

POLLUTION PROBLEMS

There are many forms of pollution to be considered:

Plastic

PCBs

Micro beads

Heavy metals

Radiation

Oil

These are just some.

Things “break down” or “degrade” as a result of many things. Biodegradable means that living organisms like bacteria. Some things are photodegradable – break down by light. In all cases though, the degrading progress requires the degrading force be there. For example in some areas where biodegradable materials have been placed, the bacteria are not present and so things like lettuce leafs which should break down rapidly do not.

Oil which can be broken down by some bacteria last because the bacteria exist in sufficiently small quantities that they cannot possible consume all the oil

One has to remember that the “degradability” of anything is contingent on the appearance in sufficient quantities to degrade it. (see the pamphlet on the “notes” page or go directly to

http://userhome.brooklyn.cuny.edu/anthro/jbeatty/CORESE
[A/images/trash.pdf](http://userhome.brooklyn.cuny.edu/anthro/jbeatty/CORESE/A/images/trash.pdf)

Plastic

Plastic presents problems in terms of degradation, which doesn't happen, since although it is a biological product it has been so altered that it no longer breaks down like that. Whereas oil is even biodegradable thanks to some bacteria, plastic is not. It leads to concerns since plastic bags and can containers are trapping animals and are sometimes eaten by them which they mistake for food, Sea turtles are fond of jellyfish which the plastic bags often resemble. The plastic may be eaten and cause blockages in the digestive tract and cause the animal to die. Plastic is common place and bags, plastic plates, utensils and such often find their way onto the beach where people picnic. This also happens with bottles, both plastic and glass.

Microbeads

Microbeads are solid bits of plastic less than 1 millimeter in size (0.0393701 of an inch) They occur in personal exfoliating cleaning products such as shampoo, toothpaste and the like.

The Microbead-Free Waters Act of 2015 phased out microbeads in rinse off cosmetics as of July 2017. Because of the small size they can pass through sewerage treatment plants and move on into various bodies of water.

Their impact is largely on fish that develop behavioral problems like the inability to smell predators (or perhaps ignoring the smell of predators)

Birds have been known to eat them and this produces problems for them and other animals up the food chain that eat them.

PCBs (Polychlorinated Biphenyls)

These are chemicals made by humans and do not occur naturally. For 50 years (1929 - 1979) they were made in the US, then their production was outlawed. Because they exhibit non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including Electrical, heat transfer and hydraulic equipment, plasticizers in paints, plastics and rubber products, pigments, dyes and carbonless copy paper and other industrial applications. They can accumulate in different organisms some of which are used for food by people, hence bio-magnification is a possibility. They may be cancer producing. There is evidence to suggest they impact the immune system as well as the reproductive systems among other things.

Heavy Metals (Not the music groups)

Heavy metals include cadmium, mercury, lead and arsenic, all of which appear in the World Health Organization's list of 10 chemicals of major public concern. Other examples include manganese, chromium, cobalt, nickel, copper, zinc, selenium, silver, antimony and thallium

Thallium had been claimed a “Wonder Drug” for pregnant women who were suffering from insomnia and morning sickness. However a large number of children (over 10,000) whose mothers had used the drug were born with birth

defects which included being born with shortened arms and/or legs, or no arms or legs at all. Many died young and only fewer than 3,000 were still alive in 2011.

Minamata

The other major event had to do with mercury poisoning (methylmercury) in Minamata in Kumamoto Prefecture, Japan.
(SEE Prefecture map of Japan below)

There the Chisso had been releasing this chemical into the water from 1932 to 1968. It took several years to identify the cause of the illness and many more get legal compensation for the damage. The symptoms of the illness include ataxia, numbness in the hands and feet, general muscle weakness, loss of peripheral vision, and damage to hearing and speech. In extreme cases, insanity, paralysis, coma, and death follow within weeks of the onset of symptoms. A congenital form of the disease can also affect fetuses in the womb.

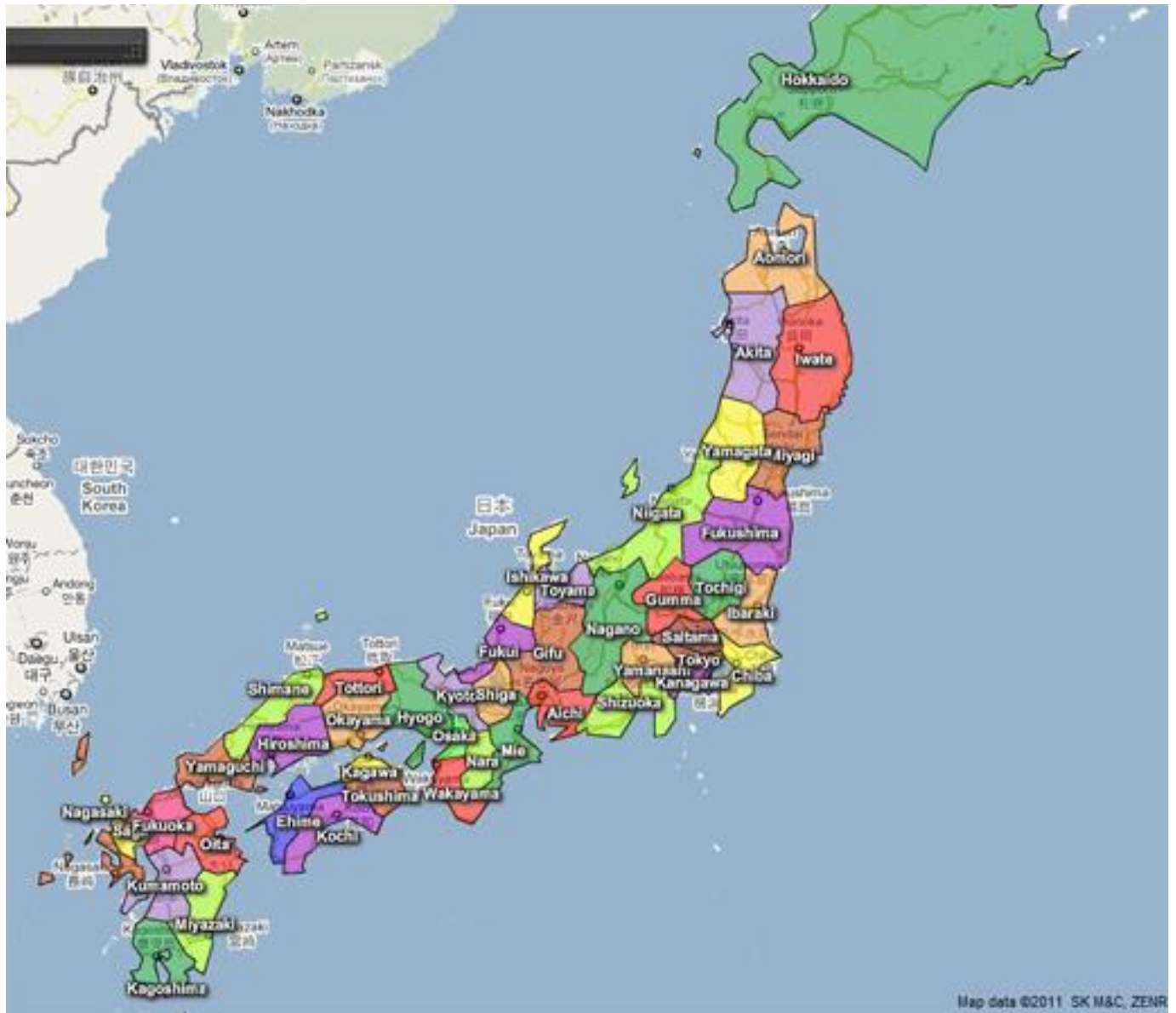


Kumamoto is the light purple on the island furthest south. Niigata is on the west coast of Japan, on the main island (Honshu) and is marked light green – the fourth prefecture down from the top of the main island. The single green island on the top is Hokkaido. Toyama prefecture (see below) is just below Niigata and is shown in purple on the

map Mie Prefecture (see below) is located on the main island on the large peninsula next to the island of Shikoku which lies just south of the main island and east of Kyushu (the island on which Kumamoto is found). Mie is indicated by a green color.

Toyama prefecture (see below) is just below Niigata and is shown in purple on the map

Mie Prefecture (see below) is located on the main island on the large peninsula next to the island of Shikoku which lies just south of the main island and east of Kyushu (the island on which Kumamoto is found). Mie is indicated by a green color.



Of the 2265 people affected by the disease, 1784 have died. In 1965 a second outbreak occurred in Niigata prefecture. Of the four major pollution disasters (all caused by improper handling of industrial waste), three involved water. Itai - Itai ("itai" is Japanese for "it hurts") disease was caused by cadmium poisoning in rivers, the

Minamata and Niigata Minamata disease were involved with the sea. Only the Yokkaichi Asthma disease in Mie Prefecture was air pollution

Name of disease	Japanese prefecture affected	Cause	Source	Year
Itai-itai disease	Toyama Prefecture	Cadmium poisoning	Mitsui Mining & Smelting Company	1912
Minamata disease	Kumamoto Prefecture	Methylmercury	Chisso Corporation	1956
Niigata Minamata Disease	Niigata Prefecture	Methylmercury	Showa Denko	1965
Yokkaichi Asthma	Mie Prefecture	Sulfur dioxide	Air pollution within Yokkaichi	1961

Problems of Minamata disease and relation to A-bombs and ETA. People from these pariah groups have problems in marrying because of fear of genetic mutations.

Radiation

There are questions about the impact of radiation on life in the ocean. From the A-bomb tests on Bimini through the problem of radiation from the Dai ichi Nuclear plant in Fukushima that was heavily damaged by the recent tsunami there have been questions about how much radiation has occurred and what impact it has had on life in the ocean.

The idea of radiation impacting life in the ocean has been common in popular culture in post WWII films. Godzilla is a prime example. The original Japanese film (not the altered American version with Raymond Burr) raises questions about the social responsibility of scientists (dutifully removed from the American release)

OIL

There is always some concern about ships rupturing and spilling oil, or oil rigs breaking down and pouring huge amount of oil into the sea. Not all ships that run aground spill oil.

Costa Concordia

This huge cruise ship ran aground with the death of about 32 people. Given the number of people on board this was almost miraculous. The ship nearly sank because of the captain's improper behavior. As a result he was charged and convicted of 32 counts of manslaughter. He is serving 16 years in prison.

There was great deal of concern about the rupturing of the fuel tanks in an effort to remove it. All went fine and there was no oil released into the water.

HOW DOES THE OIL GET INTO AND OUT OF THE WATER?

While most people think of the major oil spills like the Exxon Valdez or the BP Deep Water Horizon as the major polluters, oil, often in larger quantities enters the ocean in many ways. There are natural oil seeps in which oil from under the ocean comes out of the earth into the ocean. There is much run off for the land. Some people estimate that there is 4 times as much oil entering the ocean every year as a result of the oil dripping or leaking out of cars and washing into the ocean as was spilled in the EXXON VALDEZ spill in Alaska. There is much work that needs to be done in determining just how much oil enters the water from these sources. The figures are often controversial and misleading. Some figures give the amounts of oil spilled from the amount carried in the ship that leaked minus the amount left on board. Others claim the amount spilled is the amount left on the ship + the amount of oil recovered. This can be as much as 15% less, since the amount recovered is not considered to have been spilled. Oil spills cause a great deal of damage to the life in the ocean and this is the major concern since it impacts many things – especially food supplies.

The recent oil spill from Con Ed was one of 37,000 gallons of "dielectric fluid," or transformer oil, which may contain PCBs. This is transformer oil which is used for insulation

and is mineral oil based. When I examined the spill on Wed. most of the oil appeared gone. There was some sheen near the shore, which is probably oil that adhered to plants and rocks and is being slowly washed away with each tide.

The Coast Guard requires that all oil spills be reported. Failure to report can result in serious fines depending on the size of the spill it can be up to \$45,000 a day or three times the cost of the clean-up.

DAMAGE is to plant and animal life in the water. Oil gives birds problems in they can lose their ability to fly, ability to stay warm; gets into gills of fish so they can't get O₂ Gets into shellfish

The Exxon-Valdez oil spill of March 24, 1989, had long-lasting effects on Alaska's environment, animals and way of life. At the time of the spill, hundreds of volunteers stepped forward to clean up seabirds and other animals drenched in oil. Their work helped a modest number of animals, but many still died, and recovery efforts for a number of species continue after 24 years.

Sad Statistics

According to the National Wildlife Federation, the death toll of individual species of native Alaskan wildlife is still being tallied as of 2013. In the days immediately following the spill -- which, at the time was the worst in U.S. history -- many animals died including upwards of 100,000 and possibly as many as 250,000 seabirds. More than 2,800 sea otters and 12 river otters immediately expired . At least 300 harbor seals and almost 250 bald eagles were also instantly

destroyed. Orcas living in the area at the time, 22 in number, were killed, as were countless fish. Small organisms were killed by the trillions, leaving those animals who prey on them with nothing to eat, causing even more deaths. In the following days and weeks, these numbers climbed much higher.

How They Died

Aside from the reef fish and other animals nearby when the Exxon Valdez ran aground, millions of animals died as a direct or proximate cause of the spill. Animals covered in oil tried vainly to clean their bodies by licking themselves, only to be poisoned by the toxins in the oil. Birds weighted down by the heavy oil were unable to fly. Otters depend upon the unique design of their fur to help them tolerate extreme cold climates. When covered in oil, their fur is unable to act as a protective covering, so otters die of hypothermia. Whales are killed when they eat fish covered in oil or when their blowholes are plugged with oil, making it impossible for them to breathe.

The slick stretched from Bligh Reef to the village of Chignik on the Alaskan Peninsula. 250,000 seabirds, 2,800 sea otters, 300 harbor seals, 250 bald eagles, 22 killer whales, and billions of salmon and herring eggs.....the 'best' estimate of how many animals died outright from the spill.
Mar 24, 1989

A DEADLY TOLL: THE GULF OIL SPILL AND THE UNFOLDING WILDLIFE DISASTER A Center for Biological Diversity Report — April 2011 The BP Deepwater Horizon catastrophe in 2010 spilled 205.8 million gallons of oil and

225,000 tons of methane into the Gulf of Mexico.

Approximately 25 percent of the oil was recovered, leaving more than 154 million gallons of oil at sea. In addition to the oil, nearly 2 million gallons of toxic dispersants were sprayed into the Gulf's waters. This did not actually reduce the amount of oil left in the ocean, but merely broke it into smaller particles, which may actually make the oil more toxic for some ocean life and ease its entry into the food chain. A year after the April 20, 2010, explosion that caused the well to leak oil for months, the ultimate toll on people and wildlife is still not fully understood. But one thing is clear: The number of birds, sea turtles, dolphins and other animals sickened or killed and tallied as part of the government's official count represents a small fraction of the total animals harmed by this disastrous spill. The toll on wildlife continues to mount. Dead turtles, marine mammals, birds and fish are still washing up on beaches. Dolphins are miscarrying, and pelicans are attempting to nest on beaches polluted with tar balls and subsurface oil. The impacts of previous oil disasters show that wildlife in the Gulf will continue to be affected by this spill for decades. Lingering pollution from a 1969 spill in Massachusetts, for example, is still affecting fiddler crabs. Likewise, oysters and mangroves in Mexico are still affected by pollution from the 1979 Ixtoc spill in the Gulf, and oil remains on Alaskan beaches from the 1989 Exxon Valdez spill with continuing impacts on birds and fish. In order to comprehensively assess the likely impacts of the Gulf oil spill to date, the Center for Biological Diversity has combed government figures, news reports and scientific articles. To provide a more accurate estimate of the death toll, we used multiplication factors identified by leading scientists that estimate how many more animals are killed

than are actually observed or collected. In total, we found that the oil spill has likely harmed or killed approximately 82,000 birds of 102 species, approximately 6,165 sea turtles, and up to 25,900 marine mammals, including bottlenose dolphins, spinner dolphins, melon-headed whales and sperm whales. The spill also harmed an unknown number of fish — including bluefin tuna and substantial habitat for our nation's smallest seahorse — and an unknown but likely catastrophic number of crabs, oysters, corals and other sea life. The spill also oiled more than a thousand miles of shoreline, including beaches and marshes, which took a substantial toll on the animals and plants found at the shoreline, including seagrass, beach mice, shorebirds and others.

BIRDS

More than 82,000 birds may have been harmed by the spill. At least 102 species of birds are known to have been harmed by the BP oil spill, including black skimmers, brown pelicans, clapper rails, common loons, laughing gulls, northern gannets and several species of terns. Oiled birds have been collected from west of Galveston, Texas, to south of Fort Myers, Fla. The number of birds reported by the government as being injured by the spill represents only a portion of the total affected. The official number represents only the number of birds collected by wildlife officials, and does not include oiled birds that were seen but not collected or birds that vanished undetected. Biologists on the scene say that the official count greatly underestimates the number of birds actually harmed. Scientific research indicates that mortality can be assumed to be four to 11 times higher than the number of birds retrieved, and that a common “rule of

thumb” estimate is that the actual mortality was likely 10 times higher. To date more than 8,200 birds have been collected, indicating that more than 82,000 may have been harmed by the spill. Of particular concern are brown pelicans and federally threatened piping plovers. Brown pelicans were removed from the endangered species list just five months before the Gulf disaster. Since the spill, 932 brown pelicans have been collected, so it can be assumed that more than 9,300 have likely been harmed. Scientists are reporting that oiled pelicans are still being found a year later. Despite good intentions, cleaning oiled pelicans doesn’t necessarily save their lives, and cleaned pelicans that do survive may never be able to reproduce. Only one dead piping plover has been collected, but oil pollution has soiled the bird’s critical habitat on the Chandeleur Islands.

SEA TURTLES

Approximately 6,000 sea turtles have likely been harmed by the spill. The five sea turtles species found in the Gulf (green, Kemp’s ridley, hawksbill, leatherback and loggerhead) are all federally listed as endangered or threatened, and all have been harmed by the spill. Oiled turtles have been collected from Port Arthur, Texas, to Apalachicola Bay, Fla., and seaside residents are reporting that dead turtles continue to wash up on a daily basis. The official tally of collected turtles underestimates total mortality because it does not include turtles that perished undetected, and includes only turtles collected last winter. The official number of turtles collected and attributed to the spill is 1,146. The government is not adding turtles that are washing ashore this spring to the total due to an ongoing federal criminal investigation of the spill’s effects. The media

has reported that at least 87 dead turtles have washed onto beaches this spring, though some of these deaths may be attributable to drowning in shrimp trawls. Scientists estimate that at least five times as many turtles die as wash up on shore, indicating that between 5,730 and 6,165 sea turtles have likely been harmed by the oil spill to date.

MARINE MAMMALS

As many as 25,900 marine mammals may have been harmed by the oil spill to date. At least four species of marine mammals have been killed by the oil spill, including bottlenose dolphins, spinner dolphins, melon-headed whales and sperm whales. Oiled marine mammals have been collected from west of Cameron, Texas, to Port St. Joe, Fla. Researchers are reporting that carcasses are washing up daily, and that half of the dead animals are stillborn or dead infant dolphins. The oil spill could impair marine mammal reproduction in the Gulf for decades, as some orca whales that were exposed to the Exxon Valdez oil spill have not been able to reproduce since that spill in 1989. As with birds and sea turtles, the number of marine mammals reported as harmed by the spill grossly underestimates the true number affected. Scientists estimate that the number of marine mammals harmed may be up to 50 times higher than the number that have been collected. The government has collected 128 dead or affected dolphins and whales whose harm was attributed to the BP spill, indicating that at least 6,400 marine mammals may have actually been harmed. Though oil on some of the dolphins that have washed ashore this spring has been traced to the BP disaster, the government is not adding those dolphins to the official tally because of the ongoing

criminal investigation. The media has reported 390 strandings this spring. If these animals are included in the tally, then it can be estimated that up to 25,900 marine mammals may have been harmed by the oil spill to date.

FISH

It is difficult to conceive of how many fish have been killed by the Gulf disaster. The widespread pollution from the BP oil spill caused fishing closures across 88,500 square miles. The Gulf of Mexico is home to more than 500 fish species, with new species continuing to be discovered. Oil and dispersed oil are toxic to all life stages of fish, and oil spills affect fish reproduction for at least decades. The BP disaster particularly threatens species that are already at risk of extinction such as Atlantic bluefin tuna, Gulf sturgeon, smalltooth sawfish and the dwarf seahorse. The oil spill occurred during the peak spawning months for the bluefin tuna, pushing this severely overfished species closer to the brink of extinction. The spill could extirpate our nation's smallest seahorse, the one-inch long dwarf seahorse, from much of its range, as both oil and dispersants are toxic to seahorses and the seagrass they need to survive.

INVERTEBRATES

Oil and dispersed oil are toxic to marine invertebrates such as corals, lobsters, crabs, oysters, clams, zooplankton, starfish and sand-dwelling organisms. It is impossible to tally how many invertebrates have been harmed by the BP oil spill. The government has stated that resources that invertebrates rely on have been injured, ecological services have been disrupted, and that the potential for invertebrate recovery is limited. Researchers have observed dead and

dying corals in deep waters southwest of the BP well, reporting that the corals have been covered with a brown substance. Fishermen have reported vanishing oysters, and oiled crabs are being found on beaches. In November, fishermen reported pulling up tar balls in their shrimp nets, and the closure on royal red shrimp fishing lasted until February. Oil pollution will persist for decades or longer in the Gulf, resulting in continued disruption to invertebrate life. Scientists tracing the fate of the dispersed oil in the water column have found that oil particles are being transferred within the food web, which poses ongoing risks to all marine life in the Gulf. Forty years after an oil spill off the coast of Massachusetts, fiddler crabs are still being harmed by persistent pollution.

PLANTS

Oil, dispersed oil and dispersants are all toxic to marine and onshore plants such as seagrasses, mangroves and wetland vegetation, which provide habitat and food for many species. Oil pollution can have long-term negative effects on plants, and oil trapped in plant roots can become re-suspended in the water column during storms. Pollution from the BP spill oiled more than 1,000 linear miles of shoreline and contaminated marshes and mangrove habitats that support nesting birds. Seagrass beds that support sea turtles and seahorses were also harmed by the spill.

TERRESTRIAL MAMMALS

Tarballs and subsurface oil on beaches threaten terrestrial mammals such as federally protected beach mice, including the Alabama, Choctawhatchee, St. Andrews and Perdido

Key beach mice. Mice can ingest tar balls and subsurface oil when constructing burrows, putting them at risk of tumors and lowered immune response.

CONCLUSION The price paid by wildlife in the Gulf for the BP oil spill will continue to rise. Although it is the largest to date, the Gulf oil spill was simply the latest in a string of ongoing and inevitable spills produced in the Gulf. More than 320 known spills involving offshore drilling have occurred there since 1964. Spills massively degrade ecosystems and all of the wildlife dependent on those ecosystems in the Gulf. Clean-up efforts only remove a fraction of the persistent oil and gas spilled. The remainder of the oil, including millions of gallons remaining in the Gulf, will continue to poison wildlife for generations. Besides the direct harm to wildlife, the spill impoverishes the people of the Gulf and the nation, who depend on this rich body of water for food, culture, environmental enrichment and recreation.

Cleaning the waters has been a difficult task. One new approach has been to “magnetize” the oil and lift it from the water and separate it with magnets. This leave the water clean of oil and the oil clean enough of water to processes it in a refinery.

<https://www.youtube.com/watch?v=ZaP7XOjsCHQ>

SOME TERMS

Absorbtion: something is taken into some material

Adsorbtion: something attaches to the outside of some material

Booms: There are different kinds, but the main point is that they are used to contain and absorb some of the material

Skimmers: Machines that move around in an oil spill and the oil on the surface spills over the edge of the skimmer and into it.

Vacuums: pretty much like the machine at home. This lifts oil off of the water, with some water comping up as well.

UNITED STATES COAST GUARD

Some small history and functions

The Coast Guard was formed on August 4th 1790 by Alexander Hamilton as the Revenue Cutter Service. During its career, it has been merged with other agencies such as the U.S. Lighthouse Service. Over the years it has been moved through different departments – Treasury, Transportations, Navy, Defense and Homeland Security. The shifting nature of its missions has caused these shifts in alignment. There are about 30,000 active duty Coast Guard members across the nation - about 6,000 fewer than there are members of the NYPD. When the NY marathon starts from the CG Base at Ft. Wadsworth Staten Island

there are more runners than there are members of the active duty Coast Guard (more than 50,000 finish the race!)

Currently there are four basic missions the Coast Guard carries out – military, law enforcement, Marine Safety and Environmental Protection. Their environmental concerns are not recent, but go back to 1822 when they were tasked with protecting US timber from poaching!

The USCG is the only one of the 5 military agencies not under the department of defense, but is under Homeland Security. Its marine safety missions involving rescues at sea makes it the only one of the military organizations more interested in saving people than killing them. Its role in oil spills is well known. It is important here perhaps to note that a great job is declared if 10% - 15% of the oil is recovered. The Authority for its environmental action comes from several federal laws.

The Coast Guard does not, per se, do the clean ups of the oil, but rather acts to track down culprits and oversee the actions. Clean ups are actual done by other companies. The USCG also notifies those agencies which try to deal with animals that have been impacted by an oil spill, but the USCG does not deal with the animals themselves that have been impacted by the oil.

There follows a list of the more important laws concerning the environment. Following the list is information on aquatic nuisance species and invasive species and steps to be take to protect against them

MARPOL In 1973, the International Convention for the Prevention of Pollution from Ships at Sea (MARINE POLLUTION) was drafted and signed by a number of seafaring nations. In 1978, it was updated to include five annexes on ocean dumping. In 1997, an annex on air pollution by ships was added. The annexes cover the following:

Annex I Oil

Annex II Hazardous liquid carried in bulk

Annex III Hazardous substances carried in packaged form

Annex IV Sewage

Annex V Garbage

Annex VI Air Pollution

By ratifying MARPOL 73/78, a country automatically adopts annexes I and II; the remaining annexes are optional. The United States has ratified optional annexes III and V. For a summary of MARPOL, see

<http://www.epa.gov/OWOW/OCPD/marpol.html>

MPPRCA

Marine Plastic Pollution Research and Control Act (1987) – MPPRCA implements the International Convention for the Prevention of Pollution from Ships, Annex V (MARPOL 73/78) and restricts the overboard discharge of plastic and other garbage. For a summary, see

<http://www.cmcocean.org/mdio/marpol.php3>

CWA

Clean Water Act (1972) – focuses on the use, discharge, and disposal of sewage, oil, and hazardous substances including dispersants. For a summary of the CWA and a link to the full text of the Act, go to

<http://www.epa.gov/region5/defs/html/cwa.htm>

OPA

Oil Pollution Act (1990) – requires reporting and cleanup of all oil and hazardous substance spills. For a summary of the OPA and a link to the full text of the Act, see <http://www.epa.gov/region5/defs/html/opa.htm>

OAPCA

Organotin Antifouling Paint Control Act (1988) – regulates the use and application of antifouling paints for some marine vessels. For the full text of the Act, see

<http://www4.law.cornell.edu/uscode/unframed/33/2404.html>

CVA

Clean Vessel Act (1992) – designed for the construction of pumpout facilities through financial incentives to local marinas.

For a summary of the CVA, see

http://fa.r9.fws.gov/cva/cva_info.html#CVA .

For the details of the Act, see

<http://www.fws.gov/laws/digest/reslaws/clenves.html>

FWPCA

Federal Water Pollution Prevention and Control Act (1997) – establishes goals and policies for the restoration and maintenance of the chemical, physical, and biological integrity of our nation's waters. A summary of the FWPCA can be viewed at:

<http://www4.law.cornell.edu/uscode/33/ch26.html> .

For FWPCA (section 1322) information on the use of marine sanitation devices:

<http://www.uscg.mil/hq/gm/mse/regs/FWCPA.html>

ESA

Endangered Species Act (1973) –provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. For a summary of the ESA and a link to the full text of the Act, see

<http://www.epa.gov/region5/defs/html/esa.htm>

MMPA

Marine Mammal Protection Act – establishes a moratorium on taking and importing marine mammals, their parts, and products. The Act provides protection for polar bears, sea otters, walruses, dugongs, manatees, whales, porpoises, seals, and sea lions. For a summary of the MMPA, see

<http://www.lab.fws.gov/lab/cargo/mmp.htm>

CZMA

Coastal Zone Management Act – encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats. For a summary of the CZMA, see

http://tis-nt.eh.doe.gov/oepa/law_sum/CZMA.HTM

CAA

Clean Air Act – regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.

For a summary of the CAA, see

<http://www.epa.gov/region5/defs/html/caa.htm>

RCRA

Resources Conservation and Recovery Act – addresses the issue of how to safely manage and dispose of the huge volumes of municipal and industrial waste generated nationwide. For more information on the RCRA, see

<http://www.epa.gov/epaoswer/hotline/rcra.htm>

PWSA

Port and Waterways Safety Act – states that navigation and vessel safety and protection of the marine environment are matters of major national importance. It insures that the handling of dangerous articles and substances on the structures in, on, or

immediately adjacent to the navigable waters of the United States is conducted in accordance with established standards and requirements. For details, see

<http://www4.law.cornell.edu/uscode/33/1221.html>

NMSA

National Marine Sanctuaries Act – protects special marine resources, such as coral reefs, sunken historical vessels or unique habitats, while facilitating all “compatible” public and private uses of those resources. For a summary of the NMSA, see

<http://www.sanctuaries.nos.noaa.gov/natprogram/nplegislation/nplegislation.html>

In addition to dealing with oil spills and other pollutants in the water, the USCG deals with the taking of fish and violations of laws which deal with over fishing and by-catches as well as the dangers of the transportation of Aquatic Nuisance Species into American Waters. These are life forms that arrive in bilge water and also just attached to the bottom of a vessel which become transplanted into areas where they may have no natural predators and may drive native species out of existence. extinction. The spill could extirpate our nation’s smallest seahorse, the one inch long dwarf seahorse, from much of its range, as both oil and dispersants are toxic to seahorses and the seagrass they need to survive.

ANS – Aquatic Nuisance Species

ANS are nonindigenous aquatic species that pose significant ecological and economic threats to aquatic ecosystems. This can include fish, aquatic plants, algae, invertebrates, mussels, viruses, and other aquatic pathogens.

As per [Executive Order 13112](#) an "invasive species" is defined as a species that is:

- 1) non-native (or alien) to the ecosystem under consideration and
- 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Invasive species come into the environment in different ways. Some, like those hitching a ride on different kind of vessels

- Ballast water operations
- Biofouling of ship hulls
- Transported on watercraft, fishing gear, and other recreational equipment/li>
- 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

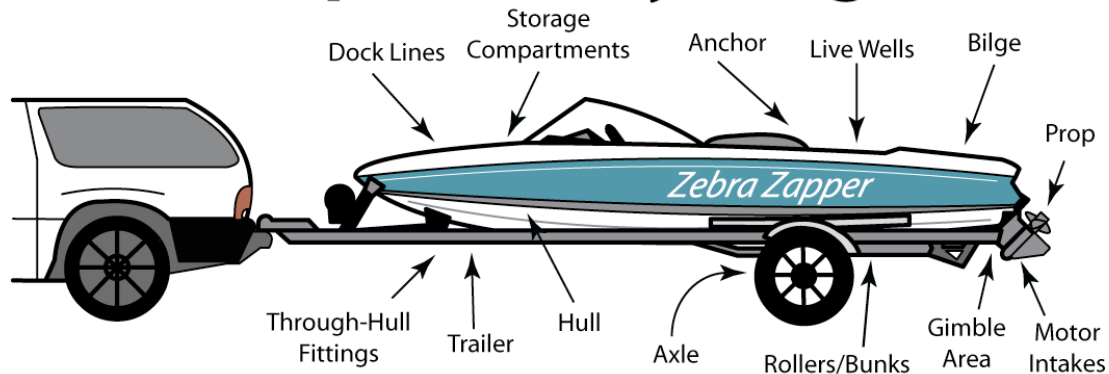
Prevention

- Don't release exotic pets or plants into the environment.
- Buy and plant only native trees and plants.

- Learn to identify invasive species in your area and report sightings to the proper authorities.
 - Prevent and help clean up pollution on land and in the water.
 - Obey all related laws and educate others about the negative impacts of invasive species.
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- Spray your boat and trailer with high-pressure water and then rinse with hot water after each use. DO NOT use salt and/or chlorine water mixtures as the runoff can pollute the waterway and the mixtures can damage boat equipment.
 - Drain and flush the motor, live well, bilge and transom wells with hot water.
 - Remove all visible vegetation from your boat, propeller, anchor, trailer and any other equipment or objects that were in the water.
 - Dry your boat and equipment for at least five days before entering another body of water.
- Some ANS, like Zebra and Quagga mussels, can live for days or even weeks out of water depending on the relative humidity and time of year.
- DO NOT dump unused bait or its packing material into the water. While bait may be bought locally, it is often shipped from farther away.

Before Leaving & Before Launching...

Inspect Everything!



In addition to the instructions above, people who use personal watercraft with jet-drive systems (such as Jet Skis) should also:

- Avoid running your engine through aquatic plants when on the water.
- Push or winch the watercraft onto the trailer when leaving the water
- Once on the trailer, run the engine for five to ten seconds to blow out excess water that may contain ANS.
- Carefully inspect the engine and steering nozzle for fragments of aquatic plants or other ANS. Be sure the motor is turned off first!

What follows here is information on specific marine organisms that are Aquatic Nuisance Species in NY, The information comes from a NYS web site and gives you some

contact information and so on. You are NOT responsible for the different organisms and what they do. This is FYI.

AQUATIC NUISANCE SPECIES AND INVASIVE SPECIES

DEPARTMENT OF ENVIRONMENTAL CONSERVATION NYS

1. An Aquatic nuisance species is any species found in the water which becomes an annoyance to people. As defined by

As per [Executive Order 13112](#) an "invasive species" is defined as a species that is:

- 1) non-native (or alien) to the ecosystem under consideration and
- 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

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.

2. Definition of Aquatic Nuisance Species

3. ANS are nonindigenous aquatic species that pose significant ecological and economic threats to aquatic ecosystems. This can include fish, aquatic plants, algae, invertebrates, mussels, viruses, and other aquatic pathogens.

Species Specific Information

Use the links below to find information on specific invasive species learn what DEC is doing to combat them.

Plants

- [Didymo \(Rock Snot\)](#)
- [Giant Hogweed](#)
- [Hydrilla](#)
- [Wild Parsnip](#)

Insects

- [Asian Longhorned Beetle \(ALB\)](#)
- [Emerald Ash Borer \(EAB\)](#)
- [Hemlock Woolly Adelgid](#)
- [Gypsy Moth](#)
- [Sirex Woodwasp](#)
- [Viburnum Leaf Beetle](#)

Fish and Shellfish

- [Chinese Mitten Crab](#)

Chinese Mitten Crab

in the Hudson River Estuary



Photo by Tom Lake, Estuary Naturalist

Chinese mitten crabs (*Eriocheir sinensis*) (CMC) is our newest Hudson River invader! The Chinese mitten crab, a non-native species from East Asia, is a costly and environmentally damaging invader in Europe and San Francisco Bay. The first one was caught in early June, 2007 in the Hudson River Tappan Zee section 27 miles upstream from the mouth. As of June 9, 2008, at least three juvenile CMC have been caught - one in Cold Spring, Putnam County and two in Tivoli Bays, Dutchess County, suggesting reproduction is occurring and CMC are rapidly moving upriver. They are

among the first caught in the eastern United States coastal waters. A few others have been caught in the Chesapeake Bay and Delaware Bay. About a dozen Chinese mitten crabs have been reported in the Great Lakes - St. Lawrence system since 1965; although a population has not established in this system, more frequent sightings from 2004 - 06 have raised concerns.

These crabs may be found in both freshwater and salt water. They are walking crabs that can emerge from the water to move upstream of barriers and are capable of moving several hundred miles upstream from saltwater. They spend most of their lives in freshwater rivers, migrating to brackish or salt water to reproduce. The young move upstream, sometimes spending 2 - 5 years in freshwater.

Why be concerned? These crabs are aggressive and may compete with our popular native blue crab in the Hudson River. Their burrowing habits may threaten stream bank and earthen dam stability and promote erosion and habitat loss.

How did they get here? We are not certain; however, ship ballast water and live release are the two most likely means.

Identification

Only freshwater crab in the Hudson River drainage

- Claws equal size with white tips and hair
- Carapace (shell) up to 4 inches wide; light brown to olive color
- Eight sharp pointed walking legs; no swimming legs

If you catch a Chinese mitten crab

Do not release it back to the water

- Keep it and freeze it (preserve in alcohol if you can't freeze it)
- Note date and location caught (GPS coordinates preferred but pinpointed on a map is acceptable) and how you caught it
- If possible, take a close-up photo. You may e-mail photo to SERCMittenCrab@si.edu for identification.

The Mitten Crab Network, a partnership among several state, federal and research organizations, is collecting data to determine the status, abundance and distribution of this species. New York State Department of Environmental Conservation's Division of Fish, Wildlife and Marine Resources

has agreed to collect and hold specimens for genetics testing to determine the origin of individuals caught in the Hudson River.

The Department of Environmental Conservation is seeking the public's assistance in collecting any CMC specimens that may exist in NY. Persons who collect and possess a CMC solely for the purpose of turning the crab over to the Department will not be prosecuted under 6 NYCRR 44.10* for possession or transport violations. Persons collecting and holding CMC for the sole purpose of turning the crab over to the Department must, within 48 hours of collecting the CMC, contact one of the following individuals:

Long Island Sound, New York Harbor and Hudson River below George Washington Bridge: Kim McKown, NYS DEC Division of Fish Wildlife and Marine Resources Crustacean Unit, 631-444-0454

Hudson River above George Washington Bridge: Sarah Fernald, NYS DEC Division of Fish, Wildlife and Marine Resources, Hudson River Estuary Research Reserve, 845-889-4745.

NOTE:

*** NYS Fish and Wildlife regulations (Section 44.10) prohibit releasing Chinese mitten crab into waters of New York State; prohibits possession, importation, transportation, purchase or sale or offer of purchase or sale of Chinese mitten crab whether dead or live. This regulation requires Chinese mitten crab to be destroyed unless lawfully held under a license or permit to collect, possess or sell for propagation, scientific or exhibition purposes issued under section 11-0515 of the Environmental Conservation Law. In addition, the Federal Lacey Act prohibits inter-state transport of Chinese mitten crabs.**

- [Northern Snakehead Fish](#)

Northern Snakehead Fish

(*Channa argus*)

What are they?



The Northern Snakehead

The northern snakehead is an invasive fish native to China, Russia and Korea. Other snakehead species are native to parts of Asia and Africa. Two populations of this air-breathing predator have been identified in New York State; one in two connected ponds in Queens, NYC and one in Ridgebury Lake in the Town of Wawayanda, Orange County. While the Queens population is confined, the Ridgebury population, situated in the Wallkill River drainage, has the potential to infest the entire Hudson River drainage and beyond to the Great Lakes and continental US. DEC plans to eradicate the Ridgebury population using rotenone.

Why should I care?



Northern Snakehead in a tank

Snakeheads are highly invasive and have the potential to disrupt recreational and commercial fishing, harm native fish and wildlife, and impact our economy. New York State prohibits possession, sale and live transport of snakehead fish (genus *Channa* and *Parachanna*) and their viable eggs. Importation and interstate transport of snakeheads is prohibited under federal Lacey Act. Northern snakeheads are top predators capable of growing to at least three feet long and surviving throughout the continental US in a variety of habitats. With teeth similar to our pike and walleye, they are superb predators. They feed voraciously, primarily on other fish but also eat frogs, crayfish and aquatic insects. While they prefer weedy shallow waters, they can inhabit virtually any of our lakes and streams. They tolerate a wider range of oxygen levels than our native species. When oxygen is insufficient to support most of our native fish, snakeheads can

breathe air and they may survive for days out of water in damp conditions. Young fish can move across the ground to access water. Snakeheads spawn multiple times each year with females releasing tens of thousands of eggs each time. Eggs hatch in one to two days during the summer and parents guard the young until they begin to feed. Upon hatching, snakeheads feed on zooplankton then begin consuming other fish larvae when they are less than an inch long.

What do they look like?

- Tan to pale brown with dark brown blotches on sides and saddle-like markings on back.
- Elongate body with long dorsal and anal fins.
- Many sharp teeth.
- Large mouth reaching far behind eyes.
- May be confused with bowfin which has a short anal fin, small teeth and often a black spot at base of tail.

What should I do if I see or catch a snakehead?

- REPORT any caught or observed snakehead to DEC's regional fisheries office.
- If you catch one, DO NOT RELEASE it. Kill it immediately, freeze it and report your catch. Take a digital photo if possible

DEC Regional Fisheries Offices

Region 1: 631-444-0280

Region 2: 718-482-4922

Region 3: 845-256-3161

Region 4: 607-652-7366

Region 5: 518-897-1333

Region 6: 315-785-2263

Region 7: 607-753-3095

Region 8: 585-226-2466

Region 9: 716-372-0645

More about Northern Snakehead Fish:

- [DEC's Plans to Eradicate Northern Snakehead Fish](#) - Information of plans to treat Ridgebury Lake and Catlin Creek to kill off invasive northern snakehead fish
- [Sea Lamprey](#)

Sea Lamprey

Lake Champlain

Sea Lamprey Control



**Department of
Environmental
Conservation**



Strategic Plan for Lake Champlain Fisheries

The Lake Champlain Fish and Wildlife Cooperative has released the [Final 2009 Strategic Plan for Lake Champlain Fisheries \(PDF - 126 KB\)](#). The Strategic Plan provides a framework for implementing the Cooperative's coordinated fisheries management programs. It outlines fish community goals and objectives and describes the role of each of the agencies.

Events

2015 Lake Champlain Sea Lamprey Control Schedule

Lampricide Treatments - Fall 2015

- Stream and River TFM Treatments
 - In New York: Putnam Creek, Beaver Brook and Mount Hope Brook
 - In Vermont: Hubbardton River, Winooski River and Lewis Creek
 - New York - Vermont Border: Poultney River

Biology



The sea lamprey (*Petromyzon marinus*) is one of four lamprey species found in the Lake Champlain Basin. Lampreys are eel-shaped fish with a skeleton made of cartilage and they belong to a relic (primitive) group of jawless fishes called Agnathans. The sea lamprey has smooth, scaleless skin and two fins on its back (dorsal fins). The sea lamprey is parasitic; it feeds on other fish, using a suction disk mouth filled with small sharp, rasping teeth and a file-like tongue. These are used by the sea lamprey to attach to a fish, puncture its skin, and drain its body fluids.

Life cycle

Sea lampreys have a complex life cycle. The first four years of their life are spent as ammocoetes [am-mah-seats] - a blind worm-like larval stage - in the soft bottom and banks of waters that flow into Lake Champlain. They then transform into the parasitic adult stage and enter the lake to feed on landlocked Atlantic salmon (salmon), lake trout and many other fish species; which they prefer due to their small scales and thin skin. After twelve (12) to twenty (20) months in the lake the adults migrate back into the streams flowing into the lake to spawn, after which the adults die.

Lampreys in Lake Champlain

Moderate numbers of sea lampreys were first noted in Lake Champlain in 1929. The sea lamprey has been considered a non-native invasive species

that entered Lake Champlain during the 1800s through the Hudson/Champlain Canal. Recent genetic studies indicate that the sea lamprey may be native to Lake Champlain.

Three other lamprey species are found in the Lake Champlain Basin. Two species are non-parasitic, and while the third species is parasitic, it does not have a significant impact on the Lake Champlain fish community.

Whether the sea lamprey is native to Lake Champlain or not, it is having detrimental impacts on the Lake Champlain fisheries, ecosystem, and human residents that are very significant.

See [Sea Lamprey Biology](#) for more information.

Impacts

Sea lamprey have a major detrimental impact on the Lake Champlain fish community, the Lake Champlain Basin ecosystem, the anglers that fish Lake Champlain, and the many people throughout the watershed whose livelihood is directly or indirectly supported by the fishing and tourist industry.



Adult sea lamprey attach to a host fish, rasp and puncture its skin, and drain its body fluids, often killing the host fish. Their preferred hosts are salmon, lake trout and other trout species, however they also feed on other fish species, including lake whitefish, walleye, northern pike, burbot, and lake sturgeon. The lake sturgeon is listed as a threatened species in New York and an endangered species in Vermont and it is likely that sea lamprey are affecting their survival.

Impacts on Host Fish

Most sea lamprey hosts are native fish species that have been part of the Lake Champlain Basin ecosystem for thousands of years. Additionally many

of these fish species are important sportfish, highly prized and sought after by local and visiting anglers.

Prior to any control measures, angler catches of lake trout and salmon in Lake Champlain were a fraction of catches in similar lakes, despite intensive stocking efforts. High wounding rates indicated that sea lamprey were having a significant impact on the lake trout and salmon populations, and were preventing the restoration of these native fish species to Lake Champlain.



Studies on the Great Lakes show a 40 to 60 percent mortality rate for fish attacked by sea lamprey. Other studies found that a single sea lamprey can kill 40 or more pounds of fish during its adult life. The abundance of sea lamprey were obviously having significant impacts on Lake Champlain's fishery and ecosystem.

Impacts on Local Economy

Poor fishing caused many anglers to seek fishing opportunities elsewhere. A study estimated that 29.4 million dollars in economic benefits to businesses and residents of the Lake Champlain Basin were lost due to the impacts of sea lamprey.

See [Sea Lamprey Impacts](#) for more information.

Control



Due to the severity of the impacts that sea lamprey have on the Lake Champlain fishery and ecosystem, and the social and economic impacts on the people who live in the Lake Champlain Basin, it has been determined that sea lamprey populations should be controlled. The federal and state governments, the agencies that manage Lake Champlain, the various organizations that are concerned with Lake Champlain and the people that live in the Lake Champlain Basin generally agree that it would be irresponsible not to control the sea lamprey population.

The New York State Department of Environmental Conservation, the Vermont Department of Fish and Wildlife and the United States Fish and Wildlife Service formed a cooperative and began an integrated control program to reduce the sea lamprey population in Lake Champlain to an acceptable level. The program is not attempting to eliminate the sea lamprey from Lake Champlain, but rather to reduce the impacts of sea lamprey on the lake's fishery and restore balance to the ecosystem.

Control Efforts

Physical methods of control include the use of barriers to prevent adult sea lamprey from migrating up waterways to spawn and traps to capture adult sea lamprey before they can spawn.



However, the most significant and effective form of control has been the treatment of tributaries and deltas with lampricides - TFM in tributaries and Bayluscide on deltas. The lampricides target the larval sea lamprey, killing them before they can transform into their parasitic adult form.

It should be noted that after years of study in Lake Champlain, the Great Lakes, and other places where sea lamprey are controlled by using lampricides, fisheries managers have concluded that the lampricides have little or no known permanent effect on populations of non-target species present in the treatment areas.

Control Program



Click on the map to see a larger map

Evaluation of an eight year experimental sea lamprey control program that took place in Lake Champlain in the 1990s documented significant benefits for fish and anglers. These benefits included decreases in wounding rates on trout and salmon, increases in weight and survival rates of lake trout, increases in angler catch rates of lake trout and a benefit to cost ratio of 3.5 to 1.

At the end of the eight year experimental sea lamprey control program, a limited, three-year interim sea lamprey control program was undertaken from 1998 to 2000. After a thorough environmental review, a long term sea lamprey control program began in 2002.

Fish sampling programs, salmon returns to fish ladders, angler surveys and sampling of larval sea lamprey are used to measure the effectiveness of the control program. The control program may be expanded to other streams and delta areas if significant sea lamprey populations develop in them.

Assessments



Assessments of sea lamprey populations are made before any control measures are undertaken and afterwards to assist in determining the effectiveness of the controls. Field staff, using a variety of capture methods, sample both adult and larval sea lamprey from streams and deltas to determine the presence and density of sea lamprey populations. This information is used to determine which streams or deltas are in need of control measures and which control measures to use.

Scientists and fish managers have considered, and continue to consider, other methods to reduce sea lamprey impacts. These include the use of pheromones (chemical attractants naturally produced by lamprey) to capture adult sea lamprey, the release of sterile males to disrupt spawning, and the stocking of lamprey-resistant strains of fish.

See [Sea Lamprey Control](#) for more information.

More about Sea Lamprey:

- [Sea Lamprey Biology](#) - What is a sea lamprey? How does it live and breed? How did it get into Lake Champlain?
- [Sea Lamprey Impacts](#) - Impacts from sea lamprey on the fishery and ecosystem of Lake Champlain
- [Sea Lamprey Control](#) - Physical, chemical and other methods utilized in the effort to control sea lamprey in Lake Champlain
- [Sea Lamprey Control Method Map](#) - This map shows different methods employed in the control of Lake Champlain sea lamprey.
- **Sea Lamprey**
 - [Sea Lamprey Biology](#)
 - [Sea Lamprey Impacts](#)
 - [Sea Lamprey Control](#)

- [Sea Lamprey Control Method Map](#)
-
- Links Leaving DEC's Website
 -
 - [United States Fish and Wildlife Service](#)
 - [Vermont Department of Fish and Wildlife](#)
 - [Lake Champlain Basin Program](#)
 - [Great Lakes Fishery Commission](#)
 - [US Fish and Wildlife Service Great Lakes Sea Lamprey Management Program](#)
 - [Environmental Impact Statement and Other Supporting Documents](#)
 - [Lake Champlain Fisheries Technical Committee Minutes and Reports](#)
- Contact for this Page
- Region 5 Fisheries
 P.O. Box 296
 1115 State Route 86
 Ray Brook, NY 12977
 518-897-1333
[Send us an email](#)
- This Page Covers



Zebra Mussel

Dreissena polymorpha

PLANTS

Plants

- [Didymo \(Rock Snot\)](#)

Didymo (Rock Snot)

What is didymo?



Didymo covered rock.

Photo courtesy of Tim Daley,
Pennsylvania Department of
Environmental Protection.

Didymo (*Didymosphenia geminata*), also known as "rock snot," is a non-native invasive microscopic algae (diatom) that can produce large amounts of stalk material to form thick brown mats on stream bottoms. Didymo threatens aquatic habitat, biodiversity and recreational opportunities. Native to northern North America and Europe, didymo has rapidly expanded its range, invading streams in several western states before moving east. Didymo has been found in several major New York water-based recreational rivers.

Historically, didymo has been found in cool, clear, nutrient poor waters but has expanded its worldwide distribution to include nutrient rich waters. Rivers with stable, regulated flows are particularly at risk.

How do I know if I find didymo?

- Color - tan, brown or white (not green); may form long white "tails"
- Texture - like wet wool (not slimy)
- Strength - firmly attached; does not fall apart when rubbed between fingers

What are the impacts of didymo?

Unlike many other aquatic invasive plants, didymo grows on the bottom of both flowing and still waters. It is characterized by the development of thick mat-like growths (blooms), which can last for months, even in fast flowing streams. During blooms, these mats may completely cover long stretches of stream beds, altering stream conditions and choking out many of the organisms that live on the stream bottom, which can affect trout and other fish by limiting their food. For the recreational user, footing can become very difficult due to the heavy growths.

Where has didymo been found in New York?

Didymo has been confirmed in the following rivers in New York:

- Batten Kill and one tributary (Washington County)
- Kayderosserrass Creek (Saratoga County)
- East Branch Delaware River below Pepacton Reservoir (Delaware County)
- West Branch Delaware River below Cannonsville Reservoir (Delaware County)
- West Branch Delaware River below Delhi to Cannonsville Reservoir (Delaware County)
- Mainstem Delaware River (Delaware and Sullivan Counties)
- Mouth of Little Delaware River (Delaware County)
- Esopus Creek downstream of the Shandaken Portal (Ulster County)
- West Branch Croton River (Westchester County)

Please note: these are very popular fishing and water-based recreational rivers. It is very likely that didymo is present in other river systems, but has not been detected yet. Do not assume that rivers not listed above are free of infestation.

Can didymo be eradicated once it becomes established?

There are currently no known methods for controlling or eradicating didymo once it infests a water body.

How is didymo spread?

The primary way for didymo to be spread is by anglers, kayakers, canoeists, tubers, boaters and others engaging in water-based recreation can unknowingly spread didymo. The microscopic algae can cling - unseen - to waders, boots, boats, clothing, lures, hooks, fishing line and other equipment and remain viable for several weeks under even in seemingly dry conditions.

How can I prevent the spread of didymo?

Water recreationists are urged to use the "Inspect, Clean and Dry" method to limit the spread of invasive species, including didymo. Details on the "Inspect, Clean and Dry" method can be found on the "[Attention Boaters and Anglers: Don't Spread Invasive Species!](#)" web page.

Equipment and gear can also be placed in a freezer until all moisture is frozen solid. Please note that freezing is a didymo specific treatment and will not necessarily prevent the spread of other invasive species of fish diseases and may damage some gear.

Note: If cleaning, drying or freezing is not practical, restrict equipment use to a single water body.

Felt Sole Considerations: DEC encourages anglers to consider alternatives to felt-soled waders such as rubber studded boots. Felt-soles, due to their ability to absorb didymo cells and to stay damp for prolonged periods of time, are a major vector in spreading didymo and require special treatment (prolonged soaking in disinfectant).

- [Giant Hogweed](#)
- [Hydrilla](#)

Hydrilla

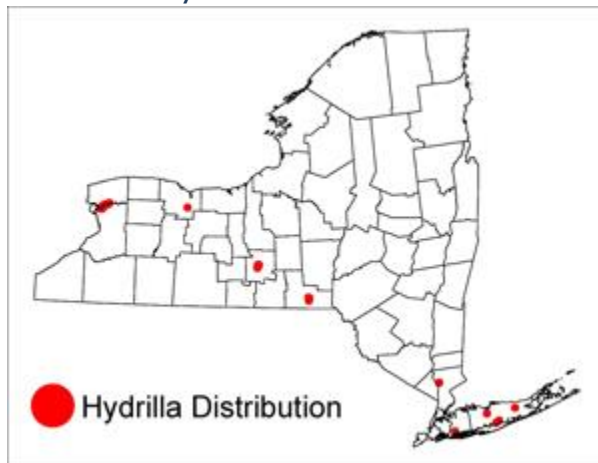
What is hydrilla?



Hydrilla forming a dense mat in water

Hydrilla or "water thyme" (*Hydrilla verticillata*) is an aquatic plant from Asia that is one of the most difficult aquatic invasive species to control and eradicate in the United States. Infestations can have negative impacts on recreation, tourism, and aquatic ecosystems. It is a [federally listed noxious weed](#) (leaves DEC website) which means that its movement between states and in foreign commerce is prohibited. It is a popular aquarium plant, but it was recently [prohibited from sale or possession in New York State](#). View the [hydrilla factsheet \(PDF, 177 KB\)](#).

Where is hydrilla located in New York?



Hydrilla was first discovered in 2008 in a small pond in Orange County and has since been discovered in Broome, Erie, Kings, Monroe, Nassau, Niagara, Suffolk, Tompkins, and Westchester counties.

How does it impact lakes, rivers, and wetlands?

Hydrilla can grow up to an inch a day, producing dense mats of vegetation that initially grow along the bottom of lakes and rivers. As they grow up to the water's surface, these mats can become several feet thick, shading out and displacing native plants that provide food and shelter to native wildlife. They interfere with waterfowl feeding areas and fish spawning sites. Hydrilla disrupts water flow in reservoirs, hampers drainage in irrigation canals, and decreases dissolved oxygen in the water, which results in fish kills. The size and weight of sport fish such as large mouth bass are also reduced in areas infested with hydrilla.

How can it impact me?

Hydrilla's dense mats of vegetation can interfere with boating, swimming, and fishing. Municipalities that rely on tourist dollars from recreational use of lakes and ponds can suffer serious losses in income due to an infestation. Waterfront property values can be greatly reduced, and property owners may incur some of the costs of management, which is expensive and long-term.

How does it spread?

In addition to producing seed, hydrilla has green overwintering buds called turions and tubers that grow at the end of the roots and store energy. New populations of hydrilla can sprout from any of these, as well as from plant

fragments that easily break off from the main plant. Turions, tubers, and plant fragments can be carried by currents or boats, boat trailers, and fishing gear to new locations.

How can I identify hydrilla?



Hydrilla has whorls of 3 or more leaves



Leaves have serrated edges and mid-veins

Hydrilla generally grows along the bottoms of wetlands, rivers, streams, lakes, and ponds in late spring and early summer. As the days grow longer and the water temperature becomes warmer it will deposit tubers in the soil

and grow to the surface of the water, creating a wall of vegetation. Plants branch profusely with each individual branch having a series of whorls of leaves (leaves growing around the stem in the same plane). Each whorl has more than three leaves and each leaf has serrated edges and a spiny mid-vein down the center. In brackish water hydrilla will turn brown in early fall and in hard water (water high in dissolved calcium and magnesium) it may develop a whitish coating of calcium carbonate.

Look-alikes

Brazilian elodea is a native of South America that has whorls of more than three leaves. Its whorls of leaves are closer together on the stem which give the plant a bushy appearance. Individual leaves have smooth edges and a smooth mid-vein.

Native elodea has whorls of three leaves that have smooth edges and smooth mid-veins.

What can I do?

- Inspect and remove plant fragments and mud from boats, trailers, and equipment before and after each use.
- Dispose of all debris in trash cans or above the waterline on dry land. Note: tubers and turions can easily be transported in sediment.
- Clean and dry your equipment thoroughly before visiting other waterbodies.
- Do not dispose of unwanted aquarium plants in waterbodies, ditches, or canals.
- Monitor recently acquired aquatic plants because hydrilla tubers can be transported in the attached soil/growing material.
- Learn how to identify hydrilla and report infestations to DEC at isinfo@dec.ny.gov or (518) 402-9405

Learn more about hydrilla in New York and the U.S.

- [NYSDEC Hydrilla Fact Sheet \(PDF, 177 KB\)](#)
- [Ithaca, NY \(Tompkins County\)](#) (leaves DEC website)
- [Croton-on-Hudson, NY \(Westchester County\)](#) (leaves DEC website)
- [Western NY \(Erie County\)](#) (leaves DEC website)
- [New York Invasive Species Clearinghouse](#) (leaves DEC website)
- [Distribution map of hydrilla in the United States](#) (leaves DEC website)
- [California](#) (leaves DEC website)
- [Florida](#) (leaves DEC website)
- [National Invasive Species Information Center](#) (leaves DEC website)

