A Guide to Least-Wanted Aquatic Organisms of the Pacific Northwest

Aquatic Invasive Species

The Threat of Non-native Organisms

Non-native organisms are moving in. Plants, animals and microbes from foreign places grow out of control, causing significant economic and biological damage. In our own backyard we see weedy species like Himalayan blackberry, scots broom and English ivy. We read about the alien zebra mussels advancing in U.S. and Canadian waterways, encrusting everything in their path. And we wonder if deadly foreign pathogens, like cholera, might be lurking around the corner.

Where did this problem come from? How are these organisms spreading? You may be surprised by the answer: people's actions!

This guide describes some of the "least wanted" marine or freshwater invasive species that threaten the Pacific Northwest. Some of these plants and animals already have reached our shores, some haven't. The species in this pamphlet are highlighted because they have been known to cause significant damage, both biological and economic, in other regions they have invaded.

Aquatic Invasive Species

People can unintentionally spread "alien" aquatic species simply by releasing an unwanted pet into the wild, by dumping a bait bucket overboard, or by forgetting to wash off their boat before launching it into a new body of water.

Some non-native species are benign or may even have positive impacts. Only a small percentage is harmful. Most of our domestic animals and crop foods, including wheat, soybeans and cattle, are not native to North America. Aquatic non-natives can be valuable too. The Manila clam and the Pacific oyster, for instance, are now the basis of aquaculture industries in the Pacific Northwest.

But some non-native species populations explode after introduction, significantly harming the environment or human health. These invading species — sometimes called "nuisance species," "aliens," "exotics," or "non-natives" — may harm and sometimes even cause the extinction of native species by competing against them for food, space or other resources. They can endanger human health by introducing parasites and pathogens. Once established, most non-native species are impossible to eliminate.

Smooth Cordgrass

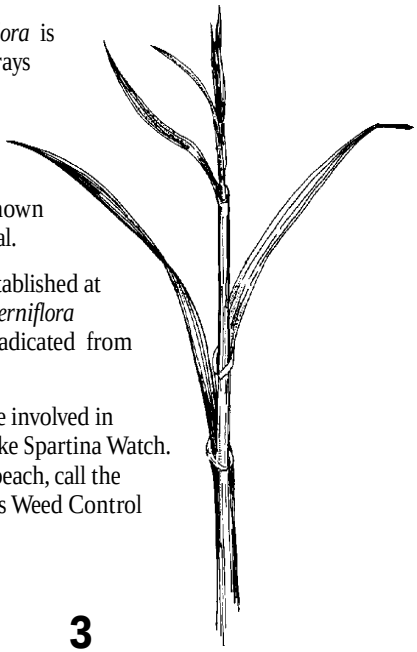
Spartina alterniflora

Description: Spartina species are perennial marsh grasses, producing plants that bear seeds yearly. They are 2 to 5' tall with hollow, hairless stems. Where the leaf blade meets the stem, there is a tiny fringe of hairs. Unlike our native grasses, spartina grasses grow on the beach in areas that are flooded daily by tidal waters. Once established, the cordgrass is hardy, adaptable to salinity and tidal ranges.

The threat: Spartina species transform productive mudflats and eelgrass beds into marshy areas, trapping sediments, changing the elevation of the landscape and displacing native animals and plants. Migrating shorebirds lose critical feeding areas along the Pacific Flyway. Spartina grasses threaten nursery habitat for fish, oyster and clam habitat, and waterfront beaches.

Origin and transport: The intertidal regions of the west coast of North America have been invaded by three species, *Spartina alterniflora, S. patens* and *S. anglica*. *S. alterniflora* and *S. patens* are native to the east coast of North America, and *S. anglica* originated in England as a hybrid. These grasses are native to the saltmarshes, where they are an important component of the ecosystem and are prized for erosion control.

In Washington, *S. alterniflora* is present in Willapa Bay, Grays Harbor and Puget Sound. *Spartina anglica* is present throughout Puget Sound. *Spartina patens* is present at one known location along Hood Canal.



In Oregon, *S. patens* is established at several sites. A small *S. alterniflora* colony was successfully eradicated from Florence, Oregon.

What you can do: Become involved in volunteer organizations like Spartina Watch. If you find spartina on a beach, call the Washington State Noxious Weed Control Board at 206.872.2972.

Chinese Mitten Crab

Eriocheir sinensis

Description: The mitten crab is named for the dense patches of hairs on its equally-sized white-tipped claws. The shell, which grows to approximately 3" in width, has four spines on either side. The legs of the adult crab are generally more than twice as long as the shell width. Mitten crabs are especially notable for their migration. Adults migrate downstream to reproduce in the estuaries. Small juvenile crabs settle out in salt or brackish water in late spring, then migrate, often long distances, to rear in freshwater. They are adept walkers on land, and will leave the water readily to walk around barriers.

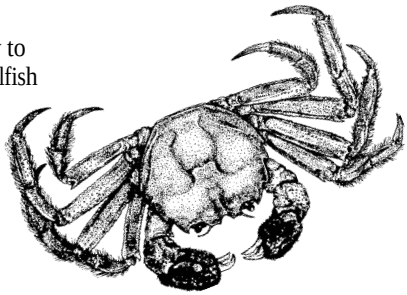
The threat: Chinese mitten crabs pose a threat to native invertebrates and to the ecological structure of freshwater and estuarine communities. They can damage commercial fisheries by entangling in fishing nets. The crabs have been blamed for clogged pumps, screens and intakes of water diversions in northern California.

They can weaken and damage banks and levees by burrowing into them. They may prey on salmonid and sturgeon eggs, as well as other native species. There are also human health concerns. Mitten crabs in China are carriers of the Asian lung fluke.

Origin and transport: The Chinese mitten crab is native to the coastal rivers and estuaries of the Yellow Sea in Korea and China. It is prized there as a delicacy. It has become established in northern Europe. Attempts have been made to smuggle the crab into the Pacific Northwest, probably to start a fishery.

Although not currently in this region, the mitten crab is in northern California, where it probably arrived through intentional release or ballast water. Scientists predict that it is likely to arrive in Oregon and Washington eventually.

What you can do: Never try to establish a favorite fish, shellfish or plant species in a new body of water. Report sightings of mitten crab to Washington or Oregon departments of Fish and Wildlife.



European Green Crab

Carcinus maenas

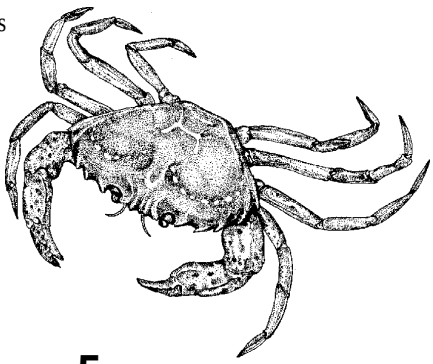
Description: The European green crab is a small- to medium-sized shore crab (adults measure 3-4" across with five spines on either side). The common name is misleading, since the crab's shell color varies widely. Juveniles can change color to match their surroundings. Adults are generally dark greenish with yellow markings as shown in this picture. The underside is often bright red or yellow. The crab is an effective forager, adept at opening bivalve shells, and it preys on clams, oysters, mussels, marine worms and small crustaceans.

The threat: In other regions, the European green crab has changed the makeup of community structure. In Maine, for example, the green crab was blamed for the collapse of the soft-shell clam fishery. In California, it has caused losses as high as 50% in Manila clam stocks.

In the Pacific Northwest, managers are concerned about the effect of green crab on the Dungeness crab, clam and oyster fisheries. The long-term outlook for this exotic is being studied.

Origin and transport: The European green crab's native range is from Northern Africa to the North and Baltic Seas. It was accidentally introduced to California, probably via ballast water, about 1989. Green crabs arrived in noticeable numbers in the Pacific Northwest in 1997, probably carried north from Oregon and California on strong El Niño currents.

What you can do: In Washington, if you find the European green crab, note the time and place and contact Washington Department of Fish and Wildlife. Transporting green crab is illegal in the state. Join volunteer groups to help monitor for green crabs.



Zebra Mussel

Dreissena polymorpha

Description: The freshwater zebra mussel is a black-and-white striped, fingernail-sized mollusk. Fast-growing zebra mussels usually reach about 2" and live for four to five years. Females can produce 40,000 eggs in one spawning, and up to a million eggs annually.

The threat: Since 1988, these tiny mussels have caused very big problems.

Zebra mussels filter feed, straining the water for phytoplankton, outcompeting zooplankton and other filter feeders for food. They can change the surrounding habitat, adhering to any hard surface. They endanger native shellfish by encrusting the shells.

They also cling to water pipes, intake screens, boats and buoys. They encrust and foul facilities at power plants, water utilities, industrial facilities, fish ladders, and navigation lock and dam operations, costing millions.

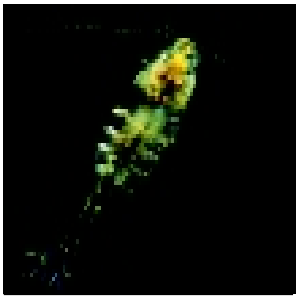
Origin and transport: Native to the Black, Caspian and Azov seas, zebra mussels were probably transported to the Great Lakes via ballast water from a transoceanic vessel. First discovered in Lake St. Clair, Michigan, in 1988, the mussels have spread throughout the Great Lakes, the Mississippi, Hudson, Susquehanna and Illinois river basins.

Although the mussel is not currently in the Pacific Northwest, recreational boats can transport them on hulls or as microscopic larvae in livewells or bilgewater. As boats are moved from infested to uninfested areas, they can bring the organisms with them.

What you can do: Remove any aquatic weeds or other accidental hitchhikers on your boat, diving gear, jet skis, trailers, floatplanes and other equipment before you leave an area. Drain water from your boat and any other areas that hold water. Empty bait buckets on land or into the trash.

Microscopic Organisms

Pseudodiaptomus inopinus



People often forget there is a whole world of microscopic organisms in the sea. Microscopic single-celled marine algae called phytoplankton serve as energy producers at the base of the oceanic food web, sustaining life in the rest of the sea and, ultimately, on Earth. Grazing on the phytoplankton are zoo-plankton, tiny animals living in the water column. These organisms are important food resources for many animals, including juvenile salmon.

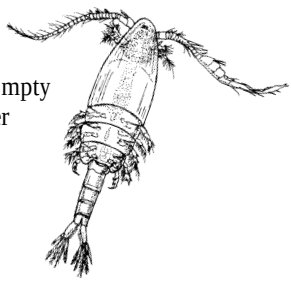
A University of Washington fisheries researcher collecting routine water samples found an unfamiliar creature inhabiting the Columbia River. It was *Pseudodiaptomus inopinus*, one of several non-native species of zooplankton that have appeared recently. Originally from Asia, this copepod has become established and abundant in the Columbia River and many smaller Northwest estuaries. The extent and ecological effects of this invasion are unknown, including its role in estuarine food webs, and potential effects on juvenile salmon and other commercially important species.

Origin and transport: Microscopic organisms are found in coastal areas all over the world. One of the chief pathways of introduction is ballast water, which can contain numerous species. Microorganisms also can be present in bait buckets or in tanks holding aquarium or research animals.

The threat: Ballast water can transfer pathogens and parasites, including the bacteria known to cause cholera. Although breakouts of the disease have not occurred, analyses of Chesapeake Bay water, for example, have shown the presence of a new strain of cholera originating in the Mediterranean or North Sea.

So far the effects of organisms such as *Pseudodiaptomus inopinus* on native organisms and habitats are unknown, but it is optimistic to assume all effects of microscopic organisms will be benign.

What you can do: Be aware of legislation and government programs that address introductions of nonindigenous species. Drain water from boats or other equipment when leaving a body of water. Empty bait buckets on land or into the trash. Never release pets, plants or aquarium animals or plants into the wild.



Can You Really Make a Difference?

Each individual plays an important role in slowing the introduction and spread of unwanted non-native species. Here are more suggestions on how you can help:

- Use native plants when landscaping your property. Most non-natives aren't a threat to our Northwest ecosystem, but with native plants you can't go wrong.
- Teach your children about the richness of ecosystems. Explain that plants, animals and microbes all live as part of a larger system — one cannot be affected without impact on another.
- Participate in community groups designed to restore habitat, survey, remove and report sightings of invasive species.
- Keep in mind that eradication of established non-natives is usually impossible. Preventing unwanted introductions is possible if we all do our part.

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WSG-MR 00-02
February/01

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