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 at 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.goepaoswer/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.

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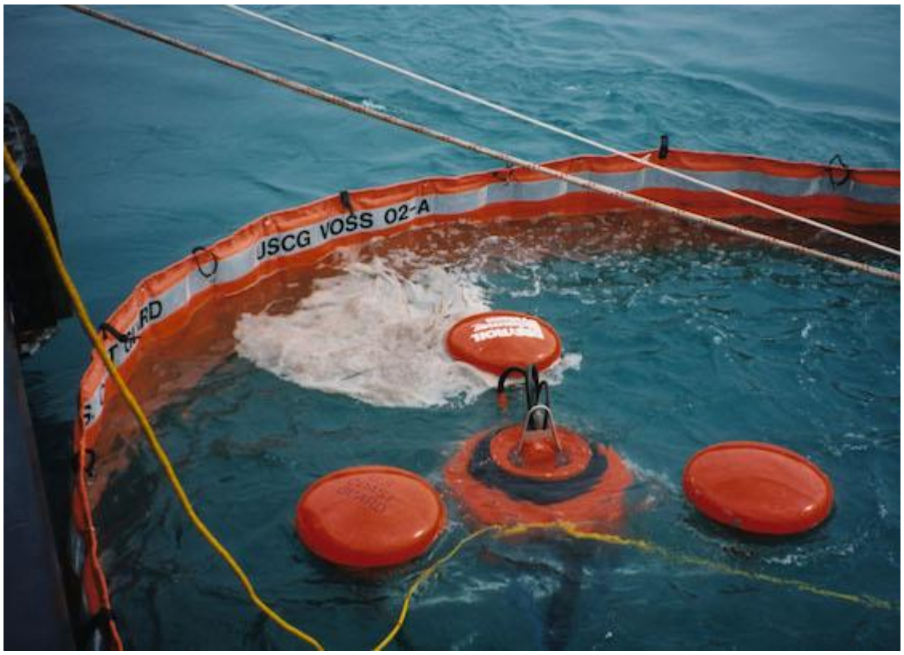
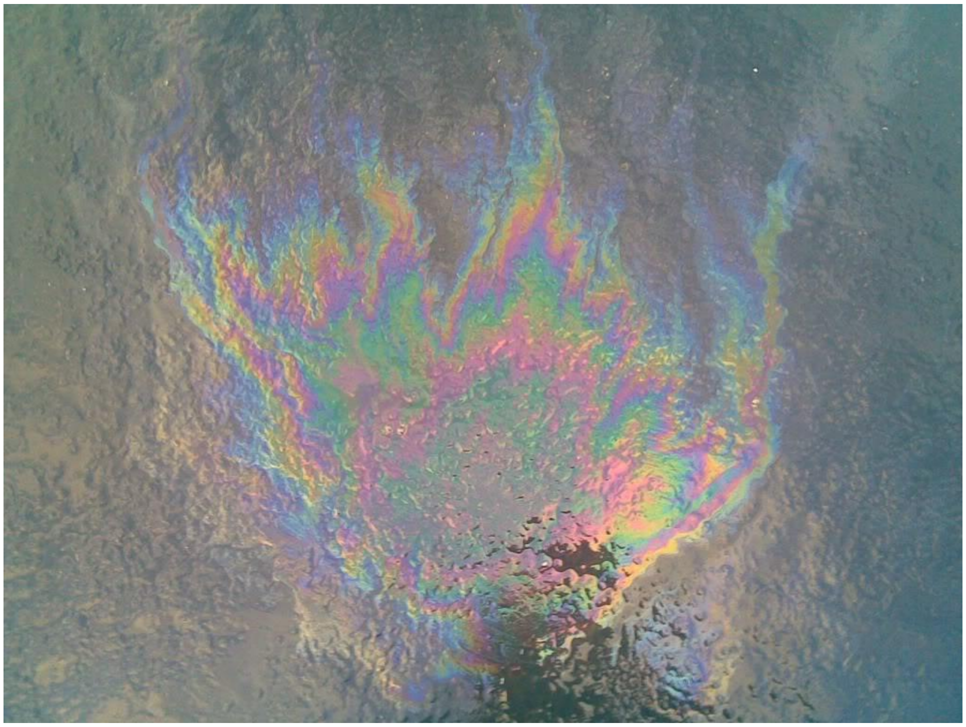


Skimmers



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Booms at work!

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Boom surrounds a set of floating net pens at a salmon hatchery in Prince William Sound, Alaska, to protect the pens from oil spilled from the Exxon Valdez.

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- In places where the boom can deflect oil away from sensitive locations, such as shellfish beds or beaches used by piping plovers as nesting habitat.
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SMART

An aircraft releases chemical dispersant over an oil slick in the Gulf of Mexico in 2010. (U.S. Coast Guard)

Special Monitoring of Applied Response Technologies (SMART) is a cooperatively designed monitoring program for in situ burning and dispersants. SMART relies on small, highly mobile teams that collect real-time data using portable, rugged, and easy-to-use instruments during dispersant and in situ burning operations.

Data are channeled to the Unified Command (representatives of the responsible party and the state and federal governments who are in charge of the spill response) to address critical questions:

- **Are particulates concentration trends at sensitive locations exceeding the level of concern?**
- **Are dispersants effective in dispersing the oil?**

Having monitoring data can assist the Unified Command with decision-making for dispersant and in situ burning operations.

The SMART program is a joint project of these agencies:

- **U.S. Coast Guard**
- **NOAA**
- **U.S. Environmental Protection Agency**
- **Centers for Disease Control and Prevention**
- **Bureau of Safety and Environmental Enforcement (part of the agency formerly known as the Minerals Management Service)**

Dispersants

To monitor the efficacy of dispersant application, SMART recommends three options, or tiers.

Tier I: A trained observer, flying over the oil slick and using photographic job aids or advanced remote sensing instruments, assesses dispersant efficacy and reports back to the Unified Command.

Tier II: Tier II provides real-time data from the treated slick. A sampling team on a boat uses a monitoring instrument to continuously monitor for dispersed oil 1 meter under the dispersant-treated slick. The team records and conveys the data to the Scientific Support Team, which forwards it, with recommendations, to the Unified Command. Water samples are also taken for later analysis at a laboratory.

Tier III: By expanding the monitoring efforts in several ways, Tier III provides information on where the dispersed oil goes and what happens to it.

1. **Two instruments are used on the same vessel to monitor at two water depths.**
2. **Monitoring is conducted in the center of the treated slick at several water depths, from 1 to 10 meters.**
3. **A portable water laboratory provides data on water temperature, pH, conductivity, dissolved oxygen, and turbidity.**

In Situ Burning

For in situ burning operations, SMART recommends deploying one or more monitoring teams downwind of the burn, at sensitive locations such as population centers. The teams begin sampling before the burn begins to collect background data. After the burn starts, the teams continue sampling for particulate concentration trends, recording them both manually at fixed intervals and automatically in the data logger, and reporting to the

Monitoring Group Supervisor if the level of concern is exceeded. The Scientific Support Team forwards the data, with recommendations, to the Unified Command.

More Information about SMART

SMART has already been successfully tested in the field. SMART was used to monitor both dispersant applications and in situ burning operations in the Gulf of Mexico during the 2010 Deepwater Horizon/BP oil spill, and in February 1999 it was used to monitor the in situ burning of the New Carissa, a freighter grounded offshore of Coos Bay, Oregon. Spills and exercises like these help us to enhance SMART.

Special Monitoring of Applied Response Technologies (SMART) [PDF, 769.6 KB]: The SMART protocol, updated in August 2006.

SMART at the New Carissa Oil Spill [PDF, 387.0 KB]: A summary of how SMART was used during the New Carissa response in 1999.

Matrix Effects on Fluorometric Monitoring and Quantification of Dispersed Oil in the Open Ocean and Coastal Environment: Results of the 1999 R/V Ferrel Research Project [PDF, 519.0 KB]: A 2001 report on a 1999 research project aboard the NOAA Ship Ferrel, designed to identify the potential for matrix effects related to monitoring of dispersed oil.

In Situ Burning: Find more information about in situ burning and burn monitoring.

Dispersant Mission Planner: This is a tool that oil spill planners and responders can use to assess dispersant application system performance.

Dispersant Application Observer Job Aid: This is a field guide for those trained in observing and identifying dispersed and undispersed oil, describing oil characteristics, and reporting this information to decision-makers.

Response Techniques Photo Gallery: View photographs of a variety of ways first responders contain and clean up oil spills.

Response Techniques

All oil spill cleanup methods have some kind of environmental impact, so selection of a cleanup method inherently forces us to make a tradeoff of the effects of the oil versus the effects of the cleanup. Clean-up techniques range from physical removal (such as skimming boats) to chemical and biological treatment methods (for example, dispersants and oil-eating bacteria). View photos of some commonly used techniques for oil spill response and shoreline cleanup.

1.

Ship Skimming Oil After Deepwater Horizon Spill
A "vessel of opportunity" skims oil spilled after the Deepwater Horizon well blowout in the Gulf of Mexico in April 2010.
photo: NOAA

2

Cleaning the Banks of the Mississippi River After the M/V Westchester Oil Spill

Cleanup workers manually remove oil following the M/V Westchester spill in the Mississippi River near Empire, Louisiana, in November 2000.

photo: NOAA

Workers Assess the Shoreline after the Exxon Valdez Oil Spill

Workers conducting a shoreline assessment following the T/V *Exxon Valdez* oil spill in Prince William Sound, Alaska, in March of 1989. (NOAA)

photo: NOAA

Using Pom-poms to Absorb Oil

Workers clean oil from the beach in Port Fourchon, LA in June 2010, following the Deepwater Horizon/BP oil spill in the Gulf of Mexico in April. (NOAA)

photo: NOAA

Response to a Grounded Tanker in the Galapagos

A response vessel sprays dispersant onto an oil spill in the Galapagos. The tanker Jessica struck a reef off Puerto Baquerizo Moreno on San Cristobal Island on the night of January 16, 2001. The 260 foot vessel was carrying 160,000 gallons of diesel fuel oil and 78,000 gallons of intermediate fuel oil 120, and spilled a significant quantity of this oil.

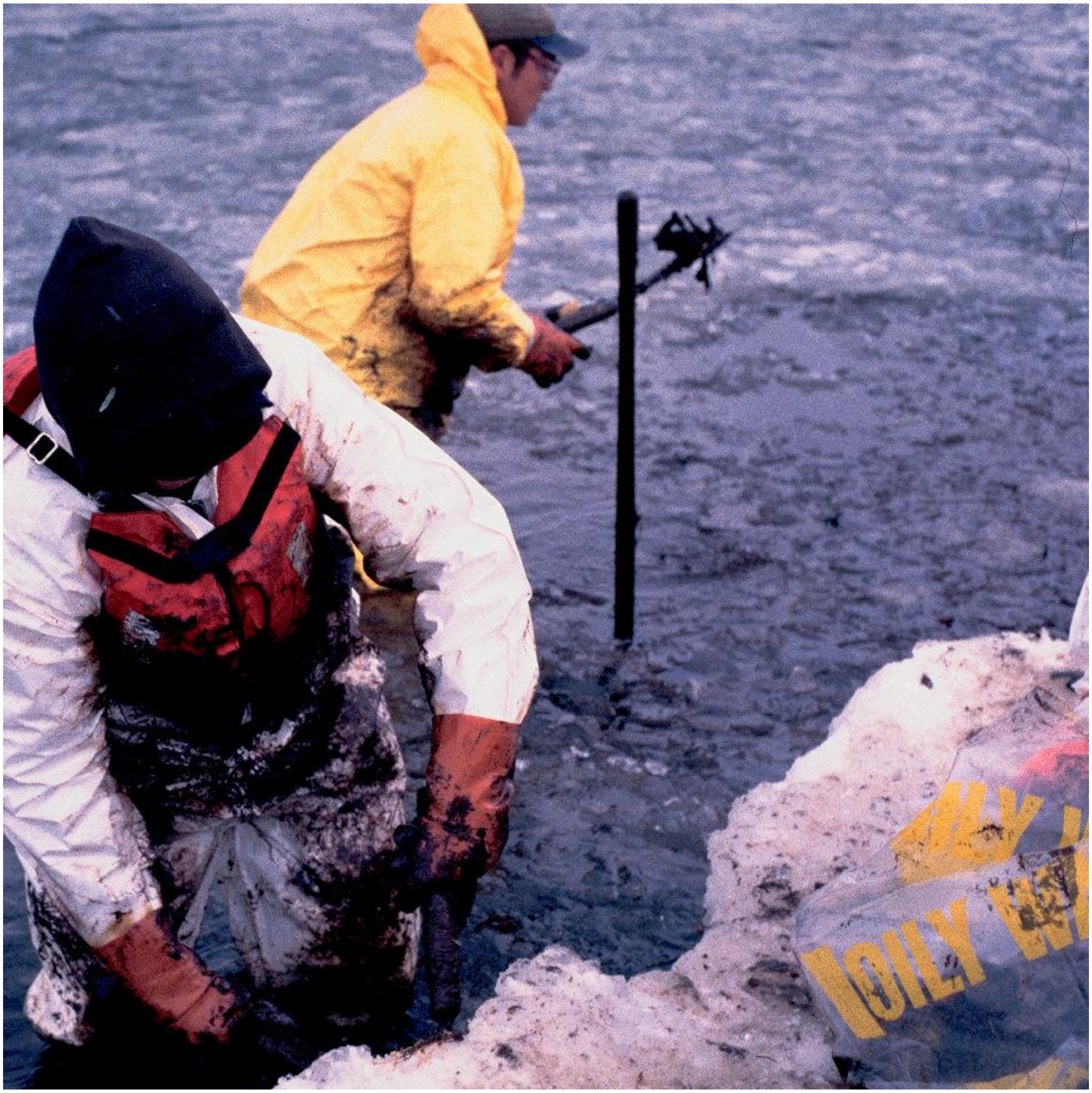
photo: Heidi Snell

Workers at the Tank/Barge DBL152 Oil Spill
Workers at the Tank/Barge DBL152 spill off of the Louisiana coast in November 2005. (NOAA)
photo: NOAA

Shoreline Survey following the Selendang Ayu Oil Spill
A worker conducts a shoreline survey following the M/V Selendang Ayu grounding and oil spill near the Aleutian Islands, Alaska, in December 2004. (NOAA)

photo: NOAA

8

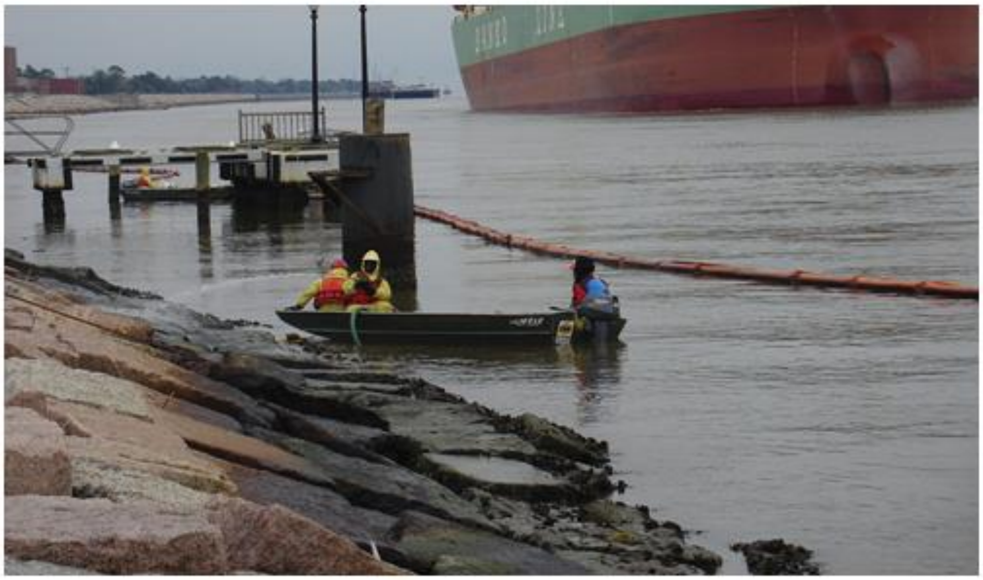


Cleaning Oil Spilled When Freighter Kuroshima Ran Aground

Manual labor following a spill caused when the coastal freighter M/V *Kuroshima* ran aground on rocks near Dutch Harbor, AK, in November 1997. (NOAA)

photo: NOAA

9



Washing Oil from Rocks after Eagle Otome Oil Spill

Workers cleaning oil spilled following a collision involving crude oil tanker *Eagle Otome* in Port Arthur, Texas, in January 2010. (NOAA)

photo: NOAA

Dispersant Application Near the Louisiana Coast

In November 2005, Tank/Barge DBL152 and the T/V *Rebel* allided with an obstruction approximately 32 miles from the Louisiana Coast, causing a spill. In the photo, dispersant is being applied to the oil. (NOAA)

photo: NOAA

Overflight After Cosco Busan Oil Spill

LCDR Elizabeth Jones conducting an overflight following the M/V *Cosco Busan* spill in San Francisco Bay in March of 2000. (NOAA)

photo: NOAA

12

Skimming Oil After the M/T Athos Spill

Skimming the Delaware River in Philadelphia following the M/T *Athos I* spill on November 26, 2004. (NOAA)

photo: NOAA

13

Cleaning oiled marshes in Louisiana after 2010 Deepwater Horizon oil spill

After the 2010 Deepwater Horizon spill, a heavy layer of oiled vegetation mats were preventing the thick emulsified oil underneath from breaking down along Barataria Bay's marshes. Here a NOAA SCAT Team scientist monitors the progress of cleanup efforts in a test plot.

photo: (NOAA/Scott Zengel)

U.S. Coast Guard uses ERMA® (Environmental Response Management Application) at Hurricane Isaac Response

U.S. Coast Guard Recon/Hazards Branch using the NOAA online response mapping tool Gulf of Mexico ERMA® (Environmental Response Management Application) following Hurricane Isaac to plan next-day field activities. Gulf of Mexico ERMA was used as the Common Operational Picture for the response. Additionally, the USCG District 8 Command staff used ERMA to see where the Sector NOLA (New Orleans, Louisiana) folks were working and how that work was progressing.

In situ burn of oil spilled after Deepwater Horizon oil spill in 2010

After the Deepwater Horizon oil spill in the Gulf of Mexico in April 2010, in situ burning was used as one technique to remove oil form the water.

photo: NOAA

Sampling water after an oil spill in Louisiana swamp

In 2013, after controlled burns were used to remove oil spilled in a wooded swamp near Baton Rouge, Louisiana, a scientist takes samples of the water.

photo: NOAA

Controlled burn of an oil spill in a Louisiana swamp

A view of one of the controlled burns to remove oil spilled in a wooded swamp outside of Baton Rouge, Louisiana, on January 19, 2013.

photo: U.S. Coast Guard

Selendang Ayu Shoreline Assessment

Conducting a shoreline survey following the following the M/V Selendang Ayu spill of its fuel oil and cargo of soybeans near the Aleutian Islands, Alaska, in December 2004. (NOAA)

photo: NOAA

Buzzards Bay Overflight

A responder performs an aerial survey after the Bouchard Barge 120 oil spill in Buzzards Bay near Massachusetts and Rhode Island in 2003. (NOAA)

photo: NOAA

Mechanical Protection Guidelines [PDF, 996.4 KB]: A 1994 manual describing how to deploy booms, barriers, and other mechanical protection devices during a spill response.

FAQ: Microbes and Oil Spills: This report is based on the deliberations of over 20 of the nation's leading experts who came together for one day to develop clear answers to seven frequently asked questions regarding the role of microbes in an oil spill.

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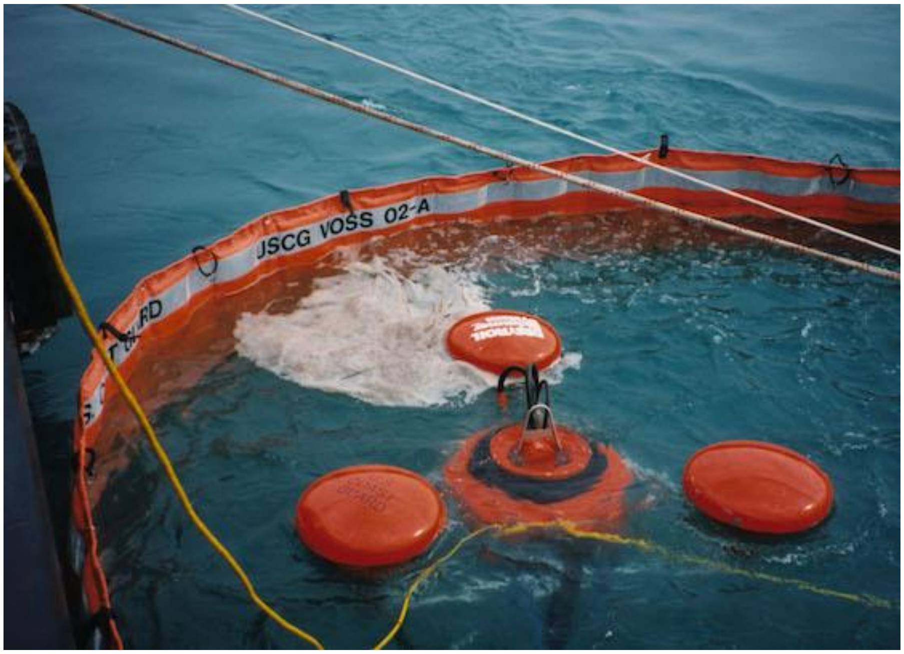

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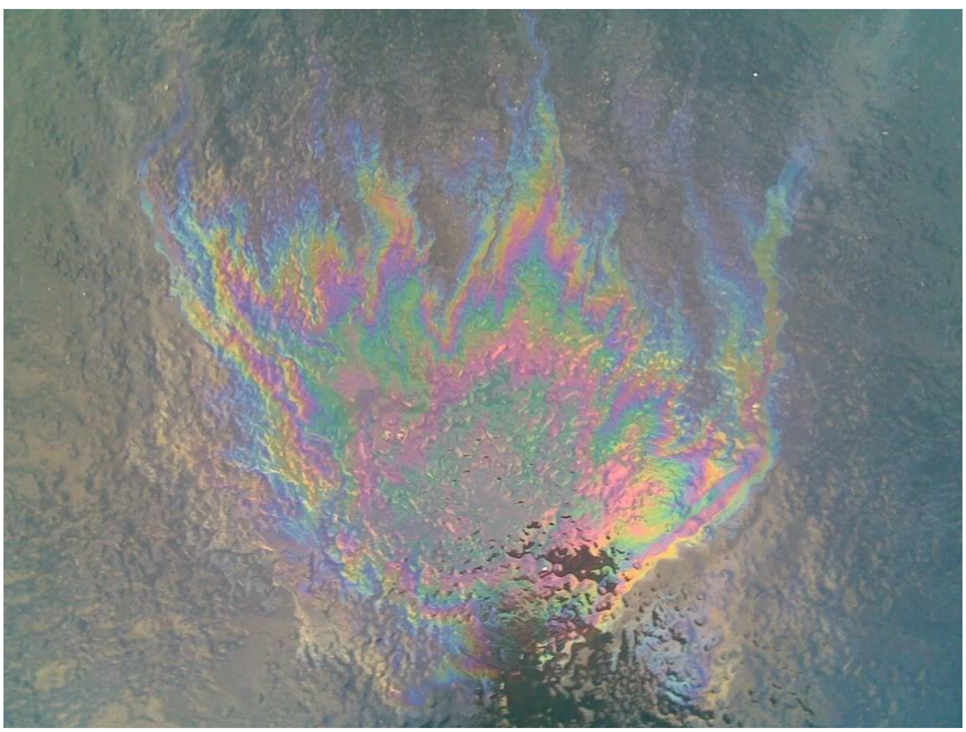

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SMART

An aircraft releases chemical dispersant over an oil slick in the Gulf of Mexico in 2010. (U.S. Coast Guard)

Special Monitoring of Applied Response Technologies (SMART) is a cooperatively designed monitoring program for in situ burning and dispersants. SMART relies on small, highly mobile teams that collect real-time data using portable, rugged, and easy-to-use instruments during dispersant and in situ burning operations.

Data are channeled to the Unified Command (representatives of the responsible party and the state and federal governments who are in charge of the spill response) to address critical questions:

- **Are particulates concentration trends at sensitive locations exceeding the level of concern?**
- **Are dispersants effective in dispersing the oil?**

Having monitoring data can assist the Unified Command with decision-making for dispersant and in situ burning operations.

The SMART program is a joint project of these agencies:

- **U.S. Coast Guard**
- **NOAA**
- **U.S. Environmental Protection Agency**
- **Centers for Disease Control and Prevention**
- **Bureau of Safety and Environmental Enforcement (part of the agency formerly known as the Minerals Management Service)**

Dispersants

To monitor the efficacy of dispersant application, SMART recommends three options, or tiers.

Tier I: A trained observer, flying over the oil slick and using photographic job aids or advanced remote sensing instruments, assesses dispersant efficacy and reports back to the Unified Command.

Tier II: Tier II provides real-time data from the treated slick. A sampling team on a boat uses a monitoring instrument to continuously monitor for dispersed oil 1 meter under the dispersant-treated slick. The team records and conveys the data to the Scientific Support Team, which forwards it, with recommendations, to the Unified Command. Water samples are also taken for later analysis at a laboratory.

Tier III: By expanding the monitoring efforts in several ways, Tier III provides information on where the dispersed oil goes and what happens to it.

4. **Two instruments are used on the same vessel to monitor at two water depths.**
5. **Monitoring is conducted in the center of the treated slick at several water depths, from 1 to 10 meters.**
6. **A portable water laboratory provides data on water temperature, pH, conductivity, dissolved oxygen, and turbidity.**

In Situ Burning

For in situ burning operations, SMART recommends deploying one or more monitoring teams downwind of the burn, at sensitive locations such as population centers. The teams begin sampling before the burn begins to collect background data. After the burn starts, the teams continue sampling for particulate concentration trends, recording them both manually at fixed intervals and automatically in the data logger, and reporting to the

Monitoring Group Supervisor if the level of concern is exceeded. The Scientific Support Team forwards the data, with recommendations, to the Unified Command.

More Information about SMART

SMART has already been successfully tested in the field. SMART was used to monitor both dispersant applications and in situ burning operations in the Gulf of Mexico during the 2010 Deepwater Horizon/BP oil spill, and in February 1999 it was used to monitor the in situ burning of the New Carissa, a freighter grounded offshore of Coos Bay, Oregon. Spills and exercises like these help us to enhance SMART.

Special Monitoring of Applied Response Technologies (SMART) [PDF, 769.6 KB]: The SMART protocol, updated in August 2006.

SMART at the New Carissa Oil Spill [PDF, 387.0 KB]: A summary of how SMART was used during the New Carissa response in 1999.

Matrix Effects on Fluorometric Monitoring and Quantification of Dispersed Oil in the Open Ocean and Coastal Environment: Results of the 1999 R/V Ferrel Research Project [PDF, 519.0 KB]: A 2001 report on a 1999 research project aboard the NOAA Ship Ferrel, designed to identify the potential for matrix effects related to monitoring of dispersed oil.

In Situ Burning: Find more information about in situ burning and burn monitoring.

Dispersant Mission Planner: This is a tool that oil spill planners and responders can use to assess dispersant application system performance.

Dispersant Application Observer Job Aid: This is a field guide for those trained in observing and identifying dispersed and undispersed oil, describing oil characteristics, and reporting this information to decision-makers.

Response Techniques Photo Gallery: View photographs of a variety of ways first responders contain and clean up oil spills.

Response Techniques

All oil spill cleanup methods have some kind of environmental impact, so selection of a cleanup method inherently forces us to make a tradeoff of the effects of the oil versus the effects of the cleanup. Clean-up techniques range from physical removal (such as skimming boats) to chemical and biological treatment methods (for example, dispersants and oil-eating bacteria). View photos of some commonly used techniques for oil spill response and shoreline cleanup.

1.

Ship Skimming Oil After Deepwater Horizon Spill
A "vessel of opportunity" skims oil spilled after the Deepwater Horizon well blowout in the Gulf of Mexico in April 2010.
photo: NOAA

2

Cleaning the Banks of the Mississippi River After the M/V Westchester Oil Spill

Cleanup workers manually remove oil following the M/V Westchester spill in the Mississippi River near Empire, Louisiana, in November 2000.

photo: NOAA

Workers Assess the Shoreline after the Exxon Valdez Oil Spill

Workers conducting a shoreline assessment following the T/V *Exxon Valdez* oil spill in Prince William Sound, Alaska, in March of 1989. (NOAA)

photo: NOAA

Using Pom-poms to Absorb Oil

Workers clean oil from the beach in Port Fourchon, LA in June 2010, following the Deepwater Horizon/BP oil spill in the Gulf of Mexico in April. (NOAA)

photo: NOAA

Response to a Grounded Tanker in the Galapagos

A response vessel sprays dispersant onto an oil spill in the Galapagos. The tanker Jessica struck a reef off Puerto Baquerizo Moreno on San Cristobal Island on the night of January 16, 2001. The 260 foot vessel was carrying 160,000 gallons of diesel fuel oil and 78,000 gallons of intermediate fuel oil 120, and spilled a significant quantity of this oil.

photo: Heidi Snell

Workers at the Tank/Barge DBL152 Oil Spill
Workers at the Tank/Barge DBL152 spill off of the Louisiana coast in November 2005. (NOAA)
photo: NOAA

Shoreline Survey following the Selendang Ayu Oil Spill
A worker conducts a shoreline survey following the M/V Selendang Ayu grounding and oil spill near the Aleutian Islands, Alaska, in December 2004. (NOAA)

photo: NOAA

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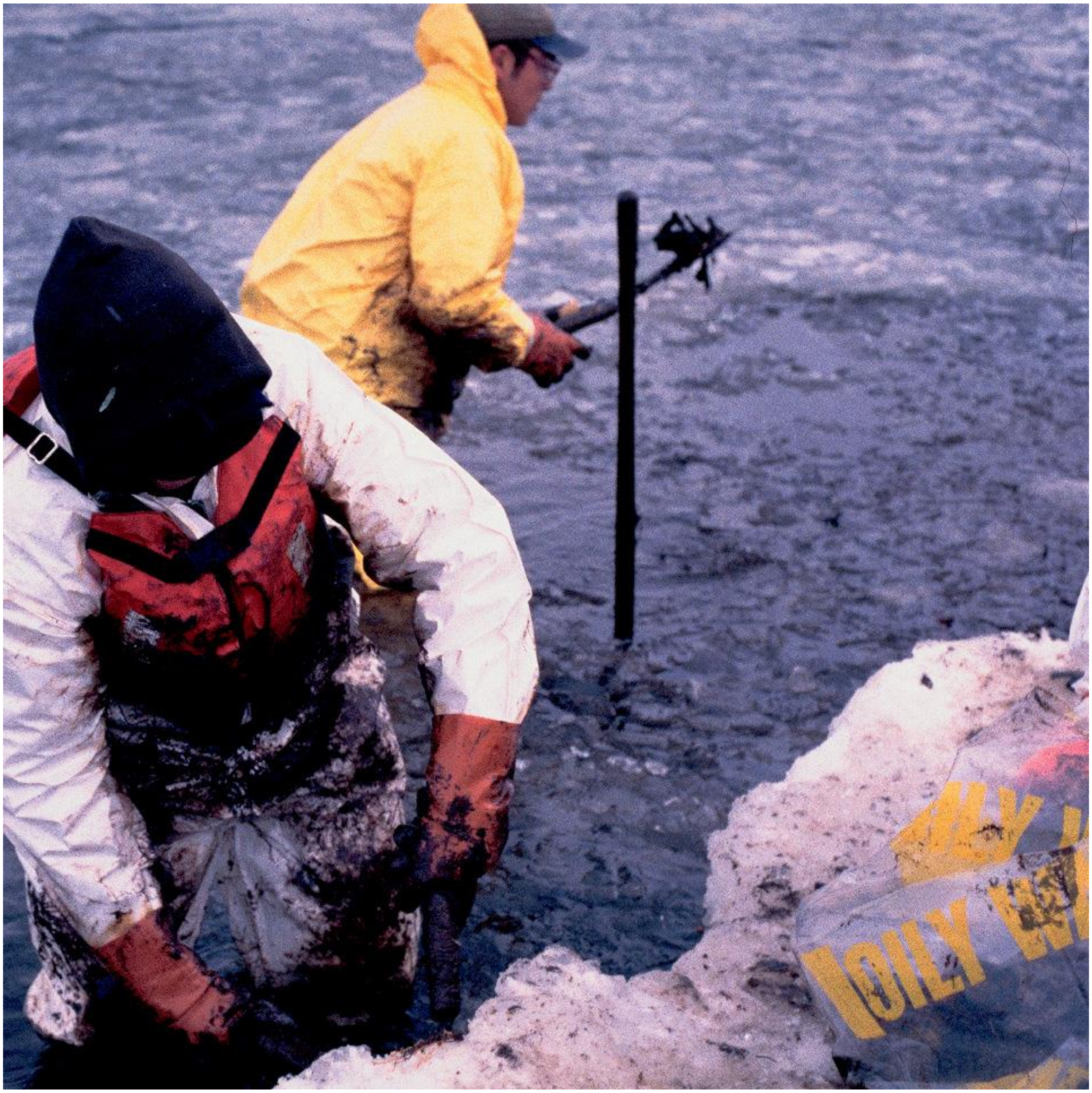
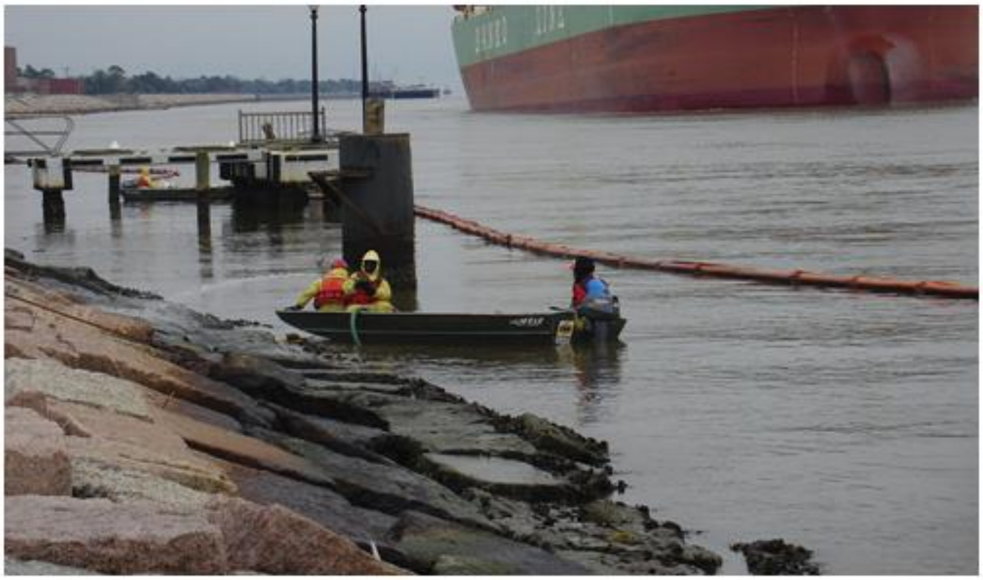


Cleaning Oil Spilled When Freighter Kuroshima Ran Aground

Manual labor following a spill caused when the coastal freighter M/V *Kuroshima* ran aground on rocks near Dutch Harbor, AK, in November 1997. (NOAA)

photo: NOAA

9



Washing Oil from Rocks after Eagle Otome Oil Spill

Workers cleaning oil spilled following a collision involving crude oil tanker *Eagle Otome* in Port Arthur, Texas, in January 2010. (NOAA)

photo: NOAA

Dispersant Application Near the Louisiana Coast

In November 2005, Tank/Barge DBL152 and the T/V *Rebel* allided with an obstruction approximately 32 miles from the Louisiana Coast, causing a spill. In the photo, dispersant is being applied to the oil. (NOAA)

photo: NOAA

Overflight After Cosco Busan Oil Spill

LCDR Elizabeth Jones conducting an overflight following the M/V *Cosco Busan* spill in San Francisco Bay in March of 2000. (NOAA)

photo: NOAA

12

Skimming Oil After the M/T Athos Spill

Skimming the Delaware River in Philadelphia following the M/T *Athos I* spill on November 26, 2004. (NOAA)

photo: NOAA

13

Cleaning oiled marshes in Louisiana after 2010 Deepwater Horizon oil spill

After the 2010 Deepwater Horizon spill, a heavy layer of oiled vegetation mats were preventing the thick emulsified oil underneath from breaking down along Barataria Bay's marshes. Here a NOAA SCAT Team scientist monitors the progress of cleanup efforts in a test plot.

photo: (NOAA/Scott Zengel)

U.S. Coast Guard uses ERMA® (Environmental Response Management Application) at Hurricane Isaac Response

U.S. Coast Guard Recon/Hazards Branch using the NOAA online response mapping tool [Gulf of Mexico ERMA®] (Environmental Response Management Application) following Hurricane Isaac to plan next-day field activities. Gulf of Mexico ERMA was used as the Common Operational Picture for the response. Additionally, the USCG District 8 Command staff used ERMA to see where the Sector NOLA (New Orleans, Louisiana) folks were working and how that work was progressing.

In situ burn of oil spilled after Deepwater Horizon oil spill in 2010

After the Deepwater Horizon oil spill in the Gulf of Mexico in April 2010, in situ burning was used as one technique to remove oil form the water.

photo: NOAA

Sampling water after an oil spill in Louisiana swamp

In 2013, after controlled burns were used to remove oil spilled in a wooded swamp near Baton Rouge, Louisiana, a scientist takes samples of the water.

photo: NOAA

Controlled burn of an oil spill in a Louisiana swamp

A view of one of the controlled burns to remove oil spilled in a wooded swamp outside of Baton Rouge, Louisiana, on January 19, 2013.

photo: U.S. Coast Guard

Selendang Ayu Shoreline Assessment

Conducting a shoreline survey following the following the M/V Selendang Ayu spill of its fuel oil and cargo of soybeans near the Aleutian Islands, Alaska, in December 2004. (NOAA)

photo: NOAA

Buzzards Bay Overflight

A responder performs an aerial survey after the Bouchard Barge 120 oil spill in Buzzards Bay near Massachusetts and Rhode Island in 2003. (NOAA)

photo: NOAA

Mechanical Protection Guidelines [PDF, 996.4 KB]: A 1994 manual describing how to deploy booms, barriers, and other mechanical protection devices during a spill response.

FAQ: Microbes and Oil Spills: This report is based on the deliberations of over 20 of the nation's leading experts who came together for one day to develop clear answers to seven frequently asked questions regarding the role of microbes in an oil spill.

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 diffent 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

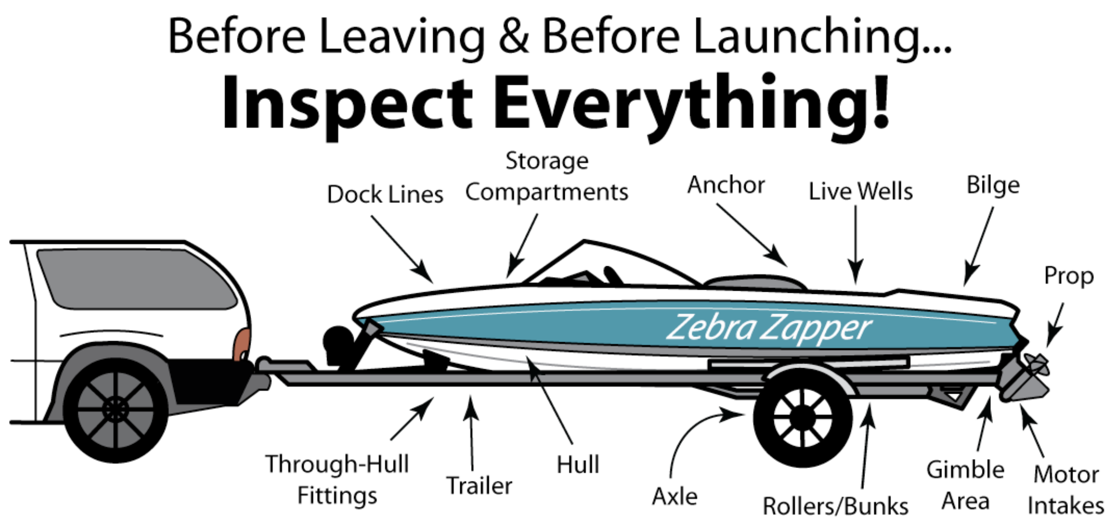
- Accidentally released with other species in the plant and animal trade

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.

• 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.



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 nonindigenousspecies 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

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. Lamprey 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 lamprey 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
  

-