and any resulting impacts from the operation of oil tankers and the terminal. This is done by analyzing the tissue of mussels and sediments collected from Port Valdez and Prince William Sound.

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.

In recent years, the Council has been studying ways to improve sampling methods, including testing genetic effects of hydrocarbons on mussels. The Council also deployed devices in Port Valdez to monitor for lower levels and different kinds of hydrocarbons. These new technologies detect chemicals at very low levels. 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 work 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



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.

were obviously damaged by the spill have recovered, as have most of the habitats. Pacific herring, one pod of orca, 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** | One effect that has changed little is the lingering Exxon Valdez oil found on the spill's most heavily oiled beaches. This lingering oil has been tested and "fingerprints" as Exxon Valdez oil. It is still remarkably volatile. If disturbed, this lingering oil can be released back into the marine environment. The Exxon Valdez Oil Spill Trustee Council continues to study the persistence and toxicity of this lingering oil.

| **Oil Spill Dispersants** | Dispersants are chemicals that break up spilled oil floating on the surface into droplets which are then scattered into the water column. When conditions are right, the oil breaks into smaller droplets below the surface so that it does not subsequently coat the shoreline, birds, or marine mammals. 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 extensive research to better understand how chemically dispersed oil behaves in the water column, from the surface of the sea to the sea floor, and how it affects different species in Alaska. 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 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 funded several projects in recent years that found:

- Ultraviolet radiation (a component of sunlight) significantly increases the toxicity of oil to marine organisms.
- Oil becomes 2 to 450 times more toxic when dispersed and exposed to sunlight. Ninety percent of Pacific herring larvae, 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 guide policy in Alaska) to address questions about dispersant toxicity, effectiveness, and planning.

The Alaska Regional Response Team recently made significant changes to the guidelines for how dispersants are used in Alaska. The updated guidelines eliminated the preauthorization of dispersants in Prince William Sound, which the Council believes is a positive step.

Official Council Position on Dispersants There are so many unknowns about the effects of dispersants — including long-term impacts — that the Council has consistently advocated for a conservative and precautionary approach to their use.

In 2006, after years of in-depth study, the Council adopted a position opposing any use of chemical dispersants in Prince William Sound. Dispersant studies, along with inconclusive laboratory and open sea tank tests, prompted the Council's opposition to dispersant use until research shows the chemicals to be a safe and effective way to treat spilled oil.

The Council supports state and federal response policy of using mechanical response with booms and skimmers as the first priority in oil spill

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.

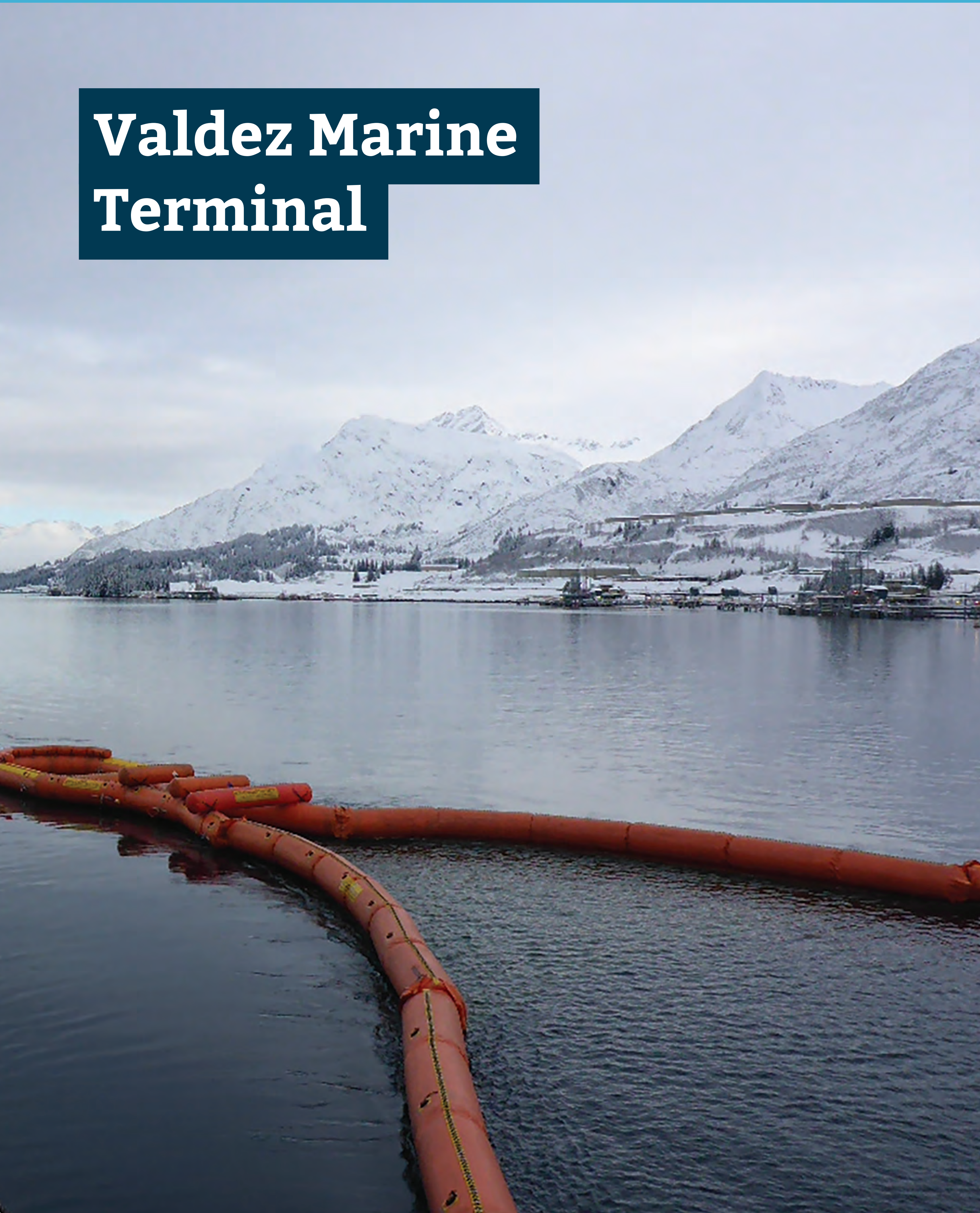
response. Dispersants shift oil from one part of the environment to another versus removing it, as mechanical response does. Consequently, the use of dispersants represents an uncertain environmental trade-off.

| **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.

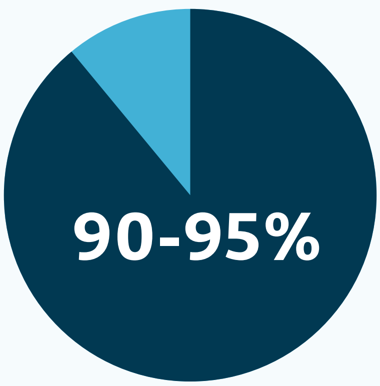
Burning converts oil from water pollution to air pollution, which still stays in the environment. In December 2004, the Council adopted a position advocating in-situ burning only after mechanical recovery has been ruled out.

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



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 Hawaii, 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.



of the oil produced on Alaska's North Slope is loaded onto tankers for shipment to Hawaii, the West Coast of the United States, or Alaska's Cook Inlet.

In the late 1980s, North Slope production peaked at about two million barrels of oil (over 84 million gallons) each day. Flow through the pipeline has declined since then; it averaged 527,323 barrels (about 22 million gallons) per day in 2017.

Building the 800-mile pipeline from Prudhoe Bay to Prince William Sound cost $8 billion, took three years, and employed some 70,000 people. Alyeska Pipeline Service Company has been transporting oil through the pipeline for over 40 years, since 1977. In this time, the system has moved more than 17 billion barrels of oil (well over half a trillion gallons), enough to make up more than 22,250 tanker loads.

While these statistics are impressive, they also 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 is needed to ensure that the necessary inspection and maintenance is performed to assure continued safe operations.

| **Controlling Pollution from the Terminal** | In the early years, much more pollution was emitted from the terminal compared to today. Alyeska has made many improvements in their operations, from advanced technology to better maintenance practices, resulting in improved air and water quality in the vicinity of the facility.

Routine operation of the terminal still creates a low level of ongoing pollution, mostly from oil residues released into the water and hydrocarbon vapors released into the air. 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 volatile organic compounds 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 system to capture these harmful vapors 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.

Better Ballast Water Treatment 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. Contaminated ballast water carried in crude oil tanks must be cleaned before being discharged into the environment.

The ballast water facility was originally designed to process up to 30 million gallons of ballast water per day (as well as storm water run-off from the terminal grounds), but now handles less than one million gallons per day on average. 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.

| Improved Maintenance System at Terminal | In 2011, the Council sponsored a comprehensive study of maintenance practices of all oil-handling assets at the terminal. The study indicated that procedures, their implementation, and the actual maintenance activities themselves had become so complicated that there was concern whether these assets were being properly maintained. A major part of the problem could be traced to Alyeska's use of an antiquated system that managed maintenance activities. In 2014, Alyeska implemented an upgrade to their maintenance management and tracking processes and now uses a modern and widely used system.

| 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 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 Sewer 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 sewer system to the Ballast Water Treatment Facility.

The pipes, manholes, and catch basins that make up that sewer were found to be leaking in 2008. This sewer is buried outside the secondary containment system and could therefore be a source of environmental contamination. Repairs were initially unsuccessful, however, beginning in 2014, Alyeska began installing high density polyethylene components into one of the secondary containment areas to replace the old, leaking sewer system. This repair proved highly successful. By 2017, Alyeska had completely replaced the sewer 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 sewer 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. These corroded welds were located over the water. Protective coatings, which may have prevented the corrosion, were not used when the terminal was originally built. In some locations, more than 60 to 70 percent 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 percent 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 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.

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

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?

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 the greatest spill prevention and response system in the world.

The Council has become increasingly concerned about rollbacks or weakening of state and federal environmental protections. 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. The Council also devoted a significant amount of resources toward monitoring and educating legislators, regulators, and the public about the contract transition for tanker escort, prevention, and response related marine services from Crowley Marine Services to Edison Chouest Offshore in 2018. This transition was important because these resources include key oil tanker spill prevention services, and the response assets should prevention measures fail.

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 knots 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 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 assure the training is complete and thorough.

Response Gap The Council continues to have major concerns about regulations governing the tugs that escort loaded oil tankers out of Prince William Sound. The Alyeska terminal contingency plan indicates that SERVS response operations can work in winds up to 40 mph (35 knots) and waves 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 percent 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 percent of the time, and larger in the winter, when immediate response is largely impossible over 50 percent 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 set to expire at the end of 2017, but was reauthorized through the end of 2018 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 a refined fuels tax to help fill this funding gap passed by the state in 2015.

| **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 crude oil storage tank liner system installed at the Valdez Marine Terminal during original construction uses now-obsolete oil-degradable asphalt technology. These buried liners have not been regularly or comprehensively inspected for degradation or damage since terminal construction in 1977. In parallel with the replacement of the secondary containment sewer systems, Alyeska began a program to opportunistically inspect the condition of this buried asphalt liner in 2014.

Those inspections have included both visual and laboratory testing of relatively small areas of the buried liner. Available laboratory testing results of undamaged liner samples has revealed that the liner should be able to adequately contain an oil spill long enough to allow Alyeska to respond to such an event. However, the visual testing has revealed multiple areas where there were existing holes as well as at least one area of extensive cracking in the asphalt liner.

While Alyeska repaired the sections where damage was revealed, questions remain regarding the condition of the liner in areas that have not been uncovered and visually inspected to date. In 2017, the Council initiated a project to investigate the potential use of non-destructive testing methods that could be used to comprehensively test the integrity of this buried asphalt liner at the Valdez Marine Terminal.

| **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 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.

More ship ballast water is discharged into Prince William Sound—primarily Port Valdez—than any other port in the state. Much of this ballast water comes from ports already invaded by invasive species.

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.

Citizen Science Monitoring The Council and invasive species experts are mostly concerned about known ballast water invaders that have yet to be found in our waters such as the European green crab or tunicates. 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 green crabs along the shores in our communities. So far, green crabs have not been found in Alaska, although most experts agree that they will make it to the state eventually.

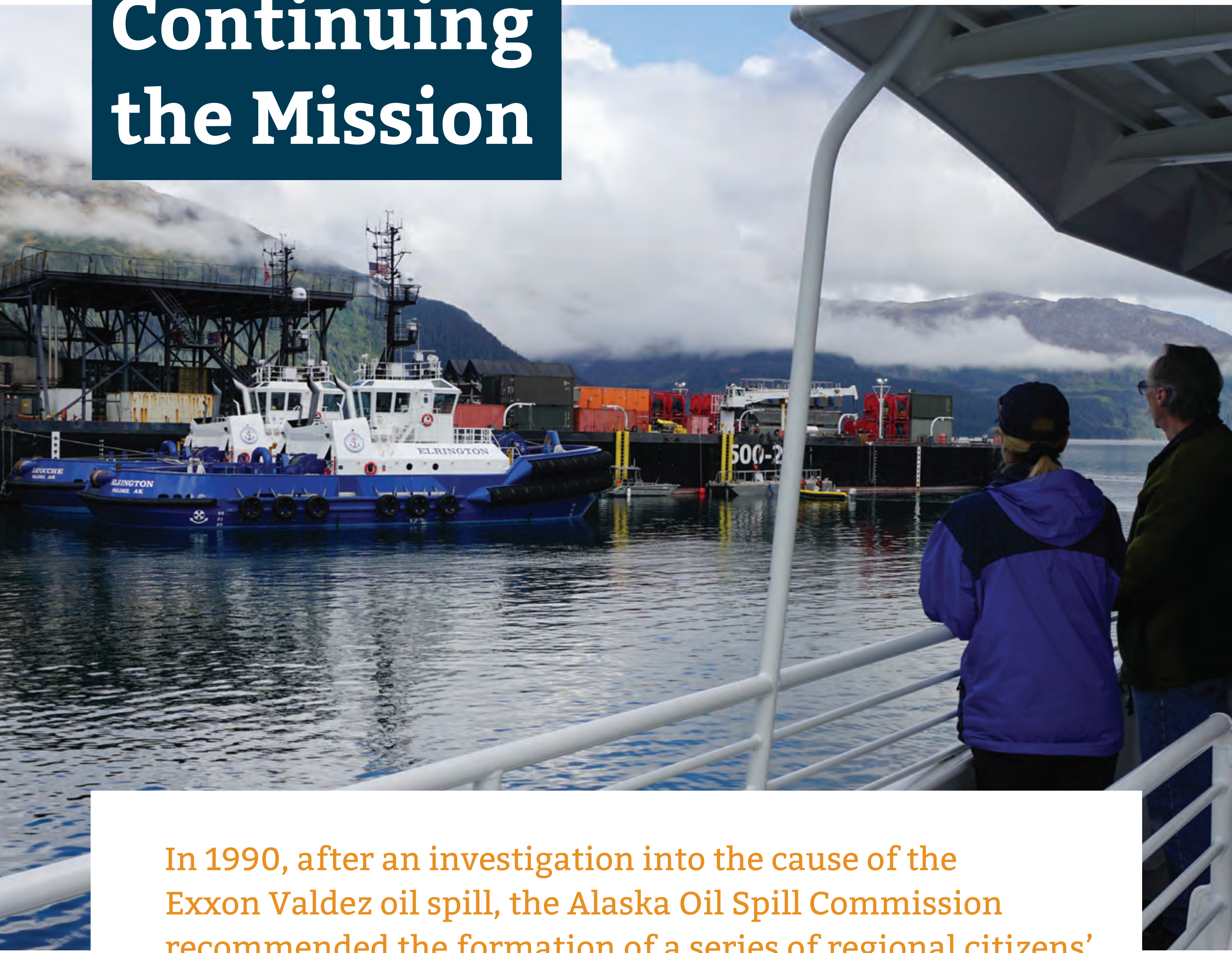
Supporting Laws and Regulations In addition to its research, the Council monitors and advises regulators and legislators on invasive species.

At present, the tankers in the North Slope crude oil trade are exempted from U.S. Coast Guard requirements to exchange their ballast water at sea, although exchange is required by the Environmental Protection Agency.

Two newer, and potentially more effective, methods for reducing species traveling in ballast water are either filtration or chemical treatment. In 2016, the Vessel Incidental Discharge Act was introduced in Congress. The intent of this legislation was to standardize rules for ballast water treatment across the country and formalize deadlines for shippers to install new and approved onboard treatment equipment.

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

Continuing the Mission



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.

The Council is working with Alyeska's SERVS to share the realities of oil spill response and lessons about oil spill prevention with communities throughout the region. Through chartered public boat tours that began in 2016, people in the communities of Seward, Cordova, Homer, and Whittier have had the opportunity to go out and experience annual on-water oil spill training by local commercial fishing fleets (with Valdez and 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.

The people living closest to a danger have the most to risk and are the most likely to insure that readiness and alertness are maintained.

As stated in the Alaska Oil Spill Commission's final report: "The people living closest to a danger have the most to risk and are the most likely to insure 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 | Over the past 30 years, many voices among those who experienced the tragedy of the Exxon Valdez oil spill 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 documents related to the spill.

Personal Stories from the Spill In 2009, the Council published a book including personal stories of some of those that lived through the Exxon Valdez spill. Entitled "The Spill: Personal Stories from the Exxon Valdez Disaster," 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

One of the biggest changes in the last decade is that the Exxon Valdez spill is no longer the biggest oil disaster in United States history. On April 20, 2010, the 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. Other citizens from across the U.S. and around the world have used the Council as a resource after their own technological disasters.

of technological disasters. The project also received funding assistance from the Institute of Museum and Library Services.

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 Prince William Sound. The Council's analytical work on oil transportation safety and policy is highly reliant upon information that can be found within its repository of historical documents.

| Inspiring Tomorrow's Advocates | The Council also helps educate future generations about their 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 identified by the Council. 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 over time, educating youth in remote Council communities, and monitoring for marine invasive species in Prince William Sound. These youth interns gain valuable skills and a deeper understanding of the Council's work and the need to continue our mission into the future.

Oil Spill Curriculum The Council has sponsored the K-12 Alaska Oil Spill Curriculum since 1990, which is available to teachers anywhere in the world. The curriculum provides lessons covering many aspects of oil spill science and oil spill effects on the marine environment. The curriculum was recently revised and continued updates will be implemented to keep it relevant, including the addition of new lessons and mapping them to national standards.

Into the Future As individual and institutional memories of the Exxon Valdez grounding fade with time, the risk increases of the complacency that allowed it to happen returning. Thus, despite all of the valuable safety improvements in Prince William Sound since 1989, continued vigilance over terminal and tanker operations is as imperative as ever and new generations must step in to promote prevention and preparedness. This reaffirms the importance of the collaborative citizen oversight developed since the Exxon Valdez spill continuing to function as long as oil flows through the Trans Alaska Pipeline System.

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

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