



## NOAA FISHERIES SERVICE

### West Coast Region

# Aquatic Invasive Species 101

## Overview

Every species has a natural range that is governed by biological, chemical, and physical barriers. As development occurs and as people move and travel, they often bring species from other areas with them. These species – both plants and animals – are known as exotic and non-native species because they are introduced to an area outside of their native range. When these exotic species survive and thrive in the new location, reproducing and competing with native organisms, they are known as invasive species. Their presence can cause environmental harm to the local ecosystem, and negatively impact local economies. In marine, estuarine, river, and lake ecosystems, these species are known as aquatic invasive species.

## Pathways for invasive species

The mode by which invasive species are transported to a new location is known as a pathway. Invasive species enter the United States through a variety of pathways. These include transportation (ship ballast water, containers, packing materials, ship hull fouling, etc.), commerce of living organisms (i.e., plant trade, pet trade, aquarium releases, livestock, aquaculture, and stocking for sport fishing), and biological controls, among others (Lodge et al. 2006). These various pathways pose significant management challenges.

## Locations & Impact

Aquatic invasive species are found throughout the United States. They are in forests, fields, and wetlands; streams, rivers, and bays; and across coastlines. In some regions the problem is more severe than others. Florida, the Great Lakes, and the southern West

Coast, for instance, are among the most heavily infested regions. This is because these regions have a higher concentration of pathways for introduction (e.g., transportation hubs, such as ports), or because the climates allow for the invasive species to thrive. Invasive species can also be found from Alaska to Louisiana, and from Maine to Texas.

**Aquatic invasive species are organisms introduced into aquatic ecosystems in which they are not native. They can cause environmental or economic harm, or impact human health.**

Invasive species may not have natural predators in their new environment. They can outcompete native species for resources such as food, light, prey, and habitat; and they can also spread disease among native species. As a result, invasive species populations can increase dramatically in a short period of time. This growth may reduce habitat quality, lower biodiversity, and eventually impact fishery resources and protected species.



Photo: tomboydimages.com

# Effective Mitigation Tools

Following the introduction of an exotic species, there is an opportunity to eradicate it through a rapid response action if detected in time. If the invasion has spread to a point that eradication is not possible, then the species may be subject to control and management efforts. Regardless of whether the goal is eradication or control/management, there are different options to consider. These include:

- **Physical or Mechanical Control**—This involves physically removing the invasive species (i.e., harvesting) or using barriers or traps to prevent it from spreading. This approach must be used with caution to prevent further spread (e.g., through fragmentation) during removal.
- **Chemical Control**—This involves the use of pesticides. Though the use of chemicals may be effective, they can present dangers for other species and the ecosystem. The key is to choose chemicals that are low-risk, yet effective, and that can be applied when the pest is at its most vulnerable.
- **Cultural Management**—Cultural management is the manipulation of the habitat in ways that increase the mortality of the invasive species or reduce its rate of growth and damage. Cultural management includes: selection of pest resistant varieties of crops, mulching, winter cover crops, changing planting dates to minimize insect impact, burning, flooding, crop rotations that include non-susceptible crops, moisture management, the addition of beneficial insect habitat, or other habitat alterations that help the native species outcompete invasive species.
- **Biological Controls**—This involves the intentional use of an invasive species' enemies (predators, parasites, and pathogens) – or other exotic species – to reduce the invasive species populations. This

Once established, aquatic invasive species are very costly to eradicate. Prevention is the most cost effective and environmentally sensitive tool to control them. Preventing new invasions requires creative approaches to education and outreach, screening and injurious wildlife prohibitions, and rapid response techniques.



Photo: [tomboyimages.com](http://tomboyimages.com)



Photo: tomboyimages.com

[Click here to watch](#) NOAA video of management of aquatic invasive species in action; divers removing invasive devil weed (*Sargassum horneri*) near Catalina Island. Video by Adam Obaza

## What you can do

Successfully managing invasive species includes prevention, eradication, and control. You can limit the spread of invasive species and control them where they are present. If you think you see an invasive species:

- Take a picture. Do not remove it until you know the right methods. If the right removal methods are not used, you could unintentionally spread it.
- Consult local natural resource guidebooks and field guides, comparing with your photo.
- Consult the Internet to identify the species. NatureServe Explorer, for example, is an authoritative online source for more than 65,000 plants, animals, and ecosystems across the United States and Canada.
- Tap into The Invasive Species Information Node for identification resources.
- Enlist help from your local park, nature center, nursery, university, aquarium, or zoo.
- Contact your **State Department of Natural Resources** office:

[California Department of Fish and Wildlife](#)

[Oregon Department of Fish and Wildlife](#)

[Idaho Parks and Recreation](#)

[Idaho National Invasive Species Center](#)

[Washington Department of Fish and Wildlife](#)

- Contact your local **Cooperative Extension System** office. These offices, part of the Cooperative State Research, Education, and Extension Service, provide answers to commonly encountered problems on topics such as: agriculture, animal and plant health, nutrition, and environmental issues.

[California Division of Agriculture & Natural Resources Cooperative Extension](#)

[Oregon State Cooperative Extension Service](#)

[University of Idaho Cooperative Extension](#)

[Washington State University Cooperative Extension](#)

- Contact the **U.S. Department of Agriculture** for assistance in the identification of plant, insect, snail or slug, roundworms, and plant pathogens.

[U.S. Department of Agriculture National Invasive Species Center Information](#)

# NOAA Fisheries and invasive species

NOAA Fisheries' mission includes conserving and restoring living marine resources and their habitats. To the extent that aquatic invasive species impact these resources, we play an active role in preventing, controlling, and eradicating these harmful species. This supports sustainable management of commercial and recreational fisheries and the recovery of species protected under the Endangered Species Act.



*Devil weed (Sargassum horneri)*



*Japanese eelgrass (Zostera japonica)*



*Cordgrass (Spartina alterniflora X. foliosa)*



*Culerpa*

## Learn more about invasive species in aquatic environments

[NOAA Aquatic Invasive Species FAQ](#)

[Aquatic Invasive Species Legislation](#)

[Aquatic Invasive Species Overview](#)

[NOAA Habitat Restoration and Invasive Species](#)

[Aquatic Nuisance Species Task Force](#)

[National Invasive Species Council](#)

[National Invasive Species Information Center](#)

[Invasive Species Laws and Regulations](#)

