EPA United States Environmental Protection Agency

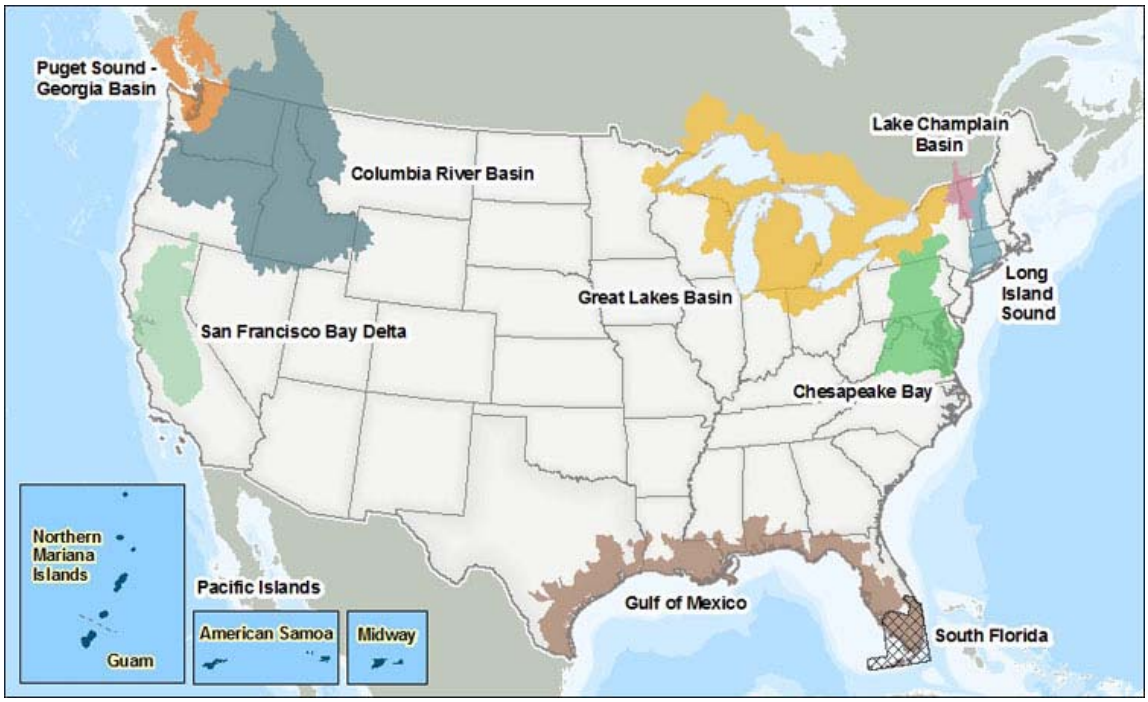
Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Introduction

A watershed is the land area that drains to a common waterway. Rivers, lakes, estuaries, wetlands, streams, and even the oceans are catch basins for the land adjacent to them. Ground water aquifers are replenished based on water flowing down through the land area above them. These important water resources are sensitive to chemicals and other pollutants released within or transferred across their boundaries.

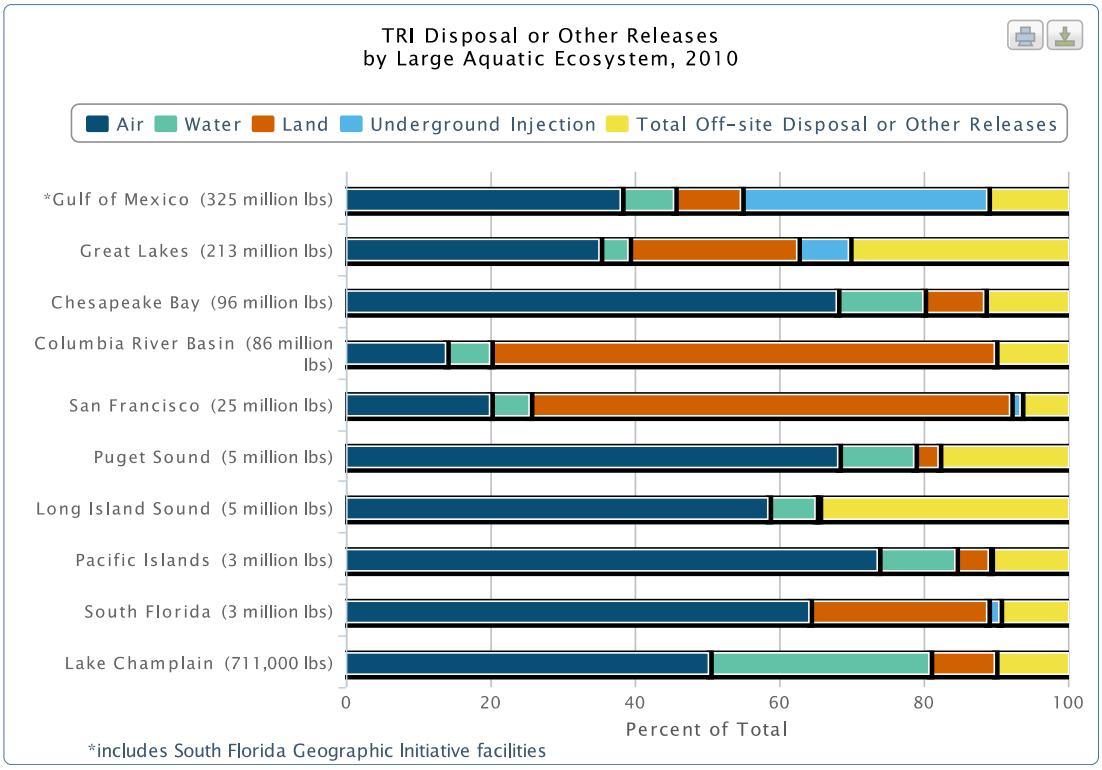
A large aquatic ecosystem (LAE) is comprised of multiple small watersheds and water resources within a large geographic area. The Large Aquatic Ecosystems Council was created by the U.S. Environmental Protection Agency in 2008 to focus on protecting and restoring the health of critical aquatic ecosystems. Currently there are ten program LAEs in this program, which are listed below and shown in the following map:

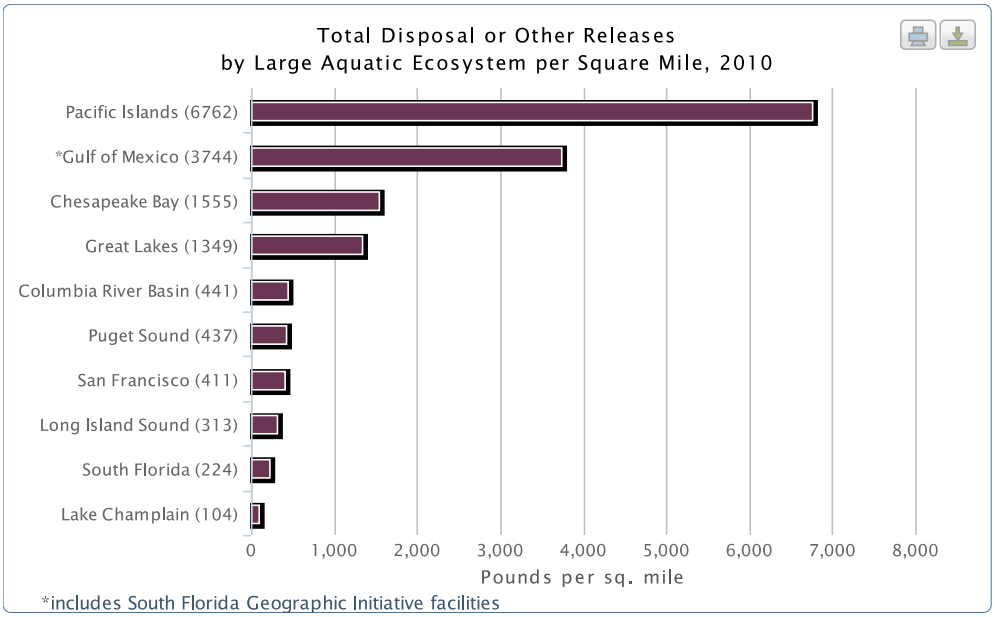
- Chesapeake Bay [Español]
- Columbia River Basin [Español]
- Great Lakes Basin [Español]
- Gulf of Mexico [Español]
- Lake Champlain Basin [Español]
- Long Island Sound [Español]
- Pacific Islands [Español]
- Puget Sound-Georgia Basin [Español]
- San Francisco Bay Delta [Español]
- South Florida [Español]



Water pollution, surface runoff, contaminated sediment, toxic discharges, and air emissions can impact the environmental quality of the land, water, and living resources within an aquatic ecosystem. Persistent toxic pollutants can be especially problematic in aquatic ecosystems because pollutants accumulate in sediments and may bioaccumulate in the tissues of fish and other wildlife at the top of the food chain to concentrations many times higher than in the water or air, causing environmental health problems for both humans and wildlife.

The TRI program has profiled each of these ten LAEs. Each profile includes information on the toxic chemicals released or otherwise managed as wastes, the sources of the toxics chemicals, and the potential impacts of these chemicals on the ecosystem and human health. The total quantity of toxic chemicals managed as wastes varies greatly among the LAEs along with the types and sizes of industrial facilities. How facilities dispose of or release toxic chemicals within the LAEs-whether to the land, air, or water-also varies greatly among the LAEs, as shown below.





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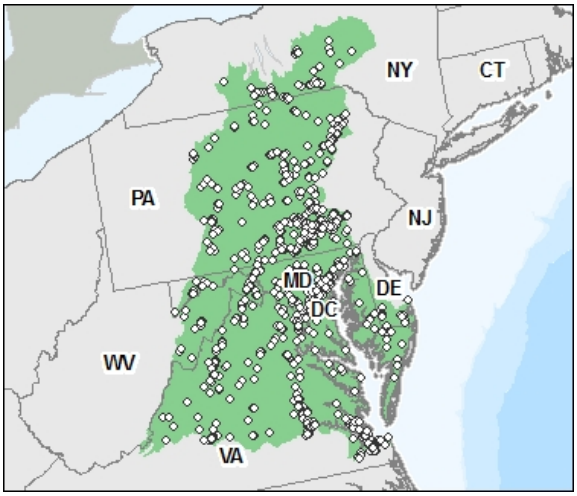
EPA United States Environmental Protection Agency

Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Chesapeake Bay



TRI facilities in Chesapeake Bay Watershed

Quick Facts for 2010:

U.S. Watershed Size:	64,000 sq. miles
U.S. Population:	16.6 million
Number of TRI Facilities:	910
Total On-site and Off-site Disposal or Other Releases:	71.0 million lbs
Total On-site:	58.0 million lbs
•Air:	40.7 million lbs
•Water:	10.1 million lbs
•Land:	7.2 million lbs
•Underground Injection:	29 thousand lbs
Total Off-site:	13 million lbs

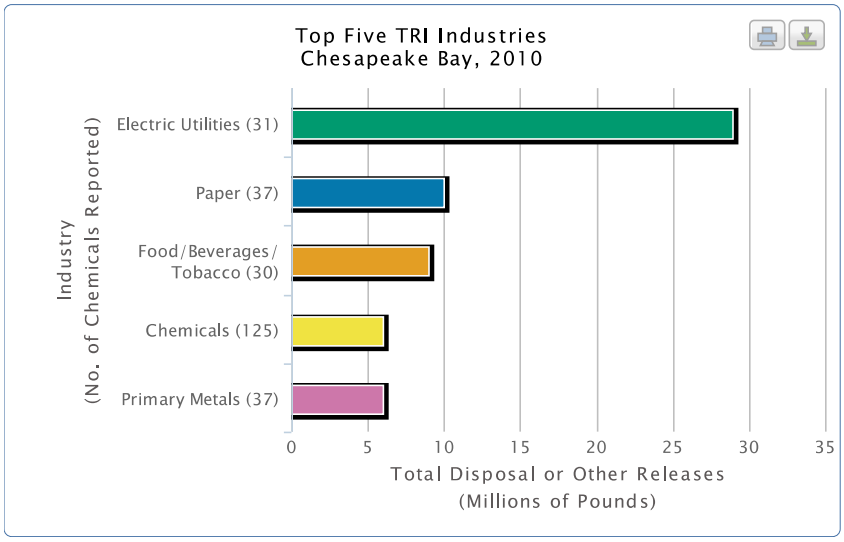
The Chesapeake Bay is the largest estuary in the United States and is home to more than 3,600 species of plants, fish, and animals. More than 350 species of fish are known to live, feed and spawn in the Bay and about 500 million pounds of seafood are harvested each year.

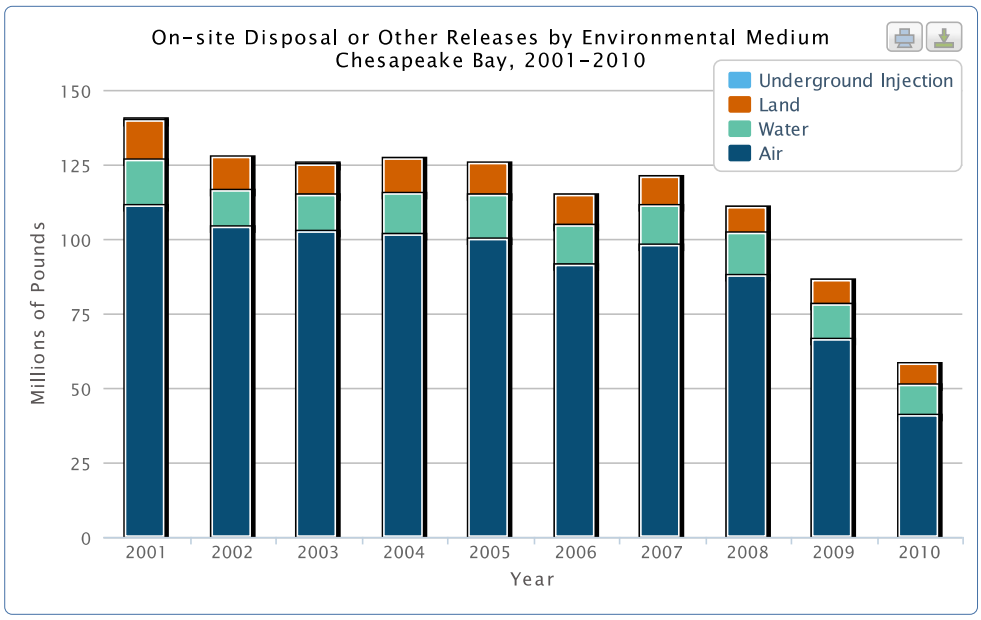
Some of the largest sources of TRI chemicals in the Chesapeake Bay watershed are air releases from electric power generating facilities. Hydrochloric and sulfuric acids released by power generating facilities and other industrial sources fall as acid rain onto the Bay and its watershed contributing to the acidification of surface waters. This source of acidification has been documented as an important factor in the ongoing decline in the populations of fish species that spawn in the Bay's streams and estuaries, including striped bass, American shad, alewife, menhaden, and herring. Air releases in the Chesapeake Bay region decreased by 63% from 2001 to 2010, including a decrease of 39% from 2009 to 2010. Four large coal-fired electric power plants in Marylandand one in Pennsylvania showed significant reductions from 2008 to 2010 having installed pollution control equipment during that time period.

The TRI chemical disposed of or otherwise released in the second largest amount, behind air releases of hydrochloric acid, was nitrate compounds discharged to surface waters, primarily due to releases from numerous poultry and food processing facilities. Excess nitrogen stimulates aquatic plant growth, particularly in nitrogen-limited waters, such as the Chesapeake Bay. Such intense plant growth, or eutrophication, can result in low oxygen levels and "dead zones" in summer months. Surface water discharges decreased by 33% from 2001 to 2010, including a decrease of 11% from 2009 to 2010.

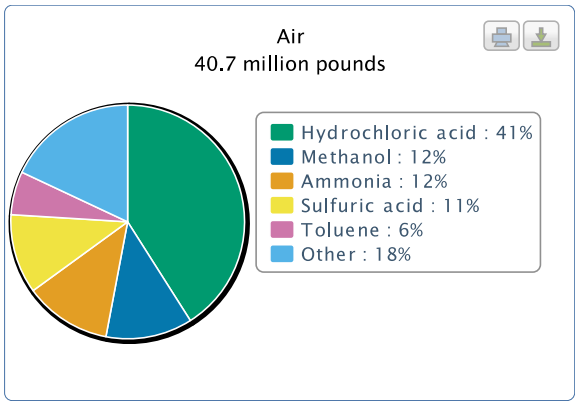
Most of the on-site land disposal or other releases were reported by electric utilities, primarily barium, vanadium and manganese and their compounds. On-site land disposal or other releases decreased by 48% from 2001 to 2010, including a decrease of 11% from 2009 to 2010.

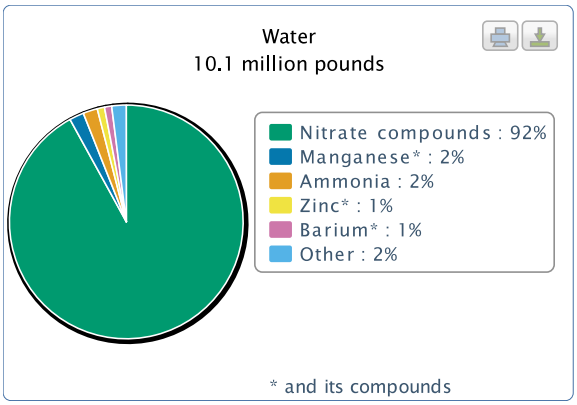
The Chesapeake Bay Program is a multi-jurisdictional partnership working to restore and protect the Bay and its many resources. The Bay Program partners include federal, state and local governments, farmers, developers and homeowners. To learn more about ongoing efforts to protect the Chesapeake Bay Watershed, visit: www.chesapeakebay.net.

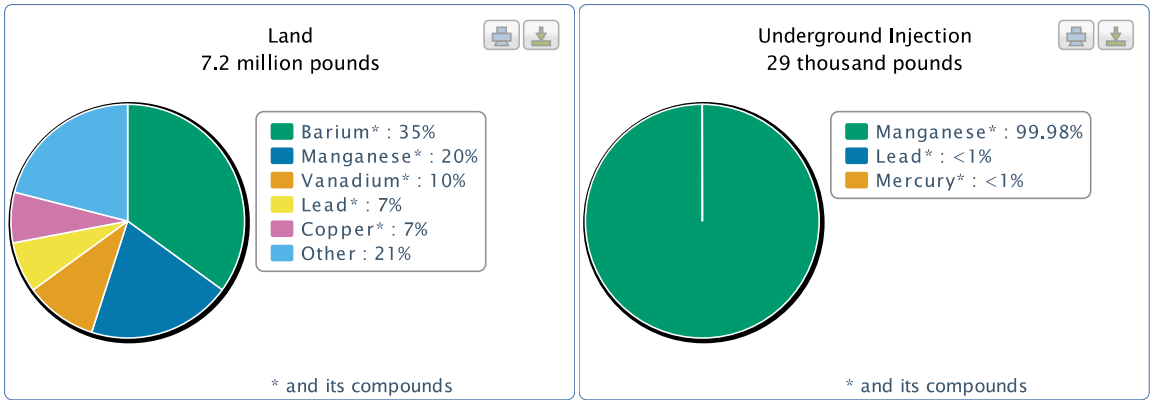




Top Five Chemicals by Environmental Medium
Chesapeake Bay, 2010







These charts represent the top five TRI chemicals in pounds released for this LAE, and do not include all chemicals of concern nor the priority or importance of those chemicals within the LAE. For more specific information, please visit the LAE Website at http://water.epa.gov/aboutow/owow/programs/large_aquatic.cfm.

Last updated on Thursday, January 05, 2012

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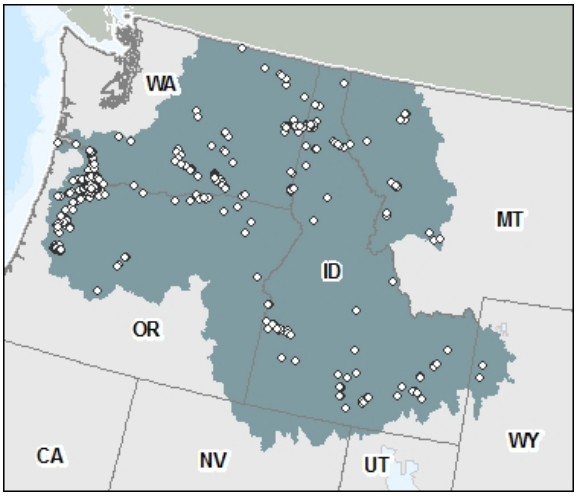
Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Columbia River Basin



TRI facilities in Columbia River Basin

Quick Facts for 2010:

U.S. Watershed Size:	194,700 sq. miles
U.S. Population:	6 million
Number of TRI Facilities:	457
Total On-site and Off-site Disposal or Other Releases:	102.6 million lbs
Total On-site:	94.5 million lbs
•Air:	13.0 million lbs
•Water:	4.7 million lbs
•Land:	76.7 million lbs
•Underground Injection:	none
Total Off-site:	8.2 million lbs

The Columbia River Basin covers an area of more than 260,000 square miles (194,700 square miles in the United States) in parts of seven U.S. states and British Columbia, Canada. The Columbia River begins in the Rocky Mountains of British Columbia, and flows for 1,200 miles through the states of Washington and Oregon before emptying into the Pacific Ocean. The Basin is home to many industries vital to the Pacific Northwest, including sport and commercial fisheries, agriculture, transportation, recreation, mining, paper mills, and hydro-electric power generation.

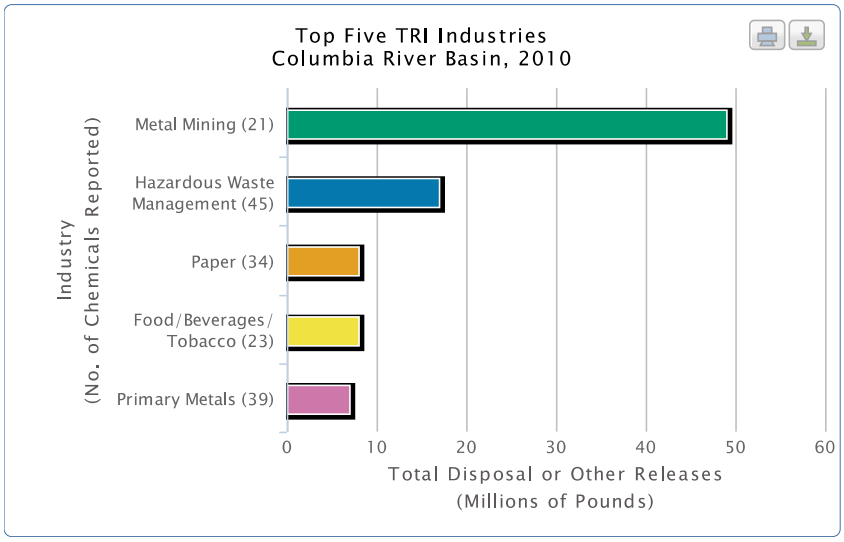
The Columbia River Basin ecosystem is also home to many important plant and animal species. The Columbia River salmon and steelhead runs, for example, were once the largest fish runs in the world. Recent studies and monitoring programs have found significant levels of toxic chemicals in fish and the waters they inhabit, including DDT, PCBs, mercury, dioxins, and other anthropogenic toxic chemicals. According to EPA Region 10's "Columbia River Basin Toxics Reduction Action Plan," such accumulation of toxics in fish threatens the species, and human consumption of fish with significant body burdens of toxics can lead to health problems.

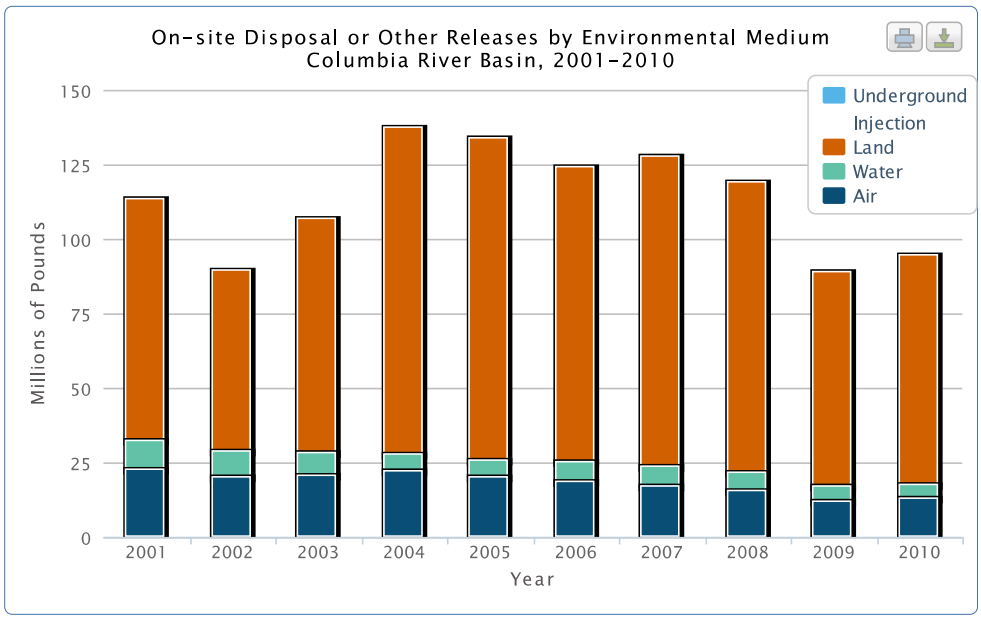
In 2010, some of the largest sources of TRI chemicals in the Columbia River Basin included the land disposal of manganese, copper, lead and zinc and other metals from metal mines. Runoff from these areas, as well as wastewater effluent from numerous pulp and paper mills, is associated with degraded water quality. Hazardous waste management facilities had on-site land disposal, primarily of zinc and lead and their compounds. On-site land disposal or other releases accounted for 81% of total on-site disposal or other releases in the Columbia River Basin in 2010. They decreased by 5% from 2001 to 2010, but increased by 7% from 2009 to 2010.

Air releases accounted for 14% of total on-site disposal or other releases in 2010. They decreased by 43% from 2001 to 2010 but increased by 10% from 2009 to 2010. The primary sources of air releases were pulp and paper mills, mainly consisting of methanol, and food processors and chemical manufacturers, mainly consisting of ammonia.

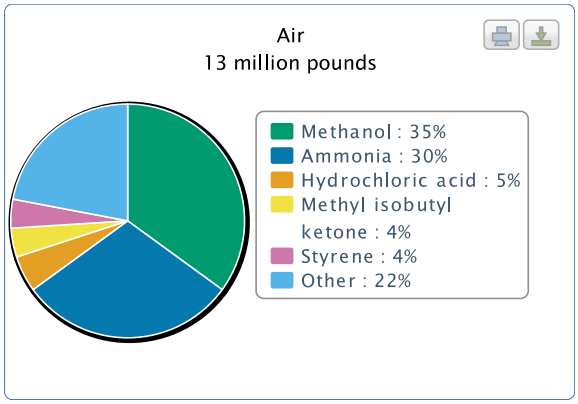
Surface water discharges were 5% of total on-site disposal or other releases in 2010. They decreased by 51% from 2001 to 2010, including a 9% decrease from 2009 to 2010. The food processing industry accounted for half of the surface water discharges in 2010, almost all of which was nitrate compounds.

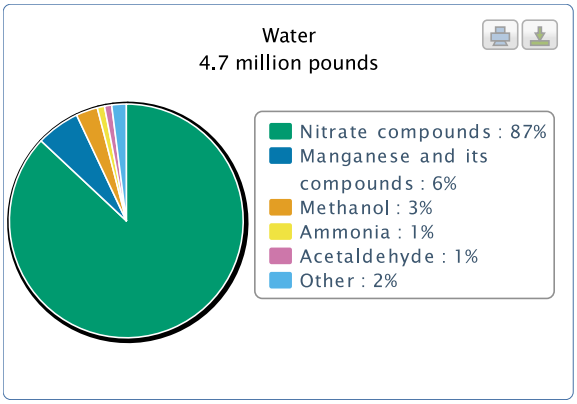
Indian Tribes and state and federal governments are all engaged in efforts to restore and improve the water, land, and air quality of the Columbia River drainage basin and have committed to work together on a range of ecosystem restoration efforts.To learn more about ongoing efforts to protect the Columbia River Basin, visit: http://yosemite.epa.gov/r10/ecocomm.nsf/Columbia/Columbia.

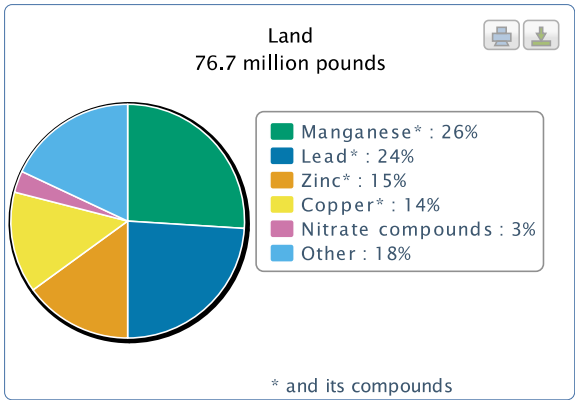




Top Five Chemicals by Environmental Medium
Columbia River Basin, 2010







No underground injection reported

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Last updated on Thursday, January 05, 2012

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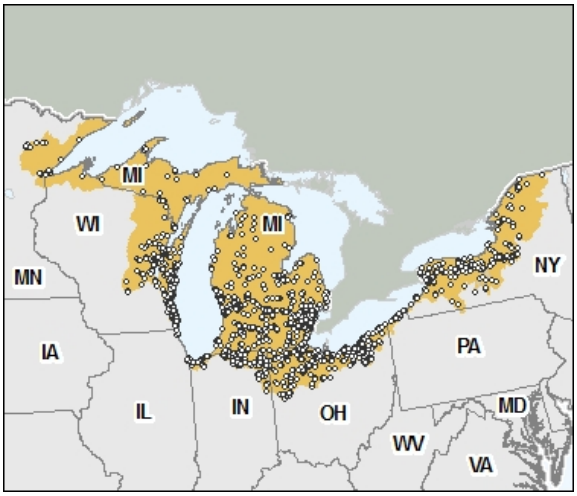
Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Great Lakes Basin



TRI facilities in Great Lakes Basin

Quick Facts for 2010:

U.S. Watershed Size:	157,900 sq. miles
U.S. Population:	30 million
Number of TRI Facilities:	2,393
Total On-site and Off-site Disposal or Other Releases:	216.0 million lbs
Total On-site:	140.1 million lbs
•Air:	69.4 million lbs
•Water:	9.7 million lbs
•Land:	40.6 million lbs
•Underground Injection:	20.5 million lbs
Total Off-site:	75.9 million lbs

The Great Lakes Basin consists of the Superior, Michigan, Huron, Erie and Ontario Lakes, a number of other lesser lakes and waterways, and the surrounding watershed. The watershed covers parts of the U.S. states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin, as well as parts of the province of Ontario in Canada. The Great Lakes are the largest freshwater bodies in the world, with a surface area of more than 94,000 square miles. The Great Lakes system drains less than one percent of its total water volume each year to the Saint Lawrence River, resulting in high residence time for water and toxics entering the basin.

Major contributors to the ecological problems in the Great Lakes Basin include urban runoff, hazardous waste management, sewage disposal, and discharges of industrial wastewaters containing toxic chemicals. These environmental releases affect not only water quality but also aquatic food chains, fish populations, and human health.

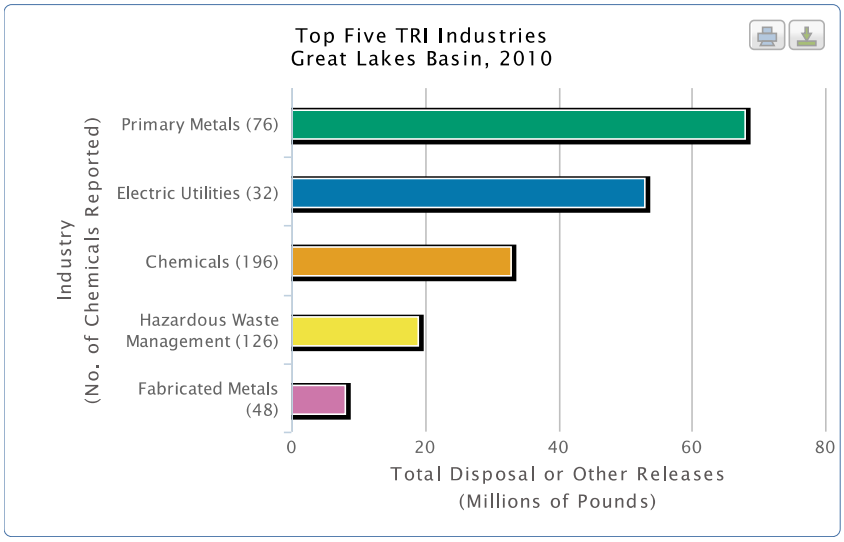
The largest air releases of toxics in the Great Lakes Basin in 2010 were hydrochloric acid, mainly from electric utilities, and ammonia and carbonyl sulfide, mainly from chemical manufacturers. Air releases decreased by 47% from 2001 to 2010 including a decrease of 8% from 2009 to 2010. The Great Lakes are very susceptible to resulting acid rain pollution due to the large surface areas in the water and watershed.

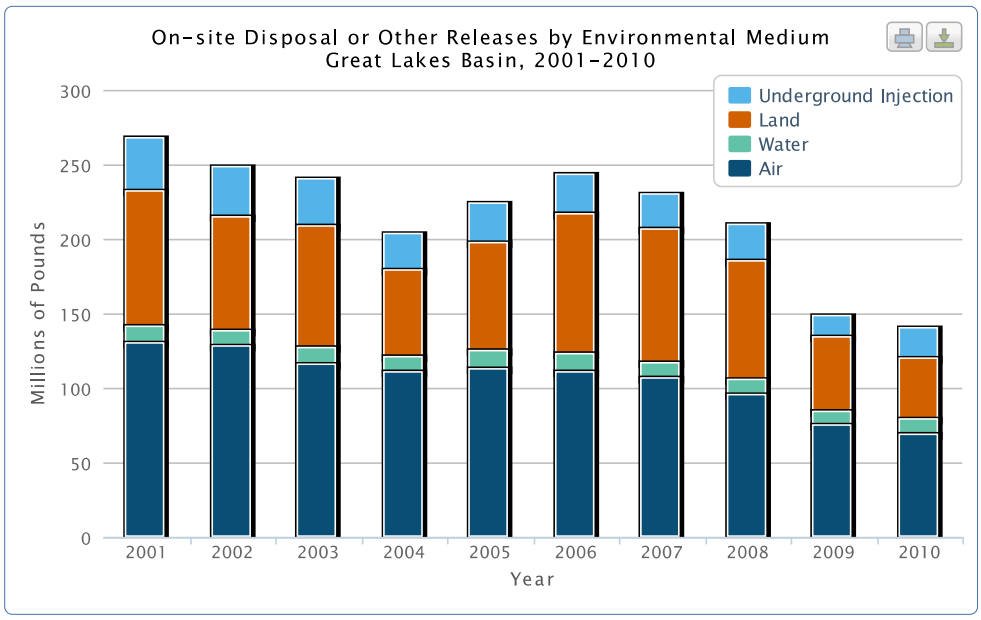
Nitrates and pesticides are common surface water pollutants from agricultural land and municipal wastewater treatment plants. Nitrates were also discharged in significant quantities by primary metals facilities (such as iron and steel mills and smelters) and food and beverage manufacturers in 2010. Surface water discharges in the Great Lakes Basin decreased by 14% from 2001 to 2010, but from 2009 to 2010 they increased by 11%.

Electric utilities were the primary source of on-site land disposal of barium and its compounds in 2010. Primary metals facilities reported the largest amounts of manganese and zinc and their compounds in the basin. From 2001 to 2010, on-site land disposal or other releases decreased by 55%, including an 18% decrease from 2009 to 2010.

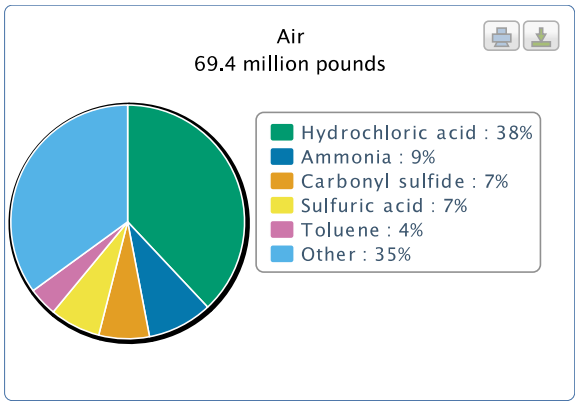
In the Great Lakes Basin, there was on-site underground injection of TRI chemicals at hazardous waste management, chemical manufacturing and primary metals facilities during 2010. Hazardous waste management facilities were the primary source of nitric acid; chemical manufacturers reported acetonitrile and hydrogen fluoride; and chemical manufacturers and primary metals facilities reported ammonia. Underground injection decreased by 43% from 2001 to 2010, but increased by 36% from 2009 to 2010.

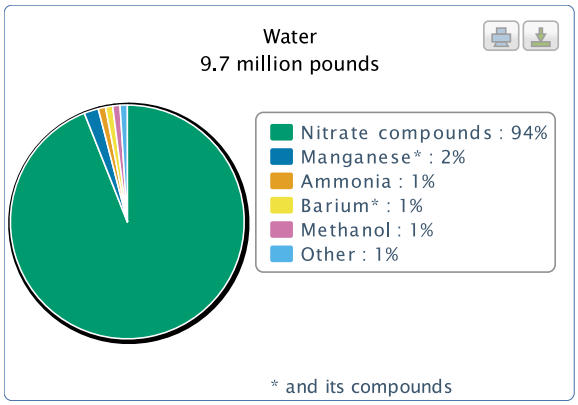
The health of the Great Lakes is much improved from previous decades due to voluntary and regulatory efforts at the local and international level, beginning with the first wide scale effort in 1972, the Great Lakes Water Quality Agreement, which coordinated water quality management efforts of the United States and Canada. Since that time, many toxic chemical disposals or other releases have been reduced or eliminated through regulatory and voluntary actions on both sides of the border; however, pollutants still enter the basin and the effects of many of the previously released toxic chemicals are not yet attenuated. To learn more about ongoing efforts to protect the Great Lakes, visit: www.epa.gov/glnpo.

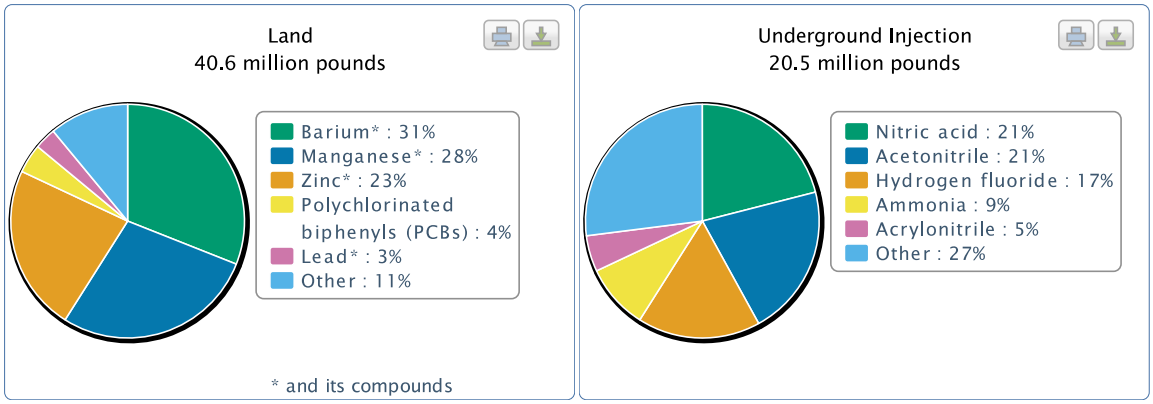




Top Five Chemicals by Environmental Medium
Great Lakes Basin, 2010







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Last updated on Thursday, January 05, 2012

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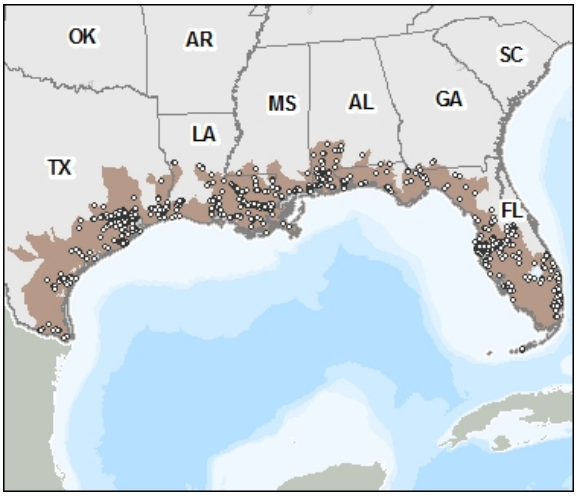
Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Gulf of Mexico



TRI facilities in Gulf of Mexico

Quick Facts for 2010:

U.S. Watershed Size:	86,800 sq. miles
U.S. Population:	44.2 million
Number of TRI Facilities:	1,313
Total On-site and Off-site Disposal or Other Releases:	351.8 million lbs
Total On-site:	317.4 million lbs
•Air:	106.3 million lbs
•Water:	21.5 million lbs
•Land:	32.8 million lbs
•Underground Injection:	156.9 million lbs
Total Off-site:	34.4 million lbs

The Gulf of Mexico is a vast, highly productive body of water in ecological, economic, and social terms. This large aquatic ecosystem (LAE) includes major portions the U.S. states of Texas, Louisiana, Mississippi, Alabama, and Florida. The Gulf of Mexico ecosystem supports a wide array of natural resource dependent industries, including oil and gas production, marine shipping, agriculture, and tourism. The Gulf of Mexico is also one of the largest commercial fishing regions in the United States. The coastal areas are also home to many large petroleum refining and chemical production facilities. The ecosystem of the Gulf and surrounding land is complex and delicate, shared and used by many people, wildlife and plant life.

Runoff and discharges from agricultural, industrial, and municipal sources into surface waters bring excessive nutrients and toxic pollutants into the Gulf. One of the world's largest hypoxic or dead zones, where oxygen is too low to support aquatic life, is along the Texas and Louisiana coast, primarily the result of pollution flowing from the Mississippi River. High levels of heavy metals, pesticides and petroleum are observed in water, sediments and in the tissues of many aquatic species.

Almost half of total on-site disposal or other releases were injected underground into on-site wells in 2010. In this region, underground injection is used for the disposal of toxic chemicals, including nitrate compounds, ammonia and acetonitrile, primarily by the chemical manufacturing industry. Underground injection increased by 34% from 2009 to 2010 and by 15% from 2001 to 2010.

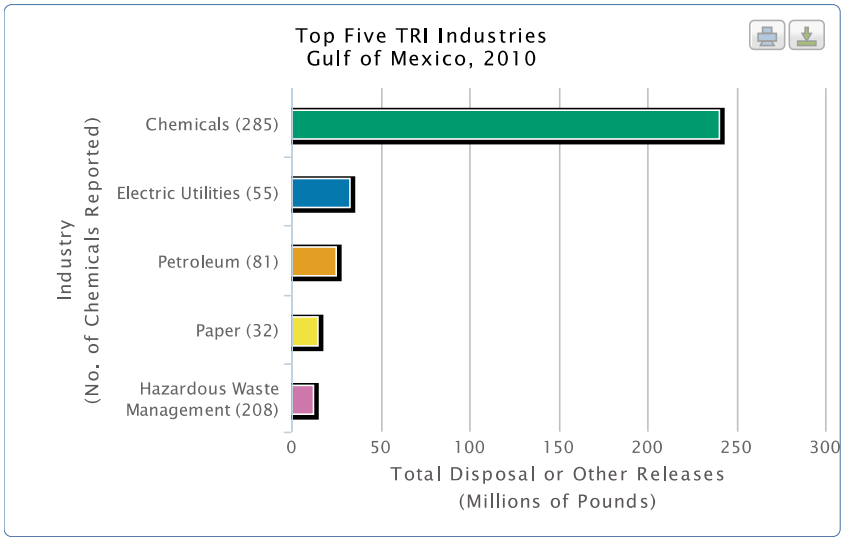
Air releases were one-third of the total on-site disposal or other releases. The largest amounts of TRI air releases in the Gulf of Mexico aquatic ecosystem were ammonia, primarily from chemical manufacturers; hydrochloric acid, primarily from electric utilities; and methanol, primarily from pulp and paper mills and chemical manufacturers. Air releases decreased by 15% from 2009 to 2010 and by 43% from 2001 to 2010.

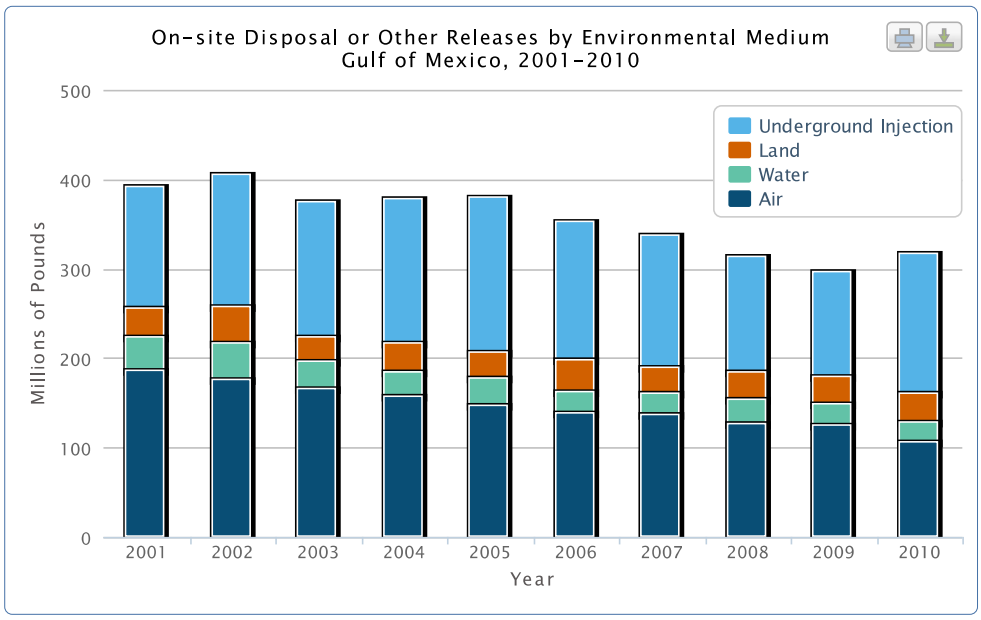
Nitrate compounds constituted the largest TRI surface water discharges in 2010, primarily from petroleum refining and chemical manufacturers. Surface water discharges decreased by 8% from 2009 to 2010 and by 42% from 2001 to 2010.

Electric utilities had the largest on-site land disposal or other releases in 2010, primarily comprised of barium and manganese compounds. Hazardous waste management facilities reported the second largest amounts, mainly comprised of nickel and zinc compounds. Chemical manufacturers had the largest on-site land disposal of manganese and lead compounds. On-site land disposal or other releases increased by 4% from 2009 to 2010, resulting in a slight (0.5%) increase overall from 2001 to 2010.

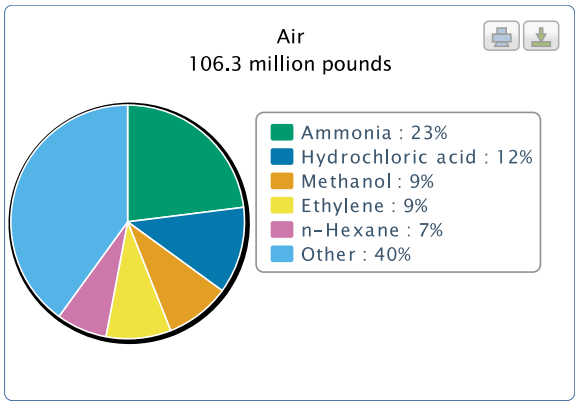
Note that these releases do not reflect releases of chemicals from the British Petroleum offshore oil spill in 2010. Under section 313 of the Emergency Planning and Community Right-to-Know Act, the TRI reporting requirements apply only to facilities in industrial sectors designated by certain North American Industrial Classification System (NAICS) codes. Facilities that extract crude petroleum or natural gas from the earth, such as the British Petroleum offshore oil well facility in the Gulf of Mexico, are classified in NAICS 211111, which is not currently subject to TRI reporting requirements.

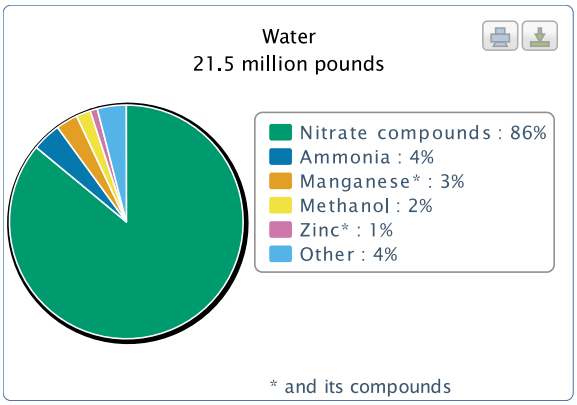
A number of federal, state and local groups are concerned about the impact of these releases and other threats to the Gulf of Mexico ecosystem. The 2004 Gulf of Mexico Alliance initiated by the five Gulf states and the 1998 U.S. EPA's Gulf of Mexico Program both monitor and protect the health of the Gulf of Mexico ecosystem.To learn more about ongoing efforts to protect the Gulf of Mexico, visit: www.epa.gov/gmpo.

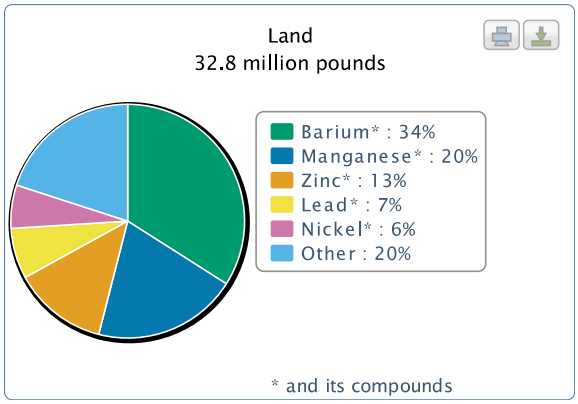


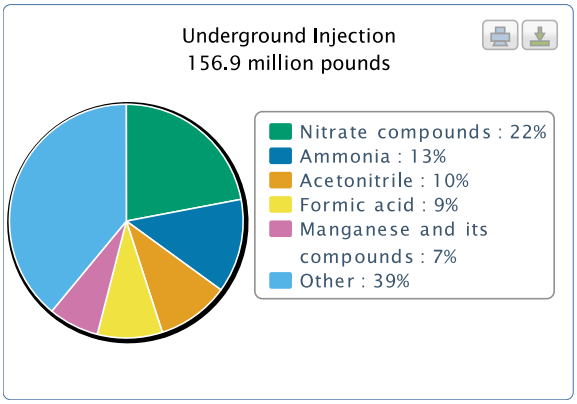


Top Five Chemicals by Environmental Medium
Gulf of Mexico, 2010









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Last updated on Thursday, January 05, 2012

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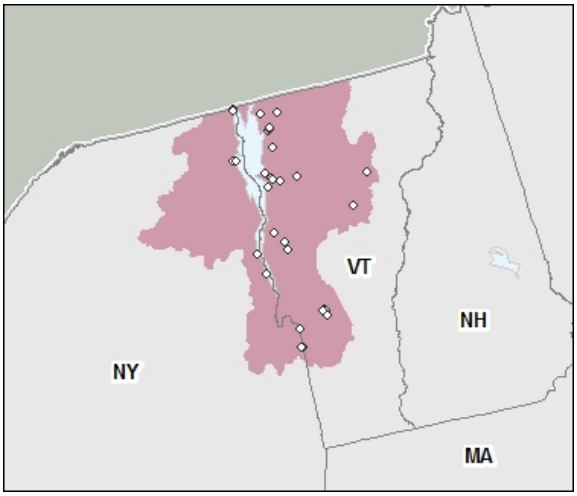
Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Lake Champlain Basin



TRI facilities in Lake Champlain Basin

Quick Facts for 2010:

U.S. Watershed Size:	6,800 sq. miles
U.S. Population:	600 thousand
Number of TRI Facilities:	30
Total On-site and Off-site Disposal or Other Releases:	653 thousand lbs
Total On-site:	562 thousand lbs
•Air:	246 thousand lbs
•Water:	222 thousand lbs
•Land:	95 thousand lbs
•Underground Injection:	none
Total Off-site:	91 thousand lbs

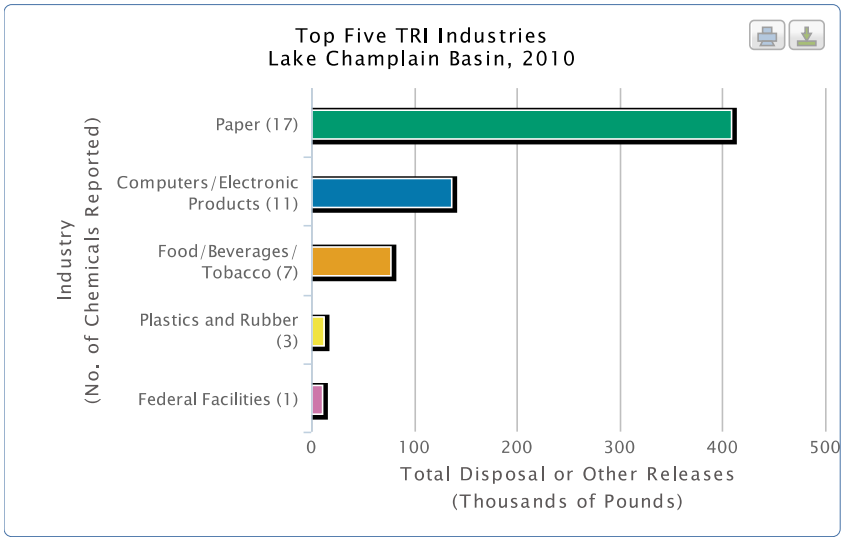
Lake Champlain is situated between the states of New York, Vermont, and the Canadian province of Quebec. The Lake's watershed is in the Champlain Valley, located between the Green Mountains of Vermont, the Adirondack Mountains of New York and includes portions of Quebec. The Lake is used for drinking water for over 200,000 people, as well as for fishing and recreation.

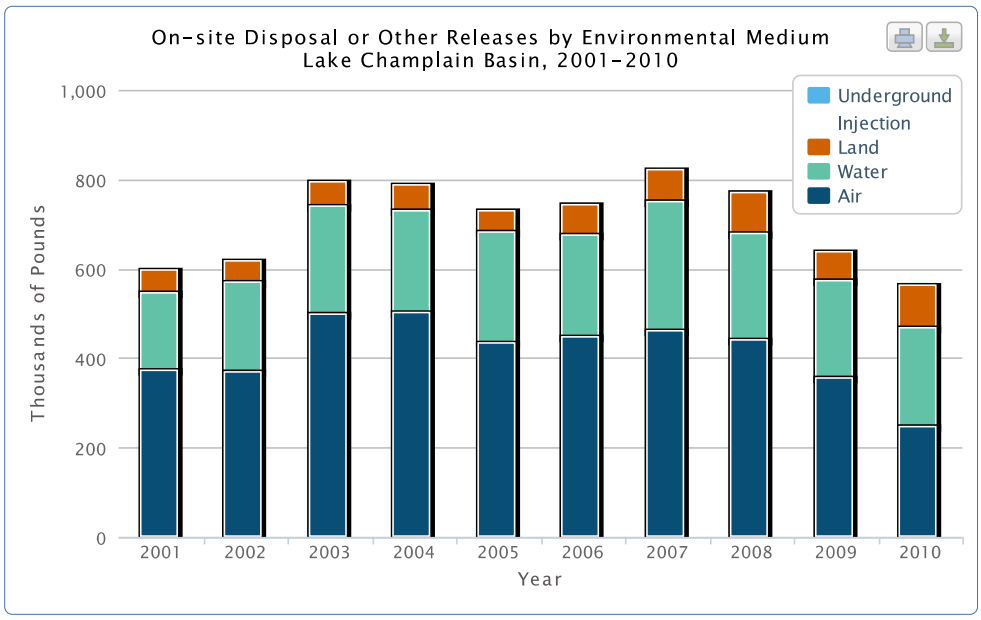
Air releases were 44% and surface water discharges were 39% of total on-site disposal or other releases in the Lake Champlain watershed in 2010. One paper mill reported 92% of the total air releases for 2010, mainly composed of methanol and acetaldehyde.This paper mill decreased its air releases, even though production levels increased; it did report increased on-site treatment and energy recovery of these chemicals for 2010. Air releases from facilities in the Lake's watershed region decreased by 31% from 2009 to 2010.

Nitrates and phosphorous are released to surface water primarily through agricultural runoff and municipal wastewater treatment plants. Nitrates are also discharged from TRI facilities producing paper products and computer/electronic components. One facility producing semiconductors and related devices reported 55% of total surface water discharges for 2010, mainly composed of nitrate compounds. One paper mill reported 45% of surface water discharges, mainly manganese compounds and nitrate compounds. The paper mill decreased surface water discharges from 2009 to 2010. However, the computer/electronic components manufacturer increased production levels and surface water discharges during that time period, resulting in an overall increase of 2% from 2009 to 2010 and of 27% from 2001 to 2010 for the region.

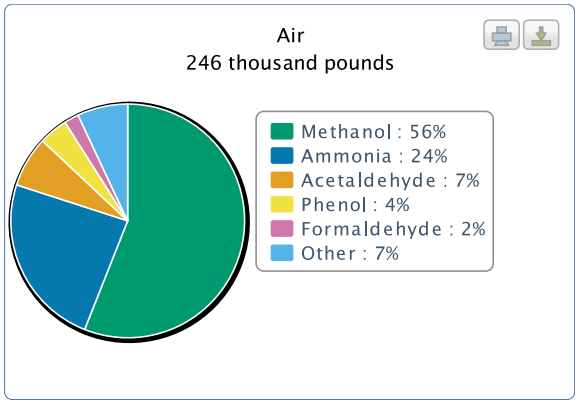
The largest amounts of disposal to land on-site in 2010 were primarily from paper mills and federal facilities and consisted mainly of manganese, zinc, and lead and their compounds, as well as methanol. On-site land disposal or other releases in the Lake Champlain watershed increased by 53% from 2009 to 2010 and by 97% overall from 2001 to 2010, due to reporting by one paper mill.

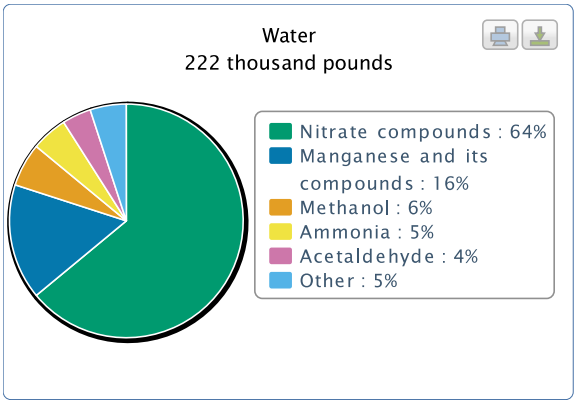
In 1996, New York, Vermont and the EPA endorsed the Lake Champlain Basin Program as a pollution prevention, control, and restoration plan for Lake Champlain. The government of Quebec joined the Program in 2003. The plan primarily aims to reduce high phosphorus levels in the Lake, which cause damaging algal blooms. Another priority of the plan is to reduce the amounts of toxic substances entering the Lake. Toxics, such as PCB's and mercury, which accumulate in the aquatic food chain, have resulted in fish consumption advisories. To learn more about ongoing efforts to protect Lake Champlain, visit: www.lcbp.org.

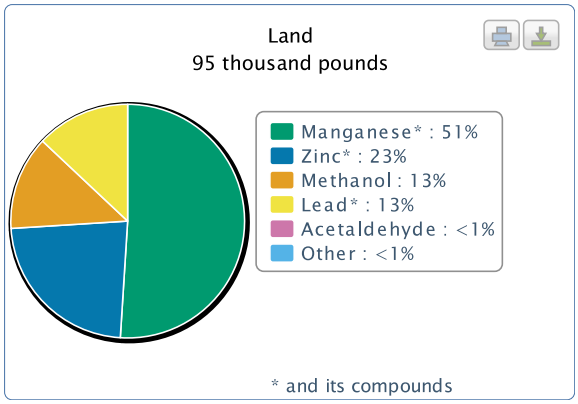




Top Five Chemicals by Environmental Medium
Lake Champlain Basin, 2010







No underground injection reported

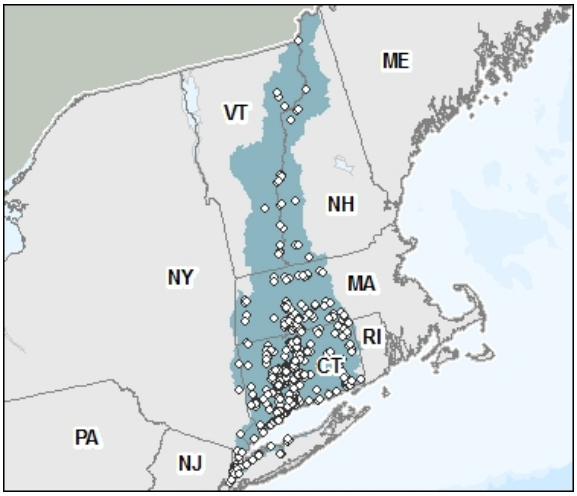
These charts represent the top five TRI chemicals in pounds released for this LAE, and do not include all chemicals of concern nor the priority or importance of those chemicals within the LAE. For more specific information, please visit the LAE Website at http://water.epa.gov/aboutow/owow/programs/large_aquatic.cfm.

Last updated on Thursday, January 05, 2012

EPA United States Environmental Protection Agency

Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Long Island Sound



TRI facilities in Long Island Sound

Quick Facts for 2010:

U.S. Watershed Size:	17,400 sq. miles
U.S. Population:	8 million
Number of TRI Facilities:	493
Total On-site and Off-site Disposal or Other Releases:	3.7 million lbs
Total On-site:	2.3 million lbs
•Air:	1.9 million lbs
•Water:	304 thousand lbs
•Land:	83 thousand lbs
•Underground Injection:	none
Total Off-site:	1.4 million lbs

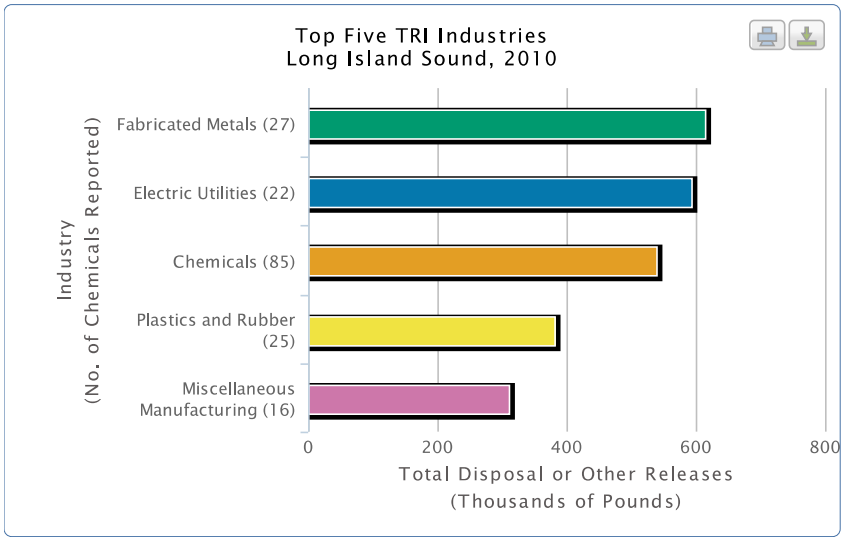
Long Island Sound is a large and productive estuary lying between Connecticut to the north and Long Island, New York, to the south. It is home to more than 170 species of fish and dozens of species of migratory birds. The Sound supports a large commercial fishing and shellfishing industry and its waters and shores are an important recreational resource. The Sound's watershed, which begins at the headwaters of the Connecticut River near the Quebec border, covers more than 17,000 square miles and is home to more than 8 million people.

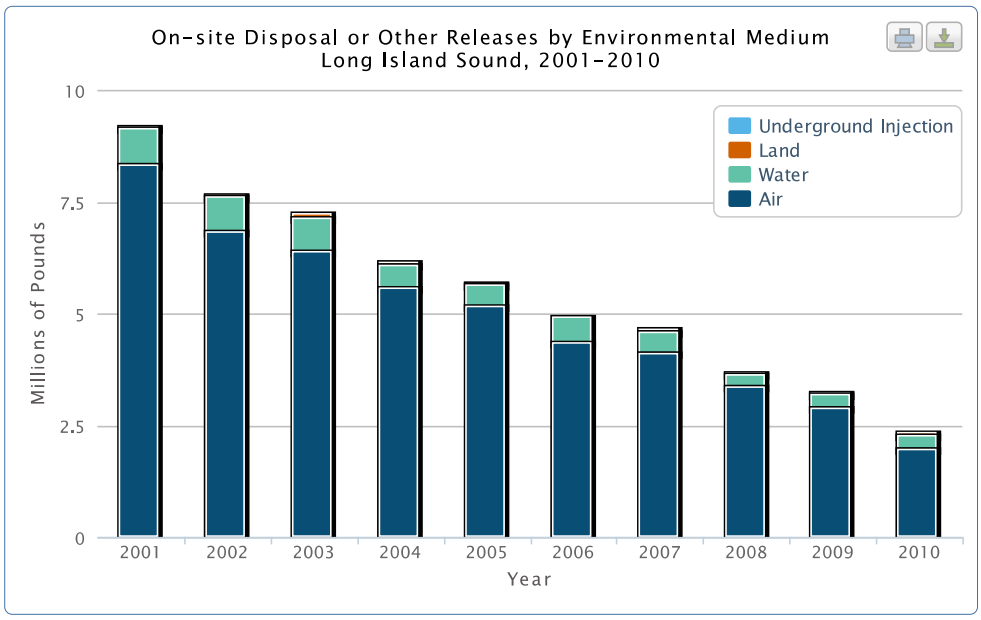
On-site total disposal or other releases in the Long Island Sound watershed decreased by 27% from 2009 to 2010 and by 74% from 2001 to 2010. Air releases accounted for 83% of the total on-site disposal or other releases in the Long Island Sound watershed in 2010. Four industry sectors accounted for over half of all air releases: electric utilities, plastics/rubber, chemicals and fabricated metals. Air releases decreased by 32% from 2009 to 2010 and by 77% from 2001 to 2010. Hydrochloric acid was released to air in the largest amount, mainly by electric utilities and the plastics/rubber sector.

Fabricated metals facilities and chemical manufacturers reported 97% of the total surface water discharges for 2010, mainly composed of nitrate compounds. Surface water discharges decreased by 3% from 2009 to 2010 and by 62% from 2001 to 2010.

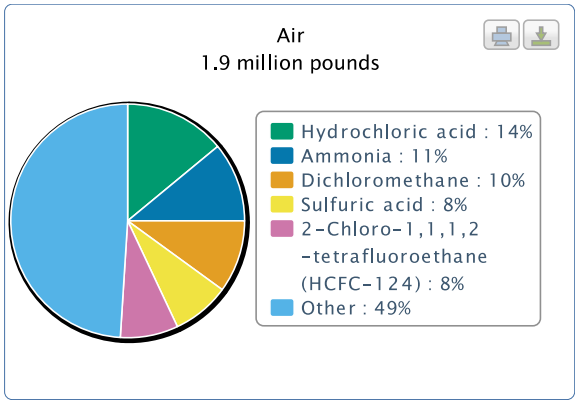
One hazardous waste management facility accounted for 91% of on-site land disposal or other releases in the watershed in 2010, mainly composed of copper and chromium compounds. On-site land disposal or other releases more than tripled from 2009 to 2010 due to reporting by this hazardous waste management facility, which did not report any on-site land disposal in 2009.

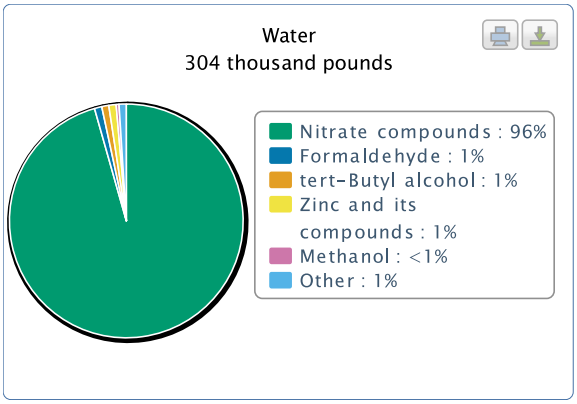
Much of the land area bordering Long Island Sound is densely populated and the health and productivity of the Sound, its wetlands, intertidal areas, and other habitats have been diminished by development and pollution. Areas of the Sound are impaired as habitat for fish and shellfish because of low dissolved oxygen levels, a condition called hypoxia. Reducing nitrogen loads, which contribute to oxygen depletion, is a top priority for the government and nongovernmental organizations working to protect the Sound. Another priority is the reduction of toxic substances entering the Sound. Discharges and atmospheric deposition into the Sound, its tributaries, and watershed from industrial activities over the years have resulted in accumulation of toxic chemicals in the water column and sediments. According to the Long Island Sound Study, mercury, copper, zinc, and PCBs are of particular concern. Health advisories in Long Island Sound warn against consumption of several fish and shellfish species due to elevated levels of toxic chemicals. To learn more about ongoing efforts to protect Long Island Sound, visit: www.longislandsoundstudy.net.

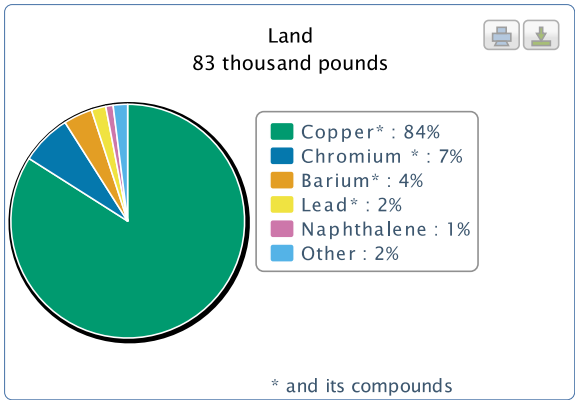




Top Five Chemicals by Environmental Medium
Long Island Sound, 2010







No underground injection reported

These charts represent the top five TRI chemicals in pounds released for this LAE, and do not include all chemicals of concern nor the priority or importance of those chemicals within the LAE. For more specific information, please visit the LAE Website at http://water.epa.gov/aboutow/owow/programs/large_aquatic.cfm.

Last updated on Thursday, January 05, 2012

EPA United States Environmental Protection Agency

Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Pacific Islands

TRI facilities in Pacific Islands

Quick Facts for 2010:

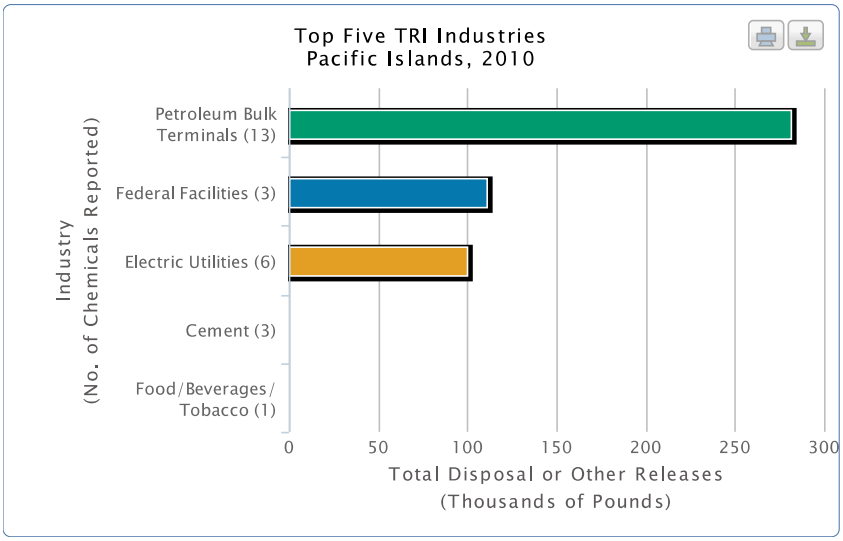
U.S. Watershed Size:	470 sq. miles
U.S. Population:	324 thousand
Number of TRI Facilities:	17
Total On-site and Off-site Disposal or Other Releases:	493 thousand lbs
Total On-site:	491 thousand lbs
•Air:	381 thousand lbs
•Water:	108 thousand lbs
•Land:	3 thousand lbs
•Underground Injection:	0.0005 lbs
Total Off-site:	1 thousand lbs

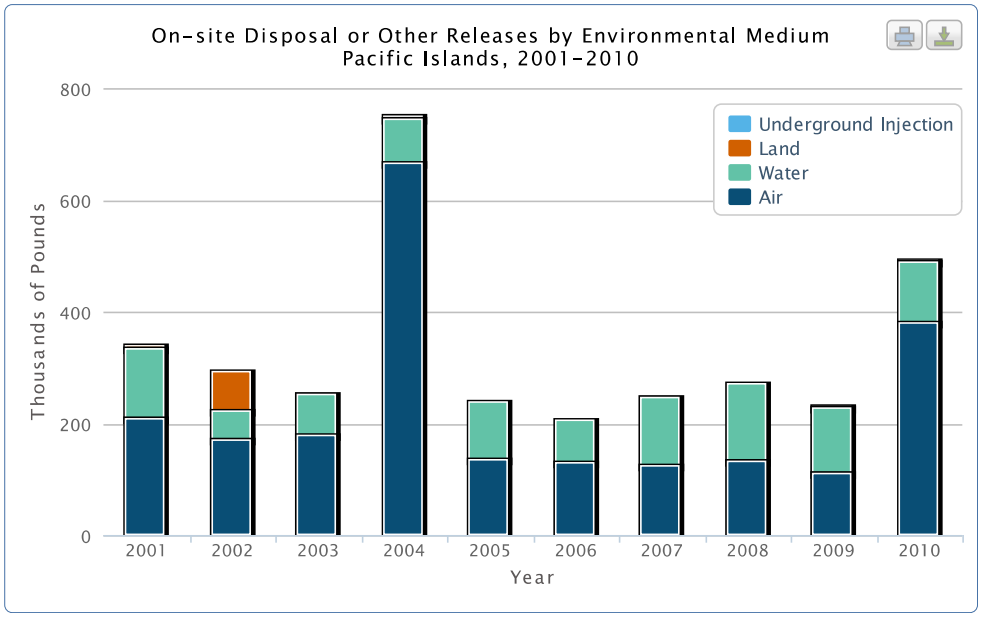
The Pacific Islands large aquatic ecosystem is comprised of the U.S. territories of Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and American Samoa. Guam and CNMI, both of the Mariana Islands, are located within Micronesia Region of the Western Pacific Ocean. American Samoa is located in the Polynesia Region of the South Pacific. The economy of the three territories is driven by tourism, the U.S. military, and fishing.

There were 17 TRI facilities reporting for 2010 in the Pacific Islands: 10 in Guam, 1 in American Samoa, and 6 in the Northern Mariana Islands. Petroleum bulk storage terminals reported the largest TRI air releases. One petroleum bulk storage terminal in Guam reported two-thirds (66%) of all air releases reported by TRI facilities in this region for 2010, including releases of n-hexane, benzene and toluene. Air releases more than tripled from 2009 to 2010 due to reporting by this one petroleum bulk storage terminal, which did not report in 2009.

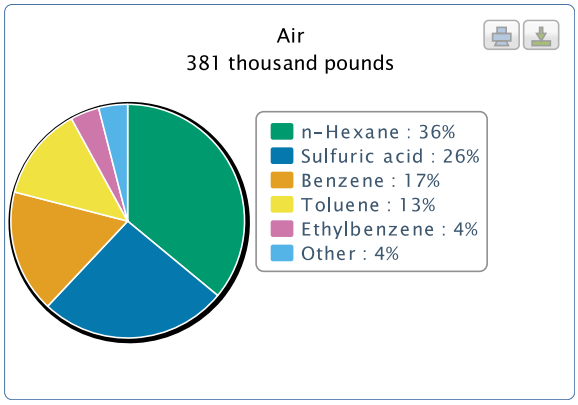
Almost all of the surface water discharges for 2010 were nitrate compounds reported by one federal facility's wastewater treatment plant. Surface water discharges decreased by 8% from 2009 to 2010 and by 14% from 2001 to 2010. Another federal facility reported on-site land disposal of lead, accounting for almost all land disposal or other releases in this region for 2010. While land disposal or other releases varies from year to year, it did decrease by 19% from 2009 to 2010 and by 44% from 2001 to 2010.

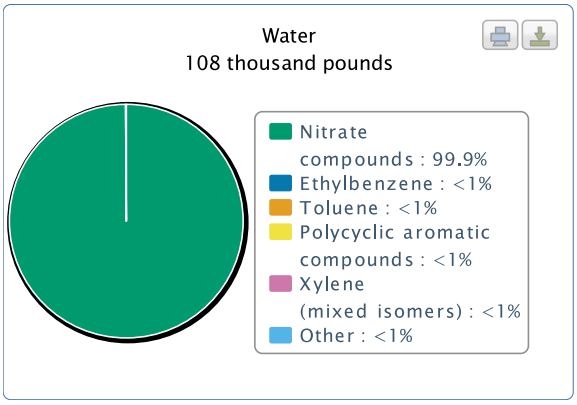
The ecology of these territories is monitored by the Region 9 EPA, as well as local EPA and DEQ offices in the territories. To learn more about ongoing efforts to protect the Pacific Islands, visit: www.epa.gov/region09/islands.

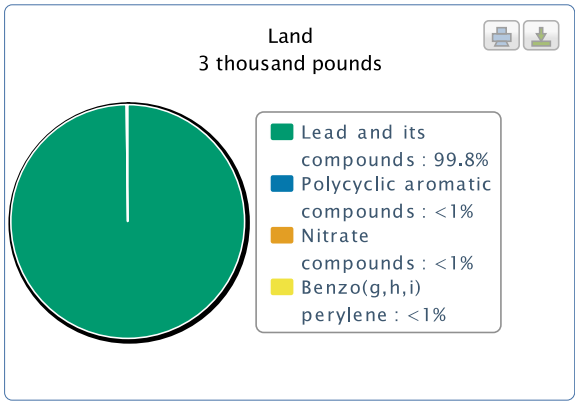


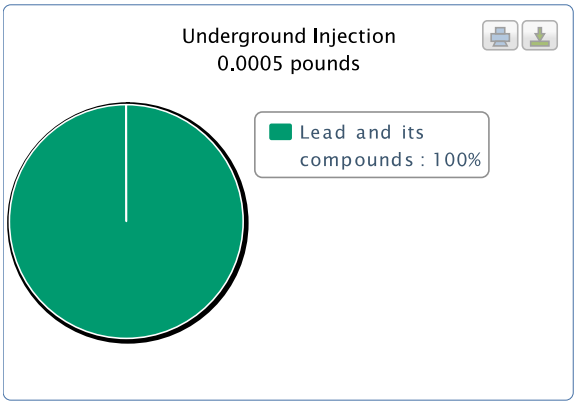


Top Five Chemicals by Environmental Medium
Pacific Islands, 2010









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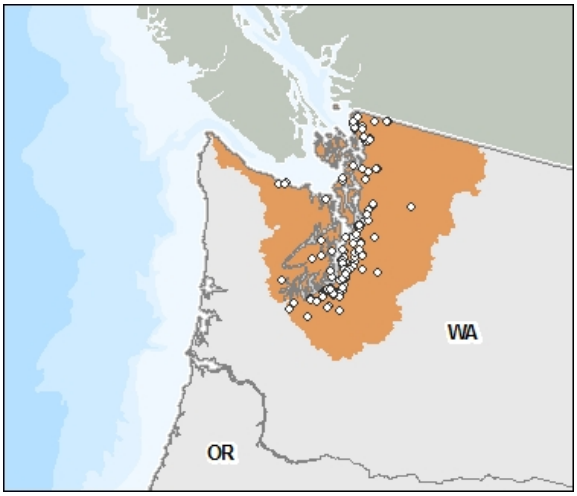
Last updated on Thursday, January 05, 2012

EPA United States Environmental Protection Agency

Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: Puget Sound - Georgia Basin



TRI facilities in Puget Sound - Georgia Basin

Quick Facts for 2010:

U.S. Watershed Size:	12,500 sq. miles
U.S. Population:	4.5 million
Number of TRI Facilities:	171
Total On-site and Off-site Disposal or Other Releases:	5.5 million lbs
Total On-site:	4.8 million lbs
•Air:	4.0 million lbs
•Water:	657 thousand lbs
•Land:	137 thousand lbs
•Underground Injection:	3 lbs
Total Off-site:	762 thousand lbs

The Puget Sound - Georgia Basin ecosystem is a shared resource of both the United States and Canada. The saltwater basin contains the Puget Sound in Washington State, the Strait of Georgia in British Columbia, and the Strait of Juan de Fuca, which separates Washington's Olympic Peninsula from British Columbia's Vancouver Island. The land and numerous rivers of mainland Washington and British Columbia, Vancouver Island, and the other islands compose the watershed which drains to this common saltwater basin.

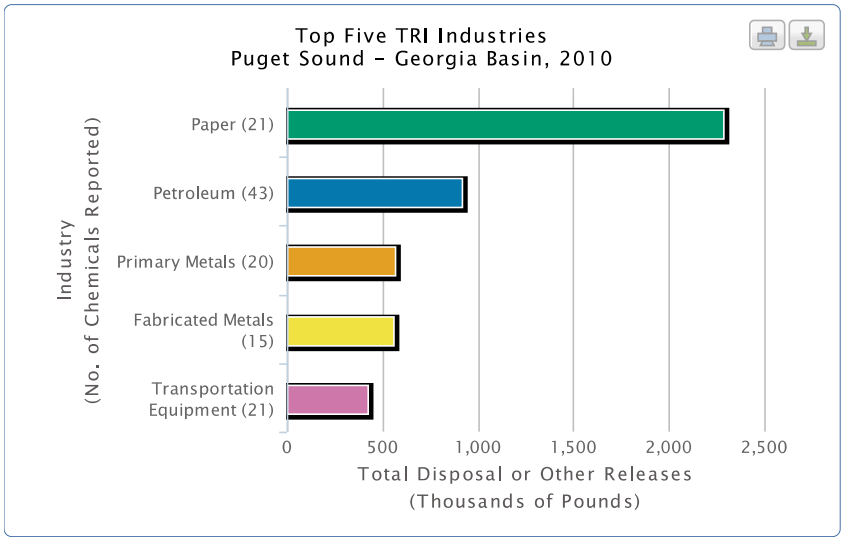
The ecosystem is one of the most ecologically diverse in North America and is also the backbone for the Region's culture and economy. The abundant coastline, waters and natural features afford a high quality of life to residents. Logging, wood products, fish and shellfish production, and tourism are major segments of the region's economy.

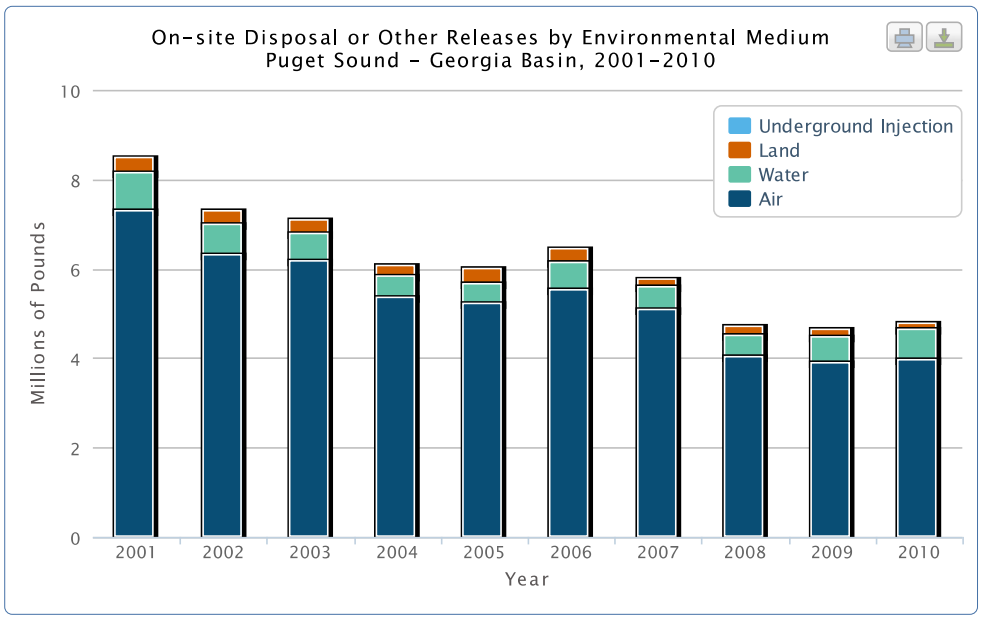
Pulp and paper facilities and petroleum refineries had the largest on-site disposal or other releases in this ecosystem in 2010. The largest air releases in the basin were of methanol and hydrochloric acid, primarily from pulp and paper mills. Air releases decreased overall by 45% from 2001 to 2010. However, they increased by 2% from 2009 to 2010.

The largest surface water discharges were of nitrate compounds, primarily from pulp and paper mills and from petroleum refineries and a federal facility. While surface water discharges decreased overall by 25% from 2001 to 2010, they increased by 14% from 2009 to 2010.

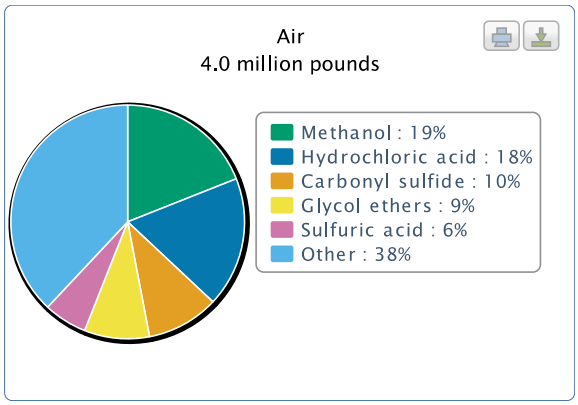
Federal facilities had the largest on-site land disposal, primarily of lead. One pulp and paper mill reported large amounts of manganese disposed of in an on-site landfill. These releases may make their way to the fresh and salt waters of the ecosystem and accumulate in the food chain as evidenced by elevated levels of these toxins in the tissues of some aquatic species in the ecosystem.

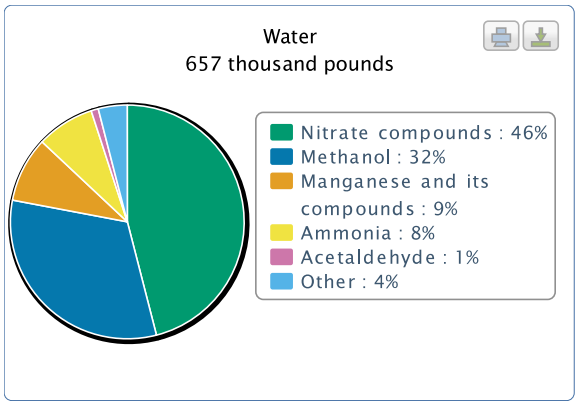
Many federal, state, and tribal government agencies as well as other local and regional groups are involved in monitoring and managing the Puget Sound-Georgia Straight. The EPA and Environment Canada have agreed to common management goals for the Region. In 2007, the Puget Sound Partnership, one of EPA's 28 National Estuary Programs, was formed by the Washington State Legislature for managing the ecological health of the Basin. To learn more about ongoing efforts to protect Puget Sound - Georgia Basin, visit: www.epa.gov/pugetsound/.

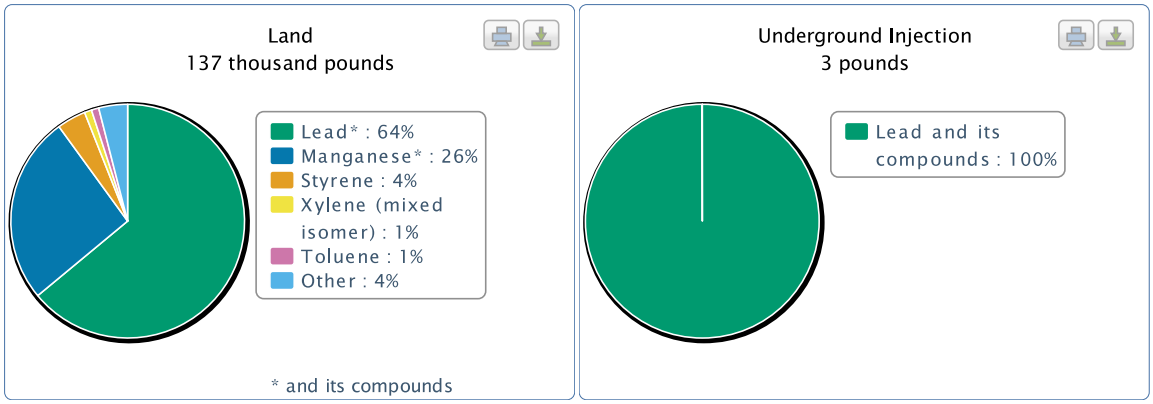




Top Five Chemicals by Environmental Medium
Puget Sound - Georgia Basin, 2010







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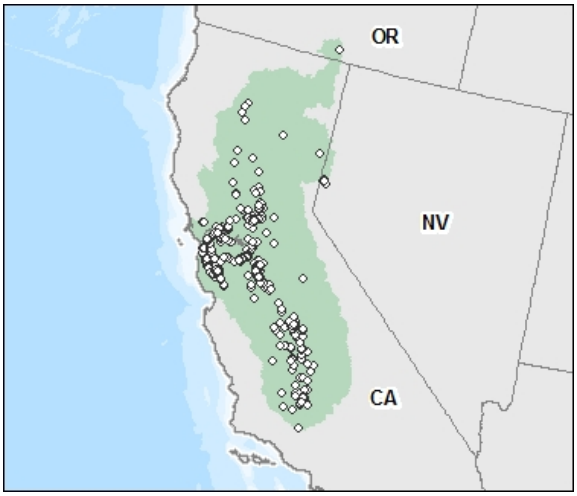
Last updated on Thursday, January 05, 2012

EPA United States Environmental Protection Agency

Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: San Francisco Bay Delta Estuary



TRI facilities in San Francisco Bay Delta Estuary

Quick Facts for 2010:

U.S. Watershed Size:	61,200 sq. miles
U.S. Population:	9 million
Number of TRI Facilities:	456
Total On-site and Off-site Disposal or Other Releases:	25.1 million lbs
Total On-site:	22.6 million lbs
•Air:	5.0 million lbs
•Water:	1.8 million lbs
•Land:	15.8 million lbs
•Underground Injection:	100 thousand lbs
Total Off-site:	2.5 million lbs

The San Francisco Bay Delta Estuary is the largest estuary on the west coast of the United States. The estuary provides critical habitat for a wide variety of birds, fish and other wildlife. The area is also home to more than 9 million people and industries vital to the region's economy, including sport and commercial fisheries, agriculture, transportation, and recreation. The large aquatic ecosystem (LAE) profiled here includes the San Francisco Bay Delta Estuary as well as the estuary's 60,000 square mile watershed, which covers about 40 percent of California.

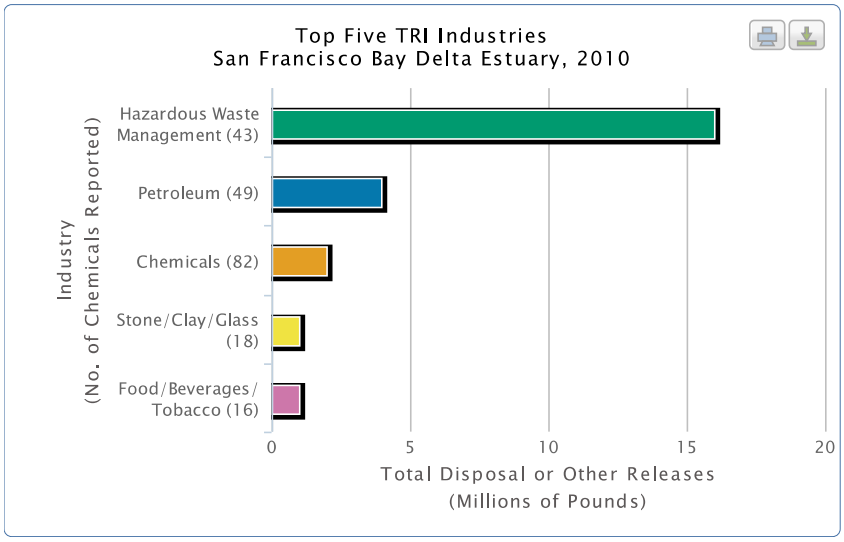
Disposal or other releases of toxic chemicals into this LAE is just one of a number of issues threatening the estuary's health. Roughly half of the water that falls as rain or snow within the watershed is diverted for use by farms, factories or households. Draining wetlands for agriculture and urban development in and around the estuary have resulted in the destruction of 80 percent of the estuary's marshes.

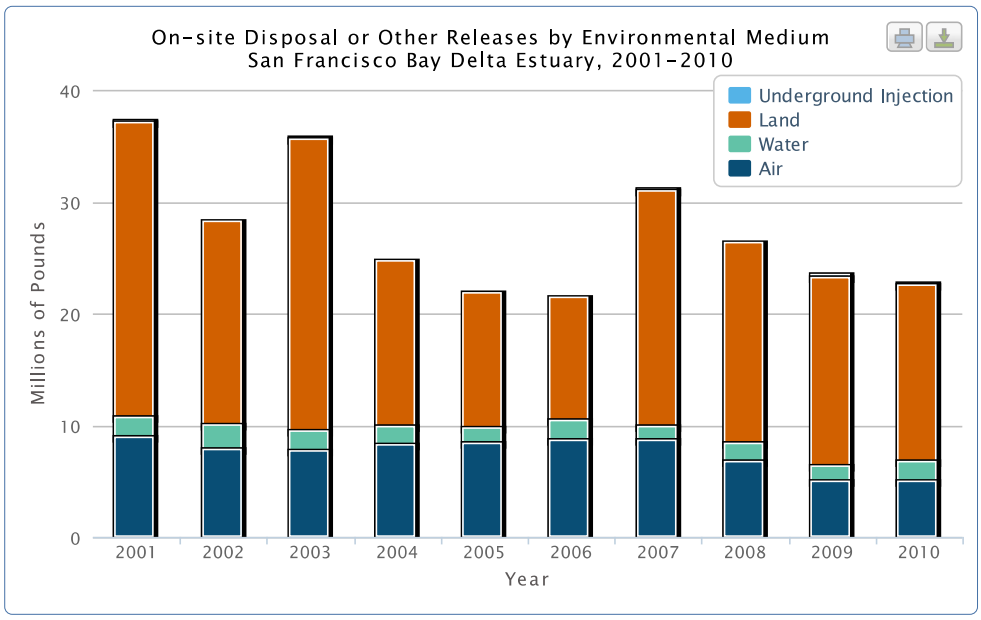
The toxic chemicals found in the estuarine environment come from a variety of sources, including runoff from cities, farms and historic mining areas, atmospheric deposition within the watershed, and discharges from industrial facilities and municipal wastewater treatment plants. Contaminated bottom sediments, along with wastewater discharges and other waste releases and disposal in the watershed, result in elevated contaminant levels in fish, shellfish and other organisms. Toxic chemicals of particular concern in the estuary include copper, mercury, selenium, pesticides, and PCBs.

Several large hazardous waste management facilities accounted for the largest quantities of toxic chemicals disposed of or otherwise released to the land although these facilities are located at some distance from the estuary and do not discharge into the estuary. These facilities are disposing of these wastes into RCRA Subtitle C landfills, which must follow very stringent guidelines for their design and operation to avoid chemical releases from the landfills. Hazardous waste management facilities had the largest on-site land disposal in 2010, mainly asbestos, copper and its compounds, aluminum oxide, and lead and its compounds. On-site land disposal or other releases in the region decreased by 40% from 2001 to 2010, including a decrease of 6% from 2009 to 2010.

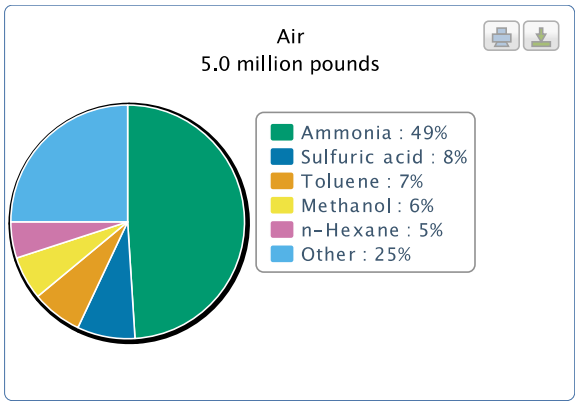
The largest water discharges in 2010 were nitrate compounds, primarily from a few large petroleum refineries. Surface water discharges increased from 2009 to 2010 by 29%, for an overall increase of 1% from 2001 to 2010. The largest air releases wereof ammonia; the sources for these are a number of large petroleum refineries and chemical plants operating within the region. Air releases decreased by 44% from 2001 to 2010, including a 1% decrease from 2009 to 2010. All on-site underground injection occurred at one food processor (mainly nitrate compounds and ammonia) and two petroleum refineries. Underground injection increased by 43% from 2001 to 2010, but decreased by 72% from 2009 to 2010.

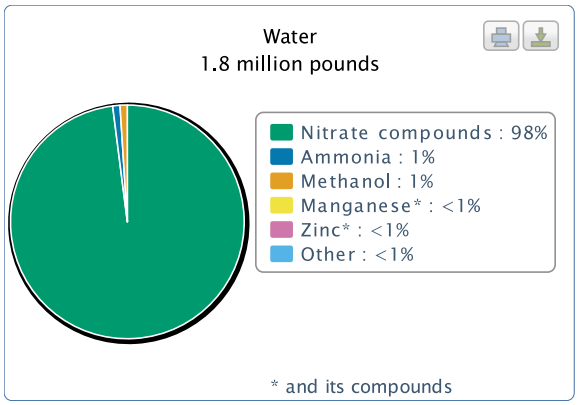
EPA works in partnership with state and local public and private institutions to conduct research and assess the effectiveness of water quality programs in the regions. To learn more about ongoing efforts to protect the San Francisco Bay Delta Estuary, visit: www.epa.gov/region9/water/watershed/sfbay-delta/.

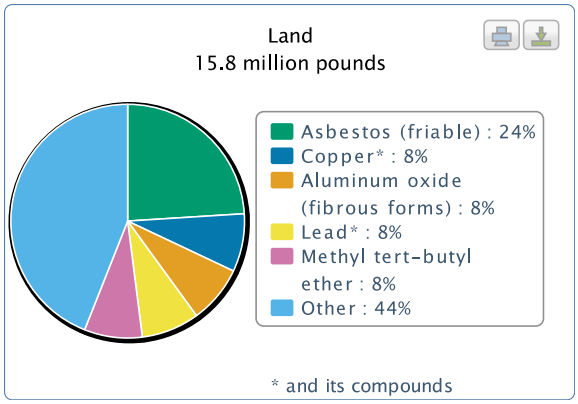


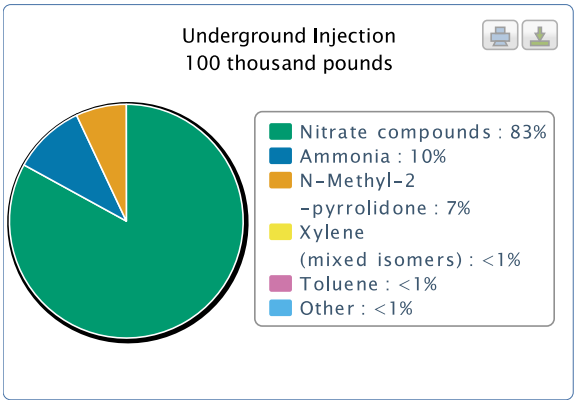


Top Five Chemicals by Environmental Medium
San Francisco Bay Delta Estuary, 2010









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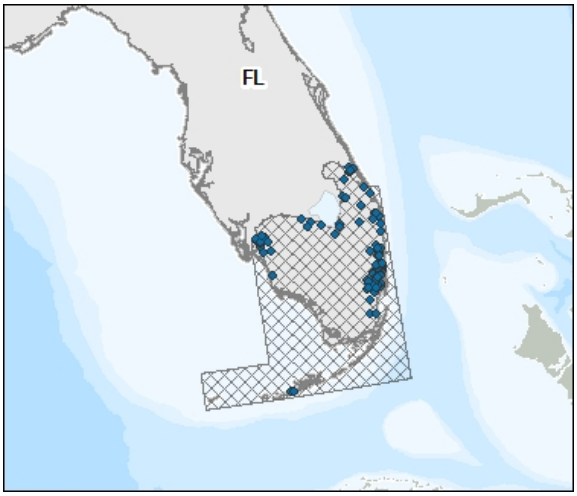
Last updated on Thursday, January 05, 2012

EPA United States Environmental Protection Agency

Toxics Release Inventory (TRI) Program

Large Aquatic Ecosystems: South Florida Geographic Initiative



TRI facilities in South Florida Geographic Initiative

Quick Facts for 2010:

U.S. Watershed Size:	17,900 sq. miles
U.S. Population:	8 million
Number of TRI Facilities:	112
Total On-site and Off-site Disposal or Other Releases:	2.9 million lbs
Total On-site:	2.7 million lbs
•Air:	2.1 million lbs
•Water:	13 thousand lbs
•Land:	488 thousand lbs
•Underground Injection:	41 thousand lbs
Total Off-site:	271 thousand lbs

The area covered by the South Florida Geographic Initiative is home to two unique ecosystems: the Everglades and the Florida Keys coral reef ecosystem. The Everglades are the largest subtropical wilderness in the United States. It is a significant breeding ground for wading birds and is home to a number of rare and endangered species. The Florida Keys coral reef ecosystem spans more than 330 miles providing habitat for over 6,000 marine species. It protects south Florida's shorelines from tropical storms and hurricanes, and sustains the region's fisheries, beaches, tourism, and recreation. The South Florida Geographic Initiative is a partnership program aimed at protecting and restoring the aquatic ecosystems of southern Florida.

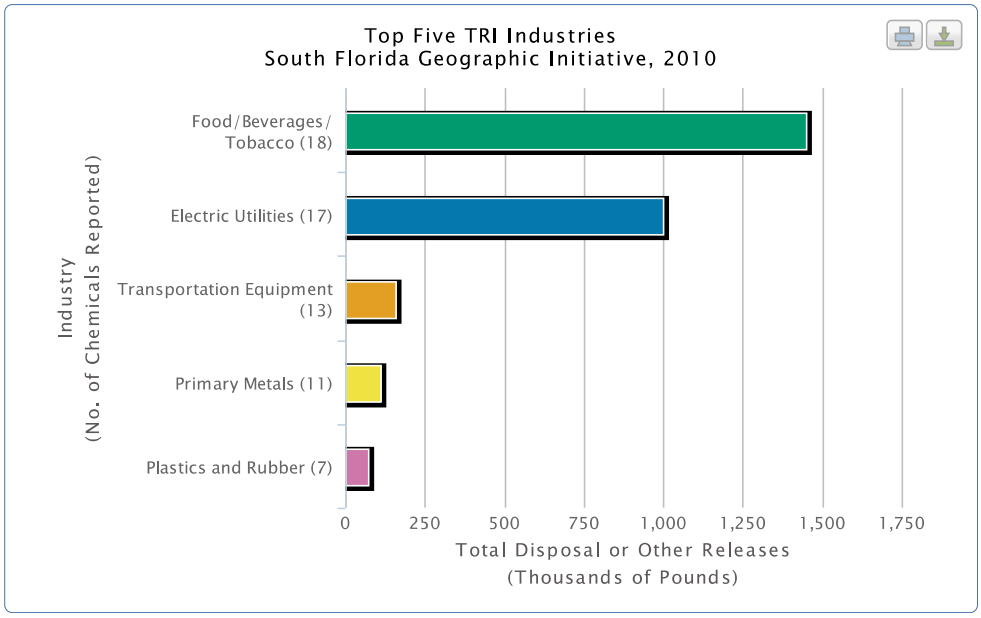
South Florida ecosystem's health is threatened in part by its expanding human population, currently about eight million people. Fifty percent of the region's wetlands have been lost to suburban and agricultural development. Altered water flows throughout the region as well as pollutant loadings of nutrients and mercury have had significant impacts on the area's ecosystems. Fish consumption advisories or bans are in place for many species because of mercury contamination and mercury concentrations in many birds and mammals were found to be highly elevated.

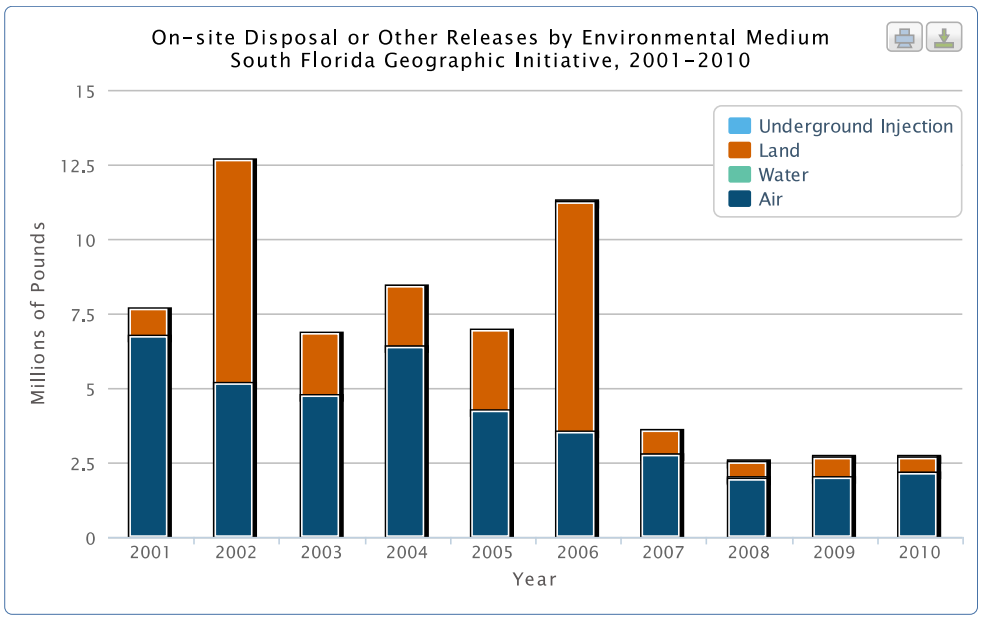
Mercury emission source studies indicate that atmospheric deposition, primarily from medical and municipal incinerators, are the major mercury emission sources in South Florida. The largest TRI mercury air releases in 2010 were from electric utilities and cement plants. Electric utilities also report some surface water discharges of mercury compounds.

The largest total TRI on-site disposal or other releases in the region are air releases of methanol, from citrus and sugar cane processing facilities, and ammonia, hydrochloric and sulfuric acids, primarily from electric power plants. While air releases in the region decreased by 68% from 2001 to 2010, they increased by 8% from 2009 to 2010. Surface water discharges also increased, by 14% from 2009 to 2010, mainly of ammonia from one electric utility.

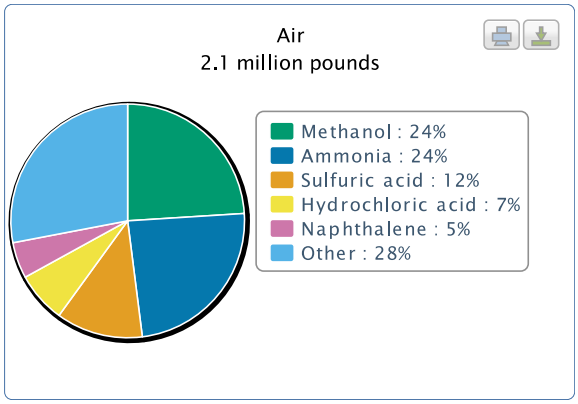
On-site land disposal or other releases were reported from food processors, mainly atrazine (a herbicide), and pendimethalin (a pesticide) from sugar cane processors. On-site land disposal or other releases decreased by 45% from 2001 to 2010, including a decrease of 25% from 2009 to 2010.

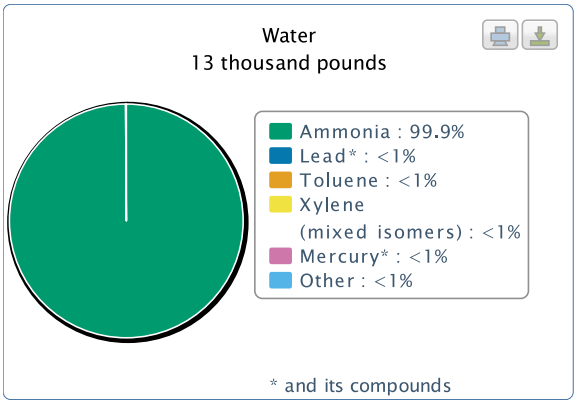
Among the efforts underway to restore the South Florida ecosystem include restoring natural water flows, controlling nutrient loading, minimizing habitat alteration, and reducing mercury contamination.To learn more about ongoing efforts to protect South Florida, visit: www.epa.gov/region4/water/southflorida.

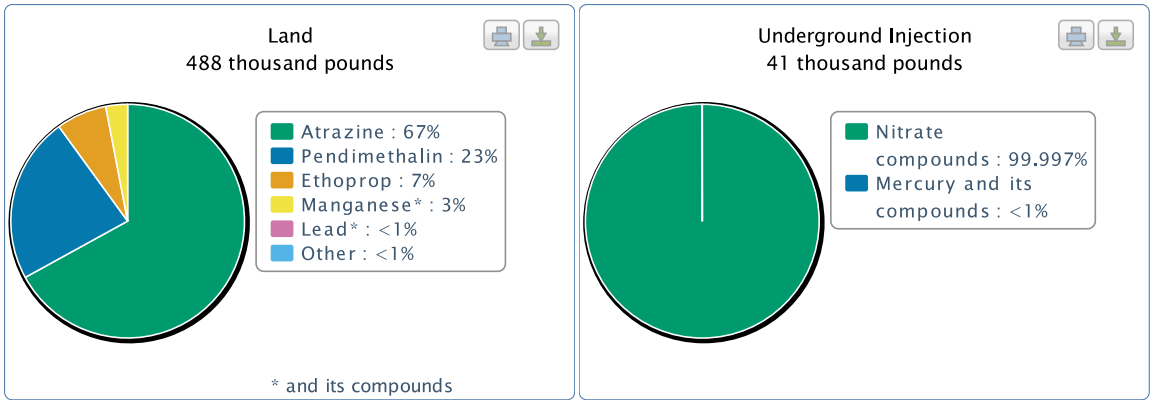




Top Five Chemicals by Environmental Medium
South Florida Geographic Initiative, 2010







These charts represent the top five TRI chemicals in pounds released for this LAE, and do not include all chemicals of concern nor the priority or importance of those chemicals within the LAE. For more specific information, please visit the LAE Website at http://water.epa.gov/aboutow/owow/programs/large_aquatic.cfm.

Last updated on Thursday, January 05, 2012