

What are ANS?

Aquatic Nuisance Species (ANS) are nonindigenous species that threaten the diversity or abundance of native species, the ecological stability of infested waters, or any commercial, agricultural, aquacultural or recreational activities dependent on such waters. ANS include nonindigenous species that may occur within inland, estuarine or marine waters and that presently or potentially threaten ecological processes and natural resources. In addition to the severe and permanent damage to the habitats they invade, ANS also adversely affect individuals by hindering economic development, preventing recreational and commercial activities, decreasing the aesthetic value of nature, and serving as vectors of human disease.

Invasive species are any species or other viable biological material (including its seeds, eggs, spores) that is transported into an ecosystem beyond its historic range, either intentionally or accidentally, and reproduces and spreads rapidly into new locations, causing economic or environmental harm or harm to human health. Synonyms for invasive species include *introduced, foreign, exotic, alien, non-native, immigrant* and *transplants*.



How are ANS Transported?

ANS species can arrive through many different pathways or vectors, but most species considered invasive arrived as a direct result of human activity. It is often impossible to identify how an organism was introduced, which can make preventing or controlling the introduction of harmful species even more challenging.

Common Pathways of Introduction:

- Ballast water operations
- Biofouling of ship hulls
- Transported on watercraft, fishing gear, and other recreational equipment
- Escape from aquaculture facilities
- Escape from nurseries and water gardens
- Intentionally stocked as food or recreational sources
- Released as biological control of existing an existing invader
- Intentional release of unwanted pets
- Utilized for habitat restoration or erosion control efforts
- Accidental or intentional release of classroom and laboratory animals
- Fishing bait release
- Accidentally released with other species in the plant and animal trade

Why should we care about ANS?

The table below provides a list of the 3 classes of adverse impacts caused by aquatic nuisance species:

Types of Aquatic-Nuisance-Species Impacts		
Environmental Effects	Economic Impacts	Public Health
Predation	Industrial Water Users	Disease Epidemics
Parasitism	Municipal Water Supplies	West Nile Virus
Competition	Nuclear Power Plants	Cholera Risks
Introduction of new pathogens	Commercial Fisheries	Parasites
Genetic	Recreational Fishing	
Habitat Alterations	Shipping	

### Environmental Effects

The impacts of invasive species are second only to habitat destruction as a cause of global biodiversity loss. In fact, introduced species are a greater threat to native biodiversity than pollution, harvest, and disease combined. ANS cause severe and permanent damage to the habitats they invade by reducing the abundance of native species and altering ecosystem processes. They impact native species by preying upon them, competing with them for food and space, interbreeding with them, or introducing harmful pathogens and parasites. ANS may also alter normal functioning of the ecosystem by altering fire regimes, hydrology, nutrient cycling and productivity.

### Economic Impacts

ANS are increasingly seen as a threat not only to biodiversity and ecosystem functioning, but also to economic development. They reduce production of agricultural crops, forests and fisheries, decrease water availability, block transport routes, choke irrigation canals, foul industrial pipelines impeding hydroelectric facilities, degrade water quality and fish and wildlife habitat, accelerate filling of lakes and reservoirs, and decrease property values. The costs to control and eradicate invasive species in the U.S. alone amount to more than \$137 billion annually. This number is likely an underestimate as it does not consider ecosystem health or the aesthetic value of nature, which can influence tourism and recreational revenue. Estimating the economic impacts associated with ANS is further confounded as monetary values cannot be given to extinction of species, loss in biodiversity, and loss of ecosystem services.

### Public Health

Introduced birds, rodents and insects can serve as vectors and reservoirs of human diseases. Throughout recorded history epidemics of human diseases such as malaria, yellow fever, typhus, and bubonic plague have been associated with these vectors. More recently, West Nile Virus was introduced into the United States through an infected bird or mosquito. Waterborne disease agents, such as Cholera bacteria (*Vibrio cholerae*), and causative agents of harmful algal blooms are often transported in the ballast water of ships. Cholera strains were also found in oyster and fin-fish samples, resulting in a public health advisory to avoid handling or eating raw oysters or seafood. Further, the effect of ANS on public health extends beyond the immediate effects of disease and parasites as chemicals used to control invasive species can pollute soil and water. Other ANS, such as invasive mussels, may increase human and wildlife exposure to organic

pollutants such as PCB's and PAHs as these toxins accumulate in their tissues and are passed up the food chain.

### How Can I Prevent the Spread of ANS?

Everyone can help prevent the introduction and spread of invasive species:

- Learn to recognize common invaders and keep an eye out for signs of new ones.
- Report sightings to the [Aquatic Nuisance Species Hotline](#) or state Department of Natural Resources.
- Inspect boats, trailers and recreational equipment before use and after use.
- Remove all plants and animals and dispose of these organisms where they will not reenter the water.
- Thoroughly clean and drain all boats, kayaks, canoes, and recreational gear after use.
- Allow watercraft to dry completely before launching into another body of water.
- Do not release live fish, including bait, into a new body of water.
- Buy pets from reputable dealers whose non-native animals are properly labeled, legally imported, and not harboring invasive pests and diseases.
- Do not release unwanted pets into the environment. If you no longer want your pet, return it to a local pet shop for resale or trade, give it to another hobbyist, or donate it to a school, nursing home, or hospital.
- Avoid growing or buying plants known to be invasive. Contact your or state Department of Natural Resources or local plant societies for a list of plants native to your area.
- Don't dump aquatic plants or aquarium water into local waters. Many plants for water gardens and aquaria are highly invasive.
- Take action! Join a volunteer invasive species monitoring or eradication group. These outings are a great way to get some exercise, meet new friends, and gain the satisfaction of knowing that you're helping to protect our environment. Contact your state invasive species council or local non-profit organizations, such as the Nature Conservancy or Sierra Club, for more information.