Puget Sound

An Ecosystem of Conflicting Needs

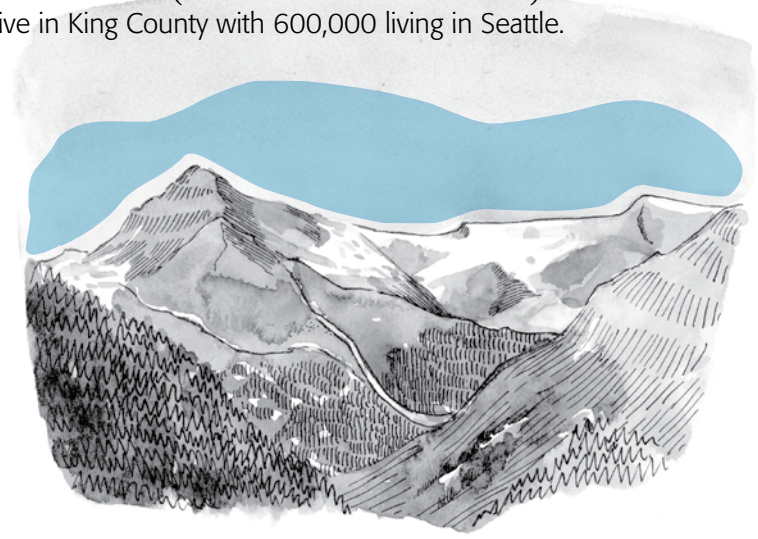
Thousands of years ago, the place we call Puget Sound was covered with huge ice fields called glaciers. Saltwater was far away and the Sound did not exist. As the climate warmed, glaciers began to melt and release water into the Pacific Ocean. Slowly sea levels rose and saltwater from the ocean found its way into a deep valley carved by glaciers between the Cascade and Olympic mountain ranges. What was once a freshwater lowland became a saltwater environment. Many kinds of plants, animals, and people came to live there. Today we call it Puget Sound.

Puget Sound is more than just the water that flowed into that glacier-carved valley thousands of years ago. It includes the land called the Puget Sound watershed and all its freshwater and saltwater. Millions of plants, animals, and people make their homes here. And everything and everybody who lives around the Sound is connected by what happens in this vast ecosytem.

The Puget Sound Ecosystem

Puget Sound is an ecosytem where saltwater from the ocean mixes with freshwater from hundreds of rivers and streams that empty into the Sound. It is so big that the water at its deepest part would almost cover one Space Needle stacked on top of another Space Needle. It has 1331 miles of saltwater shoreline and 16,000 miles of lake, river, and stream shores. Twice each day tides move billions of gallons of water in and out of Puget Sound.

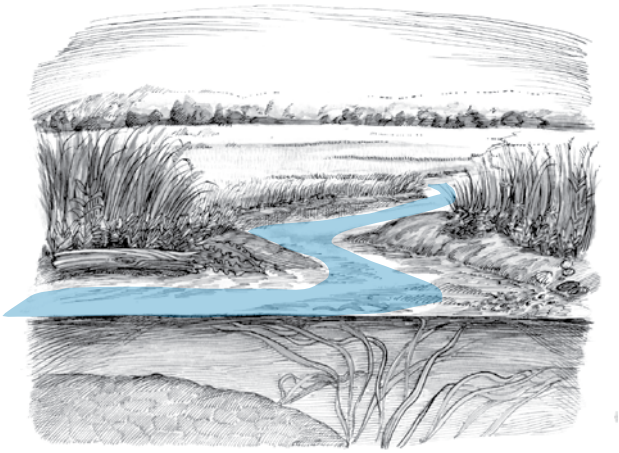
Everything in Puget Sound's ecosystem is connected. The land, water, air, light, and all the living things, including us, are part of this ecosystem. There are many different kinds of habitats in and around Puget Sound: rocky shores, sandy-gravel beaches, shallow bays, and deep-water areas as well as mountains, wetlands, streams, rivers, and lakes. Plants and animals live in every part of the ecosystem. So do humans (more than three million of us!) Over one million live in King County with 600,000 living in Seattle.



Where Is the Puget Sound Watershed?

A watershed is all the land where rain collects and runs to an area called an outlet. Watersheds are everywhere and can be very small or very big. The Puget Sound watershed is all around us and it is huge. It has 16,000 square miles of land including meadows, wetlands, rivers, lakes, bogs, and streams.

The land in our watershed also includes many hills and mountains. As you look around outside, you can see that those mountains slope toward Puget Sound the way the inside of a bathtub slopes toward the drain. Water drains from the mountains and travels many miles through forests, farms, towns, and cities before it finally reaches the saltwater of Puget Sound.



Where do you think the water in your playground goes? How about the water in your driveway or in the street in front of your house or apartment? These places are watersheds also.

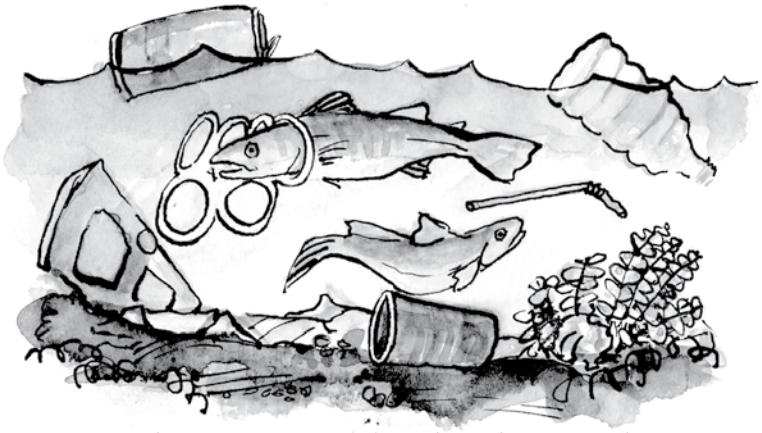
Puget Sound and People

The Puget Sound watershed brings clean water to all the plants, animals, and people who live here. Water has been rolling off our mountains and traveling in creeks, streams, rivers, and even underground into Puget Sound for thousands of years. For most of that time only a few people lived around the Sound. But today many, many people live here. In fact, there are more people living here today than lived here in all the previous 10,000 years.

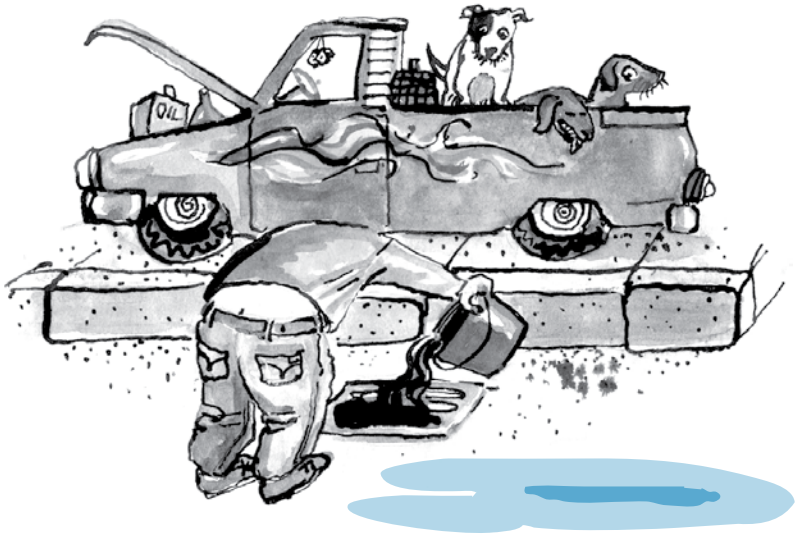
As humans moved into the Puget Sound watershed, we changed the way the watershed works. Water that used to flow through forests, meadows, and wetlands now travels through pipes, over roads, and through cities. As water travels through the watershed, it picks up a lot of things along its way to Puget Sound. Oil, gas, and chemicals from millions of cars, fertilizer from lawns and gardens, manure from farms, sewage from millions of toilets, and much more is washed into the Sound. Puget Sound has many problems caused by this pollution that humans create. And by 2020 another million people may move into this area.

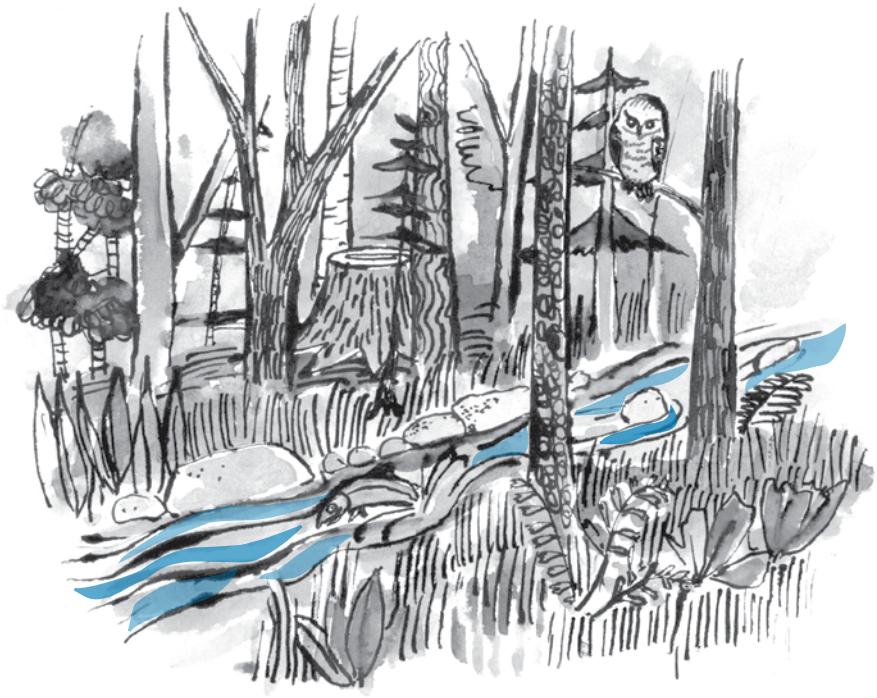
Problems in Puget Sound

Many of the problems in Puget Sound come from lots of little things that all of us do every day. Little things add up to big problems. For instance, just four quarts of motor oil can make an eight-acre oil slick on the water. Big oil spills do not happen often, but thousands of small oil spills occur every day in Puget Sound when motor oil is dumped down street drains, cars leak oil on the street, or boats lose oil and gas in the water.



Every year the average Puget Sound resident uses almost two pounds of poisons called pesticides to kill insects and other pests. Some of these poisons find their way into the Sound where they damage or kill plants and animals. Toxic chemicals we use in our houses and gardens also are dangerous for fish and other aquatic animals. Fertilizers increase plant growth in Puget Sound, which may use up oxygen animals need to stay alive. Even when we wash our hands, our clothes, or our dishes, we add our wastes to the water that flows into the Sound.





Plants and Animals Around the Sound

What happens to plants and animals in Puget Sound as they share the land and water with millions of humans? Let's look at some important examples.

Trees and Other Plants

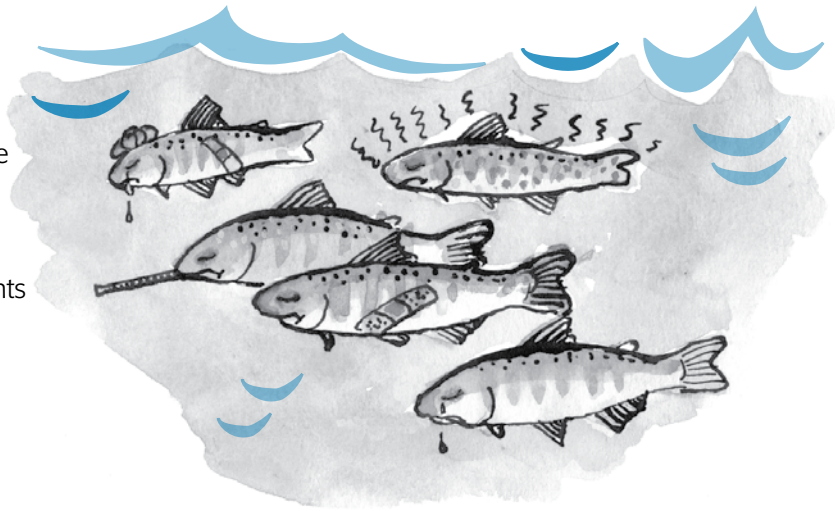
When you over water your yard, what happens? If there is so much water that not all of it can soak into the soil, some runs off and carries soil with it. That soil is called sediment. Forests do a good job of keeping sediment from running into the water. Tree roots hold the soil in place, and leaves and branches slow down the rain so it hits the ground more gently. Leaves on the ground are like sponges that soak up the water and slow its flow. When trees do all this work, they keep the soil where it belongs.

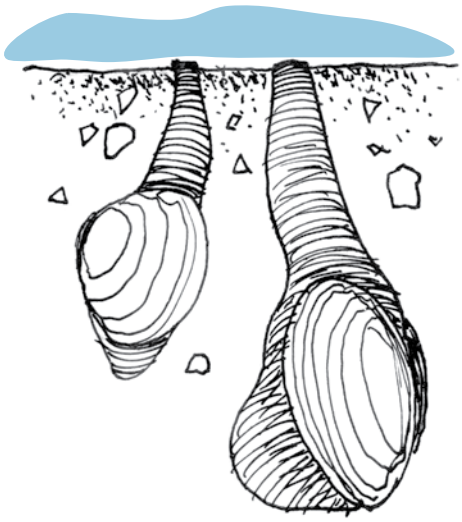
Some runoff with sediment occurs naturally. But humans cause much of it, especially when we cut down trees and other plants. Once great forests of huge trees stretched from the mountains right down to the shores of Puget Sound. But we have cut down much of the forests in the Puget Sound watershed. In addition, wetlands that used to absorb water and slowly release it have been filled in, covered, and built on. Much of the land around Puget Sound is now covered with hard surfaces like blacktop, and houses and buildings. Water cannot soak through these surfaces and reach the soil. When it rains, water races off the hard surfaces, picks up sediment, and then gushes toward Puget Sound.

Many toxic chemicals like fertilizers, motor oil, and other pollutants are carried into the Sound in this way. The sediment and the pollutants settle to the bottom of the Sound where fish and other animals live and eat. Puget Sound flatfish spend most of their lives lying on the sediment. Some, like the English sole, have large amounts of pollutants in their bodies and have developed tumors. Sediment also clogs fish gills and smothers fish eggs as well as other bottom dwellers like clams, oysters, and crabs.

Eelgrass Nurseries

Eelgrass is a saltwater plant that has long, green, skinny leaves but is not a seaweed. Like a land plant, it has roots that help hold down the muddy bottom of the Sound. Big beds of eelgrass are nurseries for many young saltwater animals like salmon, clams, crabs, and oysters. They are good places to hide and find food while animals are growing large enough to move out and live in the ocean. Some animals depend on eelgrass beds for food and shelter throughout their lives. Many eelgrass beds in Puget Sound have been destroyed by pollution as well as by land developments such as boat marinas.





Clams Can't Choose

What weighs 25 pounds and lives for a hundred years? A geoduck, the biggest clam in Puget Sound. Like all clams and oysters, geoducks strain their food from the water. They filter and eat tiny plants and animals called plankton from seawater they pump through their bodies. One geoduck can filter many gallons of seawater every day.

Filter feeders like clams and oysters cannot choose what they filter out of the water. If there are things like pollutants or dangerous bacteria, they eat that as well as the good things they need. For thousands of years, shellfish such as clams and oysters thrived in the cold, clean waters of Puget Sound. Today, they often have to live in water that contains bacteria and pollutants. Some of the bacteria they eat comes from sewage, storm runoff, boats, and farms. These shellfish are dangerous for people to eat. About one-fourth of the shellfish-growing areas in Puget Sound have harvest restrictions or are closed because of bacterial contamination.

Endangered Salmon

Salmon, like people, depend on the watershed and live in many different parts of it. They hatch in rivers, travel downstream to live in Puget Sound and the ocean, and return to rivers to lay eggs and then die. Things changed for salmon as forests were cut, land was covered with buildings and pavement, and rivers and streams were dammed. As we changed the land around Puget Sound, we took away much of the salmon's habitat. Today salmon have only about half of the habitat they need to survive.

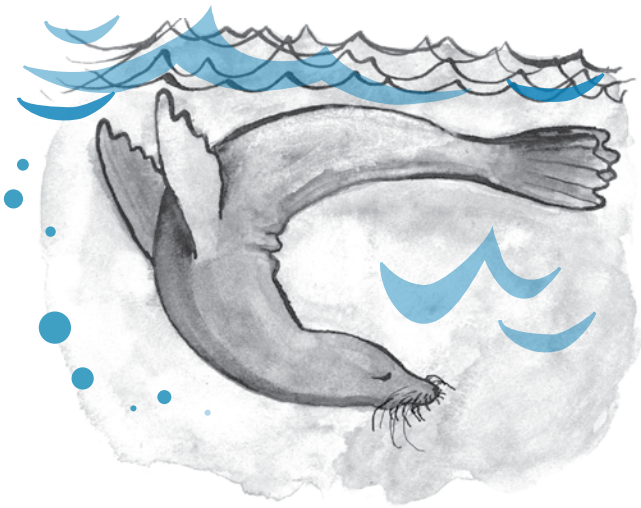
Salmon were the most important fish in Puget Sound for Native Americans. When white settlers came here they also depended on salmon. For many years there were plenty of salmon for everyone to catch, eat, and sell. People caught salmon in rivers, streams, lakes, and in the Sound. They caught them in nets and with fishing poles. For years, people caught too many salmon, which is called overharvesting. Today, because we overharvested and have damaged the places they need to live, salmon are in danger of extinction. In fact, in 1999 the largest kind of salmon in Puget Sound was officially placed on the Endangered Species List.

Disappearing Herring

In addition to salmon, the Sound has about 200 other kinds of fish. These include many kinds of cod, seaperch, greenlings, sculpins, and flatfish as well as 26 different species of rockfish. Some of the fish live in sandy bays or eelgrass beds while others live near rocks or in very deep water.

One of the most important species in Puget Sound is Pacific herring. They are food for many Puget Sound animals including fish, birds, and seals. The number of herring in the Sound has decreased steadily since 1975. We do not know exactly why this is happening. We do know, however, that Pacific herring are very sensitive to oil and other chemicals that float on the water's surface. Female herring lay their eggs near the surface on eelgrass or seaweed in shallow water. In which ways do you think contaminated water that runs off the land into the Sound might affect the herring population?

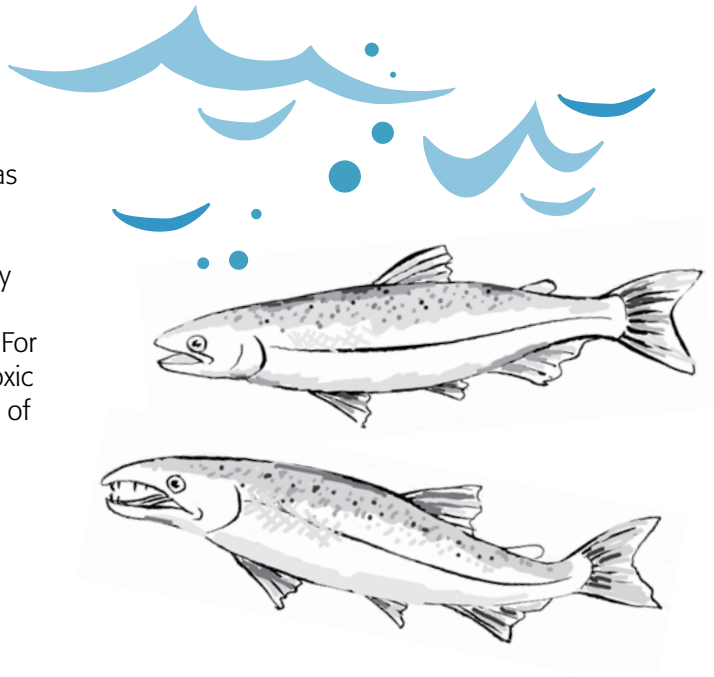
There are also three families or pods of orca whales that live in Puget Sound. They spend the winter in the ocean and return to Puget Sound in the spring. Their favorite food is the Chinook salmon, which now is in danger of becoming extinct. Orcas follow the salmon from the ocean into Puget Sound. Now that salmon are much harder to find in the Sound, what will the orcas do for food? Some people think they may search for food elsewhere and stop living in Puget Sound. What would you do if you were running out of your favorite food?



Whales and Seals in Puget Sound

Puget Sound is home to 26 kinds of marine mammals such as seals and whales. The marine mammal you are most likely to see is the harbor seal. About 16,000 live in the Puget Sound region. They are sometimes called top predators because they are rarely eaten by anything else in Puget Sound. Being a top predator is dangerous if the food you eat contains pollutants. For many years harbor seals in the Sound carried high levels of toxic chemicals in their bodies which affected the birth and growth of seal pups. Sometimes, fishermen shot seals that damaged fishing gear.

Today, harbor seals are protected by federal law from being harmed. They also have much lower levels of chemical contamination in their bodies because some areas where they live have been cleaned up.

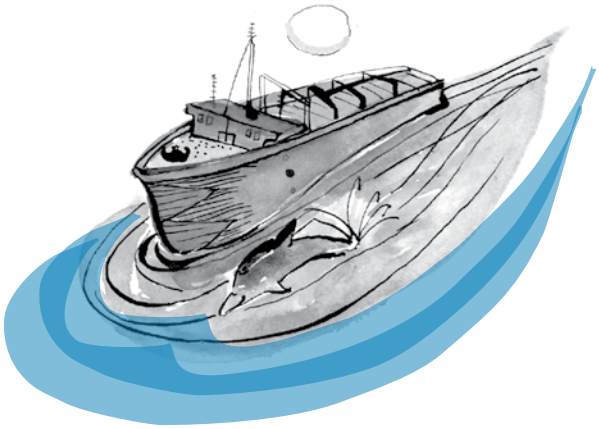


Oil, Water, and Marine Life Are a Bad Mix

What is the biggest boat you have ever seen in Puget Sound? The very biggest ones are longer than a football field. These huge tankers and barges often carry oil as they travel through the Sound. Twenty-eight ocean-going commercial ships come near the entrance to Puget Sound every day and each of these ships may carry up to two million gallons of oil.

Did you know that all the water that 30 people will drink throughout their whole lives can be contaminated by just one quart of oil? Since 1990, oil spills have decreased around Puget Sound, but they continue to happen all the time and are a serious problem. Even very small oil and gas spills add up and are just as dangerous as a big spill.

Does your family buy gallon jugs of milk? Think about what your backyard would look like if you spilled 10,000 of those jugs in it. Major oil spills of more than 10,000 gallons happen every year in Puget Sound. Serious oil spills of 25 gallons to 10,000 gallons also occur several times each year.



Most of the oil spills happen on land or when ships are being fueled. People handling the oil make mistakes or do not follow proper rules for handling oil, and sometimes equipment used with the oil breaks down. When these things cause oil spills, marine life in Puget Sound is endangered.

Oil spills hurt marine life in different ways depending on the type of oil, how much is spilled and cleaned up, and the weather and water conditions during the spill. Heavy spills are immediately dangerous for marine life, while many small spills lead to long-term problems. Oil suffocates fish by clogging their gills. Birds get sick and die as they swallow oil they clean from their feathers. Oil irritates and damages eyes and skin on many animals. It may also destroy food supplies that animals depend on.

You Can Help Take Care of Puget Sound

Taking care of Puget Sound means changing the way we do some things in order to keep our watershed and the Sound a healthy place to live. Here are some things that you and your family can do.

Recycle trash

Call 1-800-RECYCLE if you do not know what to do with your paper, metal, and plastic trash. Every year we make enough garbage to stack six feet deep in four lanes of the freeway between Seattle and Spokane.

Conserve water

Help your family check for leaks in faucets, toilets, hoses, and pipes.

Recycle used motor oil

Remind your family to call 1-800-RECYCLE to find out where to take used motor oil. Never pour oil down the street drain, because it will flow directly into streams, lakes, and Puget Sound.

Plant trees and shrubs

Trees and shrubs help water filter into the ground and prevent erosion. That keeps sediment from getting into rivers, streams, and Puget Sound.

Use fertilizers and pesticides carefully

Ask the adults in your family to avoid putting toxic chemicals and fertilizer on the lawn or garden. Rainwater washes those chemicals into the Sound where they may remain for hundreds of years.

Scoop your dog's poop

Pet waste should be disposed of in garbage cans. Do not leave it where it will wash into streams or Puget Sound.

Use phosphorous-free detergents

Read the labels on detergent packages and buy only those with low or no phosphorous. Phosphorous can cause plants in streams and lakes to grow so rapidly they use up all the oxygen needed for other aquatic life.

It is not always easy for us to change the way we live our lives in our own homes. In the real world, we also do not all have the same points of view about how each of us should live and share our Puget Sound ecosystem. People do not even agree on what the problems are and whom they affect.

Most of the problems around the Sound are caused by things we humans do as we live our lives. Since we are all part of the problems in Puget Sound, we all have to be part of the solution, too.

Think over the Puget Sound problems you have just read about and how you would solve them. Remember that the people who live, work, and play in the Puget Sound watershed have different points of view about the problems and their solutions. Discuss with others who have a different point of view and find out what each of you may have to do or give up to solve the problems.

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