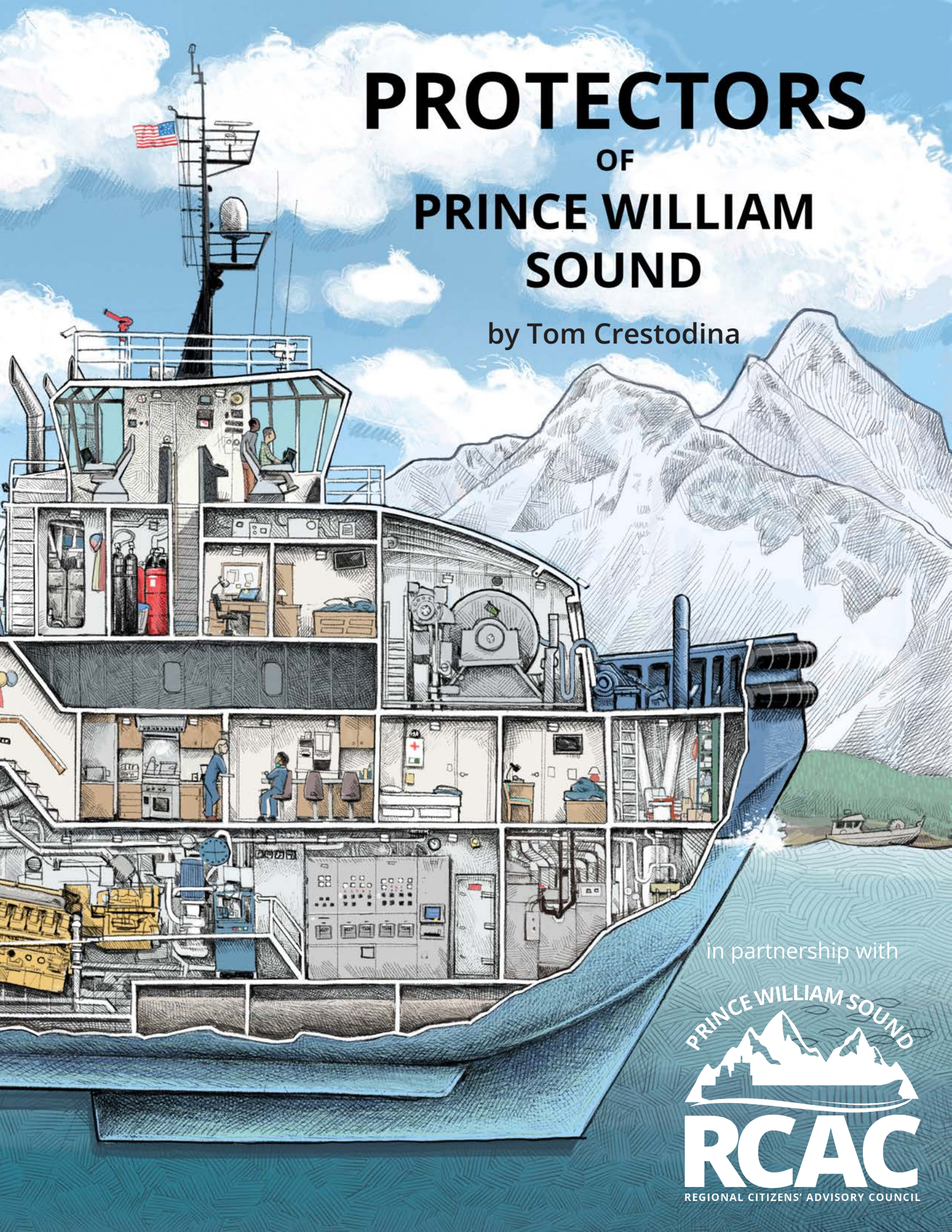


PROTECTORS OF PRINCE WILLIAM SOUND

by Tom Crestodina

in partnership with

PRINCE WILLIAM SOUND RCAC

REGIONAL CITIZENS' ADVISORY COUNCIL

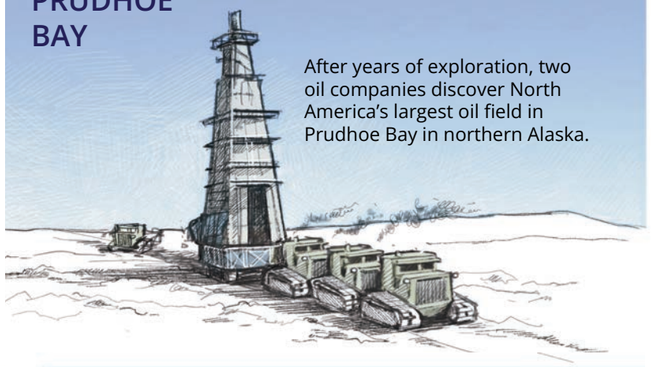
ALASKA OIL TIMELINE

1959 ALASKA STATEHOOD

President Dwight D. Eisenhower signs law making Alaska the 49th state of the union.

1968 OIL IS DISCOVERED IN PRUDHOE BAY

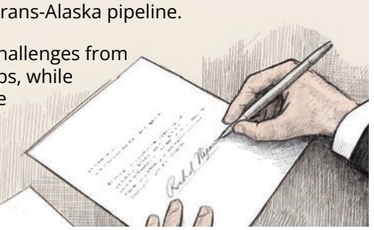
After years of exploration, two oil companies discover North America's largest oil field in Prudhoe Bay in northern Alaska.



1973 PIPELINE AUTHORIZED

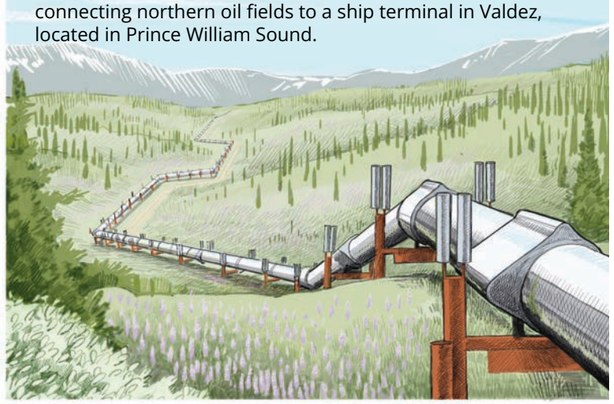
President Richard Nixon signs law authorizing the construction of the trans-Alaska pipeline.

The law ends legal challenges from environmental groups, while helping to relieve the international oil crisis.



1977 PIPELINE COMPLETED

The pipeline is built across 800 miles of Alaska wilderness, connecting northern oil fields to a ship terminal in Valdez, located in Prince William Sound.



The oil from the pipeline transforms Alaska's economy, bringing people to the state and prosperity to communities. Revenue from the transport of oil becomes the main source of funding for the state government.

MARCH 24, 1989

EXXON VALDEZ DISASTER
A ship carrying oil from Valdez to California runs aground on rocks in Prince William Sound. Millions of gallons of oil spill from the ship, polluting over a thousand miles of coastline and killing millions of animals.

The spill is among the worst man-made disasters in history and attracts attention around the world. The response is slow and ineffective, revealing a lack of preparation by the government and oil companies to deal with a major spill.

The disaster results in anger and outrage, but also brings people together to make changes to the oil transport system to make sure that it never happens again.

1990 OIL POLLUTION ACT

Congress passes laws to improve oil spill prevention and preparedness.

The federal and state laws require increased protections, leading to the creation of the Ship Escort Response Vessel System, or SERVS, that includes the fleet of tugs and other vessels working to prevent and clean up spills.

Federal laws also created two community organizations in Alaska to monitor and advise the oil transportation system to improve safety – one for Cook Inlet and the other for Prince William Sound. These are called the Regional Citizens Advisory Councils (RCACs).

MODERNIZATION OF TUGBOATS

At the time of the Exxon Valdez spill, there were a few older tugboats escorting tankers in Prince William Sound. Over the following years new tugs have been added, with increasing power to stop or steer a runaway oil tanker.

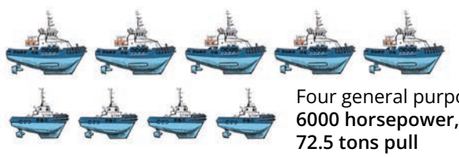
1989 - five tugs with **5,000-7,000 horsepower, 57-88 tons pull**

1990 - Three "service" tugs, **6,000 horsepower, 82 tons pull**

1999 - Nanuq and Tan'erliq **10,000 horsepower, 212 tons pull**

2001- Alert, Attentive, Aware **10,000 horsepower, 150 tons pull**

2018 - New generation Edison Chouest Offshore tugs arrive; five large escort tugs, **13,000 horsepower, 242 tons pull**; these are some of the world's most powerful tugboats

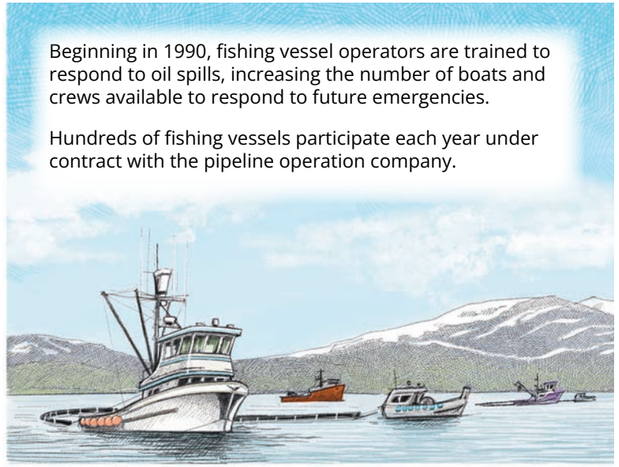


Four general purpose tugs **6000 horsepower, 72.5 tons pull**

FISHING VESSEL TRAINING

Beginning in 1990, fishing vessel operators are trained to respond to oil spills, increasing the number of boats and crews available to respond to future emergencies.

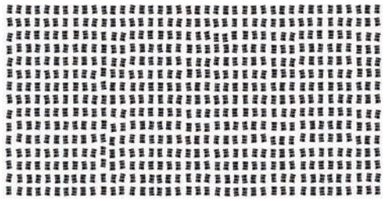
Hundreds of fishing vessels participate each year under contract with the pipeline operation company.



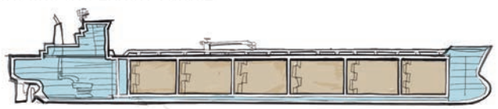
SAFETY IMPROVEMENTS

When Exxon Valdez spilled its oil, there was not enough capacity to store recovered oil and the contaminated water that came with it.

At the time there was 12,000 barrels capacity. Today there is room for 600,000 barrels.

1989  Today 

The 1990 law required changes to ship design, adding an outer hull layer which would reduce the amount of oil spilled in a grounding incident like the Exxon Valdez.



When Exxon Valdez ran aground, there were not enough oil containment barriers, known as oil "boom."

Today there is a ready supply of 40 miles length of modern oil boom in Southcentral Alaska, some of which is stored near areas sensitive to pollution.

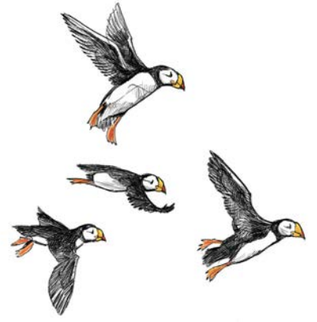
GOING FORWARD

The SERVS oil spill prevention and response system is operated by the Alyeska Pipeline Service Company and works in partnership with government to maintain a multi-layered defense against oil pollution.

The systems in Southcentral Alaska are actively monitored by the RCACs to ensure that they are as effective as possible. The relationship between the organizations is permanent and required by law, balancing the economic concerns of the energy industry with community input and oversight.

PROTECTORS
OF
PRINCE WILLIAM SOUND

by Tom Crestodina



in partnership with

PRINCE WILLIAM SOUND
RCAC
REGIONAL CITIZENS' ADVISORY COUNCIL

ACKNOWLEDGMENTS FROM TOM CRESTODINA:

The making of this work was only possible through the generous assistance of the many professionals who shared their time and knowledge with me during its creation. There are too many to name, but particular credit is owed to Mike Day, Roy Robertson, Andrea West, Mike Hess, Domingo Canabal, and above all, Brooke Taylor who conceived the project and tirelessly guided it to its conclusion.

Also, I would like to thank Clem Tillion, who is not only a great asset to his operation, but who also loaned me a belt when I was touring his vessel. His thoughtful gesture allowed me to maintain my dignity while touring the escort tug.

As with everything I do, this book is dedicated to my wife Ania and my two sons, Franio and Henryk.

ACKNOWLEDGMENTS FROM THE PRINCE WILLIAM SOUND REGIONAL CITIZENS' ADVISORY COUNCIL:

First and foremost, thank you to Tom Crestodina for agreeing to create this amazing project with us!

The Council had a number of volunteers and staff contribute to moving this book forward, including our Board of Directors and the Information and Education Committee. In particular, we would like to thank Amanda Bauer, Robert Beedle, Maia Draper-Reich, John Guthrie, Amanda Johnson, Ruthie Knight, Joe Lally, Savannah Lewis, Matt Melton, Kate Morse, Suparat Prasannet, Roy Robertson, Jeremy Robida, Donna Schantz, Brooke Taylor, and Jaina Willahan for their input and support.

This project could not have been done without the cooperation of industry. Multiple groups assisted with Tom's visit to Valdez to learn more about the vessels and equipment, and helped verify the technical information included in the book. We would like to thank Alyeska Pipeline Service Company, in particular Mike Day, Kate Dugan, and Betty Hoffman; Polar Tankers, especially Andrea West; and the Southwest Alaska Pilots Association, including Annie Wiard, and captains Ian Maury and Josh Weston.

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www.pwsrcac.org

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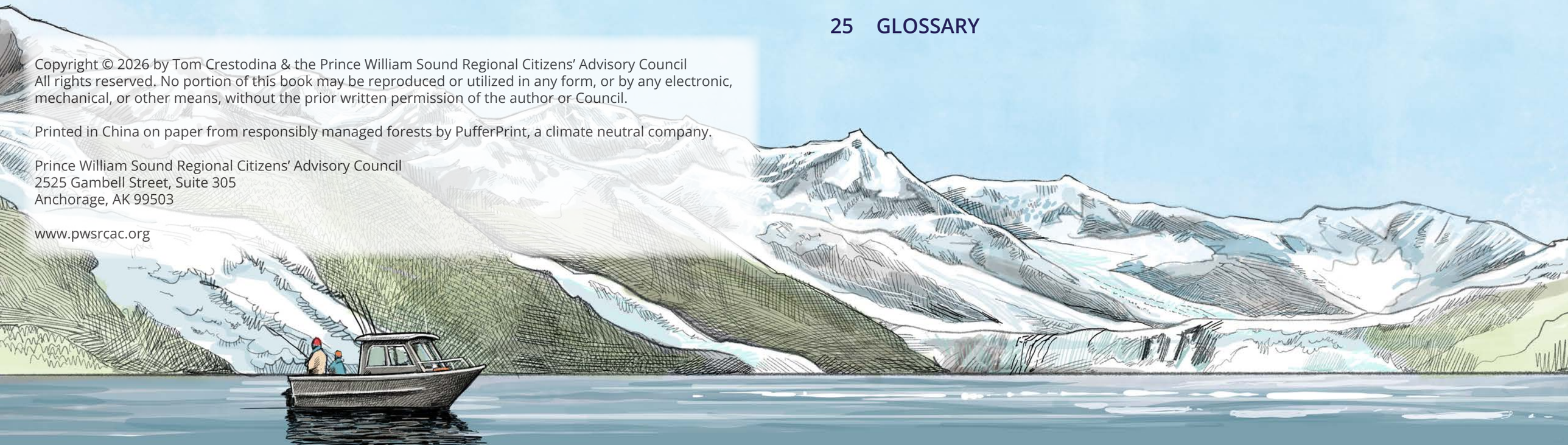
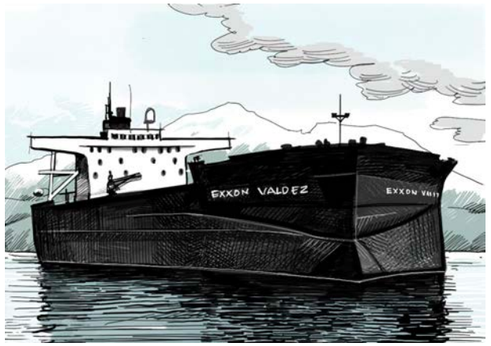
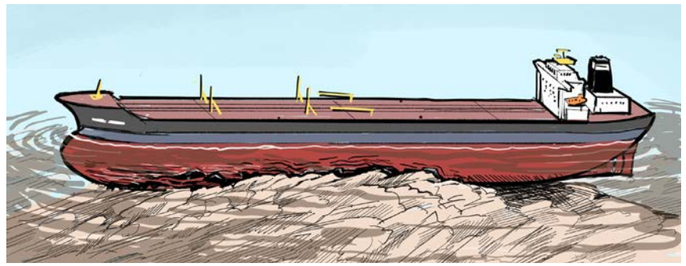


THE INCIDENT: THE EXXON VALDEZ OIL SPILL



The oil tanker ship Exxon Valdez was a symbol of pride in Prince William Sound, Alaska. It was named for the small town of Valdez, where many of the people worked at the Marine Terminal, loading Alaska oil onto ships for transport to refineries on the West Coast. The oil is a vital part of America's energy supply, powering cars, homes, and factories – and bringing prosperity to their community.

Then, on the night of March 23, 1989, the ship departed the terminal loaded with 53 million gallons of oil. By the next morning, it would become a symbol of tragedy and destruction.



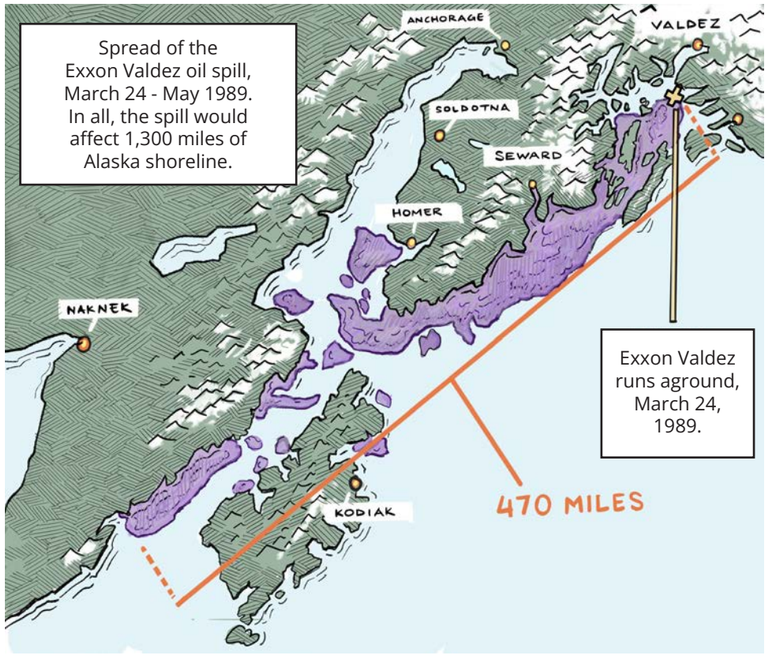
Just after midnight on the morning of the 24th, the ship hit a group of underwater rocks known as Bligh Reef. The ship, nearly 1,000 feet long and weighing 270,000 tons, skidded over the rocks, ripping open its bottom.

The Exxon Valdez was a single-hulled tanker, which meant that there was no separation between the cargo tanks and the outer skin of the ship. Oil gushed from the tanks into the water, floating to the surface. By the time responders arrived, the layer of oil around the ship was more than a foot thick and it was filling the air with toxic, flammable gasses.

A quick, organized response was needed – the oil was spreading into the waters of the Sound – but the oil companies were totally unprepared for a spill of this size. There was some equipment to contain and clean up oil spills kept at the Marine Terminal, but it was buried under deep snow.

Government agencies and the oil companies argued about what to do, wasting valuable time. Fishermen hurried to help with their boats and knowledge, but they were ignored.

Some spilled oil was collected and the remaining oil on board the Exxon Valdez was pumped onto another ship. Attempts were made to disperse the spill with chemicals. But on the third day after the accident, a storm blew into the Sound, spreading the oil far beyond anyone's control.



An estimated 11 million gallons leaked from the ship. Some believe it was much more than that. Over the following months, the wind, tides, and currents carried it hundreds of miles across the coast of Southcentral Alaska, killing wildlife and covering the shore with greasy, toxic muck.

As it spread, the oil killed at least 250,000 seabirds, 2,800 sea otters, hundreds of seals and bald eagles, and as many as 22 orcas. Billions of herring and salmon eggs died before they could hatch.

Exxon, the company that owned the ship, hired thousands of workers to try to clean the oil from the beaches and the water. The cleanup work lasted for years and cost over 2 billion dollars, but only recovered a small fraction of the spilled oil.

Many local people depended on fishing, hunting, and tourism for food and income. They were desperate, confused, and furious. They had been told that the ships were safe, and that there was a plan in place to contain and clean up spills if they happened. Instead, a spill from just one ship was devastating the environment and economy that they depended on.

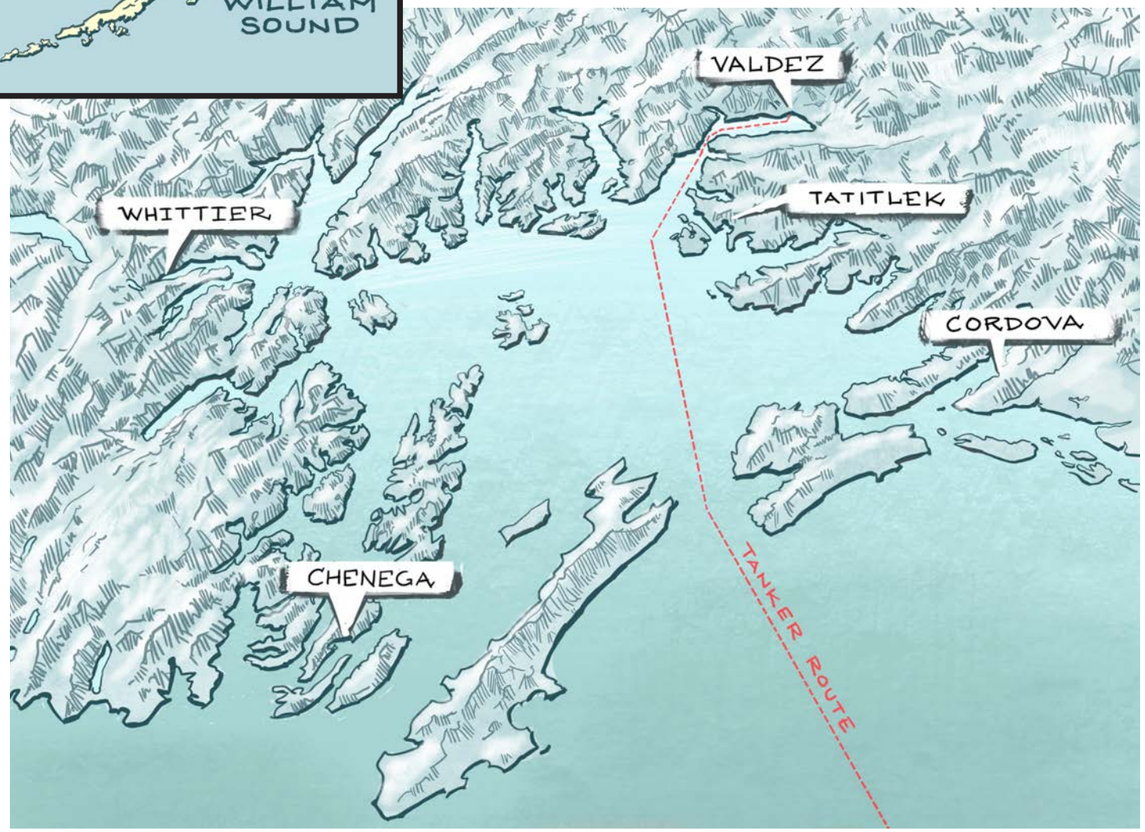
The disaster shocked people around the world. It was difficult to believe that a single ship could do so much damage. The Exxon Valdez, once the pride of a community, was now a warning to the world.

The people of Prince William Sound knew one thing for certain: this must never happen again.

THE PLACE: PRINCE WILLIAM SOUND, ALASKA

Prince William Sound is an ocean inlet in Southcentral Alaska. It is a place of astonishing natural beauty – and a key point in the oil supply chain.

Oil from the North Slope of Alaska travels to Port Valdez through the 800-mile-long trans-Alaska pipeline. From there it is transported by ship to refineries around the Pacific. Around 200 tankers pass through the Sound each year, carrying up to 7 billion gallons of North Slope oil.



The waters that they pass through are surrounded by snow-covered mountains and lush green forests. The thousands of islands and bays of the Sound are home to an incredible bounty of wildlife and people who depend on it.

After the Exxon Valdez spill, America's lawmakers took action to protect Prince William Sound – and other places where oil spills are a possible danger – by creating the Oil Pollution Act of 1990 and new state regulations, which laid out new requirements for prevention and response. It also created a way for local people to have a voice in the decisions.

In Southcentral Alaska, marine spill prevention and response systems would be monitored by Regional Citizens Advisory Councils – the RCACs. Made up of local community members, they represent the many people who depend on the waters and wildlife of the region.

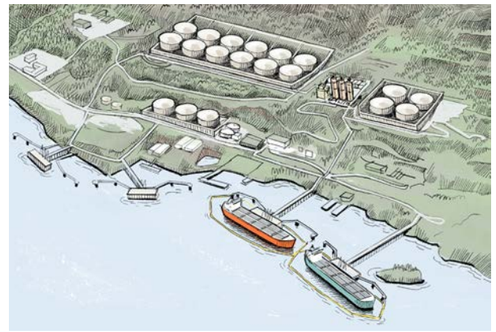
PRINCE WILLIAM SOUND
RCAC
REGIONAL CITIZENS' ADVISORY COUNCIL

THE PRINCE WILLIAM SOUND RCAC

The RCAC doesn't enforce laws – it monitors the companies and government agencies that enforce industry rules. Experts working for the RCAC along with volunteers give recommendations for safe oil transport, and report back to the public on problems and risks in the system. Most importantly, by actively keeping an eye on the system, the RCAC works to make sure that the oil companies never let down their guard against spills.

ALYESKA PIPELINE SERVICE COMPANY

Alyeska Pipeline Service Company operates the pipeline terminal where the tankers are loaded with oil. The 1990 law requires Alyeska to fund the RCAC, but guarantees the RCAC complete independence in its work. As the operator of the oil operations, Alyeska also manages the Ship Escort Response Vessel System.



SHIP ESCORT RESPONSE VESSEL SYSTEM (SERVS)

SERVS directly manages the spill safety and response fleet. It operates powerful tugboats to escort ships through the Sound, and keeps a force of other vessels prepared to clean up a spill when it happens. While SERVS is a part of Alyeska, the RCAC monitors its work.

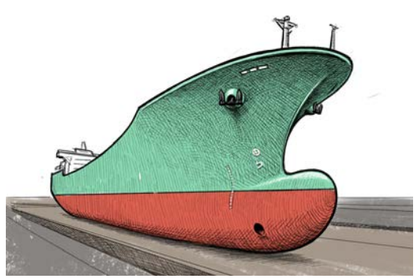
Alyeska pipeline SERVICE COMPANY

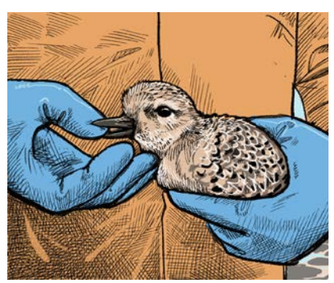
After the Exxon Valdez spill, it was clear that the fishermen should have been an important part of the response. Today, SERVS trains fishing crews to use oil spill cleanup equipment and makes sure their boats are ready to spring into action in an emergency.

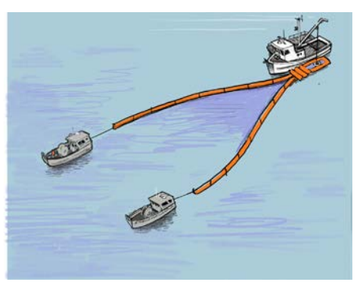
Since the Exxon Valdez disaster, major improvements have been made to each part of the spill prevention and response system.

The improvements include safer ship designs, training and equipment to collect spilled oil, and plans to care for animals affected by spills. It also gives local boats a role in the response.

In this book, we will look at the ways that groups including SERVS, working with the RCAC, use boats and ships to help keep the Sound safe from oil spills.







THE STAKES: WILDLIFE OF THE SEA AND SHORE

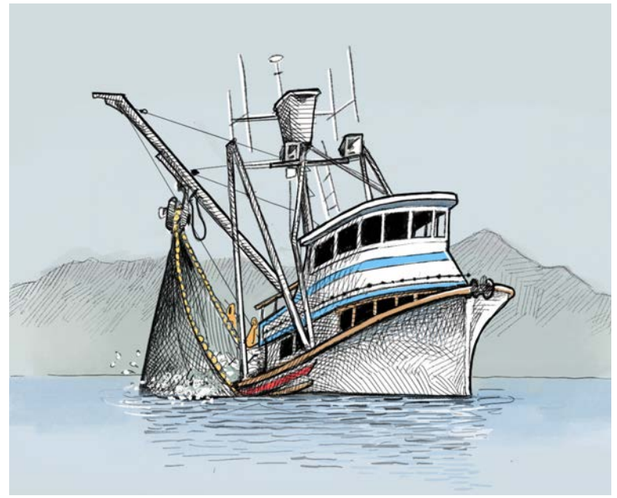
AN ABUNDANCE OF ANIMALS

In the coastal food web of Alaska, the fish, mammals, and birds depend on one another to thrive. Each species hunts and forages, depending on healthy stocks of prey species. An oil spill like the Exxon Valdez incident harms not only the animals that are killed directly, but also predators that need them for food.

PRINCE WILLIAM SOUND COMMUNITIES, FAMILIES, AND CULTURE

Oil spills also impact important human activities, harming sources of food and income.

Commercial fishing supports more families in Prince William Sound than any other industry. Most of the boats are small with one to five people on board, and they are proud of their work, their vessels, and the quality of their catch. Each year millions of salmon are harvested by local boat operators. Oil spills that damage fish populations put the livelihoods of fishing families at risk.



Hunting is an important way that people in the Sound connect with nature, explore the beauty of the region, and provide food for families. Visitors who travel to Prince William Sound to hunt also bring needed income to local guides and hosts. Native people have hunted in the Sound for 10,000 years. Oil spills hurt animal populations and release toxic gasses, threatening this vital activity.

Sport and subsistence fishing are another way for families to experience nature and collect food supplies. The waters of the Sound are rich with delicious seafood species, including lingcod, halibut, salmon, shrimp, and crab. People travel from around the world to fish in the Sound, but a major oil spill like the Exxon Valdez would poison fish and make them unsafe to eat.

Certain places are special to Alaska Native people. Protecting cultural sites is very important to Alaska Native tribes and communities as they represent the traditions, history, and heritage of their ancestors. These sites are viewed as gifts that have been passed on to them from Elders, allowing them to teach future generations. Many of the cultural sites are still used today for gathering food and other subsistence activities.

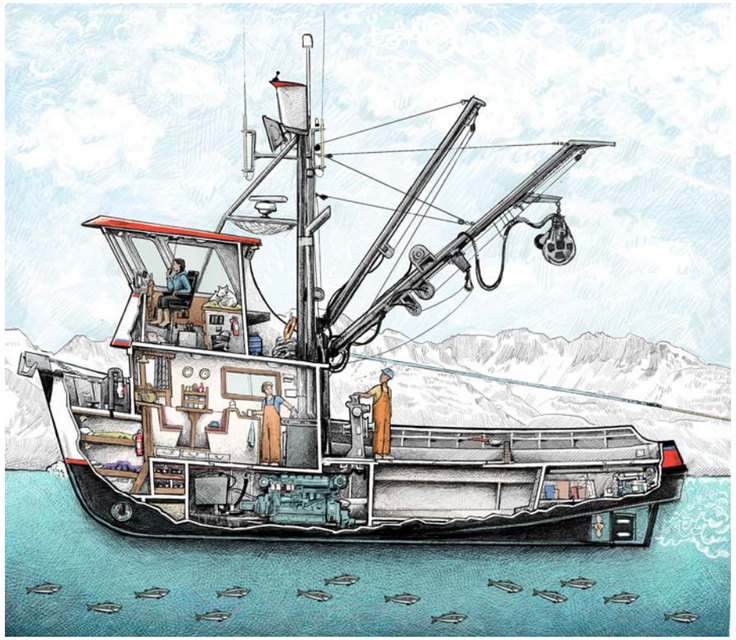
FISHING BOATS BECOME PROTECTORS

During the Exxon Valdez cleanup, the local fishing boat operators were eventually hired to help clean up oil, even though they didn't have enough equipment, training, or support. Even so, the value of their knowledge became so obvious that today about 350 local boats around Prince William Sound, the Kenai Peninsula, and Kodiak Island are now trained annually by SERVS and ready to respond to an oil spill.

These local fishing boat owners and crews have a deep understanding of the tides, currents, and weather in the areas where they work. They also have a lot of practice at gathering organic materials and bringing it into port. Their boats are based all along the coasts of the region, allowing them to reach critical areas quickly.

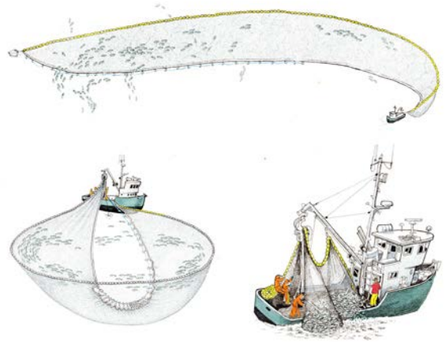
Fishing workers care very much about the environment. Their jobs depend on the health of fish populations. This makes them important partners in keeping the area safe from spills and cleaning up any messes.

The two main types of fishing vessels in the Sound are known as purse seiners and bowpicker gillnetters. They are both built to catch salmon in the summer, but many do other kinds of fishing as well.

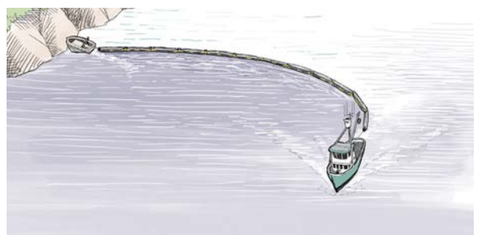


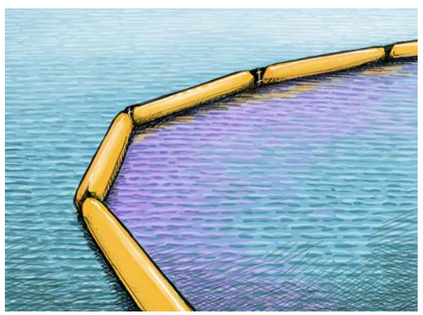
SALMON PURSE SEINER

The larger vessels use a seine net to catch fish. The main boat and a smaller boat called a skiff tow the net to surround salmon near the shore, and then lift them into the boat.



In an oil spill response, the seiner crew is able to use a similar technique, making use of the skills that they have developed while fishing. Instead of towing a net, the seiner tows an inflatable barrier on the surface of the water to block, divert, or collect spilled oil.



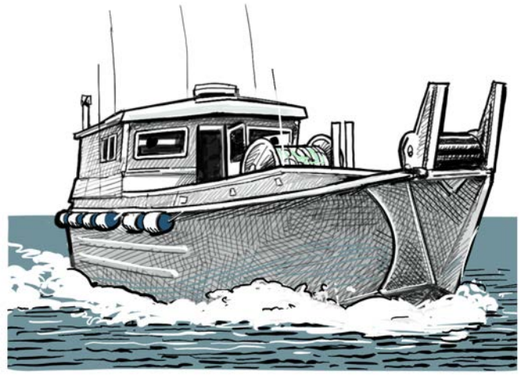


The barrier is called a "boom." It works because oil is lighter than water, so it tends to stay at the surface. Boom are the main tool for controlling spilled oil, but they don't work very well in rough conditions.

Seiners make up about a third of the SERVS on-call fleet. Like other contracted boats, they train every year to prepare for a possible spill situation. Fishing vessels are compensated for their participation and must meet expectations of readiness to participate in the program.

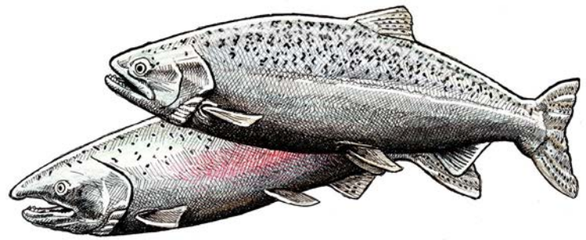
BOWPICKER GILLNETTERS

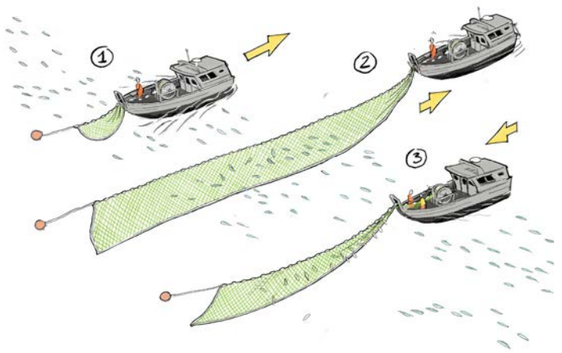
Most of the vessels in the Prince William Sound fishing fleet are bowpickers – boats that set their nets in the water and haul them back aboard over the bow, or front, of the boat. These boats are smaller than the purse seiners, and are very nimble and quick.



The nets used by these boats are called gillnets. When a fish swims into the net, the gill covers on the sides of its head get stuck, and the fishermen untangle them when the net is pulled back aboard.

The bowpickers are the main boats in one of the most famous fisheries in the world – the Copper River salmon fishery near the town of Cordova. Every year in early summer, the arrival of the Copper River fish signals the beginning of the salmon season. To celebrate, the first of these prized fish are loaded onto planes and flown directly to Seattle and greeted with a red carpet reception, then eaten in restaurants.





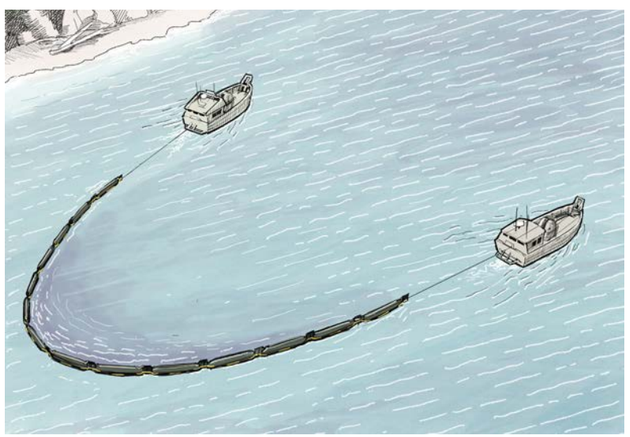
By having a variety of vessels under contract, SERVS is able to adapt to different situations. The seiners have more towing power and can carry heavier equipment, while the fast, agile bowpickers can race to a spill site. They train to work together using different tactics, which gives the system flexibility.

Using boom, the boats can divert or contain spilled oil, but to collect it, they need special recovery equipment designed to separate the oil from the water and store it until it can be disposed. In the next section, we will take a look at the barges and skimmers that are standing by to do just that.

The net is stored on a drum, a large reel at the center of the deck. A large rubber roller powered by the engine helps lift the net out of the water as the drum pulls it in.

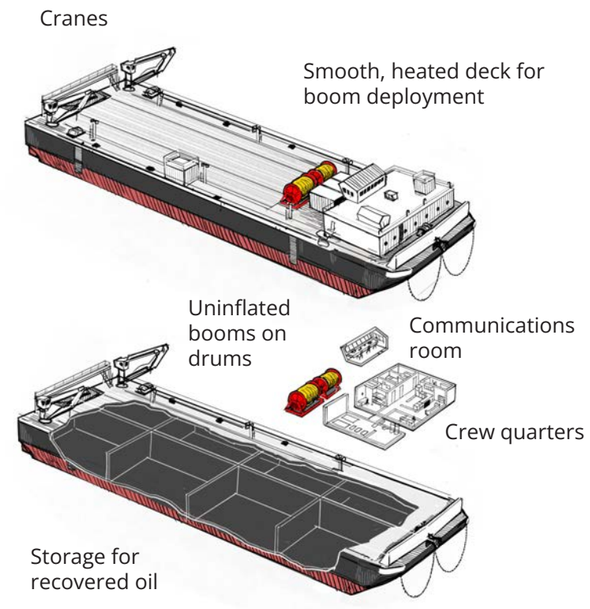
Because the net is almost always in front of the boat, it is less likely to get tangled in the boat's propellers at the back.

Because the bowpickers are light and have a shallow bottom, they are good at working near the shore in places where the water is not very deep. This makes them very good at containing or collecting oil that threatens shallow beach areas.



ADVANCES IN SPILL RECOVERY EQUIPMENT

OIL SPILL RESPONSE BARGE (OSRB)



At the time of the Exxon Valdez spill, the only storage facility for spilled oil in Prince William Sound was a single barge with a capacity of 500,000 gallons – far too little for the amount of oil spilled. To make matters worse, when they tried to scoop up the oil from the ocean, they collected a lot of contaminated seawater, which took up most of the space in the barge's tanks.

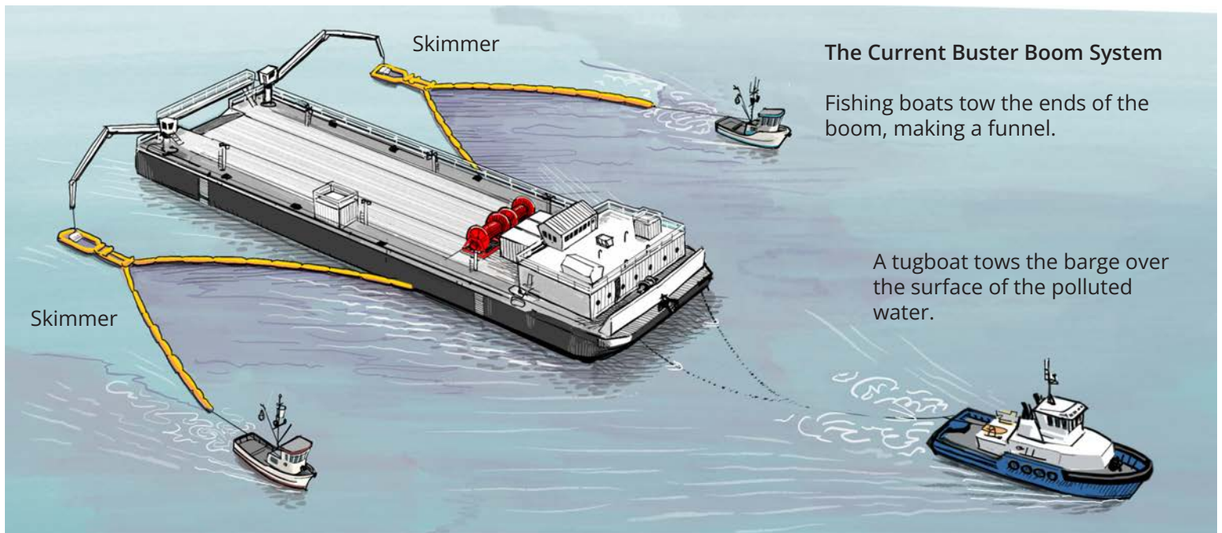
Today, SERVS has storage for 37 million gallons of oil – about 75 times as much as in 1989. This includes five purpose-built Oil Spill Response Barges (OSRBs) to gather and store oil, each with a capacity of about 4.5 million gallons. The barges are ready at all times, with a full crew on board day and night, 365 days a year.

RECOVERY OPERATION

In a major spill, the OSRBs can capture oil using boom and skimmers with help from the local fishing fleet and SERVS tugs. Drills are done every year to practice this work, which requires skilled captains on each boat.

The OSRBs also function as mobile command centers. With so many vessels and people to coordinate, responders use the Incident Command System, a communication system that was developed to respond to major fires in western states.

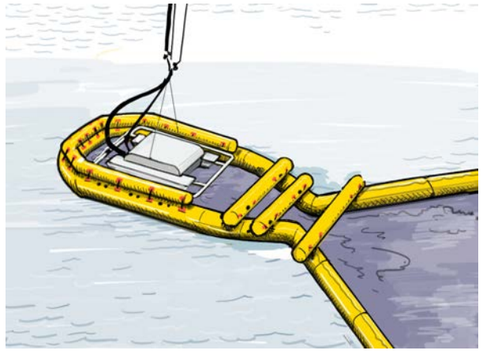
THE OSRB IN ACTION



The OSRBs use boom towed through the water to funnel the floating oil to the skimmer. The oil gathers in a pocket in the back of the boom, called the collection well. As oil collects on the surface of the well, the heavier water escapes through a drain in the bottom. The skimmer floats on the surface inside the well, held in place by a crane on the barge.

SKIMMERS SEPARATE OIL FROM WATER

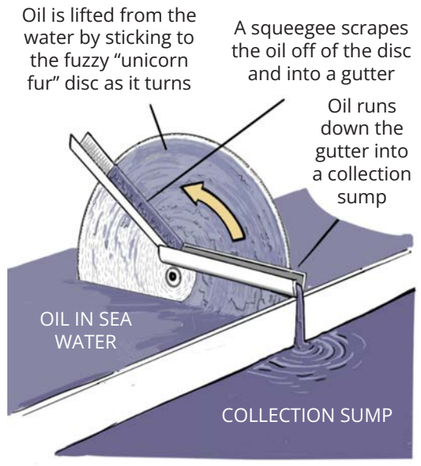
One reason that oil spills are difficult to clean up – in addition to water currents and winds – is that it has to be separated from the water that it is floating in. If too much water is gathered along with the oil, it fills up the storage tanks of the cleanup vessel before enough of the oil is collected. Skimmers are machines designed to gather oil with as little water as possible.

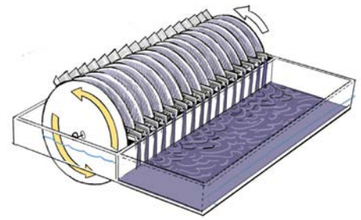


The skimmers on the OSRBs separate the oil using discs that are covered with a soft, fuzzy fabric that the makers call "unicorn fur." The fabric attracts oil, but won't soak up water. The discs are partially submerged so that as they turn, oil from the surface of the water is lifted on the fabric surface, then wiped off by squeegees and drained into a collection sump. The oily muck from the sump is then pumped into the tanks on the barge.

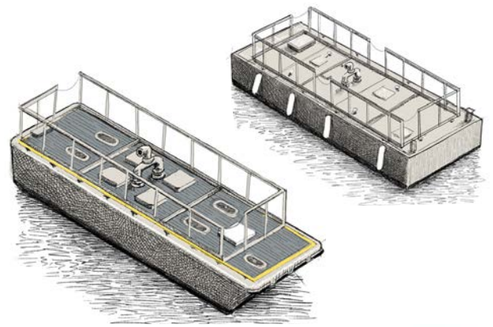
The fishing fleet and tugs also train to conduct recovery operations using skimmers. They practice using different combinations of vessels for different situations.

In order for the smaller vessels to collect oil, they need a way to store it, which is why SERVS also has over 50 smaller storage and transport barges.





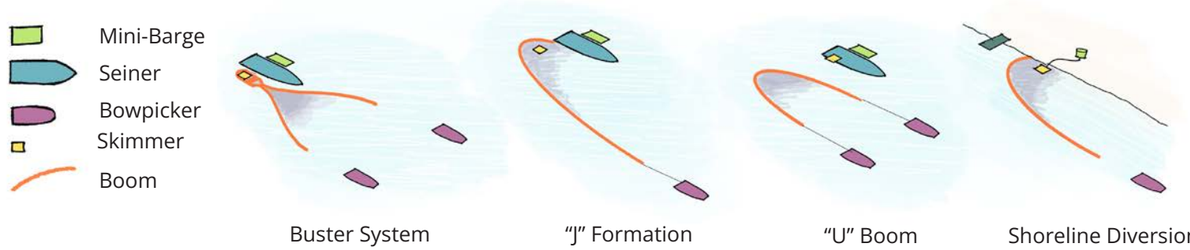
A single skimmer uses multiple discs



MINI- AND MICRO- BARGES

The large OSRBs work best in open water and can collect large amounts of spilled oil. But for places where the water is shallow or there is not much room to maneuver, there are small mini- and micro-barges that can be handled by smaller vessels.

The micro barges are stored at strategic locations around the Sound. Their safety railings can fold down so that they can be stacked on top of each other when they are not in use.



Even with the best equipment and training, spilled oil is incredibly difficult to control and clean up. The best way to stop oil from harming wildlife is to make sure ships don't wreck in the first place. That's the job of expert navigators, known as pilots. They are the subject of the following pages.

LOCAL PILOTS GUIDE SHIPS THROUGH THE SOUND

Oil tankers crossing through the Sound are guided by an expert ship navigator called a pilot. Pilots specialize in bringing ships through risky or sensitive waters.

Before they can be certified, pilots must be first be licensed to command large ships, which takes years of experience and training. Then they have to prove their skills and knowledge of the waters where they work by qualifying through a local organization made up of other pilots.

The pilots in Prince William Sound are a part of the Southwest Alaska Pilots Association, which has been guiding ships in Alaska since 1975. It has one of the longest and most difficult training and testing programs in the country – it can take as long as five years to become licensed.

Before empty tankers approach Bligh Reef, the pilot travels out to meet them in a fast pilot boat and goes aboard by climbing a rope ladder. When the same ships leave the port loaded with oil, the pilots guide them out past the reef, where the pilot boat picks them up to bring them back to town.

Crossing between the pilot boat and the ship can be risky. The pilot boats are specially designed to make the crossing safe. This Prince William Sound pilot boat has special features to make it stable and safe in the sometimes stormy Alaska waters.

Handrails are placed away from the edge of the deck so pilots can hang on and steady themselves. This way, they can hold on while reaching for the ladder without getting caught between the rail and the ship as the vessels move around in the waves.

The decks are heated to keep ice from forming on them in the winter months. The windows also have heaters inside the glass to keep them free of frost.

The pilot boat is propelled by a powerful set of water jets and uses a v-shaped hull to reduce water resistance. It can travel as fast as 30 miles per hour – very fast for a boat. It also uses electronically controlled stabilizers that help to keep it very level even in rough waves.

The pilots' training and knowledge can keep ships safe in almost any weather, but even the best pilot can't steer a ship if its engines or rudders fail. When a huge oil tanker loses control, only an incredibly powerful tugboat can tow it to safety. Those tugs are the subject of our next section.

ESCORT TUGS ARE READY FOR EMERGENCIES

The best way to stop an oil spill from harming the environment is to make sure ships don't collide or run aground. Escort tugs help prevent accidents by following close to the ships, ready to help steer or stop them in case of an emergency.

Before the Exxon Valdez oil spill, tankers were escorted by a single tug that stayed nearby and guided by a pilot from the time they left the terminal until they were a few miles from Bligh Reef. That means the Exxon Valdez did not have a tugboat escort or pilot when it hit the rocks.

Today, loaded tankers must have two escort tugs with them for the entire trip through Prince William Sound until they reach the open ocean, and the pilot stays on board until the ship has passed Bligh Reef. Five new escort tugs were built specifically for this purpose in 2018. They are some of the largest, most powerful tugboats in the world.

Two tugs escort the tanker ship out to the ocean, with one of them tethered to it the first stage of the trip.

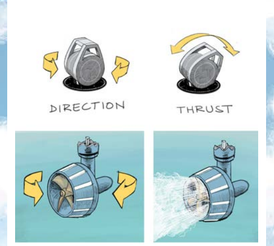
The wheelhouse sits high on the tug – as high as the roof of a three-story building.

Large windows and cameras in the wheelhouse let the captain see all around. The windows are heated to keep ice from forming during the cold Alaska winters.

The escort tugs carry equipment to help contain spilled oil. Each tug has a small boat on the upper deck that can tow a boom for containing spilled oil, and skimmers to remove it from the water.

A crane on the deck can put the boom boat into the water and take it back out.

These special tugs, called Z-drive tugs, don't have a regular steering wheel. Instead, the captain uses handles on the armrest of their chair to point the propellers in any direction. By tilting these handles, the captain can control how much thrust each propeller produces.



FORWARD TOWING WINCH

Emergency towing gear hangs from the back of the house.

AFT TOWING WINCH

There are five of these massive escort tugs in Prince William Sound – enough to escort two ships at a time with one tug kept in reserve.

They have professional crews on board at all times, keeping them clean and well-maintained. To make sure that all of the equipment is ready to use, every system is monitored remotely by the company that built them.

The tugs are so large and stable that they can work in any weather conditions. This is vitally important in Alaska where winter storms can produce waves 20 feet high. During the worst storms, ships are not allowed to travel loaded through Prince William Sound, and trainings are canceled. But in an emergency, the escorts tugs and their crews are always prepared to respond, regardless of the weather.

Tough rubber fenders allow the tugs to push on ships without causing any damage.

The tugboats have a heavy steel fin, called a skeg, that sticks out of the bottom. The skeg helps them steer and control the ship's movements.

The propellers are housed inside nozzles and can turn to push in any direction, including sideways or backwards.

The escort tugs produce an incredible amount of thrust. Their engines produce over 13,000 horsepower, as much as seven semi trucks – but by using their z-drives and skegs, they can apply even more force when stopping a runaway oil tanker. To do that, they use a technique known as indirect towing.

ASSISTING A TANKER IN DISTRESS

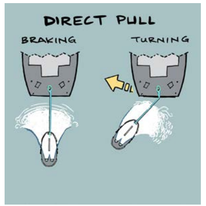
Thousands of ships are crossing the oceans at any given time, usually without major problems – but emergencies do happen. People can make mistakes, engines can break down, and steering systems can fail. Sometimes a ship's rudders even fall off and sink. While these situations are rare, they are very serious, especially if the ship is carrying dangerous cargo like crude oil.

The escort tugs need to be ready for these emergencies. To stay prepared, they perform drills that simulate situations such as steering or engine failures.

To practice dealing with a tanker that has lost steering control, the tanker simulates an emergency by steering hard to one side on purpose, while the tug maneuvers to correct the turn. To simulate an engine breakdown, the ship stops its propellers while the tug takes action to stop the ship.

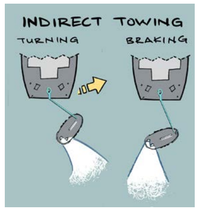
Regular tugs have a straight propeller shaft and are steered by a rudder. With their powerful z-drives, the Prince William Sound escort tugs can do things that would be dangerous or impossible for ordinary tugs.

DIRECT AND INDIRECT TOWING



At slow speeds, the tug can simply use its propellers to resist the ship's movement.

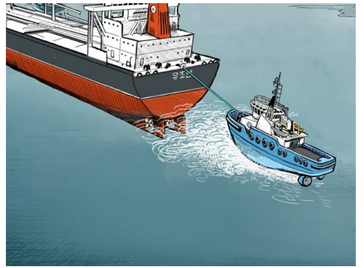
This is called direct towing, and it can help slow the ship or turn it by pulling in the desired direction. Any tugboat can do this.



Instead of the using only its propeller power to control the moving ship, some modern tugs can produce more braking power by turning to the side and being dragged behind the ship. The water resistance of the skeg being pulled along sideways can produce double the steering or braking force of direct engine pull.

Called indirect towing, it is only safe for certain types of tugs.

The most effective way to stop a runaway ship is to combine the two methods. The tug uses indirect towing when the ship is still traveling at its full speed, turning it away from hazards. Then when it has slowed the ship enough, it switches to a direct pull to stop it completely and get ready to tow it in to port for repairs.



The new escort tugs are a powerful tool to prevent spills and the Exxon Valdez disaster might have been prevented if they had been in use, but the Oil Pollution Act goes a step further to prevent spills. It made changes to how new ships would be built, reducing the risk of a major catastrophe.

OIL TANKER SAFETY IS IMPROVED

Since the Exxon Valdez disaster, design improvements have been required for new ships in Prince William Sound. While none of these measures can eliminate the risk of a spill, together they make the system safer for the environment.

A key change is the requirement for all new tankers to have a double hull. Single-hulled tankers like the Exxon Valdez have no separation between the cargo tanks and outer hull of the ship. Double hulled tankers used today have a space of about six feet between the outside hull and the tanks. A double hull wouldn't have completely stopped the Exxon Valdez from spilling its oil, but it could have reduced the amount by as much as 60%.

The house of the ship contains the bridge (wheelhouse), control rooms, and offices, as well as crew sleeping and living areas.

Each crew member lives on board the ship for weeks or months at a time, working in shifts so that there are always people ready to deal with problems or emergencies. They need to be alert and ready to work, so each person has comfortable quarters to sleep, eat, and rest.

A manifold is a system of piping used in the loading and unloading of liquid cargo, like crude oil. It connects the ship and terminal. The manifold is on the ship's deck and can be controlled either from the cargo control room in the house or from the manifold.

The manifold is also used to control and remove the toxic, flammable gasses that build up inside the tanks during loading.

Loading the tanker involves moving huge volumes of flammable fluids. If a fire were to break out during loading, the results could be catastrophic.

The vapors from the oil are only flammable when mixed with air. To prevent explosions and fires, the ship removes all of the air from the tanks, replacing it with a gas that doesn't contain enough oxygen to support a fire.

Tankers also have firefighting systems on board the ship and on the dock.

Tugboats steering heavy ships like tankers use massive amounts of force. Ships must have strong towing points, called "bitts," for the tugboats to tie their lines to.

Tankers in Prince William Sound are required to have "superbitts" that can handle the enormous pulling power of the tugs in an emergency.

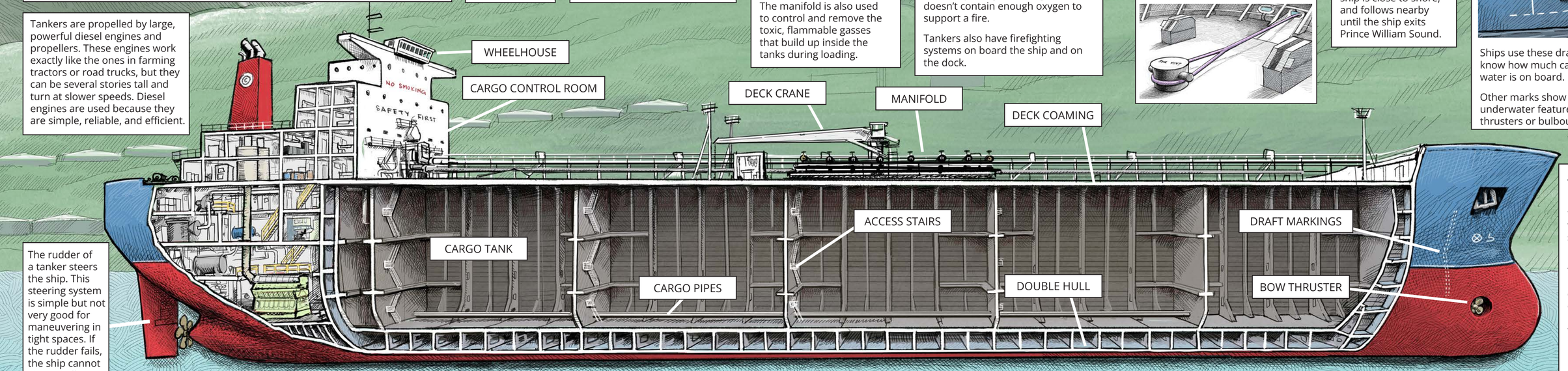
When the loaded ship leaves the terminal, it weighs thousands of tons more than when it arrived empty. Before leaving, a tug is tethered, or tied, to the superbitt on the stern. This tug stays connected while the ship is close to shore, and follows nearby until the ship exits Prince William Sound.

The "draft markings" are numbers marked on the side of the ship. They tell how far it is from the water surface to the bottom of the ship, measured from the bottom edge of the number itself.

Ships use these draft markings to know how much cargo or ballast sea water is on board.

Other marks show the location of underwater features, like the bow thrusters or bulbous bows.

Tankers are propelled by large, powerful diesel engines and propellers. These engines work exactly like the ones in farming tractors or road trucks, but they can be several stories tall and turn at slower speeds. Diesel engines are used because they are simple, reliable, and efficient.



The rudder of a tanker steers the ship. This steering system is simple but not very good for maneuvering in tight spaces. If the rudder fails, the ship cannot steer at all.

A bow thruster is a propeller in a tunnel that passes through the ship sideways.

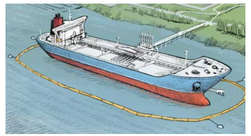
It helps maneuver the ship when it is close to a dock, but is not effective if the boat is moving forward, even at low speeds.

Not all ships have bow thrusters.

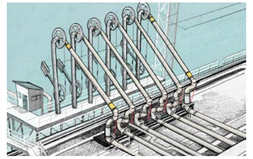
A local ship pilot comes aboard about 25 miles out to guide it to the terminal.

When the ship is close to the terminal, tugboats come to push it to the dock.

Before any oil is loaded onto the ship, small boats surround it with floating boom – barriers that help keep any spilled oil from drifting into the surrounding waters.

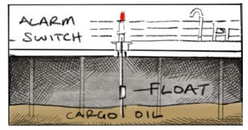


The oil boom is attached to buoys that keep it in the proper shape around the ship. If oil spills inside the boom, it can be skimmed from the surface before it escapes.



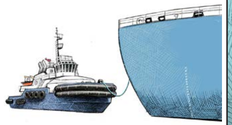
The ship is filled using the loading arms. The arms are flexible pipes that swing out to attach to the manifold on deck.

Each tank has a high-level alarm that warns the crew if a tank is being overloaded. Space must be left at the top of the tank because oil expands when the ship travels to warmer places.



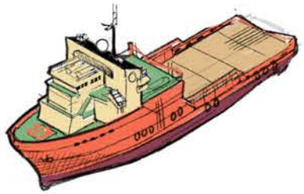
As the ship fills up with oil, it sinks deeper in the water. The depth is called its draft. It is loaded slowly and carefully so it doesn't tilt or become unbalanced, and crew members stay on the deck to watch for spills.

If any oil is spilled on the deck, it is contained by a low barrier called "coaming."



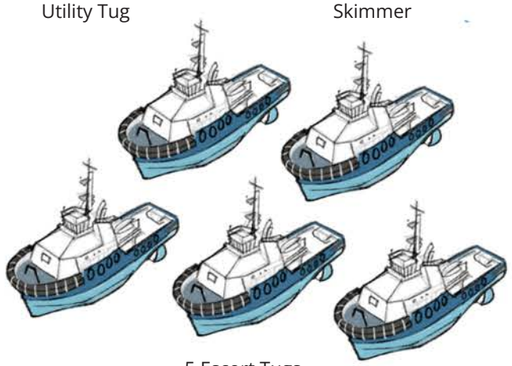
When the ship is full and ready to leave, an escort tug is attached to it using a very strong line.

OVERVIEW OF THE SERVS FLEET

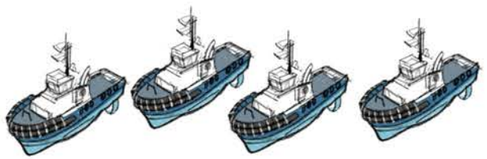


Utility Tug

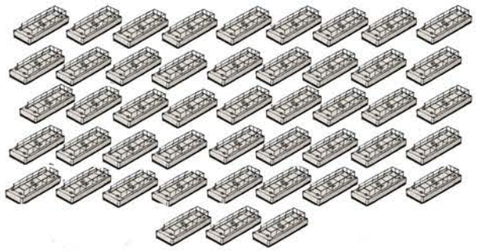
Valdez Star
Skimmer



5 Escort Tugs

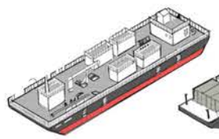


4 General Purpose Tugs

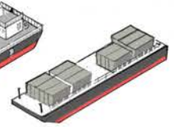


48 Mini Barges

12 Micro Barges



Allison Creek Oil
Transport and
Storage Barge

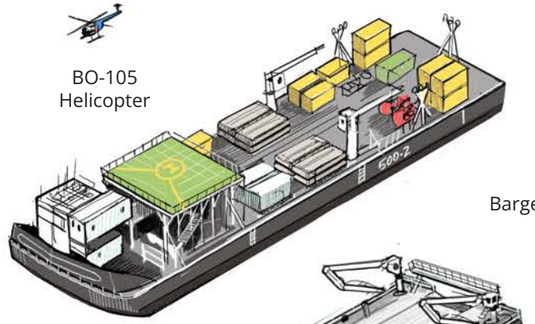


Sawmill Creek
Equipment
Storage Barge

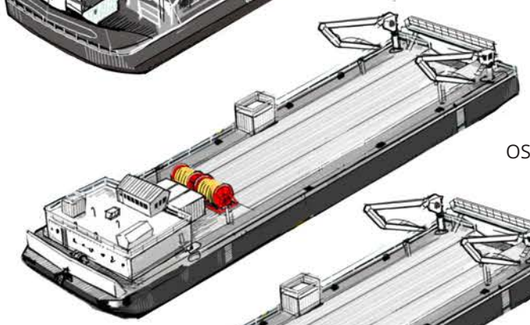
Dynamic Plane
Skimmers

Fort Liscum Skimmer

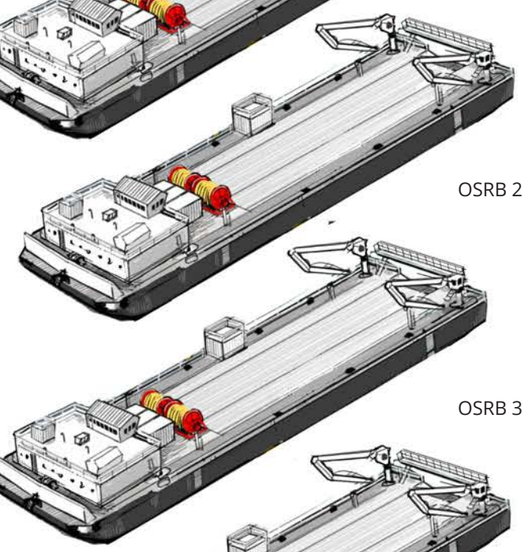
BO-105
Helicopter



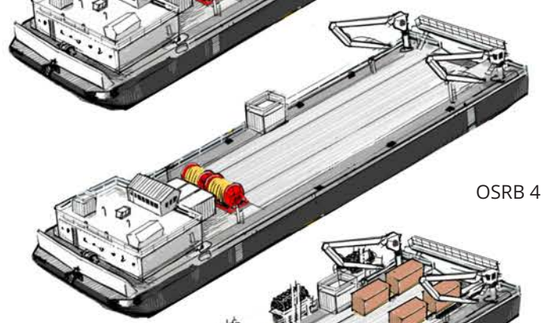
Barge 500-2



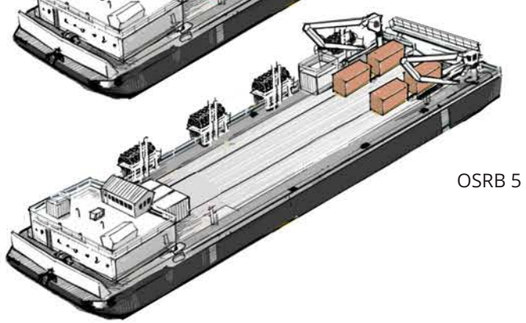
OSRB 1



OSRB 2



OSRB 3

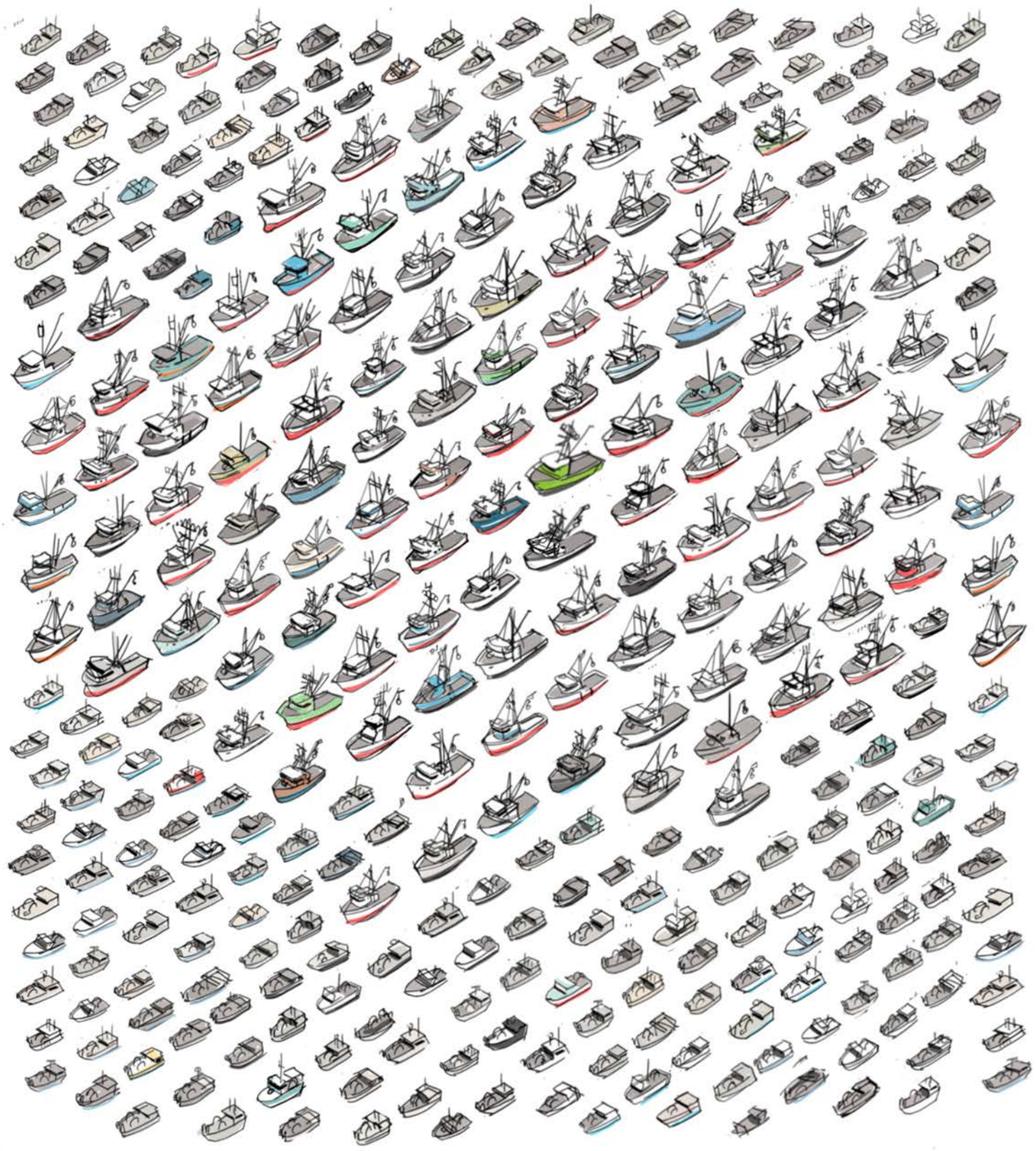


OSRB 4

OSRB 5

Fishing Tenders

Landing Craft

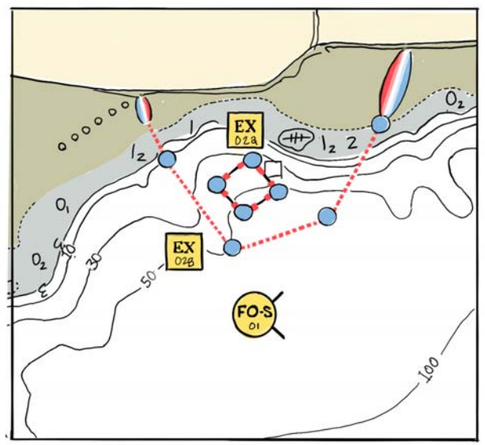


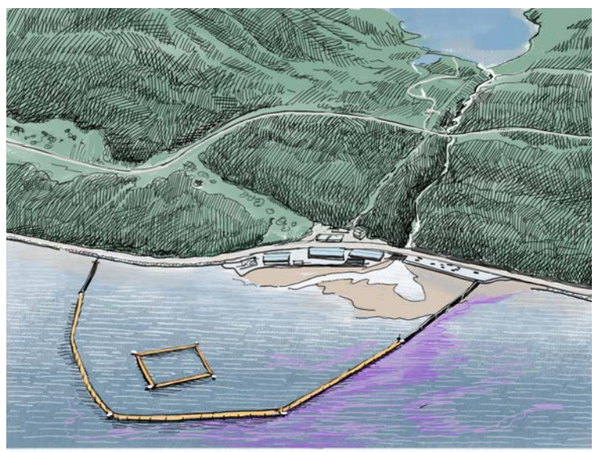
The fishing fleet – over 350 contracted vessels – makes up a huge part of the response system. They provide flexibility and speed, and because many are trained in advance, they can be deployed quickly and effectively in an emergency.

REDUCING HARM FROM OIL SPILLS

GEOGRAPHIC RESPONSE STRATEGIES

There are some places in the Sound that are especially important to protect from oil spills. They include sites that are important to Alaska Native people or areas where fish spawn. State of Alaska authorities make a specific plan to keep spilled oil out of each of these places. The plans are laid out clearly in the form of a map and in some places the equipment needed is stored at the site, ready to use.





This map shows the plan for protection of a fish hatchery near the Marine Terminal. Millions of salmon are raised here every year for fishers to catch and sell to seafood buyers. The map shows where oil boom is to be placed if the hatchery is threatened by an oil spill. The boom used near the beach is specially designed so that they won't be damaged by touching the sand and rocks in the shallow water. The boom in deeper water is connected to buoys that are placed ahead of time.

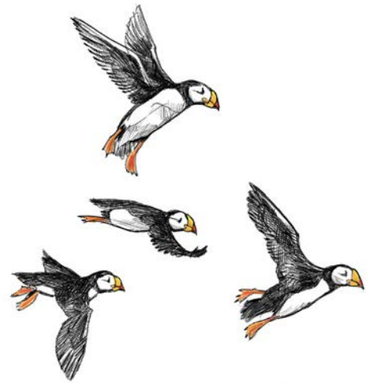
The boom is stored in sheds on the shore and a ramp has been built so that they can slide down into the water. The crew practices putting the boom in place by pulling the end out of the shed and attaching it to a kind of boat called a landing craft. The landing craft pulls the boom out to be attached to a buoy, while the shore crew fills it with air. Once in place the boom will help keep oil away from the hatchery.

Landing craft are perfect for this kind of work. They are built with a tough bottom and a ramp at the front that allows the crew to reach the shore in places where ordinary boats can't go because they would need a dock with deeper water to avoid being damaged. There are many places on the wild shores of Prince William Sound where only a landing craft can go. SERVS has three of these boats and there are others that are ready to help in the case of a spill.

KEEPING ANIMALS AWAY FROM SPILLED OIL

Wild animals don't understand that oil in the water can injure or kill them. In Prince William Sound, millions of land and sea birds, including horned puffins, return to the same places every year to feed on fish and lay eggs. If those areas are polluted with oil, workers can try to protect the birds by frightening them away from the spill.

Most animals are wary of unfamiliar objects or noises, and certain shapes or movements can scare them away from a place for a while. For many years, humans have tried to find ways to keep animals away from crops. Our growing understanding of how animals think has improved our ability to affect their behavior.



Brightly colored balloons with a circular eye shape make birds feel as if they are being watched by a predator. They will frighten the birds away until the birds get used to them.

A propane-powered "cannon" can be used to make very loud booming noises that keep birds from landing in a polluted area.

The unpredictable movements of a "tube dancer," usually seen advertising businesses on the sides of roads, can be an effective way to frighten animals away from spilled oil.

WILDLIFE RESCUE AND THE OTTER HOSPITAL

When an animal has a lot of oil on its fur or feathers, it's unlikely to survive without help. The spill response system includes a Wildlife Branch, which coordinates with government agencies and other organizations to capture and give medical treatment to oiled birds and mammals, giving them a better chance for survival.

Sea otters live almost their entire lives on the surface of the cold sea water, where they are able to survive because their fur is incredibly good at keeping them warm. If their fur becomes contaminated with oil, it loses its insulating properties and the otters will die from the cold.

In an oil spill, the responders will try to capture oiled otters and move them to the Otter Hospital, where they can be washed using gentle soaps to remove the oil from their fur without hurting the otters.

Even with treatment, many oiled animals cannot be saved – the best way to protect wildlife from oil spills is to make sure that they don't happen.

THE LESSONS OF THE PAST ARE A COMPASS FOR THE FUTURE

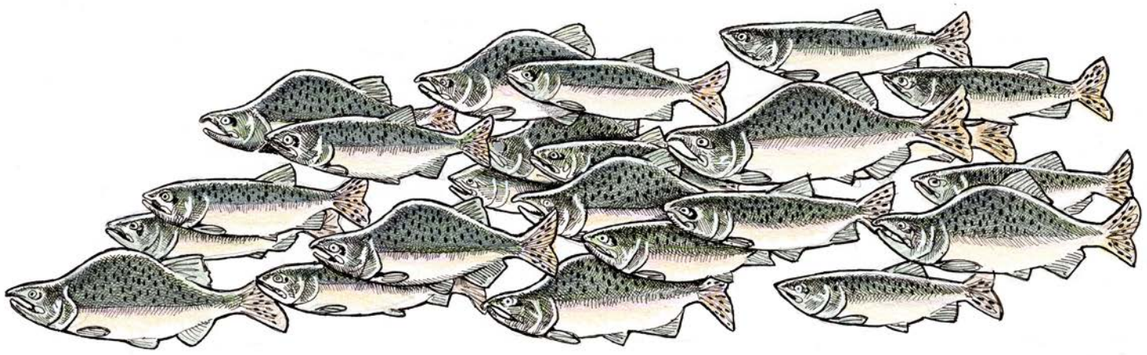
The Exxon Valdez disaster must never be forgotten, because it must never be repeated.

Oil spill prevention is not only necessary—it is vital work, worth doing because the stakes are immense and because it demands courage, ingenuity, and vigilance.

The Regional Citizens Advisory Council (RCAC) system has been successful because its involvement creates a dialogue where the oil industry is driven by local voices to go beyond the bare minimum of compliance with the law. If the 1990 law had not created an outside group to monitor the companies and government agencies, the work to improve the system might have been less effective. The councils' ability to highlight problems and speak out openly has proven more powerful than policing alone.

The people working in the oil spill safety system—including the industry employees, trained fishing vessel operators, pilots, and community volunteers—are not just doing a job; they are guardians of the Sound. Their passion and persistence elevate routine duty into something larger: a commitment that protects lives, livelihoods, and the Sound's abundant resources of fish and wildlife.

Still, the risk of spills is real – and the cost of a major spill would be enormous. The cost of dealing with a spill after it happens is one reason that the strongest link in the safety chain must always be prevention: keeping spills from happening at all is the most important goal. Since that terrible day in March of 1989, the record of prevention has been very good and all of the people involved should be proud of it.



Oncorhynchus gorbuscha – pink salmon – are one of the living treasures of the Sound

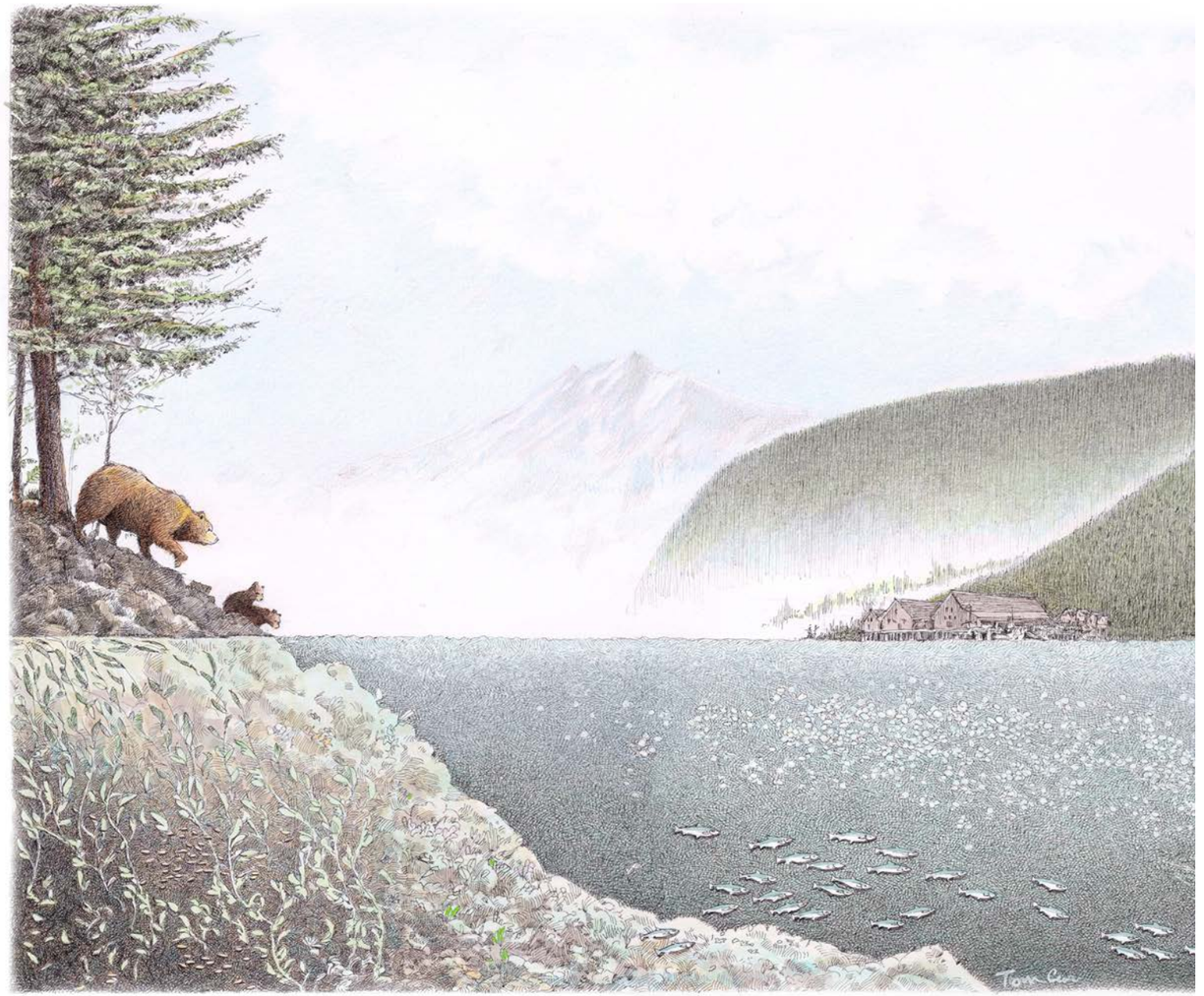
The work of the RCAC also reflects another shared understanding – that the natural beauty and resources of the Sound are beyond monetary value. The RCAC is a mechanism to bring that perspective to the planning table when decisions are made about oil transportation. It represents the values of the communities, which include many industry workers, and makes sure that the pressure on people to make profits doesn't trample their respect for the Sound's crucial wildlife, ecosystems, and local economies.

In effect, the RCAC brings the family of interests into a single discussion to ensure that important issues are voiced. Like any honest conversation about challenging issues, this dynamic inevitably produces disagreements. Even so, the dialogue has been remarkable in generating good faith. Moreover, the current situation helps support the efforts of people inside the industry who believe in a commitment to protecting their home waters.

But the work is not done. The systems must continue to improve, to adapt, and to apply the best available technologies. Keeping the Sound safe is a work in progress and a duty that will pass to future generations. In the end, it is those who care deeply about this work who bear the burden of protecting and preserving the beauty of Prince William Sound. That is why the memory of Exxon Valdez must endure.

As John F.C. Johnson, Vice President of Cultural Resources for Chugach Alaska Corporation, observed: "A person without history is like a ship drifting in the ocean, not knowing where they are going or where they came from."

The Exxon Valdez was a catastrophe, but its memory is also a warning. It reminds us how much there is to lose and how much depends on vigilance. Protecting Prince William Sound is not only a responsibility—it is an inheritance, carried forward by new generations the same way a family carries its memories, to keep Prince William Sound whole.



FROM THE COUNCIL: RESOURCES FOR EDUCATORS AND PARENTS

The Prince William Sound Regional Citizens' Advisory Council works to combat complacency to ensure the region's spill prevention and response system is one of the greatest in the world. The Council educates and informs others about this system as part of the mandates set out for the organization in the Oil Pollution Act of 1990, or OPA 90, and works to ensure the system continues to be held to the highest standards. It is one of two RCACs established after the Exxon Valdez oil spill and required in OPA 90. The other is the Cook Inlet Regional Citizens Advisory Council.

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. Constant vigilance is needed to prevent a return to the complacency that allowed the Exxon Valdez spill to happen.

After the Exxon Valdez spill, citizen involvement helped transform the Prince William Sound system into what it is today. In today's world, it can seem overwhelming to try to make change. This system is a testament to the positive change community voices can have.

If you are using this book as an educational tool, you can use questions like those below to continue conversations around these topics:

- After reading about and exploring the boats and equipment involved with oil spill prevention and response, why is this system of boats important to your environment and community?
- How are you connected to the system for oil spill prevention and response in Prince William Sound?
- Closing with a question like: How can you use your voice for the safety of your environment and community? Or, what can you do to be an engaged community member where you live?

FREE LESSON PLANS AND ACTIVITIES

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. 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**

WE'D LOVE TO HEAR FROM YOU!

Share how you've used this book and its information to educate your community at **education@pwsrcac.org**.

THE SPILL: PERSONAL STORIES FROM THE EXXON VALDEZ DISASTER

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.

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. Copies of "The Spill" book are available free of charge by contacting the Council.

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.

Both resources can be found through the Council's website: **www.pwsrcac.org/spillstories**

PRINCE WILLIAM SOUND
REGIONAL CITIZENS' ADVISORY COUNCIL
www.pwsrcac.org

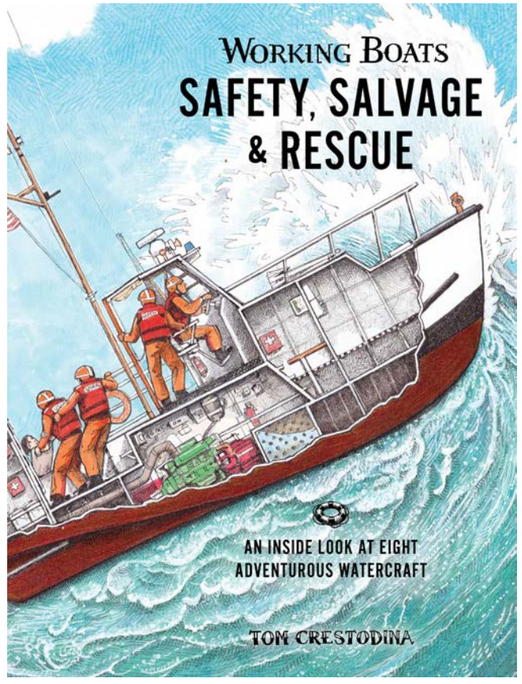
ABOUT THE AUTHOR

Tom Crestodina is an Alaska fisherman whose drawings have brought the fascinating world of life at sea to readers throughout the Northwest U.S. and beyond. He began making his beloved series of cutaway drawings as a way to connect with his young children while he was away working to provide for his family, showing the interiors and functions of fishing vessels.

Tom is the author and illustrator of the acclaimed "Working Boats" series of books. The series includes vessels that serve families and the world at large in a multitude of ways – advancing scientific research, building infrastructure, and providing food.

Tom fishes in Southeast Alaska when he is not making drawings at his home in Bellingham, Washington, where he lives with his wife Ania and their two sons.

Check out more from Tom Crestodina, including his "Working Boats" series: **thescow.bigcartel.com**



GLOSSARY

ALYESKA PIPELINE SERVICE COMPANY: The company that operates and maintains the Trans Alaska Pipeline System, including the terminal in Valdez. More information: www.alyeska-pipe.com

BARGE: A floating platform without its own propulsion. The barges shown here were purpose-built to store the oil and water that would need to be collected during a spill, as well as response equipment.

BERTH: The place a vessel stays or "parks" at on a dock or wharf.

BITT: The post on the deck of a ship for tying up lines. There are also "superbitts," which are heavily reinforced towing points that can handle the massive pulling power of the escort tugs in an emergency.

BOOM: Temporary floating barriers used to contain oil when spilled into water. Boom comes in different dimensions and weights. Different types are used for different environmental conditions or tactics. For example, bigger boom is better in rougher water.

BOW: The front of a boat.

BOW THRUSTER: A propulsion device located at the bow of a ship that provides lateral thrust (or left/right movement).

BULBOUS BOW: A streamlined flare or bulb at the bow, just below the waterline, which increases speed, range, fuel efficiency, and stability, by reducing drag.

BUOY: A floating device usually used to mark the location of something under the water. They can also be used to hold boom in place. Some buoys have sensors that collect information used by scientists or are used as weather stations for a given location.

COAMING: A raised border around a deck or hatch to keep water and/or oil from leaking overboard.

CRUDE OIL: Raw, unprocessed or unrefined oil.

CYLINDERS: Part of an engine. A tube-shaped device in which a plunger called a piston is pushed into, to do mechanical work, such as turning a crankshaft to drive a propeller.

DOUBLE HULL: A ship design where there is a space between the cargo tanks and the ship's outer skin. This is a requirement for all tankers operating in Prince William Sound.

DRAFT: The depth of a ship's bottom below the waterline.

EMULSION: A mixture of two or more liquids, such as crude oil and water, that are normally unmixable. In an emulsion, one liquid is dispersed in the other. During an oil spill, for example, tiny water droplets get mixed into the spilled oil by wind and waves, forming a mixture that looks like chocolate mousse or pudding.

FENDER: An object used to protect a vessel from being damaged by rubbing against another boat or dock. Fenders are usually made from special inflatable materials.

GEOGRAPHIC RESPONSE STRATEGIES or GRS: Site specific, detailed plans made by the State of Alaska, and others including the U.S. Coast Guard and Environmental Protection Agency, with input from local stakeholders and experts, to protect economically, environmentally, or culturally sensitive areas in the event of an oil spill.

HATCHERY: A facility that raises salmon to support wild populations and/or provide fish for harvest.

HAZING: Techniques used to deter wildlife away from areas affected by an oil spill.

HOUSE: The section of a tanker where the control room, offices, crew quarters, and eating and recreation areas are located.

HULL: The watertight body of a ship.

INERT GAS: A gas that has a very low reaction rate to other substances. In oil tanker holds, this would be a gas that does not contain enough oxygen to allow combustion, or burning, to protect flammable cargo.

KNOTS: A unit of speed, representing one nautical mile per hour, which is about 1.15 land miles per hour. It is used in maritime navigation for measuring vessel speed. The term comes from how sailors historically used a device with a rope and physical knots to gauge speed by counting knots over a specific time.

LANDING CRAFT: A type of boat used to transport equipment or people to shore, often having a flat bottom and a lowerable ramp on the front, rather than a normal bow, to allow beach access.

LOADING ARM: Moveable piping system at the berth that may include fixed piping, or a combination of fixed and flexible piping. This system swings out to attach to the piping on tanker's deck used to transport oil and vapor between the terminal and the tankers.

MANIFOLD: Located on the ship's deck, this system brings many valves into one place and serves as the connection point between the ship and the terminal. The manifold piping connects to the cargo piping that runs through the cargo tanks on the ship.

OLEOPHILIC: Something that likes or attracts oils, rather than water.

PILOT BOAT: A boat used to transport maritime pilots between land and the inbound or outbound ships they will be piloting, or safety navigating into and out of port.

REFINERY: A place where raw materials, such as crude oil, are processed and converted into refined products, such as gasoline or diesel fuels.

REGIONAL CITIZENS ADVISORY COUNCILS: The Oil Pollution Act of 1990 requires citizen oversight councils in Alaska for Prince William Sound and Cook Inlet. The councils promote partnership and cooperation around local citizens, industry, and government; build trust; and provide citizen oversight of the oil industry in their regions.

RUDDER: A flat piece of metal hinged vertically near the stern of a boat, used for steering.

SHIP ESCORT RESPONSE VESSEL SYSTEM or SERVS: The department at Alyeska Pipeline Service Company focused on preventing and responding to oil spills. The tugs and OSRBs within the system are owned and operated by Edison Chouest Offshore, who is contracted with Alyeska to provide these services.

SKEG: A section of the bow or stern that tapers or projects out, protecting the propeller and supporting the rudder. The tugs featured in this book have large skegs that help stabilize steering and play a role in maneuvers to stop or steer a ship in motion.

SKIMMER: A machine that floats on the surface of the water removing floating spilled oil.

STERN: The back of a boat.

SUBSISTENCE FOOD: Food that is produced or collected to meet the needs of a person or family, often through traditional means. Many Alaska Native communities and peoples rely on marine mammals, fish, crustaceans, fowl, eggs, and other natural resources, many of which were harmed by the Exxon Valdez oil spill.

SUMP: A low space that collects water, oil, and other liquids, usually to then be pumped into a storage container, such as a tank or barge.

TANKER: A ship designed to transport large amounts of oil, chemicals, or other products.

TETHER: To tie together. In this book, we describe how a tug and tanker are tethered (tied) together for parts of the tanker's transit through Prince William Sound as one of the safety measures in place. This allows for quicker action to assist, on the part of the tug, if the tanker loses power, steering, or has other issues.

TOWING: When a boat is pulled, pushed, hauled alongside, or any combination of those actions.

TRANS ALASKA PIPELINE SYSTEM: Also known as TAPS, this system transports crude oil from Alaska's North Slope to Valdez, where it is then loaded onto oil tankers. The system includes the trans-Alaska pipeline that runs 800 miles, beginning at Prudhoe Bay (on the North Slope) and ending at the Valdez Marine Terminal, and the terminal itself.

A consortium of companies owns TAPS, which as of 2026 are: Harvest Alaska, LLC., ConocoPhillips Transportation Alaska, Inc., and ExxonMobil Pipeline Company LLC. Alyeska acts as the TAPS operator and pipeline transportation service on behalf of the owner companies.

VALDEZ MARINE TERMINAL: The terminal operated by Alyeska Pipeline Service Company, located on Port Valdez in Prince William Sound, Alaska, where the trans-Alaska pipeline ends and Alaska North Slope crude oil is loaded onto tankers for transport to refineries. Part of the Trans Alaska Pipeline System.

WHEELHOUSE: The structure on a vessel where the main steering and navigation station is located.

Z-DRIVE: A type of marine propulsion system that allows for 360-degree rotation, allowing rapid change in thrust or direction. Short for azimuthing drive.

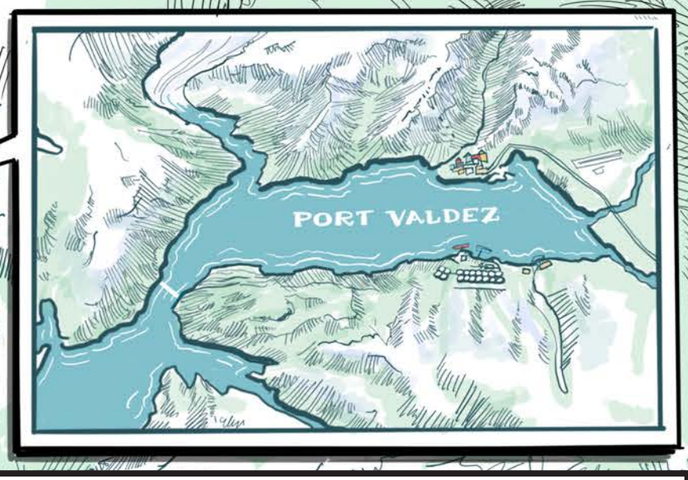
MAP OF THE PRINCE WILLIAM SOUND PREVENTION AND RESPONSE SYSTEM

People and equipment are kept at stations throughout the Sound so that they are ready for an emergency along the tanker route.

- Bligh Reef, site of the Exxon Valdez grounding.
- Barge sites. Response barges are moored to anchored buoys in Port Valdez, and at Naked and Hinchinbrook Islands.
- Communication relays. There are radio relay sites that can pick up boats' radio signals and transmit them with more power so that a response can be coordinated over long distances.
- Fish hatcheries. Hatcheries raise and release juvenile salmon, after which they go out to sea for at least a year. They are ready to catch once they mature and return to the Sound. Before they are released, the fish are kept in pens in the ocean water, which makes them vulnerable to oil spills.

FISHING VESSELS DOCK IN THE COMMUNITIES AROUND THE SOUND

- Towns and villages. The fishing vessels trained and organized by SERVS are located in towns both inside and outside Prince William Sound, including: Cordova, Homer, Kodiak, Seward, Valdez, and Whittier. Because they are spread out through the different ports, they would be able to reach sensitive sites, like the fish hatcheries faster than if they were all in one place.



PORT VALDEZ

Port Valdez is the inlet that is home to the City of Valdez, the Valdez Marine Terminal, and the Solomon Gulch salmon hatchery. It's the base of operations for SERVS and many response resources are kept here.

When they are waiting to escort a tanker, the escort tugs are tied to a dock in the City of Valdez. The pilot boats also stay here when they are waiting to bring pilots out to incoming tankers or back once they have guided a tanker out.

The 500-2 barge and two OSRBs are kept in Port Valdez to stand by in case of a spill near the terminal. Another skimming vessel, the Valdez Star, is also kept in Port Valdez.

RULES AND SPEED LIMITS

The tankers, tugs, and pilots are required to follow safety procedures up to certain points along the route. As the tanker leaves the terminal with its two escort tugs and a pilot on board, it is allowed to travel at a speed up to 10 knots until it reaches Valdez Narrows (1), where it has to slow down to 6 knots.

After the Narrows, the tanker can speed up to 10 knots until it reaches a point marked by buoy 9 (2), where it slows for the tug to retrieve its tether, before going back up to 10 knots for the next part of the trip. The pilot has to stay on board guiding the ship until it has passed Bligh Reef (3), where the Exxon Valdez ran aground. After it is safely past the reef, the pilot gets onto a pilot boat to go back to town. The tanker can then speed up to 12 knots.

Once the tanker reaches a line between Hinchinbrook and Montague Islands (4), the tanker slows down again to 10 knots. Beyond Seal Rocks (5), it can go its full speed, about 12-15 knots, pending factors like weather. At Seal Rocks, the tugs stop following, but one stops to wait until the tanker is 17 miles past Cape Hinchinbrook (6), before returning to Valdez.

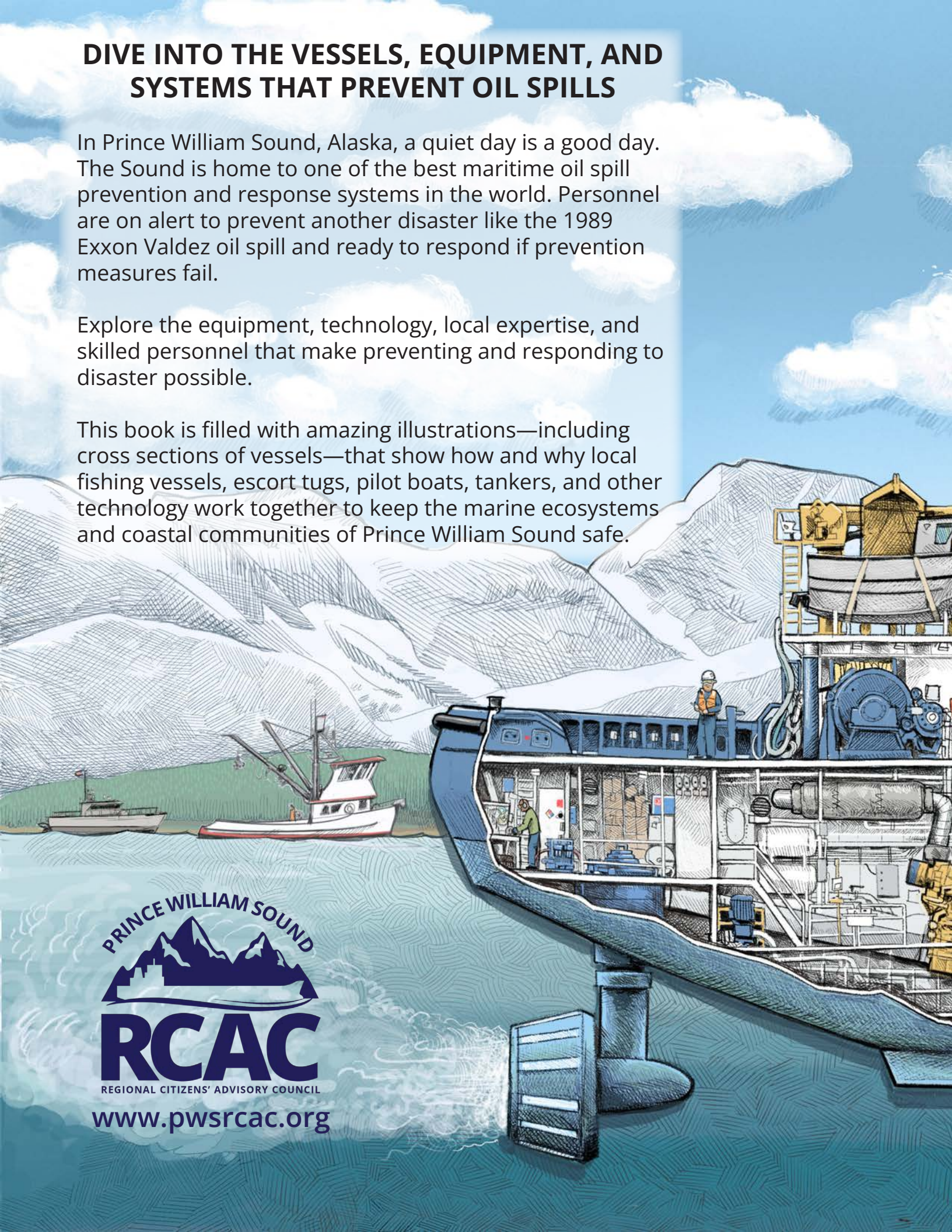
PORT VALDEZ
TATITLEK
CANNERY CREEK HATCHERY
WALLY NOERENBERG HATCHERY
WHITTIER
MAIN BAY HATCHERY
NAKED ISLAND
TANKER ROUTE
CORDOVA
COPPER RIVER
HINCHINBROOK ISLAND
SEAL ROCKS
MONTAGUE ISLAND
CHENEGA
SEWARD
ARMIN F KDERNIG HATCHERY
PACIFIC OCEAN
1
2
3
4
5
6

DIVE INTO THE VESSELS, EQUIPMENT, AND SYSTEMS THAT PREVENT OIL SPILLS

In Prince William Sound, Alaska, a quiet day is a good day. The Sound is home to one of the best maritime oil spill prevention and response systems in the world. Personnel are on alert to prevent another disaster like the 1989 Exxon Valdez oil spill and ready to respond if prevention measures fail.

Explore the equipment, technology, local expertise, and skilled personnel that make preventing and responding to disaster possible.

This book is filled with amazing illustrations—including cross sections of vessels—that show how and why local fishing vessels, escort tugs, pilot boats, tankers, and other technology work together to keep the marine ecosystems and coastal communities of Prince William Sound safe.



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