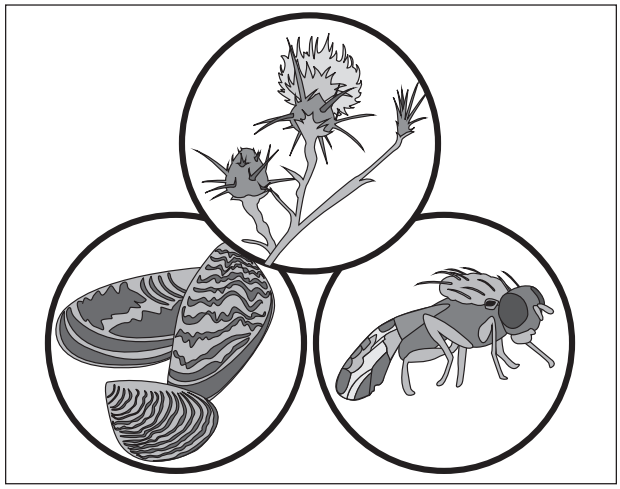
Natural Resource Fact Sheet

Invasive Species

Information compiled by the Invasive Species Council of California

Background – Invasive species are organisms that are moved by nature, people, or animals into an ecosystem where they have not been previously found. Some of these organisms are introduced naturally or accidentally by people, while others are introduced intentionally without understanding the harm they might cause. Although most of the organisms brought into our state cause no harm, a few are able to thrive in California to the detriment of native ecosystems, recreation, agriculture, infrastructure, and public or animal health. These invasive species include plants and animals, insects and other arthropods, and pathogens.



Plants – California is home to 4,200 native plant species; approximately 1,800 non-native plants also grow wild in the state. A relatively small number of these non-native plants, approximately 200, are considered invasive. Invasive plants damage ecosystems by displacing native plants, changing the structure of the plant community, and reducing the value of habitat for wildlife and other animals. Medusahead, an annual grass found in California, is an example of an invasive plant that crowds out native grass species, reducing forage for livestock. Water hyacinth is a floating aquatic plant that has invaded the Sacramento Delta and can quickly cover the surface of open water.

Animals – Invasive animals can be divided into two major groups—vertebrates, or those animals with backbones, like mammals, and invertebrates, or those without backbones, like snails. They may cause a decrease of native animals by out-competing them for resources such as food and habitat, by preying on them, or by introducing new diseases. The Norway rat is an example of an invasive vertebrate. These rodents can spread diseases affecting humans and other animals. The quagga mussel is an example of an invasive invertebrate that clogs water systems, crowding out native wildlife and damaging water supply infrastructure.

Insects and Other Arthropods – Insect and other arthropod introductions into the U.S. have increased rapidly over the past century, largely because of increased trade and travel. Invasive insects and arthropods, such as mites and spiders, often sneak onto airplanes and into shipping containers. When the containers arrive and the cargo is unloaded, pests can enter our environment unnoticed, despite government inspectors monitoring shipments. Pests can also cross state lines, "hitchhiking" as unintended passengers on produce, firewood, and other items packed in cars or planes. For example, the Mediterranean fruit fly, or medfly, is constantly entering the state through fruit smuggling, package shipments, and tourists' carry-on luggage. The medfly can infest a wide range of commercial and garden fruits, nuts, and vegetables, and is considered the most damaging agricultural pest in the world. In California, when medfly is found, regulators strip the fruit off of trees and impose quarantines on the movement of fresh fruits and vegetables, and this may cause economic hardship for those producing and selling the produce.

Diseases – Disease-causing viruses, bacteria, fungi, parasitic plants, and other pathogens typically enter the U.S. in infected fruit, plants, soil, equipment, or firewood. Invasive pathogens sometimes need a carrier, or vector, to further their spread in an area or to a new location. For example, the Asian citrus psyllid is an insect pest that acts as a vector spreading the bacterium thought to cause huanglongbing, a devastating disease of citrus trees. This bacterium is transmitted to healthy trees by the psyllid after it has fed on infected plant tissue.

Prevention and Control – Preventing the introduction of invasive species is preferred since eradication is not always successful and it is very expensive and can have economic and environmental impacts. Travelers play an essential role in invasive species prevention. Not transporting food, animals, plants, soil, firewood, or other materials that might harbor an invasive species will help protect our agriculture, forests, and natural and urban areas.

Economic Impact – Invasive species present a significant risk to California's agricultural economy, which is valued at $36 billion. Natural resources and landscapes also face ecological, economic, and aesthetic impacts. Nationally, the damage resulting from invasive species is estimated at more than $100 billion annually.

For additional information:
Invasive Species Council of California
(888) 922-4722
Website: www.iscc.ca.gov

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This is one in a series of fact sheets composed by the California Foundation for Agriculture in the Classroom (CFAITC). For additional educational materials: CFAITC, 2600 River Plaza Drive, Suite 220, Sacramento, CA 95833-3293 • (916) 561-5625 • (800) 700-AITC • Fax: (916) 561-5697
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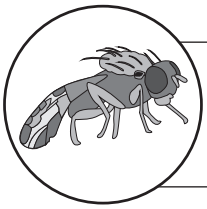
Invasive Species Activity Sheet

Draw a line connecting the invasive species to its region of origin.



The ***Mediterranean fruit fly,*** or medfly, is native to Africa and is a major threat to California agriculture. It has been reported to have infested more than 300 cultivated and wild fruits.

Yellow starthistle is native to Eurasia and is an invasive plant that crowds out native California plants and is toxic to horses.

The ***quagga mussel*** is native to Eastern Europe and is an invasive invertebrate that clogs water systems, crowding out native wildlife and damaging water supply infrastructure.

Lesson Ideas

- Plan and build traps to detect insects in your local area. Place the trap and monitor insect population. Upload images of insects collected to i-Naturalist for specimen identification.
- Examine firewood in a natural area for signs of beetle activity. Discuss how moving firewood increases the risk of spreading invasive species.
- Create a public service announcement that will encourage Californians to protect our agricultural supply from invasive species. Share the PSAs online via podcasts.
- Select an agricultural commodity that is sold and shipped around the world. Investigate locations that would reduce potential pests that may "hitchhike" with the commodity.
- Take a field trip to a California port or airport. Have a state or federal regulator explain inspection procedures.
- Research native plants and the services they provide the environment. Plant a native garden and label each plant appropriately.

Fantastic Facts

1. The total cost of invasive species damage nationwide is $100 billion.
2. The Asian citrus psyllid spreads the bacterium that is believed to cause the disease huanglongbing.
3. The Mediterranean fruit fly is considered the most damaging agricultural pest in the world.
4. The quagga mussel clogs waterways and crowds out native wildlife.
5. Vertebrates and invertebrates are subcategories of invasive animals.
6. 4,200 native plant species can be found in California.
7. Water hyacinth is an invasive aquatic plant that has invaded the Sacramento Delta.
8. Prevention is the best was to combat the introduction of invasive species.

Lesson Plan: Invasive Weed Seed Walk

Introduction: The best way to protect natural and agricultural areas from invasive species is to prevent the spread of new invasive species to those areas. When we walk or hike through muddy areas, we often carry soil with us that may include invasive seeds to new locations.

Objective: Students will examine the material that may attach to their shoes and identify methods that reduce the risk of spreading invasive weed species.

California Standards: NGSS: 3-LS4-4, 4-LS1-1, 5-LS2-1, MS-LS2-4, MS-LS2-5, MS-ESS3-3, HS-LS2-6, HS-LS2-7

Materials: Newspaper, magnifying glass, tweezers, shoes that can get dirty

Procedure:

1. Introduce students to a variety of invasive weeds, and what their seeds look like. Have students recognize different ways the seeds can be transported. Explain that some invasive weed seeds are transported by unsuspecting hikers as they move through natural environments.
2. Take students on a walk around campus. Lead them through various areas, some dry and some wet, on pavement and on grassy areas.
3. Have students remove their shoes over a sheet of newspaper. Using tweezers and a hand lens, instruct students to identify, categorize, and analyze the plant material and soil that has adhered to the soles of their shoes.
4. Lead a class discussion to highlight their findings. Discuss how wet soil (mud), like glue, causes plant material to stick as students move through different environments. Remind students that invasive species can also be part of the plant material.
5. Have students retrace their steps and consider solutions for reducing the movement of invasive species. Have students create a brochure to advise hikers, bikers, or off-road motorists on best practices to prevent the spread of invasive weed species.

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This Fact and Activity Sheet was developed by California Foundation for Agriculture in the Classroom in conjunction with California educators and meets the required education standards of the California Department of Education.