Troubled Waters

A Report on Toxic Releases into America's Waterways

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Grassroots Connection is a consulting business specializing in analysis of environmental data.

The Public Interest Research Groups (PIRGs) are state-based, non-profit, non-partisan research and advocacy organizations working on environmental and consumer issues. U.S. PIRG is the national advocacy office for the state PIRGs. PIRGs are active in more than 30 states nationwide.

Executive Summary

Under the existing federal pollution control laws, the American people are kept in the dark about the vast majority of toxic pollution of the environment by U.S. industry. Even the most comprehensive toxic pollution reporting system, the Community Right to Know Act's Toxics Release Inventory (TRI), accounts for only a small fraction of the toxic picture.

Year after year, America's waterways continue to serve as dumping grounds for toxic pollution. Today, 26 years after the enactment of the Clean Water Act, thousands of polluters flush millions of pounds of toxic substances into rivers and streams with impunity, without any obligation to inform the communities downstream about the vast majority of toxic chemical use or discharges.

Almost one billion pounds of toxic chemicals were directly discharged to America's waters between 1992 and 1996, according to Toxics Release Inventory records analyzed in Troubled Waters. At a minimum, an additional 140 million pounds of toxic substances that were dumped into publicly owned sewer systems made their way to rivers and other waters during those same five years. Given several reporting gaps in the TRI program, however, the load of toxic pollution in most rivers, streams, lakes, and bays over the past several years may be many times greater than the amounts reported in Troubled Waters.

The Most Polluted Waters

More than 500 million pounds of toxic chemicals were reported dumped into the Mississippi River between 1992 and 1996, more than the total amount of toxic chemicals dumped into all other U.S. waters combined. Most of this pollution was runoff from phosphate piles used by three fertilizer companies in Louisiana. The next five most polluted waters, in terms of toxic chemical discharges, were the Ohio River, the Brazos River in Texas, Connoquenessing Creek in Pennsylvania, the Pacific Ocean, and the Houston Ship Channel. More than 800 million pounds of toxic chemicals were directly dumped into the top 50 different rivers, creeks, and bays between 1992 and 1996. For 74 percent of rivers and waters receiving toxic pollution, one polluter accounted for all reported toxic discharges during the five year period; for 92 percent of all polluted waters, three or fewer polluters accounted for all reported toxic discharges during this time. Bearing in mind the significant shortcomings with TRI data, these figures nonetheless suggest that substantial improvements in local watersheds might be possible through efforts that target a few major polluters.

Many polluters dump large amounts of toxic chemicals down the drain to sewage treatment plants. These so-called "transfers" of toxics to publicly owned treatment works (POTWs) are not counted as releases of toxic chemicals to the environment by the TRI, even though the EPA estimates that 25 percent of these toxics substances flow through sewage treatment to the waters that receive the effluent [EPA 1997].

Well over 1.4 billion pounds of toxic chemicals were sent to sewage treatment plants in the United States between 1992 and 1996, 50% more than the amount directly released to waterways during that same time period. In many cases polluters send their toxic discharges to public sewer systems because regulations governing toxic discharges to sewers are less strict than those governing direct discharges to water.

Chemical Discharges

More phosphoric acid, nitrate compounds, and ammonia were discharged to Americas' waters between 1992 and 1996 than any other chemicals in the TRI, at 404 million, 230 million, and 110 million pounds respectively. Phosphoric acid, nitrate compounds, and ammonia present serious threats to the aquatic environment when discharged in large quantities such as those reported here, because they are converted to the nutrients phosphorus and nitrogen in water. Phosphorus and nitrogen are primarily responsible for the low-oxygen conditions that threaten whole ecosystems such as the Chesapeake Bay and portions of the Gulf of Mexico.

Sulfuric acid discharges are no longer reported to the TRI. The compound, however, continues to be dumped to waters in large amounts and contributes substantially to disruptions of local ecosystems. Temporary but significant increases in acidity of water bodies are likely to occur near major sulfuric acid discharge points, which can in turn create toxic conditions for aquatic life and liberate toxic metals stored in the local sediment.

Highly Toxic Discharges

Many of these compounds present serious hazards to human health and the environment. Every TRI chemical is reported within TRI because it is considered toxic by the U.S. EPA. However, some TRI chemicals present extra concerns due to carcinogenicity (the ability to cause cancer), persistence and bioaccumulation (the ability to build up in the body), or reproductive toxicity. About 25 million pounds of carcinogens, persistent toxic metals, and reproductive toxins were directly dumped into America's waters between 1992 and 1996. Eleven (11) million pounds were carcinogens like vinyl chloride and benzene, 15 million were toxic metals like lead or mercury, and 1.7 million were reproductive toxins such as toluene.

Carcinogens--The Weyerhaeuser plant in Longview, WA dumped more cancer causing chemicals into the nation's waters than any other facility: 780,000 pounds between 1992 and 1996. This polluter discharged into the Columbia River. Eastman Kodak in Rochester, NY, Sharon Steel Corp. in Farrell, PA, Tennessee Eastman Div. In Kingsport, TN, and Cytec Ind. In Wallingford, CT round out the top five dischargers of cancer causing compounds for these five years.

The Columbia River received the most cancer causing toxic chemical discharges between 1992 and 1996, at 1 million pounds, followed by the Genesee River in New York, the Quinnipiac River in Connecticut, the Mississippi River, and the Shenango River in Pennsylvania.

The waters of Washington State received the most cancer causing substances, 1.4 million pounds, followed by the waters of Connecticut, New York, and Pennsylvania.

Reproductive Toxins--Dupont Chambers Works in Deepwater, NJ dumped more reproductive toxins into the nation's waters than any other facility: 210,000 pounds for 1992 through 1996. All of these discharges went into the Delaware River. The Carolina Eastman Div. facility in Eastman Columbia, SC, Tennessee Eastman Div. in Kinsport, TN, Pfizer Inc. in Groton, CT, and North American Rayon Corp. in Elizabethton, TN round out the top five dischargers of reproductive toxins to America's waters during the five year period analyzed.

More reproductive toxins, 220,000 pounds between 1992 and 1996, were dumped in the Delaware River than any other body of water in the U.S. The Delaware was followed by

the Congaree River in South Carolina, the Holston River in Tennessee, the Thames River in Connecticut, and the Wautauga River in Tennessee.

The waters of New Jersey received more reproductive toxins than any other state, with 235,000 pounds discharged during the five year period analyzed. Tennessee, Texas and South Carolina follow New Jersey.

Persistent Toxic Metals--Elkem Metals Co. in Marietta, OH dumped more persistent toxic metals to the nation's waters than any other facility in the nation, 1.2 million pounds between 1992 and 1996. These metals ended up in the Ohio River. The next largest dischargers of metals were Amoco Chemical in Decatur, AL, Sharon Steel Corp. in Farrell, PA, Eastman Kodak in Rochester, NY, and Kemira Pigments Inc. in Savannah, GA.

More persistent toxic metals were dumped into the Ohio River than any other body of water in the United States, 1.8 million pounds between 1992 and 1996. The Tennessee River, the Shenango River in Pennsylvania, the Savannah River, and the Genesee River in New York follow the Ohio.

Ohio waters received more direct discharges of persistent metals between 1992 and 1996 than any other state, 1.9 million pounds. Alabama ranked second, followed by the waters of Pennsylvania and Georgia.

Recommendations

People have the fundamental right to know about the use, transport, or release of any toxic substance in their communities that might pose a risk to human health or the health of the environment. As the law stands now, required reporting under the Toxics Release Inventory provides the public with only a small fraction of this information. What we do know from the current, but very limited public disclosure law, is that America's waters serve as a dumping ground for a considerable amount of toxic pollution.

Comprehensive community right to know laws are essential steps toward basic environmental and health protection. The 1986 Community Right to Know Act has done more than any other environmental law to promote voluntary reduction in toxic chemical emissions. By shining the public spotlight on pollution, it motivates industries to reduce their emissions. However, because of the limited scope of the law, the public, and even industries themselves are only getting a fraction of the picture. Legislation is pending in Congress that would fill in many important Right to Know data gaps and help industry work toward real pollution prevention: H.R. 1636, the Children’s Environmental Protection and Right to Know Act, and S. 769, the Right to Know More and Pollution Prevention Act.

We recommend the following steps to expand the public’s Right to Know and work toward pollution prevention:

1. Expand Right to Know to include toxic chemical use information.
Currently the public receives information on only toxic chemical releases to the environment. The public is left in the dark about chemicals used in the workplace, transported through communities, and placed in products we buy. Without this chemical use, or "materials accounting" information, the public is kept in the dark, industry will miss many valuable opportunities to significantly lower pollution costs, and public policy makers will be unable to create strategies that will most effectively prevent toxic chemical hazards.

2. Lower reporting thresholds for highly toxic substances like lead, dioxins, and mercury.
Releases of these highly toxic substances present a significant threat to public health and the environment, yet often go unreported because reporting thresholds under the current law are set too high. Many toxic chemicals that have a tendency to persist in the environment or bioaccumulate as they move up the food chain are extremely toxic in very small quantities. If industries manufacture, process, or otherwise use any quantity of these substances, all of their releases to the air, lands, and waters should be reported to the public. Industries should be aiming to eliminate all release and use of these substances. We urge the Clinton Administration to set the reporting threshold for these highly toxic substances at zero.

3. Require reporting to the Toxics Release Inventory from all significant sources of toxic pollution, including sewage treatment plants, medical and solid waste incinerators, and the oil and gas industry.
The Clinton Administration has made some significant expansions to Right to Know by adding seven new industries to the Toxics Release Inventory, including hazardous waste treatment facilities, sections of the mining industry, and utilities (a major source of mercury pollution in our waters). However, many other significant sources of water pollution are still exempt from reporting requirements, including sewage treatment plants, medical and solid waste incinerators, and the oil and gas industry.

4. Strengthen the Clean Water Act.
The Clean Water Act should be strengthened to require polluters to eliminate toxic discharges, prevent polluted run-off, and ensure strict compliance with the law.

Introduction: Toxic Pollution of America's Waters

Forty (40) percent of America's rivers, lakes, and coastal waters remain unsafe for fishing, swimming or basic recreation (EPA 1996). The pollution that fouls these waterways threatens public health and the health of America's ecosystems. It deprives the U.S. economy of tens of millions of dollars from tourism, fishing, and development. According to state water quality officials, toxic pollutants degrade the quality of at least 40,000 miles of the nation's rivers (EPA 1995). In spite of the poor quality of much of America's waters, Americans make 1.8 billion recreational trips to beaches, rivers and lakes, contributing to annual sales in the tourism industry of $380 billion (EPA 1996).

Hundreds of millions of pounds of toxic chemicals are flushed into America's waterways each year. Most of this pollution is unregulated and unmonitored. A study by the General Accounting Office (GAO), a research and auditing arm of the Congress, found that 77 percent of the toxic water pollutants it analyzed were not specifically regulated by the Clean Water Act (GAO 1994). The GAO examined toxic discharges to waters from 236 pesticide, pharmaceutical, and pulp and paper manufacturing plants. The majority of toxic pollutants discharged at 200 of these 236 facilities (85 percent) were so-called "uncontrolled" pollutants that were exempt from regulation under the pollution permit process of the Clean Water Act (GAO 1994).

Today, 26 years after the enactment of the Clean Water Act, thousands of polluters flush millions of pounds of toxic substances into rivers and streams with impunity, without any obligation to inform the communities downstream about the vast majority of toxic chemical use or discharges. The public has the right to know about toxic pollution that may pose a risk to human health or the environment.

The Community Right to Know Act

The 1986 Emergency Planning and Community Right to Know Act provides the public with some information on toxic pollution released to waterways. The law requires certain large industries to report to the public their releases of approximately 600 chemicals to the air, land, and water. The information is compiled and made available to the public through the Toxics Release Inventory (TRI), the first publicly accessible, on-line environmental database. Although the Community Right to Know law has been lauded as one of the most effective environmental protections, it is drastically incomplete. Pollution estimates in the TRI, which provided the basis for the analyses presented in Troubled Waters, may account for only a small percentage of the total toxic chemical load borne by these waters during the five year reporting period.

Loopholes in the law leave the public in the dark about the complete toxic picture. The public is missing information on some of the most toxic substances known to science. Substances like lead, dioxin, and PCBs are extremely toxic even at minimal levels and persist in the environment for years. Yet because these substances are released in small quantities, they do not trigger the threshold requirements for reporting to the Toxics Release Inventory.

The public is also missing information on toxic chemicals used in the workplace, transported through communities, and placed in the products we buy. This chemical use information, also referred to as "materials accounting", would give citizens a better understanding of toxic chemicals used and stored in their communities. It would also help industries work toward real pollution prevention by identifying ways to reduce toxic pollution at the source. If polluters reduce their use of toxics at the source, they will discharge fewer toxins at the end-of-the-pipe, and we will have cleaner, safer waterways.

Far-reaching state laws in New Jersey and Massachusetts require companies to report this chemical use information. Industries in those states show reductions in chemical waste generation and overall chemical use, while numbers for the rest of the country continue to increase. Between 1990 and 1996, Massachusetts manufacturers decreased their total toxic chemical use by 24 percent, their waste generation by 34 percent, and their overall toxic chemical releases to the environment by 73 percent. Full accounting of toxic material use can also reveal many cost-effective opportunities for pollution prevention. In New Jersey, state officials estimate that every dollar spent on pollution prevention planning generates five to eight dollars in cost savings. (NJDEP 1995).

Troubled Waters Underestimates Toxic Water Pollution

The pollution of waterways described in Troubled Waters is based on an analysis of toxic chemical releases reported by industrial facilities to the Toxics Release Inventory (TRI), and so-called "transfers" of toxics to publicly owned treatment works (POTWs) -- the term that industry and the EPA use when a polluter, in most cases legally, flushes toxic chemicals down the drain to the local sewage treatment plant. Releases reported to the TRI, in turn, are based mostly on estimates of toxic pollution resulting from specific production practices and engineering systems. No monitoring of actual toxic pollution levels at reporting facilities is required to determine if TRI estimates are accurate.

The TRI requires reporting on fewer than one percent of the approximately 73,000 chemicals used in commerce, and the TRI exempts many polluters from reporting, either because they have fewer than 10 employees, or because they are not manufacturers or Federal facilities (EPA 1998). Facilities must also manufacture, process, or otherwise use more than a certain amount of a chemical in a year in order to be required to file a report.

Further, more than half of all toxics that pollute rivers, lakes, streams, and bays comes from surface runoff or atmospheric deposition, as opposed to pipes. Yet comprehensive monitoring and reporting of this so-called "non-point" source pollution is not required by any federal law.

As large as they are, the figures reported in Troubled Waters dramatically underestimate the total amount of toxic compounds that have been discharged, dumped, or made their way into America's water over the past five years. Taking all of the limitations of the existing information into account, we believe that an accurate estimate of the total load of toxic pollution in many rivers streams, lakes and bays over the past five years might be many times greater than the amounts reported here.

Hiding Toxics in the Sewer

The EPA does not include so-called "transfers" of toxic chemicals to sewer systems as an official "release" of a toxic chemical into the environment. At the same time, the EPA estimates that 25 percent of all toxic chemicals transferred to sewers from industrial facilities pass through treatment and into the waterways that receive wastewater (EPA 1997).

According to TRI estimates, transfers of toxic chemicals to publicly owned treatment works (POTWs) -- otherwise known as sewage treatment plants -- were greater in 1996 than the total amount of toxic chemicals that were directly discharged to water. To better estimate the total amount of toxic substances dumped into waterways, we assumed that each chemical had a certain percentage of the waste that was sent to the POTW pass through untreated (see Appendix A). In reality some chemicals flow through POTWs untouched, while others are removed and held in the sludge, broken down in treatment, or allowed to evaporate into the ambient air as toxic pollutants.

Toxic discharges from POTWs could not be accurately estimated for every river and body of water in the United States because POTWs are not required to report toxic discharges or receiving waters to the TRI.

Cumulative Emissions and Trends

Declining total water discharge estimates in the Toxics Release Inventory are often taken as proof that releases of toxic chemicals to waters have decreased since reporting under the TRI began in 1987. Indeed, it is true that reporting and publicizing pollution levels has achieved some actual reductions in discharges. However, the majority of reported decreases in toxic discharges to waters are due to changes in estimation methods or one-time site specific reductions in high volume chemicals that may or may not represent real long term national trends in pollution reduction. When considering only chemicals that exist in TRI in all years under consideration, there is a large decline in water releases from 1988 to 1996, but an increase from 1995 to 1996. These numbers are somewhat misleading because "reductions" may actually reflect a switch to the release of a more toxic chemical that is not on the reporting list, or incorporating more toxics into products rather than "releases." Without assurance that TRI reports on all toxic chemicals, reporting on toxic chemical use and reports of toxics in products, it is difficult to tell whether reductions are real.

To make this limited year-to-year data more instructive, we summed, by river or body of water, all water discharges for the last 5 years of TRI data available, from 1992 to 1996. These total pollution estimates provide a more meaningful long term perspective on water quality than a one year snapshot of toxic discharges. We focus on rivers and specific

water bodies because the analysis provides extremely useful information for the public and policy makers.

It is important to note that individual facilities may vary considerably from the general trend. Some appear to have made progress in reducing pollution, while at other facilities pollution has increased. Although we have summed up 5 years of data for individual facilities, we generally did not examine individual facilities' year-to-year changes in this report.

For some TRI chemicals, emissions trends are hard to decipher because EPA has removed the chemical from TRI ("delisted" it), modified the listing, or added the chemical to the TRI at some point during the five year period. Acetone, for example, was a TRI chemical between 1992 and 1993, but was delisted for 1994, so that and later years contain no information about acetone emissions for those years. When chemicals are added to the TRI, as a large group were in 1995, the inventory provides no insight into emissions in prior years. Listing changes affecting the 1992 through 1996 TRI years are presented in Appendix A of this report. The toxic pollutants tabulated in this report include all releases within TRI between 1992 and 1996, regardless of when chemicals were listed or delisted.

How Toxic is Toxic?

TRI chemicals run the gamut from toxic metals like lead and mercury that can cause birth defects, decreased fertility, and learning deficits, to known carcinogens like benzene, vinyl chloride, and arsenic, to chemicals that can damage a developing fetus, like toluene, and chemicals that can alter normal sexual development and reproductive function like some phthalates.

Requirements for the reporting of more than 25 chemicals, including some discharged in substantial quantities, has been either discontinued or modified since the TRI began in 1987, based on industry arguments that these toxic chemicals pose an "acceptable" level of risk to human health or the environment. These include ammonia, sulfuric acid, ammonium nitrate, and acetone, which ranked first, third, sixth and tenth, respectively, in total water discharges in 1990. Acetone was completely delisted, while certain forms of ammonia and sulfuric acid must still be reported. Delisting does not mean that industry is dumping less of these hazardous substances in the nation's waters, nor does it mean that the compound is any safer than when it was reported in the first place; it simply means that the public has been denied the right to know about these discharges.

This report has special sections on carcinogens, persistent toxic metals, and reproductive toxins -- three categories of toxic effect that can be of special concern. However, if a chemical is not listed within one of these categories, that does not mean that it is not toxic. According to the EPA,

> "For a chemical or chemical category to remain on or be added to the TRI list, it must be known to cause or be reasonably anticipated to cause one of the following:
>
> - Significant adverse acute health effects at concentration levels that are reasonably likely to exist beyond facility boundaries as a result of continuous, or frequently recurring releases;
> - In humans -- cancer; teratogenic effects; or serious irreversible reproductive dysfunction, disorders, heritable genetic mutations, or other chronic health effects;

- A significant adverse effect on the environment because of its toxicity, its toxicity and persistence in the environment, or its toxicity and tendency to bioaccumulate in the environment of sufficient seriousness to warrant reporting under EPCRA section 313" (EPA 1996b).

For most of the TRI chemicals, federal regulators and scientists have an incomplete understanding of the long-term toxic effects on the environment or human health. The vast majority of compounds reported in the TRI have not been fully studied, but nonetheless have triggered one of the above criteria based on what little we know.

Eutrophication

An environmental phenomenon known as eutrophication has had severe effects on the water quality of coastal waters and lakes of the United States. Eutrophication is a naturally occurring process where fluctuating nutrient loads that contain nitrogen and phosphorus cause the increased growth of algae and other aquatic plants. In natural waters, nitrogen and phosphorus loads are usually in a limited supply and thus control the amount of algal growth in these water bodies. However, human activities have added excessive amounts of nutrients into our waters, which has led to cultural eutrophication. The excessive nutrients cause the rapid growth of algae and other aquatic plants that eventually have detrimental effects on aquatic life.

Human nutrient inputs of phosphorus and nitrogen can come from a variety of sources such as fertilizer enriched agricultural runoff, human and animal sewage effluent, and urban runoff. These two nutrients, along with sunlight, fuel the explosive growth of the algae that is found naturally in most waters. As the rapid growth continues, the waters become cloudy as the algae begin to accumulate. This accumulation decreases the amount of sunlight that is able to shine through the waters and provide energy to underwater grasses for their survival and growth. Certain underwater grasses or "submerged aquatic vegetation" are essential to the survival of many aquatic life forms such as the Blue Crab and other fish that find food and shelter in these areas. The grasses are also important in helping to maintain dissolved oxygen levels in the water.

Another threat to the survival of aquatic life in eutrophic waters is the maintenance of the dissolved oxygen content that is required by most life forms, including the algae, to survive. There are several times during the eutrophication process when additional oxygen demands created by the algae can lead to low oxygen conditions in the water. During the initial production and growth of the algae, more oxygen is used for their survival than is produced by the algae, resulting in a net loss of dissolved oxygen in the water. This is coupled with the fact that if sunlight diminishes, the underwater grasses can die and decompose, using up large amounts of oxygen. And when the excess algae itself dies, its own decomposition contributes as well. All of these conditions combine to result in a suffocating affect which makes it very difficult for certain aquatic species to survive in eutrophic waters.

Phosphorus and nitrogen are both essential in the eutrophication process in fresh and salt water systems. However, in freshwater systems, phosphorus tends to be responsible for more of the algal production, while nitrogen tends to be the limiting factor in saltier waters.

TRI chemicals that primarily contribute to eutrophication include phosphoric acid, ammonia, ammonium nitrate, ammonium sulfate, and nitrate compounds. These are some of the largest volume TRI chemicals released to American waters.

Factory Farming

Pfiesteria piscicida is a microscopic organism that thrives in waters that are nutrient rich, low flowing, and have high concentrations of little bait fish such as Menhaden. Scientists have linked outbreaks of the Pfiesteria organism to the improper disposal of chicken and other animal waste products in areas that drain into certain fresh water bodies. The Chesapeake Bay has experienced Pfiesteria outbreaks, most likely due to excessive amounts of fertilizer runoff from fields. Maryland's 1 billion dollar per year Eastern Shore poultry industry uses large fields to dispose of nutrient rich chicken wastes and manure. These waste fields can contribute significant amounts of runoff during storm events in the Bay watershed. The runoff is loaded with nutrients. Fish kills are caused when the Pfiesteria, "blooming" because of the nutrients, excrete a toxic substance into the water that causes the fish in the immediate area to develop sores or lesions that eventually lead to their death. Pfiesteria then attach themselves to the dead or dying fish and feed on the open sores.

Tyson Foods has been recently accused of improper and illegal dumping of thousands of gallons of chicken waste on a barren sandy field near its Berlin facility on the Eastern Shore of Maryland [Washington Post 1998]. The accusations come at an important time because of the rising number of Pfiesteria piscicida related fish kills in the Chesapeake Bay region over the past several years. According to a story in the Washington Post, June 20, 1998, Tyson had been in violation of Maryland environmental law for up to several months, dumping from 12,000-16,000 gallons of sludge per day to a 105 acre site regardless of soil and weather conditions. This amount of sludge has about 10 times the amount of nitrogen a farmer would apply in fertilizer to a crop. Regardless of several Maryland Department of the Environment warnings, the dumping did not cease until the issue received media attention in the Washington Post [Washington Post 1998b]. The Chesapeake Bay Foundation and MaryPIRG have urged Maryland officials to impose a fine on Tyson Foods to send a message to other industries that environmental laws in Maryland will be enforced.

Because the Tyson Foods chicken waste dumping grounds is not a manufacturing facility, according to the definitions of the Community Right to Know Act, it does not have to report to TRI. This problem is an example of why TRI needs to be expanded to cover more types of pollution.

Additional Pollution Loopholes

Toxic discharges and runoff to water are a serious and largely unaddressed environmental and human health problem. Most, if not all of the pollution reported in Troubled Waters is legal. Current pollution control laws like the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), and the Toxic Substances Control Act (TSCA) do little to move the nation towards preventing or eliminating the toxic pollution cited in this report. In effect, these laws issue pollution licenses or exemptions from regulations, making legal most of the pollution reported in Troubled Waters.

The most glaring loophole may be the so-called "domestic sewage exclusion" under the Resource Conservation and Recovery Act (RCRA), whereby toxic contaminants sent to sewage treatment plants escape otherwise applicable RCRA hazardous waste regulations. This helps to account for the huge amount of toxic chemicals dumped down the drain by American industry. Another major source of toxic pollution of waters is agricultural fertilizers and pesticides. Pesticide runoff to waterways following normal application is not prohibited or monitored any federal law and is not included in this report. EPA estimates that reported TRI releases make up approximately 1.8% of the total amount of nitrogen applied as fertilizer in the United States during 1996 (EPA 1998), and that TRI

releases of the top eight conventional pesticides are less than 0.4% of their total use in the agricultural sector (EPA 1998).

Methodology

Troubled Waters is based on data collected by the U.S. Environmental Protection Agency's Toxics Release Inventory (TRI) for the reporting years 1992 through 1996, which includes the most recent data available.

The reporting requirements of the TRI apply only to manufacturing industries and, starting in 1994, federal facilities. This narrow focus excludes a large universe of water polluters, including sewage treatment plants, oil drilling and gas extraction facilities, mining industries, incinerators and other waste disposal facilities, farms, and stormwater systems. Some of these types of facilities will start to report to TRI in future years under an upcoming TRI expansion. But even after this expansion, many of the significant dischargers of toxic chemicals will not be required to report toxic releases to the environment.

In addition, during this five year period, companies were required to report the releases of only from about 350 to 620 chemicals when roughly 73,000 chemicals are used in commerce on a regular basis. A recent expansion to about 620 chemicals went into effect for the 1995 reporting year. But many high production volume chemicals are still very poorly tested for basic toxicity, and more may need to be added to TRI.

Analyzing Discharges by Body of Water Discharges from TRI facilities were assigned to a given waterway based on the "receiving stream" reported to the EPA. Most waterways reported as "tributary" streams were included with their respective rivers in this report when both were listed. Rivers themselves, however, were not considered part of larger watersheds. For example, a "Tributary to the Mississippi River" was counted as Mississippi River, while the Missouri River was not, even though it eventually runs into the Mississippi. Small streams receiving large quantities of discharges such as Gravely Run in Virginia and Clear Creek in Colorado are reported individually, as reported to the TRI. Water bodies with the same name in different states were not assumed to be contiguous without verification. To avoid adding creeks from different states together, creeks had their state added to their name if that name existed in more than one state. The same was done for rivers unless it was verified that the same river ran through the multiple states in question. Discharges from all facilities reporting discharges to a given body of water were added over the 5-year period between 1992 and 1996. More than 2,000 different water body names were listed in the TRI database for this period.

River by river totals were calculated for persistent toxic metals, carcinogens and chemicals known to cause reproductive effects based on information characterizing the toxic properties of these substances previously published by the U.S. Environmental Protection Agency and the State of California [EPA 1998; CalEPA 1997]. References for chemical characterizations and lists of chemicals included are found in Appendix A.

Reporting Toxics Dumped Down the Drain Enormous quantities of toxic chemicals are discharged to waterways via sewer systems. These so-called "transfers" of toxic chemicals to publicly owned treatment works (POTWs) totaled more than 235 million pounds in 1996, compared to 173 million pounds of direct discharges to waters reported in that same year. While the EPA does not count these transfers as environmental releases, they estimate that 25 percent of these transfers flow through sewer systems untreated [EPA 1995].

To better estimate the amount of toxic chemicals that actually make it into the nation's waters each year, we assumed a "pass-through percentage" for each chemical. This is the percentage of the chemical that would pass through a sewer system and be released when the chemical is transferred to a "typical" POTW. Pass-through percentages were obtained from a number of sources, listed in Appendix A. For most chemicals, we had to use EPA's general 25 percent estimate.

To identify the waters to which sewage treatment plants discharge effluent, we surveyed the top 50 POTWs receiving TRI transfers. Most of these had their effluent receiving waters identified by a survey taken by the Environmental Working Group (EWG) for a previous version of this report. The remainder had their receiving waters identified by examining the Permit Compliance System (PCS) water permits for municipal facilities in the city that the TRI transfers were sent to. In all, receiving waters were identified for 50 of the top 54 POTW cities receiving TRI transfers. (It is often impossible to tell which municipal facility in a city is being used from TRI information, so only cities in which all facilities discharged to the same water body were included). In all, the 50 POTW cities with identified receiving waters accounted for about 75 percent of the TRI chemicals sent to POTWs.

State level estimates of POTW and total discharges are included in the state fact sheets. Toxic chemical releases through POTWs were not attributed to specific rivers in the state level analyses due to the difficulty of verifying the receiving waters, and because of the low level of accuracy of the pass-through percentages. Analyses and tables listed in this report do not include POTW release estimates and reflect direct discharges only unless otherwise noted.

Findings

Almost one billion pounds of toxic chemicals were directly discharged to America's waters between 1992 and 1996, according to Toxics Release Inventory (TRI) records (Table 1). At a minimum, an additional 140 million pounds of toxic substances that were dumped into publicly owned sewer systems made their way to rivers and other waters during those same five years.

Many of these compounds present serious hazards to human health and the environment. Every TRI chemical is reported within TRI because it is considered toxic by the U.S. EPA. However, some TRI chemicals present extra concerns due to carcinogenicity (the ability to cause cancer), persistence and bioaccumulation (the ability to build up in the body), or reproductive toxicity. About 25 million pounds of carcinogens, persistent toxic metals, and reproductive toxins were directly dumped into America's waters between 1992 to 1996 (Table 2). Eleven (11) million pounds were carcinogens like vinyl chloride and benzene, 15 million were toxic metals like lead or mercury, and 1.7 million were reproductive toxins such as toluene.

The Most Polluted Waters

More than 500 million pounds of toxic chemicals were reported dumped into the Mississippi River between 1992 and 1996, more than the amount of toxic chemicals dumped into all other U.S. waters combined (Table 3). Most of this pollution was runoff from phosphate piles used by three fertilizer companies in Louisiana. The next five most polluted waters, in terms of toxic chemical discharges, were the Ohio River, the Brazos River in Texas, Connoquenessing Creek in Pennsylvania, the Pacific Ocean, and the Houston Ship Channel. More than 800 million pounds of toxic chemicals were directly dumped into the top 50 different rivers, creeks, and bays between 1992 and 1996.

The facilities directly releasing the most toxic chemicals to U.S. waters during this five year period were three fertilizer plants in Louisiana that released 450 million pounds of toxics to the Mississippi -- the IMC-Agrico fertilizer plants in St. James and Uncle Sam, and the PCS Nitrogen Fertilizer facility in Geismar (Table 4) . These were followed by the BASF facility in Freeport, TX, which dumped 30 million pounds of nitrate compounds into the Brazos River, the Armco facility in Butler, PA, which released into Connoquenessing Creek, and the Mobil Mining and Minerals facility in Pasadena, TX, which put 15 million pounds into the Houston Ship Channel. These top facilities released chemicals that are of concern primarily for eutrophication, or the over-fertilization and subsequent dying off of life in a water body.

For 74 percent of rivers and waters receiving toxic pollution, one polluter accounted for all reported toxic discharges during the five year period; for 92 percent of all polluted waters, three or fewer polluters accounted for all reported toxic discharges during this time. Bearing in mind the significant shortcomings with TRI data, these figures nonetheless suggest that substantial improvements in local watersheds might be possible through efforts that target a few major polluters.

The parent corporations responsible for the most toxic chemical pollution of America's waters from 1992 through 1996 were IMC-Agrico, Arcadian Fertilizers LP, Freeport McMoran Resource Partners, BASF Corp., and Armco Inc (Table 5). Many of the other companies on the Top 50 list release pollution that may not be as high in poundage, but can be even more dangerous in terms of toxic properties. Later sections on carcinogenic chemicals, persistent toxic metals, and reproductive toxins will examine the top facilities that release these especially toxic chemicals.

Dumping Toxics Down the Drain

Many polluters dump large amounts of toxic chemicals down the drain to sewage treatment plants. These so-called "transfers" of toxics to publicly owned treatment works (POTWs) are not counted as releases of toxic chemicals to the environment by the TRI, even though the EPA estimates that 25 percent of these toxics substances flow through sewage treatment to the waters that receive the effluent [EPA 1997].

Well over 1.4 billion pounds of toxic chemicals were sent to sewage treatment plants in the United States between 1992 and 1996, 50% more than the amount directly released to waterways during that same time period. In many cases polluters send their toxic discharges to public sewer systems because regulations governing toxic discharges to sewers are less strict than those governing direct discharges to water. This may be more likely to occur when the stream near the polluting facility is relatively small, and a direct discharge permit is denied by state or federal authorities.

Without knowing the precise composition of the toxic waste stream at a given factory and the treatment technology used at a specific POTW, it is impossible to calculate exactly how much of the discharge from a specific polluter makes it through sewage treatment to the water receiving the effluent. This report uses estimates of treatment efficiencies for some of the most common TRI water pollutants, and EPA's general 25 percent estimate for the rest.

We do know exactly how much individual facilities reported sending to POTWs, even if we don't know exactly how much of those toxics were released after treatment. Monsanto Co. in Sauget, Illinois sent the most toxics to a POTW between 1992 and 1996, 66 million pounds, followed by Columbian Chemicals Co. in St. Louis, Missouri with 74.7

million pounds, Air Products and Simpson Pasadena Paper, both in Pasadena, TX, and Boise Cascade Corp. in Saint Helens, OR (Table 6).

By applying the pass-through percentages to the transfers to POTWS, we could estimate total toxic releases to water in each state, adding both direct releases and estimated sewer releases (Table 7). The states with the top five estimated total direct and POTW releases are Louisiana with 486 million pounds, Texas with 80 million pounds, Pennsylvania with 52 million pounds, and Illinois and California with 35 million pounds each.

We estimated the amount of TRI toxics released from the 50 POTWS that accept the most TRI waste. We found out which rivers receive the effluent from those 50 plants (see the Methodology section for details). The results of this analysis provide significant insight into the condition of numerous waterways that receive relatively low amounts of direct toxic discharges but large amounts of toxic chemicals from sewage treatment plants.

For example, Gravelly Run in Virginia received 3 million pounds of direct discharges between 1992 and 1996, in contrast to an estimated 6 million pounds of toxics dumped into it via sewage treatment plants during that same five year period (Table 8). Lake Erie, the Connecticut River, and the Sacramento River in California all received far more toxics from sewer than direct discharges. The Raritan River in New Jersey received 3.3 million pounds of toxics from POTWs and only a negligible amount directly.

Chemical Discharges

More phosphoric acid, nitrate compounds, and ammonia were discharged to Americas' waters between 1992 and 1996 than any other chemicals in the TRI (Table 9). (Some of the chemicals in Table 9 are no longer reported to the TRI. They are included here to show the magnitude of chemicals that have been released in the past. Appendix A lists which chemicals are no longer reported.)

Phosphoric acid, nitrate compounds, and ammonia present serious threats to the aquatic environment when discharged in large quantities such as those reported here, because they are converted to the nutrients phosphorus and nitrogen in water. Through the process of eutrophication phosphorus can ultimately deprive the fresh water ecosystems of the oxygen needed to sustain life. Phosphorus pollution has been responsible for numerous fish kills in the past. Nitrogen can contribute to this same process in salt water and presents a serious threat to the health and economic viability of many of the nation's bays and estuaries. Phosphorus and nitrogen are primarily responsible for the low-oxygen conditions that threaten whole ecosystems such as the Chesapeake Bay and portions of the Gulf of Mexico.

Sulfuric acid discharges are no longer reported to the TRI. The compound, however, continues to be dumped to waters in substantial amounts and contributes substantially to disruptions of local ecosystems. Temporary but significant reductions in pH are likely to occur near major sulfuric acid discharge points, which can in turn create toxic conditions for aquatic life and liberate toxic metals stored in the local sediment.

The carcinogens directly discharged in the largest amounts were chloroform, 1,4 dioxane, and formaldehyde at 2.1 million, 1.8 million, and 1.8 million pounds respectively (Table 9). The reproductive toxins discharged in the highest amounts between 1992 and 1996 were toluene at 400 thousand pounds, 2-methoxyethanol at 290,000 pounds, and lead compounds with 270,000 pounds (Table 9).

The top persistent toxic metals dumped to America's waters during the five year period were zinc compounds, manganese compounds, and chromium compounds, with 5.5 million, 4.8 million, and 940,000 pounds respectively (Table 9). Persistent toxic metals are of particular concern because they do not degrade in the environment, and because many of them are carcinogens and reproductive toxins. Some bioaccumulate in the food chain and are eventually consumed by humans in fish and other foods.

Carcinogens

The Weyerhaeuser plant in Longview, WA dumped more cancer causing chemicals into the nation's waters than any other facility: 780,000 pounds between 1992 and 1996, according to the TRI. This polluter discharged into the Columbia River. Eastman Kodak in Rochester, NY, Sharon Steel Corp. in Farrell, PA, Tennessee Eastman Div. in Kingsport, TN, and Cytec Ind. in Wallingford, CT round out the top five dischargers of cancer causing compounds for these five years (Table 10). The Columbia River received the most cancer causing toxic chemical discharges between 1992 and 1996, at 1 million pounds, followed by the Genesee River in New York, the Quinnipiac River in Connecticut, the Mississippi River, and the Shenango River in Pennsylvania (Table 11). The waters of Washington state received the most cancer causing substances, 1.4 million pounds, followed by the waters of Connecticut, New York, and Pennsylvania (Table 12).

Reproductive Toxins

Dupont Chambers Works in Deepwater, NJ dumped more reproductive toxins into the nation's waters than any other facility: 210,000 pounds, according to TRI records for 1992 through 1996. All of these discharges went into the Delaware River. The Carolina Eastman Div. facility in Eastman Columbia, SC, Tennessee Eastman Div. in Kinsport, TN, Pfizer Inc. in Groton, CT, and North American Rayon Corp. in Elizabethton, TN round out the top five dischargers of reproductive toxins to America's waters during the five year period analyzed (Table 13). More reproductive toxins, 220,000 pounds between 1992 and 1996, were dumped in the Delaware River than any other body of water in the U.S. The Delaware was followed by the Congaree River in South Carolina, the Holston River in Tennessee, the Thames River in Connecticut, and the Wautauga River in Tennessee (Table 14). The waters of New Jersey received more reproductive toxins than any other state, with 235,000 pounds discharged during the five year period analyzed (Table 15). New Jersey is followed by Tennessee, Texas, and South Carolina.

Persistent Toxic Metals

Elkem Metals Co. in Marietta, OH dumped more persistent toxic metals to the nation's waters than any other facility in the nation, 1.2 million pounds between 1992 and 1996, according to the TRI (Table 16). These metals ended up in the Ohio River. The next largest dischargers of metals were Amoco Chemical in Decatur, AL, Sharon Steel Corp. in Farrell, PA, Eastman Kodak in Rochester, NY, and Kemira Pigments Inc. in Savannah, GA. More persistent toxic metals were dumped into the Ohio River than any other body of water in the United States, 1.8 million pounds between 1992 and 1996 (Table 17). The Ohio is followed by the Tennessee River, the Shenango River in Pennsylvania, the Savannah River, and the Genesee River in New York. Ohio waters received more direct discharges of persistent metals between 1992 and 1996 than any other state, 1.9 million pounds, according to the TRI. Alabama ranked second, followed by the waters of Pennsylvania and Georgia (Table 18).

Recommendations

People have the fundamental right to know about the use, transport, or release of any toxic substance in their communities that might pose a risk to human health or the health of the environment. As the law stands now, required reporting under the Toxics Release Inventory provides the public with only a small fraction of this information. What we do know from the current, but very limited public disclosure law, is that America's waters serve as a dumping ground for a considerable amount of toxic pollution.

Comprehensive community right to know laws are essential steps toward basic environmental and health protection. The 1986 Community Right to Know Act has done more than any other environmental law to promote voluntary reduction in toxic chemical emissions. By shining the public spotlight on pollution, it motivates industries to reduce their emissions. However, because of the limited scope of the law, the public, and even industries themselves are only getting a fraction of the picture. Legislation is pending in Congress that would fill in many important Right to Know data gaps and help industry work toward real pollution prevention: H.R. 1636, the Children's Environmental Protection and Right to Know Act, and S. 769, the Right to Know More and Pollution Prevention Act.

We recommend the following steps to expand the public's Right to Know and work toward pollution prevention:

1. Expand Right to Know to include toxic chemical use information.
Currently the public receives information on only toxic chemical releases to the environment. The public is left in the dark about chemicals used in the workplace, transported through communities, and placed in products we buy. Without this chemical use, or "materials accounting" information, the public is kept in the dark, industry will miss many valuable opportunities to significantly lower pollution costs, and public policy makers will be unable to create strategies that will most effectively prevent toxic chemical hazards.

2. Lower reporting thresholds for highly toxic substances like lead, dioxins, and mercury.
Releases of these highly toxic substances present a significant threat to public health and the environment, yet often go unreported because reporting thresholds under the current law are set too high. Many toxic chemicals that have a tendency to persist in the environment or bioaccumulate as they move up the food chain are extremely toxic in very small quantities. If industries manufacture, process, or otherwise use any quantity of these substances, all of their releases to the air, land, and water should be reported to the public. Industries should be aiming to eliminate all release and use of these substances. We urge the Clinton Administration to set the reporting threshold for these highly toxic substances at zero.

3. Require reporting to the Toxics Release Inventory from all significant sources of toxic pollution, including sewage treatment plants, medical and solid waste incinerators, and the oil and gas industry.
The Clinton Administration has made some significant expansions to Right to Know by adding seven new industries to the Toxics Release Inventory, including hazardous waste treatment facilities, sections of the mining industry, and utilities (a major source of mercury pollution in our waters). However, many other significant sources of water pollution are still exempt from reporting requirements, including sewage treatment plants, medical and solid waste incinerators, and the oil and gas industry.

4. Strengthen the Clean Water Act.
The Clean Water Act should be strengthened to require polluters to eliminate toxic discharges, prevent polluted run-off, and ensure strict compliance with the law.

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Appendix A -- TRI Chemical Lists

Chemicals were listed as carcinogens in this report if they appeared either on the State of California Proposition 65 Carcinogen List [CalEPA 1997], or if they were a known or suspect "OSHA" carcinogen by virtue of appearing in one of three sources:

1. National Toxicology Program (NTP), "Annual Report on Carcinogens"
2. International Agency for Research on Cancer (IARC) "Monographs"
3. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (as listed in EPA's 1996 TRI Public Data Release [EPA 1998]).

Chemicals were listed as reproductive toxins if they appeared of the State of California Proposition 65 Reproductive Toxin list [CalEPA 1997]. Cadmium and lead compounds were added because their constituent metal was listed. It has been our experience that TRI reporters often do not distinguish accurately between metals and metal compounds, so including only metals without their compounds can cause misleading results. Mercury compounds were listed explicitly on the Prop 65 list.

Persistent toxic metals were restricted to metals with listed metal compounds, as described in EPA's 1996 Toxic Release Inventory Public Data Release [EPA 1998] pgs 37-38.

The table below shows all of the TRI chemicals that had at least one report of a direct water release or POTW transfer. In addition to showing whether the chemical was listed as a carcinogen, toxic metal, or reproductive toxin, the table shows whether the chemical's TRI listing status changed between 1992 and 1996. Chemicals can be deleted from the list of those required to be reported under TRI, added to the list, or have the guidance for reporting change so seriously that the amount reported is affected. For instance, sulfuric and hydrochloric acids were changed so that only acid aerosol forms should now be reported. EPA changed its guidance for reporting ammonium sulfate and nitrate by delisting them and having facilities report the only the amount of ammonia included in them. (Ammonium nitrate also has its nitrate component reported under the nitrate compounds category.) The chemicals below are shown in alphabetic order, except for the delisted chemicals, which have been moved to the top of the table.

Lastly, the table below shows the POTW pass-through percentage, or amount of the chemical that passes through a POTW to be released into the environment. Pass-through percentages were estimated for TRI chemicals by using the following three sources in order (e.g. any chemical that didn't appear in the first source would have its pass-through percentage taken from the second source, or if not listed there from the third).

1. National Pretreatment Program Report To Congress, EPA Office of Water, July 1991, 21W-4004, pg 4-9 through 4-11 average of DSS Aclimated value and 40-POTW study [EPA 1991].
2. Improving Toxic Release Inventory Reporting Accuracy, Association of Metropolitan Sewerage Agencies, May 1997, pg 6 (values taken from data from AMSA members from high-volume TRI chemicals) [AMSA 1997].
3. EPA's National Sediment Contaminant Point Source Inventory estimates a general 25 percent pass-through for all TRI chemicals [EPA 1997].

It should be emphasized that these percentage estimates are likely to be inaccurate, since actual treatment rates will depend on conditions at each POTW, including the type of treatment technology used. In addition, chemicals that are "treated" may still cause public exposure either through air releases from the POTW or because they become trapped in the sewage sludge.

Overall, once these POTW pass-through percentages were applied to each chemical, it was found that 10 percent of the incoming POTW waste stream was released to waters nationwide.

List of TRI Chemicals with direct water releases or POTW transfers, 1992-1996.

Chemical Name	Chemical Abstract Services (CAS) #	TRI listing, delisting, or guidance change	Carcino-gen	Repro-ductive Toxin	Persis-tent Toxic Metal	POTW pass-through percent
n-Dioctyl phthalate	117840	Deleted in 1993				25
Bis(2-ethylhexyl) adipate	103231	Deleted in 1995				25
Diethyl phthalate	84662	Deleted in 1995				10
Acetone	67641	Deleted in 1994				5
Ammonium nitrate (solution)	6484522	Deleted in 1995				10
Butyl benzyl phthalate	85687	Deleted in 1994				25
Ammonium sulfate (solution)	7783202	Deleted in 1995				10
Methylenebis(phenylisocyanate)	101688	Deleted in 1995				25
Abamectin	71751412	Added in 1995				25
Acephate	30560191	Added in 1995				25
Acetaldehyde	75070		X			25
Acetamide	60355		X			25
Acetonitrile	75058					25
Acetophenone	98862	Added in 1994				25
Acifluorfen, sodium salt	62476599	Added in 1995	X			25
Acrolein	107028					25
Acrylamide	79061		X			25

Acrylic acid	79107					25
Acrylonitrile	107131		X			25
Alachlor	15972608	Added in 1995	X			25
Allyl alcohol	107186	Added in 1990				25
Allyl chloride	107051		X			25
Aluminum (fume or dust)	7429905					25
Aluminum oxide (fibrous forms)	1344281	Guidance changed in 1990				25
Ametryn	834128	Added in 1995				25
Ammonia	7664417	Guidance changed in 1994				10
Aniline	62533		X			25
o-Anisidine	90040		X			25
p-Anisidine	104949					25
Anthracene	120127					25
Antimony	7440360				X	25
Antimony compounds	N010				X	25
Arsenic	7440382		X		X	25
Arsenic compounds	N020		X		X	25
Asbestos (friable)	1332214		X			25
Atrazine	1912249	Added in 1995	X			25
Barium	7440393				X	25
Barium compounds	N040				X	25
Benzal chloride	98873					25
Benzene	71432		X	X		5
Benzoic trichloride	98077		X			25
Benzoyl chloride	98884					25
Benzoyl peroxide	94360					25
Benzyl chloride	100447		X			25

Beryllium	7440417		X		X	25
Beryllium compounds	N050		X		X	25
Biphenyl	92524					25
Bis(2-chloroethyl) ether	111444		X			25
Bis(2-chloro-1-methylethyl) ether	108601					25
Bis(tributyltin) oxide	56359	Added in 1995				25
Boron trifluoride	7637072	Added in 1995				25
Bromacil	314409	Added in 1995				25
Bromine	7726956	Added in 1995				25
Bromomethane	74839			X		25
1,3-Butadiene	106990		X			25
Butyl acrylate	141322					25
n-Butyl alcohol	71363					25
sec-Butyl alcohol	78922					25
tert-Butyl alcohol	75650					25
1,2-Butylene oxide	106887					25
Butyraldehyde	123728					25
Cadmium	7440439		X	X	X	25
Cadmium compounds	N078		X	X	X	25
Captan	133062		X			25
Carbaryl	63252					25
Carbofuran	1563662	Added in 1995				25
Carbon disulfide	75150			X		25
Carbon tetrachloride	56235		X			25
Carboxin	5234684	Added in 1995				25
Catechol	120809					25
Chlordane	57749		X			25

Chlorine	7782505					25
Chlorine dioxide	10049044					25
Chloroacetic acid	79118					25
1-(3-Chloroallyl)-3,5,7- triaza-1-azoniaadamantane	4080313	Added in 1995				25
p-Chloroaniline	106478	Added in 1995	X			25
Chlorobenzene	108907					25
1-Chloro-1,1-difluoroethane (HCFC-142b)	75683	Added in 1994				25
Chlorodifluoromethane (HCFC-22)	75456	Added in 1994				25
Chloroethane	75003		X			25
Chloroform	67663		X			20
Chloromethane	74873					25
Chloromethyl methyl ether	107302		X			25
3-Chloro-2-methyl-1-propene	563473	Added in 1995	X			25
Chlorophenols	N084		X			25
Chloroprene	126998					25
1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	354256	Added in 1994				25
2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	2837890	Added in 1994				25
Chlorothalonil	1897456		X			25
2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	75887	Added in 1995				25
Chlorotrifluoromethane (CFC-13)	75729	Added in 1995				25
Chromium	7440473		X		X	25
Chromium compounds	N090		X		X	25
C.I. Acid Red 114	6459945	Added in 1995	X			25
C.I. Basic Green 4	569642					25
C.I. Basic Red 1	989388					25

C.I. Direct Blue 218	28407376	Added in 1995				25
C.I. Direct Brown 95	16071866		X			25
C.I. Disperse Yellow 3	2832408					25
C.I. Food Red 15	81889		X			25
C.I. Solvent Orange 7	3118976					25
Cobalt	7440484		X		X	25
Cobalt compounds	N096		X		X	25
Copper	7440508				X	25
Copper compounds	N100				X	25
Creosote	8001589	Added in 1990	X			25
p-Cresidine	120718		X			25
m-Cresol	108394					25
o-Cresol	95487					25
p-Cresol	106445					25
Cresol (mixed isomers)	1319773					25
Crotonaldehyde	4170303	Added in 1995				25
Cumene	98828					25
Cumene hydroperoxide	80159					25
Cupferron	135206		X			25
Cyanazine	21725462	Added in 1995		X		25
Cyanide compounds	N106					25
Cycloate	1134232	Added in 1995				25
Cyclohexane	110827					25
Cyclohexanol	108930	Added in 1995				25
Cyfluthrin	68359375	Added in 1995				25
2,4-D (acetic acid)	94757		X			25
Dazomet	533744	Added in 1995				25

Dazomet, sodium salt	53404607	Added in 1995				25
Decabromodiphenyl oxide	1163195					25
2,4-D 2-Ethylhexyl ester	1928434	Added in 1995	X			25
4,4'-Diaminodiphenyl ether	101804		X			25
2,4-Diaminotoluene	95807		X			25
Diaminotoluene (mixed isomers)	25376458		X			25
Diazinon	333415	Added in 1995				25
Dibenzofuran	132649					25
1,2-Dibromoethane	106934		X			25
Dibutyl phthalate	84742					25
Dicamba	1918009	Added in 1995				25
Dichloran	99309	Added in 1995				25
1,2-Dichlorobenzene	95501					25
1,3-Dichlorobenzene	541731					25
1,4-Dichlorobenzene	106467		X			25
Dichlorobenzene (mixed isomers)	25321226		X			25
3,3'-Dichlorobenzidine	91941		X			25
3,3'-Dichlorobenzidine dihydrochloride	612839	Added in 1995	X			25
1,4-Dichloro-2-butene	764410	Added in 1994	X			25
1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1649087	Added in 1995				25
Dichlorodifluoromethane (CFC-12)	75718	Added in 1991				25
1,2-Dichloroethane	107062		X			25
1,2-Dichloroethylene	540590					25
1,1-Dichloro-1-fluoroethane (HCFC-141b)	1717006	Added in 1994				25
Dichlorofluoromethane (HCFC-	75434	Added in				25

21)		1995				
Dichloromethane	75092		X			10
2,4-Dichlorophenol	120832					25
1,2-Dichloropropane	78875		X			25
2,3-Dichloropropene	78886	Added in 1990				25
1,3-Dichloropropylene	542756		X			25
Dichlorotetrafluoroethane (CFC-114)	76142	Added in 1991				25
1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	354234	Added in 1994				25
2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	306832	Added in 1994				25
Dichlorvos	62737		X			25
Dicofol	115322					25
Dicyclopentadiene	77736	Added in 1995				25
Diethanolamine	111422					25
Di-(2-ethylhexyl) phthalate	117817		X			25
Diethyl sulfate	64675		X			25
Dihydrosafrole	94586	Added in 1994	X			25
Diisocyanates	N120	Added in 1995				25
Dimethoate	60515	Added in 1995				25
3,3'-Dimethoxybenzidine	119904		X			25
3,3'-Dimethoxybenzidine dihydrochloride	20325400	Added in 1995	X			25
Dimethylamine	124403	Added in 1995				25
N,N-Dimethylaniline	121697					25
3,3'-Dimethylbenzidine	119937		X			25
N,N-Dimethylformamide	68122	Added in 1995	X			25
2,4-Dimethylphenol	105679					25

2,6-Dimethylphenol	576261	Added in 1995				25
Dimethyl phthalate	131113					25
Dimethyl sulfate	77781		X			25
m-Dinitrobenzene	99650	Added in 1990		X		25
o-Dinitrobenzene	528290	Added in 1990		X		25
p-Dinitrobenzene	100254	Added in 1990		X		25
Dinitrobutyl phenol	88857	Added in 1995		X		25
4,6-Dinitro-o-cresol	534521					25
2,4-Dinitrophenol	51285					25
2,4-Dinitrotoluene	121142		X			25
2,6-Dinitrotoluene	606202		X			25
Dinitrotoluene (mixed isomers)	25321146	Added in 1990	X			25
1,4-Dioxane	123911		X			25
Diphenylamine	122394	Added in 1995				25
Diuron	330541	Added in 1995				25
Epichlorohydrin	106898		X	X		25
2-Ethoxyethanol	110805			X		25
Ethyl acrylate	140885		X			25
Ethylbenzene	100414					25
Ethyl chloroformate	541413					25
Ethyl dipropylthiocarbamate	759944	Added in 1995				25
Ethylene	74851					25
Ethylenebisdithiocarbamic acid, salts and esters	N171	Added in 1994				25
Ethylene glycol	107211					5
Ethylene oxide	75218		X	X		25

Ethylene thiourea	96457		X	X		25
Ethylidene dichloride	75343	Added in 1994	X			25
Famphur	52857	Added in 1995				25
Fluometuron	2164172					25
Fluorine	7782414	Added in 1995				25
Folpet	133073	Added in 1995	X			25
Formaldehyde	50000		X			25
Formic acid	64186	Added in 1994				25
Freon 113	76131					25
Glycol ethers	N230					5
Heptachlor	76448		X			25
Hexachlorobenzene	118741		X	X		25
Hexachloro-1,3-butadiene	87683					25
Hexachlorocyclopentadiene	77474					25
Hexachloroethane	67721		X			25
Hexachlorophene	70304	Added in 1994				25
n-Hexane	110543	Added in 1995				25
Hexazinone	51235042	Added in 1995				25
Hydramethylnon	67485294	Added in 1995				25
Hydrazine	302012		X			25
Hydrazine sulfate	10034932		X			25
Hydrochloric acid	7647010	Guidance changed in 1995				1
Hydrogen cyanide	74908					25
Hydrogen fluoride	7664393					25
Hydroquinone	123319					25

3-Iodo-2-propynyl butylcarbamate	55406536	Added in 1995				25
Isobutyraldehyde	78842					25
Isopropyl alcohol (manufacturing)	67630					25
4,4'-Isopropylidenediphenol	80057					25
Lead	7439921		X	X	X	25
Lead compounds	N420		X	X	X	25
Lindane	58899		X			25
Linuron	330552	Added in 1995				25
Lithium carbonate	554132	Added in 1995		X		25
Malathion	121755	Added in 1995				25
Maleic anhydride	108316					25
Maneb	12427382		X			25
Manganese	7439965				X	25
Manganese compounds	N450				X	25
Mecoprop	93652	Added in 1995	X			25
2-Mercaptobenzothiazole	149304	Added in 1995				25
Mercury	7439976			X	X	25
Mercury compounds	N458		X	X	X	25
Metham sodium	137428	Added in 1995				25
Methanol	67561					10
Methoxone	94746	Added in 1995	X			25
Methoxychlor	72435					25
2-Methoxyethanol	109864			X		25
Methyl acrylate	96333					25
Methyl tert-butyl ether	1634044					25
Methyl chlorocarbonate	79221	Added in				25

		1994				
4,4'-Methylenebis(2-chloroaniline)	101144		X			25
Methylene bromide	74953					25
4,4'-Methylenedianiline	101779		X			25
Methyl ethyl ketone	78933					25
Methyl iodide	74884		X			25
Methyl isobutyl ketone	108101					25
Methyl methacrylate	80626					25
N-Methylolacrylamide	924425	Added in 1995	X			25
2-Methylpyridine	109068	Added in 1994				25
N-Methyl-2-pyrrolidone	872504	Added in 1995				25
Metribuzin	21087649	Added in 1995				25
Molinate	2212671	Added in 1995				25
Molybdenum trioxide	1313275					25
Monochloropentafluoroethane (CFC-115)	76153	Added in 1991				25
Nabam	142596	Added in 1995				25
Naled	300765	Added in 1995				25
Naphthalene	91203					25
Nickel	7440020		X		X	25
Nickel compounds	N495		X		X	25
Nicotine and salts	N503	Added in 1995				25
Nitrapyrin	1929824	Added in 1995				25
Nitrate compounds	N511	Added in 1995				10
Nitric acid	7697372					10

Nitrilotriacetic acid	139139		X			25
p-Nitroaniline	100016	Added in 1995				25
5-Nitro-o-anisidine	99592		X			25
Nitrobenzene	98953					25
Nitroglycerin	55630					25
2-Nitrophenol	88755					25
4-Nitrophenol	100027					25
2-Nitropropane	79469		X			25
5-Nitro-o-toluidine	99558	Added in 1994				25
Oxyfluorfen	42874033	Added in 1995				25
Paraquat dichloride	1910425	Added in 1995				25
Parathion	56382					25
Pebulate	1114712	Added in 1995				25
Pendimethalin	40487421	Added in 1995				25
Pentachloroethane	76017	Added in 1994				25
Pentachlorophenol	87865		X			25
Peracetic acid	79210					25
Permethrin	52645531	Added in 1995				25
Phenanthrene	85018	Added in 1995				25
Phenol	108952					5
1,2-Phenylenediamine	95545	Added in 1995				25
1,3-Phenylenediamine	108452	Added in 1995				25
p-Phenylenediamine	106503					25
2-Phenylphenol	90437					25
Phosgene	75445					25

Phosphoric acid	7664382					0.1
Phosphorus (yellow or white)	7723140					25
Phthalic anhydride	85449					25
Picloram	1918021	Added in 1995				25
Picric acid	88891					25
Piperonyl butoxide	51036	Added in 1995				25
Polychlorinated alkanes	N583	Added in 1995	X			25
Polychlorinated biphenyls (PCBs)	1336363		X	X		25
Polycyclic aromatic compounds	N590	Added in 1995	X			25
Potassium dimethyldithiocarbamate	128030	Added in 1995				25
Prometryn	7287196	Added in 1995				25
Propachlor	1918167	Added in 1995				25
Propanil	709988	Added in 1995				25
Propargite	2312358	Added in 1995	X			25
Propargyl alcohol	107197	Added in 1995				25
Propionaldehyde	123386					25
Propoxur	114261					25
Propylene	115071					25
Propylene oxide	75569		X			25
Pyridine	110861					25
Quinoline	91225					25
Quinone	106514					25
Quintozene	82688					25
Saccharin (manufacturing)	81072		X			25
Safrole	94597		X			25

Selenium	7782492				X	25
Selenium compounds	N725		X		X	25
Silver	7440224				X	25
Silver compounds	N740				X	25
Simazine	122349	Added in 1995				25
Sodium azide	26628228	Added in 1995				25
Sodium dicamba	1982690	Added in 1995				25
Sodium dimethyldithiocarbamate	128041	Added in 1995				25
Sodium nitrite	7632000	Added in 1995				25
Styrene	100425		X			25
Sulfuric acid	7664939	Guidance changed in 1994				0.1
Terbacil	5902512	Added in 1995				25
1,1,1,2-Tetrachloroethane	630206	Added in 1994				25
1,1,2,2-Tetrachloroethane	79345		X			25
Tetrachloroethylene	127184		X			25
Tetrachlorvinphos	961115					25
Tetracycline hydrochloride	64755	Added in 1995		X		25
Thallium	7440280				X	25
Thallium compounds	N760				X	25
Thiabendazole	148798	Added in 1995				25
Thiodicarb	59669260	Added in 1995				25
Thiourea	62566		X			25
Thiram	137268	Added in 1994				25
Thorium dioxide	1314201		X			25

Toluene	108883			X		5
Toluenediisocyanate (mixed isomers)	26471625	Added in 1990	X			25
o-Toluidine	95534		X			25
Tributyltin fluoride	1983104	Added in 1995				25
Tributyltin methacrylate	2155706	Added in 1995				25
S,S,S-Tributyltrithiophosphate	78488	Added in 1995				25
Trichlorfon	52686					25
1,2,4-Trichlorobenzene	120821					25
1,1,1-Trichloroethane	71556					25
1,1,2-Trichloroethane	79005		X			25
Trichloroethylene	79016		X			25
Trichlorofluoromethane (CFC-11)	75694	Added in 1991				25
2,4,6-Trichlorophenol	88062		X			25
1,2,3-Trichloropropane	96184	Added in 1995	X			25
Triethylamine	121448	Added in 1995				25
Trifluralin	1582098					25
1,2,4-Trimethylbenzene	95636					25
Urethane	51796		X	X		25
Vanadium (fume or dust)	7440622					25
Vinyl acetate	108054		X			25
Vinyl chloride	75014		X			25
Vinylidene chloride	75354					25
m-Xylene	108383					25
o-Xylene	95476					25
p-Xylene	106423					25
Xylene (mixed isomers)	1330207					25
2,6-Xylidine	87627		X			25

Zinc (fume or dust)	7440666				X	25
Zinc compounds	N982				X	30
Trade secrets	999999999					25

Table 1. Toxic discharges to water reported to the TRI totalled 1.1 billion pounds between 1992 and 1996.

Direct Discharges	945,509,341 Pounds
Estimated Sewer Discharges *	141,478,622 Pounds
Total	1,086,987,963 Pounds

** Total discharges of toxic chemicals to sewage treatment plants in the U.S. equalled 1,429,633,487 pounds in 1992-1996. Approximately 10% of all toxic discharges to sewers pass through sewage treatment plants untreated (see Appendix A for more information)*

Source: U.S. PIRG. Compiled from U.S. EPA, Toxics Release Inventory (TRI) 1992-1996.

Table 2. Total carcinogens, persistent toxic metals, and reproductive toxins directly discharged to U.S. waters (1992-1996).

Carcinogens *	11,000,654 Pounds
Persistent Toxic Metals	15,546,478 Pounds
Reproductive Toxins *	1,656,476 Pounds
Total **	24,734,139 Pounds

** Carcinogens and reproductive toxins are defined by the State of California Proposition 65 and U.S. EPA. See Appendix A for details.*

*** The sum of carcinogens, persistent toxic metals, and reproductive toxins may be larger than the total because a chemical may be in one or more categories; i.e. a chemical may be both a carcinogen and a reproductive toxin. Each chemical was counted only once in the total.*

Source: U.S. PIRG. Compiled from U.S. EPA, Toxics Release Inventory 1992-1996.

Table 3. U.S. waters receiving the greatest direct amounts of toxic pollution (1992-1996).

Rank	River/waterbody	States with toxic discharge	Total pounds of direct discharges to water
1	Mississippi River	AR, IA, IL, KY, LA, MN, MO, MS	509,827,737
2	Ohio River	IL, IN, KY, OH, PA, WV	34,904,537
3	Brazos River	TX	33,101,694
4	Connoquenessing Creek	PA	27,530,427
5	Pacific Ocean	CA, HI, OR	18,849,963
6	Houston Ship Channel	TX	18,270,821
7	Savannah River	GA, SC	16,968,304
8	Tennessee River	AL, KY, TN	16,827,815
9	Rock River, IL	IL	13,627,108
10	Delaware River	DE, NJ, PA	12,188,470
11	Hudson River	NY	7,927,985
12	Thames River	CT	7,624,692
13	Ward Cove	AK	7,482,949
14	Straits of Juan De Fuca	WA	5,995,158
15	Schuylkill River	PA	5,495,802
16	Cedar Bayou	TX	4,940,568
17	Willamette River	OR	4,776,513
18	Amelia River	FL	4,526,641
19	Cape Fear River	NC	4,509,826
20	Little Attapulgus Creek	GA	4,366,196
21	Columbia River	OR, WA	4,323,474
22	Wisconsin River	WI	4,045,075
23	Big Blue River	IN, MO, NE	3,852,747
24	Calcasieu River	LA	3,585,121
25	Big Sioux River	SD	3,485,600
26	Mobile River	AL	3,467,735

27	Genesee River	NY	3,443,313
28	Fox River	IL, WI	3,382,928
29	Gravelly Run	VA	3,190,337
30	Ouachita River	AR, LA	3,049,884
31	Wabash River	IL, IN, OH	2,947,359
32	Iowa River	IA	2,933,692
33	Kiskiminetas River	PA	2,928,400
34	Curtis Bay	MD	2,729,133
35	Cedar River	IA	2,660,204
36	Nimishillen Creek	OH	2,610,108
37	Martin Creek, MS	MS	2,538,254
38	Snake River	ID, OR	2,529,290
39	Center Creek	MO	2,527,183
40	Kansas River	KS	2,355,848
41	Quinnipiac River	CT	2,142,989
42	Holston River	TN	2,040,610
43	Alabama River	AL	2,040,597
44	Detroit River	MI	2,028,140
45	Susquehanna River	NY, PA	2,002,733
46	Allegheny River	PA	1,847,622
47	Santa Monica Bay	CA	1,811,152
48	Tombigbee River	AL	1,782,572
49	Everett Harbor	WA	1,750,750
50	Muskingum River	OH	1,706,429

Source: U.S. PIRG. Compiled from U.S. EPA, Toxic Release Inventory 1992-1996.

Table 4. Top polluting facilities reporting direct toxic discharges to the TRI (1992-1996).

Rank	Facility Name	City	State	Toxic chemical release to water (pounds)
1	IMC-Agrico Co. Faustina Plant	Saint James	LA	222,477,269
2	IMC-Agrico Co. Uncle Sam Plan	Uncle Sam	LA	126,632,121
3	PCS Nitrogen Fertilizer L.P.	Geismar	LA	103,593,746
4	BASF Corp.	Freeport	TX	31,141,117
5	Armco Inc. Butler Ops.	Butler	PA	21,826,443
6	Mobil Mining & Minerals Co.	Pasadena	TX	15,245,805
7	Bayer Corp.	New Martinsville	WV	14,845,309
8	Louisiana-Pacific Corp. Samoa	Samoa	CA	13,908,932
9	IBP Inc.	Joslin	IL	13,609,497
10	Vicksburg Chemical Co.	Vicksburg	MS	13,536,966
11	Dupont Chambers Works	Deepwater	NJ	10,257,706
12	Elkem Metals Co.	Marietta	OH	9,161,700
13	Pfizer Inc-Groton Site	Groton	CT	7,621,535
14	3M Cordova Plant	Cordova	IL	7,550,421
15	Ketchikan Pulp Co.	Ketchikan	AK	7,482,949
16	Finch Pruyn & Co. Inc.	Glens Falls	NY	7,297,500
17	Rayonier Inc. Port Angeles	Port Angeles	WA	5,957,110
18	Armco Inc. Butler Ops.	Butler	PA	5,702,194
19	DSM Chemicals N.A. Inc.	Augusta	GA	5,438,713
20	Bayer Corp. Baytown	Baytown	TX	5,428,985
21	Carpenter Tech. Corp.	Reading	PA	5,275,592
22	IBP Inc.	Columbus Junction	IA	5,190,056
23	Inland Paperboard & Packaging	New Johnsonville	TN	5,154,268
24	Simpson Paper Co.	Eureka	CA	4,600,270

	Humboldt *			
25	Rayonier Inc. Fernandina Pulp	Fernandina Beach	FL	4,509,761
26	Engelhard Corp. Attapulgus	Attapulgus	GA	4,366,196
27	BASF Corp.	Geismar	LA	4,347,600
28	Exxon Co. USA Baton Rouge	Baton Rouge	LA	3,938,760
29	Champion Intl. Corp.	Courtland	AL	3,822,160
30	Monsanto Co.	Decatur	AL	3,586,661
31	John Morrell & Co.	Sioux Falls	SD	3,485,600
32	Mississippi Chemical Corp.	Yazoo City	MS	3,365,451
33	CF Ind. Inc.	Donaldsonville	LA	3,338,585
34	Dyno Nobel Inc. Lomo Plant	Louisiana	MO	3,266,980
35	Allied-Signal Inc. Hopewell	Hopewell	VA	3,229,719
36	Wah Chang Albany	Albany	OR	3,069,100
37	Allegheny Ludlum Corp.	New Castle	IN	3,012,960
38	PCS Nitrogen Fertilizer L.P.	Port Wentworth	GA	2,975,139
39	Fort Howard Corp.	Green Bay	WI	2,964,710
40	Eastman Kodak Co. Kodak Park	Rochester	NY	2,956,713
41	Arcadian Fertilizer L. P.	Augusta	GA	2,954,593
42	Allegheny Ludlum Corp.	Leechburg	PA	2,926,875
43	Grace Davison	Baltimore	MD	2,729,128
44	J & L Specialty Steel Inc.	Louisville	OH	2,603,095
45	Tippecanoe Labs.	Shadeland	IN	2,551,368
46	Dyno Nobel	Carthage	MO	2,527,183
47	Kimberly-Clark Corp.	Mobile	AL	2,393,910
48	Farmland Ind. Inc. Lawrence	Lawrence	KS	2,339,980
49	ADM	Southport	NC	2,310,700

50	Laroche Chemicals Inc. *	Baton Rouge	LA	2,200,000

Source: U.S. PIRG. Compiled from U.S. EPA, Toxics Release Inventory (1992-1996).

** This facility did not have any direct discharges to waterbodies in 1996, the latest year of TRI data available.*

Table 5. Top corporate toxic polluters in TRI between 1992 and 1996 (direct discharges only).

Rank	Parent Company	Total toxic discharges reported by facilities (pounds)
1	IMC-Agrico Co.	266,510,704
2	Arcadian Fertilizer L.P.	90,597,345
3	Freeport Mcmoran Resource Partners	83,615,400
4	BASF Corp.	35,599,918
5	Armco Inc.	29,267,418
6	Louisiana-Pacific Corp.	21,392,456
7	PCS Nitrogen Fertilizer L.P.	20,937,298
8	Bayer Corp.	20,459,365
9	IBP Inc.	19,835,643
10	Mobil Corp.	16,193,885
11	E. I. Du Pont De Nemours & Co. Inc	15,517,773
12	Vicksburg Chemical Co.	13,485,326
13	Rayonier Inc.	10,466,871
14	Elkem Metals Co.	9,318,368
15	3M	8,222,700
16	Exxon Corp.	8,164,401
17	Allegheny Ludlum Corp.	7,912,270
18	Pfizer Inc.	7,711,085
19	Finch Pruyn & Co. Inc.	7,297,500
20	Engelhard Corp.	6,494,685
21	Georgia-Pacific Corp.	6,145,918
22	Champion Intl. Corp.	5,575,098
23	Temple-Inland Inc.	5,510,821
24	Monsanto Co.	5,492,258
25	DSM Chemicals Holding Co. Inc.	5,438,713
26	Carpenter Tech. Corp.	5,274,175
27	Dyno Nobel Inc.	5,194,513

28	International Paper Co.	4,916,012
29	Simpson Investment Co.	4,682,549
30	J & L Specialty Steel Inc.	4,503,294
31	Kimberly-Clark Corp.	4,457,964
32	Eastman Kodak Co.	4,321,719
33	Laroche Holdings Inc.	4,212,818
34	Allied-Signal Inc.	3,750,682
35	Chevron Corp.	3,675,274
36	Smithfield Foods Inc.	3,538,187
37	Mississippi Chemical Corp.	3,451,725
38	Fort Howard Corp.	3,353,910
39	CF Ind. Inc.	3,340,775
40	Shell Oil Co.	3,289,599
41	W. R. Grace & Co.	3,152,338
42	Allegheny Teledyne Inc.	3,078,101
43	Dow Chemical Co.	3,023,495
44	Dupont Dow Elastomers LLC	3,001,963
45	Amoco Corp.	2,956,016
46	Weyerhaeuser Co.	2,946,922
47	Farmland Ind. Inc.	2,900,467
48	Eli Lilly & Co.	2,899,158
49	James River Corp. Of VA	2,860,623
50	Cytec Ind. Inc.	2,787,843

Source: U.S. PIRG. Compiled from TRI 1992-1996.

Table 6. Polluters sending the greatest amounts of toxic chemicals to sewage treatment facilities (POTWs) (1992-1996).

Rank	Facility Name	City	State	Toxic chemical release to sewers (pounds)
1	Monsanto Co.	Sauget	IL	66,281,213
2	Columbian Chemicals Co.	Saint Louis	MO	47,209,000
3	Air Prods. Inc.	Pasadena	TX	46,918,980
4	Simpson Pasadena Paper Co.	Pasadena	TX	42,159,239
5	Boise Cascade Corp.	Saint Helens	OR	33,188,978
6	Hercules Inc.	Hopewell	VA	32,955,607
7	Stone Container Corp.	Panama City	FL	32,149,647
8	Penford Prods. Co.	Cedar Rapids	IA	24,333,899
9	Stone Container Corp.	Hopewell	VA	22,661,165
10	International Paper Erie Mill	Erie	PA	19,571,600
11	Procter & Gamble Mfg. Co.	Sacramento	CA	19,006,724
12	Potlatch Corp. Minnesota Pulp	Cloquet	MN	18,830,305
13	Filtrol Corp. *	Los Angeles	CA	18,470,000
14	Sun Chemical Corp. Newark	Newark	NJ	17,000,005
15	Monsanto Co. Indian Orchard MA	Springfield	MA	16,451,397
16	Alliedsignal Inc. Hopewell	Hopewell	VA	15,181,511
17	S. D. Warren Co.	Muskegon	MI	15,086,053
18	Rockford Wire Tech. *	Rockford	IL	14,860,363
19	Westvaco Corp. Fine Papers	Luke	MD	14,143,000
20	Union Carbide Corp. Texas	Texas City	TX	13,796,336
21	PMC Specialties Group	Cincinnati	OH	12,535,000
22	Corn Prods. & Best Foods Argo	Bedford Park	IL	12,426,505
23	Hercules Inc. Aqualon Div.	Parlin	NJ	12,335,365
24	Merck & Co. Inc.	Rahway	NJ	12,022,323
25	Ciba-Geigy Corp. Newport	Newport	DE	10,439,686
26	Pharmacia & Upjohn Co. Prod.	Portage	MI	10,400,820
27	Kraft Food Ingredients Corp. *	Memphis	TN	10,342,285
28	Degussa Corp. Metal Group	South Plainfiel	NJ	9,942,970

29	Penick Corp.	Newark	NJ	9,772,039
30	Hilton Davis Co.	Cincinnati	OH	9,606,228
31	Old Bridge Chemicals Inc.	Old Bridge	NJ	9,515,821
32	Albright & Wilson Americas	Charleston	SC	9,218,738
33	Hoffmann-La Roche Inc.	Nutley	NJ	8,955,444
34	Rohm & Haas Co. Philadelphia	Philadelphia	PA	8,183,271
35	Lederle Labs.	Pearl River	NY	8,051,355
36	Malllinckrodt Inc.	Saint Louis	MO	7,855,850
37	Arco Chemical Co. Bayport Div.	Pasadena	TX	7,756,395
38	Phthalchem Inc.	Cincinnati	OH	7,736,905
39	Zeneca Inc.	Bayonne	NJ	7,491,392
40	Occidental Chemical Corp.	Sauget	IL	7,320,358
41	Witco Corp.	Memphis	TN	7,202,941
42	Cookson Pigments Inc.	Newark	NJ	7,196,426
43	A-1 Wire Tech Inc. *	Rockford	IL	7,153,069
44	Borden Packaging & Indl.	Forest Park	IL	7,090,758
45	Shepherd Chemical Co.	Cincinnati	OH	6,712,416
46	115Th Street Corp. Chicago	Chicago	IL	6,680,249
47	QO Chemicals Inc.	Memphis	TN	6,019,384
48	Du Pont Memphis Plant	Memphis	TN	6,016,329
49	Syntex Agribusiness Inc.	Springfield	MO	5,882,706
50	Monsanto	Saint Louis	MO	5,860,017

Source: U.S. PIRG. Compiled from U.S. EPA, Toxics Release Inventory 1992-1996.

** This facility did not send any toxics to sewers in 1996 TRI, the latest year available.*

Table 7. The most polluted states: direct discharges and estimated sewer discharges of toxic chemicals (1992-1996).

Rank	State	Direct discharges (lbs)	Estimated sewer discharges * (lbs)	Total discharges (lbs)
1	Louisiana	485,580,618	141,509	485,722,127
2	Texas	63,605,753	16,010,347	79,616,100
3	Pennsylvania	47,324,743	4,962,488	52,287,231
4	Illinois	25,128,011	10,209,946	35,337,957
5	California	25,850,084	9,306,170	35,156,254
6	New Jersey	14,403,554	15,595,877	29,999,431
7	Ohio	20,371,436	8,667,697	29,039,133
8	Georgia	23,886,921	1,933,978	25,820,899
9	West Virginia	21,856,987	1,574,082	23,431,069
10	Alabama	21,705,338	431,524	22,136,862
11	Mississippi	20,524,004	412,099	20,936,103
12	New York	13,996,609	5,471,853	19,468,462
13	Missouri	10,137,160	8,401,007	18,538,167
14	Tennessee	10,142,571	5,856,585	15,999,156
15	Washington	14,773,463	554,547	15,328,010
16	Virginia	6,498,305	6,829,210	13,327,515
17	Iowa	9,735,009	2,765,725	12,500,734
18	Florida	7,775,786	3,767,118	11,542,904
19	Michigan	5,423,800	5,884,341	11,308,141
20	Connecticut	10,100,090	787,572	10,887,662
21	Indiana	8,956,266	1,878,364	10,834,630
22	Wisconsin	8,097,886	2,194,648	10,292,534
23	Oregon	5,835,791	4,365,403	10,201,194
24	North Carolina	7,712,061	2,061,015	9,773,076
25	Alaska	9,088,866	297	9,089,163
26	South Carolina	6,849,787	1,899,132	8,748,919
27	Maryland	5,515,120	2,086,815	7,601,935
28	Arkansas	6,350,908	186,359	6,537,267

29	Minnesota	1,968,945	3,437,918	5,406,863
30	Kentucky	3,308,406	1,436,463	4,744,869
31	Massachusetts	331,104	4,090,732	4,421,836
32	South Dakota	3,489,075	222,499	3,711,574
33	Kansas	2,702,658	999,437	3,702,095
34	Delaware	977,116	2,218,693	3,195,809
35	Oklahoma	3,074,073	100,267	3,174,340
36	Maine	2,852,520	190,397	3,042,917
37	Idaho	2,228,929	604,220	2,833,149
38	Puerto Rico	318,712	1,919,559	2,238,271
39	Nebraska	1,897,703	337,585	2,235,288
40	Colorado	1,625,158	266,528	1,891,686
41	North Dakota	923,976	106,229	1,030,205
42	Montana	669,895	8,761	678,656
43	Rhode Island	428,641	181,498	610,139
44	Utah	246,546	304,276	550,822
45	Arizona	9,758	508,757	518,515
46	New Hampshire	326,017	114,573	440,590
47	Virgin Islands	348,529	0	348,529
48	Vermont	246,940	11,124	258,064
49	Wyoming	252,385	2,720	255,105
50	New Mexico	16,113	111,336	127,449
51	Hawaii	30,585	10,000	40,585
52	District Of Columbi	2,155	29,131	31,286
53	Guam	6,100	7,500	13,600
54	Nevada	370	368	738
55	American Samoa	5	0	5

** See Appendix A for an explanation of how discharges from POTWs were estimated.*

Table 8. The most polluted waters: direct discharges and estimated sewer discharges of toxic chemicals (1992-1996).

Rank	River/Waterbody	States contributing toxic pollution	Direct discharges to water	Estimated discharges from sewers*	Total discharges to water
1	Mississippi River	AR, IA, IL, KY, LA, MN, MO, MS, TN, WI	509,827,737	14,547,379	524,375,11
2	Ohio River	IL, IN, KY, OH, PA, WV	34,904,537	6,789,556	41,694,093
3	Brazos River	TX	33,101,694	?	33,101,694
4	Houston Ship Channel	TX	18,270,821	14,491,738	32,762,559
5	Connoquenessing Creek	PA	27,530,427	?	27,530,427
6	Pacific Ocean	CA, HI, OR	18,849,963	3,874,151	22,724,114
7	Savannah River	GA, SC	16,968,304	433,443	17,401,747
8	Tennessee River	AL, KY, TN	16,827,815	?	16,827,815
9	Delaware River	DE, NJ, PA	12,188,470	3,230,201	15,418,671
10	Rock River, IL	IL	13,627,108	?	13,627,108
11	Hudson River	NY	7,927,985	2,312,814	10,240,799
12	Gravelly Run	VA	3,190,337	6,088,195	9,278,532
13	Columbia River	OR, WA	4,323,474	3,722,436	8,045,910
14	Thames River	CT	7,624,692	?	7,624,692
15	Ward Cove	AK	7,482,949	?	7,482,949
16	Illinois River	IL	1,201,552	4,897,669	6,099,221
17	Straits of Juan De Fuca	WA	5,995,158	?	5,995,158
18	Schuylkill River	PA	5,495,802	?	5,495,802
19	Cedar Bayou	TX	4,940,568	?	4,940,568
20	Willamette River	OR	4,776,513	?	4,776,513
21	Amelia River	FL	4,526,641	?	4,526,641
22	Cape Fear River	NC	4,509,826	?	4,509,826
23	Little Attapulgus Creek	GA	4,366,196	?	4,366,196
24	Cedar River	IA	2,660,204	1,590,720	4,250,924

25	Wisconsin River	WI	4,045,075	?	4,045,075
26	Big Blue River	IN, MO, NE	3,852,747	?	3,852,747
27	Calcasieu River	LA	3,585,121	?	3,585,121
28	Big Sioux River	SD	3,485,600	?	3,485,600
29	Mobile River	AL	3,467,735	?	3,467,735
30	Genesee River	NY	3,443,313	?	3,443,313
31	Fox River	IL, WI	3,382,928	11,670	3,394,598
32	Raritan River	NJ	4	3,344,313	3,344,317
33	Lake Erie	OH, PA	545,752	2,761,402	3,307,154
34	Connecticut River	CT, MA, NH, VT	91,152	3,180,063	3,271,215
35	Ouachita River	AR, LA	3,049,884	?	3,049,884
36	Detroit River	MI	2,028,140	941,680	2,969,820
37	Wabash River	IL, IN, OH	2,947,359	?	2,947,359
38	Iowa River	IA	2,933,692	?	2,933,692
39	Kiskiminetas River	PA	2,928,400	?	2,928,400
40	Curtis Bay	MD	2,729,133	?	2,729,133
41	Nimishillen Creek	OH	2,610,108	?	2,610,108
42	Martin Creek, MS	MS	2,538,254	?	2,538,254
43	Snake River	ID, OR	2,529,290	?	2,529,290
44	Center Creek	MO	2,527,183	?	2,527,183
45	Kanawha River	WV	1,697,909	754,205	2,452,114
46	Kansas River	KS	2,355,848	?	2,355,848
47	Caribbean Sea	PR, VI	576,647	1,730,520	2,307,167
48	Gulf of Mexico	FL, LA, TX	67,497	2,215,475	2,282,972
49	Quinnipiac River	CT	2,142,989	?	2,142,989
50	Sacramento River	CA	67,117	2,028,363	2,095,480

** See Appendix A for an explanation of how discharges from POTWs were estimated.*

? means that the POTWs on this waterbody were not contacted, so no estimation could be made.

Table 9. Toxic chemicals directly discharged to U.S. waters in the greatest amounts (1992-1996).

Rank	Chemical Name	Reason	Total pounds of

			chemical discharged
1	Phosphoric acid	1	404,207,546
2	Nitrate compounds	1	230,661,198
3	Ammonia	1	110,180,556
4	Sulfuric acid	1	59,488,538
5	Methanol	1	55,334,840
6	Ammonium nitrate (solution)	1	21,171,050
7	Ammonium sulfate (solution)	1	13,201,935
8	Ethylene glycol	1	6,023,262
9	Zinc compounds	1,3	5,455,990
10	Manganese compounds	1,3	4,754,588
11	Chlorine	1	2,980,509
12	Hydrochloric acid	1	2,674,655
13	Chloroform	1,2	2,145,306
14	Acetone	1	1,976,505
15	Sodium nitrite	1	1,849,062
16	1,4-Dioxane	1,2	1,848,820
17	Formaldehyde	1,2	1,842,591
18	Diethanolamine	1	1,358,628
19	Glycol ethers	1	1,254,120
20	Chromium compounds	1,2,3	941,152
21	Acetaldehyde	1,2	844,428
22	Manganese	1,3	801,697
23	Nitric acid	1	670,017
24	Chromium	1,2,3	660,135
25	Methyl ethyl ketone	1	594,671
26	Phenol	1	561,211
27	tert-Butyl alcohol	1	552,317
28	Cyanide compounds	1	480,748
29	Methyl tert-butyl ether	1	471,393
30	Toluene	1,4	407,170

31	Copper compounds	1,3	407,017
32	Cobalt compounds	1,2,3	400,769
33	Barium compounds	1,3	393,062
34	Dichloromethane	1,2	387,664
35	Methyl isobutyl ketone	1	340,639
36	Catechol	1	339,168
37	n-Butyl alcohol	1	314,875
38	Nickel compounds	1,2,3	307,306
39	2-Methoxyethanol	1,4	291,332
40	Molybdenum trioxide	1	274,067
41	Lead compounds	1,2,3	270,412
42	n-Hexane	1	264,621
43	N-Methyl-2-pyrrolidone	1	253,560
44	Copper	1,3	231,816
45	Aluminum (fume or dust)	1	228,777
46	Chloromethane	1	219,306
47	Xylene (mixed isomers)	1	211,566
48	Zinc (fume or dust)	1,3	208,242
49	Carbon disulfide	1,4	198,835
50	Propylene	1	195,168

1: Meets EPA's TRI toxicity criteria
2: Known, possible, or probable carcinogen
3: Persistent toxic metal
4: Reproductive toxin

Source: U.S. PIRG. Compiled from U.S. EPA TRI 1992-1996.
For chemical lists see Appendix A.

Table 10. Top polluters directly discharging cancer-causing chemicals to U.S. waters (1992-1996).

Rank	Facility Name	City	State	River/waterbody	Total pounds of carcinogens
1	Weyerhaeuser Co.	Longview	WA	Columbia River	779,839
2	Eastman Kodak Co. Kodak Park	Rochester	NY	Genesee River	733,594
3	Sharon Steel Corp. Sharon ASP	Farrell	PA	Shenango River	572,235
4	Tennessee Eastman Div.	Kingsport	TN	Holston River	451,897
5	Cytec Ind.	Wallingford	CT	Quinnipiac River	422,565
6	Pfizer Inc-Groton Site	Groton	CT	Thames River	356,500
7	Amoco Chemical Co.	Decatur	AL	Tennessee River	295,805
8	Georgia-Pacific Corp.	Brunswick	GA	Turtle River	263,019
9	Ketchikan Pulp Co.	Ketchikan	AK	Ward Cove	249,741
10	Union Carbide Corp. Taft/Star	Taft	LA	Mississippi River	243,309
11	Louisiana-Pacific Corp. Samoa	Samoa	CA	Pacific Ocean	208,000
12	Dow Chemical Co.	Freeport	TX	Brazos River	200,758
13	Monsanto Port Plastics	Addyston	OH	Ohio River	193,442
14	AC Molding Compounds *	Wallingford	CT	Quinnipiac River	190,643
15	Georgia-Pacific West Inc.	Bellingham	WA	Bellingham Bay	178,403
16	Wellman Inc. Palmetto Plant	Darlington	SC	Black Creek, SC	137,067
17	Longview Fibre Co.	Longview	WA	Columbia River	127,280
18	James River Corp. Camas Mill	Camas	WA	Columbia River	123,976
19	Weirton Steel Corp.	Weirton	WV	Ohio River	121,158
20	Kimberly-Clark Corp.	Mobile	AL	Mobile River	114,000
21	Kemira Pigments Inc.	Savannah	GA	Savannah River	109,400
22	ISP Chemicals Inc.	Calvert Cit	KY	Tennessee River	95,096
23	Du Pont Florence Site	Florence	SC	Great Pee Dee	93,041

				River	
24	Du Pont Kinston Plant	Kinston	NC	Neuse River	86,590
25	International Paper Natchez	Natchez	MS	Mississippi River	80,556
26	Hoechst Celanese Corp.	Rock Hill	SC	Catawba River	72,948
27	Hoechst-Celanese Corp.	Salisbury	NC	North Second Creek	70,993
28	Clinton Labs.	Clinton	IN	Wabash River	69,250
29	PPG Ind. Inc.	Lake Charles	LA	Calcasieu River	67,501
30	Simpson Tacoma Kraft Co.	Tacoma	WA	Puget Sound	63,683
31	Merck & Co. Inc. Flint River	Albany	GA	Flint River, GA	60,390
32	Ethyl Corp.	Orangeburg	SC	Edisto River	55,720
33	Kimberly-Clark Tissue Co.	Everett	WA	Everett Harbor	53,550
34	Amoco Chemicals Co. River	Wando	SC	Cooper River	49,900
35	Champion Intl. Corp.	Canton	NC	Pigeon River	49,670
36	Alaska Pulp Corp. *	Sitka	AK	Silver Bay	47,000
37	Firestone Synthetic Rubber & *	Sulphur	LA	Calcasieu River	45,422
38	Dow Chemical Co. Louisiana	Plaquemine	LA	Mississippi River	43,431
39	Boise Cascade Corp. White	Internation Falls	MN	Rainy River	41,560
40	International Paper Riverdale	Selma	AL	Alabama River	41,400
41	Gulf States Steel Inc.	Gadsden	AL	Black Creek, AL	39,243
42	Huntsman Petrochemical Corp. *	Port Neches	TX	Neches River	39,091
43	Georgia-Pacific Ashdown Ops.	Ashdown	AR	Red River	39,005
44	Simpson Paper Co. Humboldt *	Eureka	CA	Pacific Ocean	38,600
45	Hoechst Celanese Corp.	Greer	SC	White Plains Branch	38,415

46	Federal Paper Board Co. Inc.	Riegelwood	NC	Cape Fear River	38,100
47	Dupont Chambers Works	Deepwater	NJ	Delaware River	37,668
48	Bethlehem Steel Corp.	Sparrows Point	MD	Old Road Bay	36,829
49	National Steel Corp. Great	Ecorse	MI	Detroit River	35,627
50	Du Pont Cooper River Plant	Charleston	SC	Cooper River	34,234

** This facility reported no discharges of carcinogens to water in 1996, the latest year of data available.*

Table 11. Waterbodies receiving the most carcinogens through direct discharge (1992-1996).

Rank	River/Waterbody	States discharging carcinogenic chemicals to waterbody	Total pounds of carcinogens discharged
1	Columbia River	OR, WA	1,048,853
2	Genesee River	NY	733,619
3	Quinnipiac River	CT	620,588
4	Mississippi River	AR, IA, IL, KY, LA, MN, MO,	619,346
5	Shenango River	PA	579,371
6	Ohio River	IN, KY, OH, PA, WV	471,657
7	Holston River	TN	462,637
8	Tennessee River	AL, KY, TN	437,187
9	Thames River	CT	357,793
10	Turtle River	GA	263,019
11	Pacific Ocean	CA, OR	258,606
12	Ward Cove	AK	249,741
13	Brazos River	TX	203,143
14	Bellingham Bay	WA	178,403
15	Black Creek, SC	SC	137,166
16	Calcasieu River	LA	131,378
17	Mobile River	AL	128,974
18	Savannah River	GA, SC	128,275
19	Great Pee Dee River	SC	115,612
20	Cooper River	SC	104,171
21	Neches River	TX	97,648
22	Catawba River	NC, SC	92,531
23	Neuse River	NC	88,346
24	Cape Fear River	NC	86,341
25	Tombigbee River	AL	75,216
26	Alabama River	AL	74,421
27	Wabash River	IL, IN, OH	74,240
28	North Second Creek	NC	70,993

29	Houston Ship Channe	TX	64,645
30	Puget Sound	WA	64,473
31	Flint River, GA	GA	61,500
32	Ouachita River	AR, LA	57,761
33	Edisto River	SC	56,395
34	Wisconsin River	WI	55,225
35	Delaware River	DE, NJ, PA	55,132
36	Everett Harbor	WA	53,550
37	Pigeon River	NC	49,670
38	Silver Bay	AK	47,000
39	Willamette River	OR	46,668
40	Red River	AR, LA	43,877
41	Detroit River	MI	43,740
42	Rainy River	MN	41,560
43	Black Creek, AL	AL	39,243
44	White Plains Branch	SC	38,415
45	Arkansas River	AR, CO, KS, OK	37,904
46	Old Road Bay	MD	36,829
47	Straits of Juan De	WA	33,980
48	Anacoco Bayou	LA	33,389
49	North River	GA	32,650
50	St. Croix River	ME	30,850

Source: U.S. PIRG. Compiled from U.S. EPA, Toxic Release Inventory 1992-1996.

Table 12. States with waters receiving the most carcinogens (1992-1996).

Rank	State	Total pounds of carcinogens directly discharged
1	Washington	1,420,920
2	Connecticut	992,605
3	New York	834,685
4	Pennsylvania	792,033
5	Louisiana	763,237
6	Alabama	725,830
7	South Carolina	636,035
8	Texas	563,647
9	Georgia	538,255
10	Tennessee	523,323
11	North Carolina	372,652
12	Ohio	357,429
13	Alaska	296,950
14	California	282,652
15	West Virginia	222,479
16	Kentucky	189,687
17	Indiana	176,281
18	Mississippi	126,234
19	Michigan	115,277
20	Illinois	104,998
21	Wisconsin	102,078
22	Arkansas	100,843
23	Virginia	97,885
24	Maine	93,921
25	New Jersey	80,334
26	Oregon	71,342
27	Maryland	65,965
28	Minnesota	63,966

29	Florida	50,819
30	New Hampshire	43,397
31	Nebraska	39,187
32	Missouri	37,496
33	Puerto Rico	20,671
34	Iowa	16,976
35	Idaho	13,902
36	Oklahoma	12,531
37	Colorado	11,169
38	Montana	9,665
39	Massachusetts	9,267
40	Kansas	8,685
41	Utah	7,834
42	Delaware	3,317
43	Wyoming	1,177
44	Rhode Island	1,097
45	North Dakota	828
46	Vermont	767
47	Virgin Islands	252
48	South Dakota	25
49	New Mexico	24
50	Hawaii	20

Source: U.S. PIRG. Compiled from U.S. EPA's TRI 1992-1996.

Table 13. Top polluters directly discharging reproductive toxins (1992-1996).

Rank	Facility Name	City	State	River/Waterbody	Total pounds reproductive toxins
1	Dupont Chambers Works	Deepwater	NJ	Delaware River	212,260
2	Carolina Eastman Div.	Eastman Columbia	SC	Congaree River	109,606
3	Tennessee Eastman Div.	Kingsport	TN	Holston River	109,155
4	Pfizer Inc-Groton Site	Groton	CT	Thames River	104,400
5	North American Rayon Corp.	Elizabethton	TN	Watauga River	100,250
6	Courtaulds Fibers Inc.	Axis	AL	Mobile River	67,000
7	Eastman Kodak Co. Kodak Park	Rochester	NY	Genesee River	52,700
8	Dow Chemical Co.	Freeport	TX	Brazos River	52,337
9	Caribbean Petroleum Corp.	Bayamon	PR	Caribbean Sea	46,422
10	Weirton Steel Corp.	Weirton	WV	Ohio River	35,485
11	Hercules Inc.	Hattiesburg	MS	Bouie River	28,342
12	OSI Specialties Inc.	Friendly	WV	Ohio River	25,928
13	PPG Ind. Inc.	Lake Charles	LA	Calcasieu River	23,355
14	Bayway Refining Co.	Linden	NJ	Morses Creek	20,480
15	Asarco Inc. Omaha Plant	Omaha	NE	Missouri River	20,473
16	Star Enterprise *	Union	LA	Mississippi River	17,498
17	Inland Steel Co.	East Chicago	IN	Indiana Harbor Ship Can	17,233
18	Bethlehem Steel Corp.	Sparrows Point	MD	Old Road Bay	16,400
19	Astor Corp. Mckean Plant	Smethport	PA	Potato Creek, PA	16,240
20	Phillips Puerto Rico Core	Guayama	PR	Las Mareas Bay	16,013

21	Gulf States Steel Inc.	Gadsden	AL	Black Creek, AL	15,309
22	Ciba Specialty Chemicals Corp	Mc Intosh	AL	Tombigbee River	14,786
23	Allied-Signal Inc. Hopewell	Hopewell	VA	Gravelly Run	14,203
24	Du Pont Old Hickory Plant *	Old Hickory	TN	Cumberland River	12,181
25	Astor Corp. Petrowax Refining	Emlenton	PA	Allegheny River	11,908
26	U.S. Steel USS Gary Works	Gary	IN	Grand Calumet River	10,800
27	Phillips 66 Co. A Div.Of	Borger	TX	Dixon Creek	10,200
28	Goodyear Tire & Rubber Co.	Lincoln	NE	Salt Creek, NE	9,954
29	Shenango Inc.	Pittsburgh	PA	Ohio River	9,860
30	Huntsman Petrochemical Corp.	Port Neches	TX	Neches River	9,731
31	Rhone-Poulenc Institute Plant	Institute	WV	Kanawha River	8,645
32	Crown Central Petroleum Corp.	Pasadena	TX	Houston Ship Channel	8,645
33	Gulf Reduction Corp. Esperson	Houston	TX	Buffalo Bayou	8,188
34	Neches River Treatment Corp.	Beaumont	TX	Neches River	7,521
35	Rouge Steel Co.	Dearborn	MI	Rouge River	7,180
36	CF & I Steel L.P. *	Pueblo	CO	Arkansas River	7,138
37	National Steel Corp. Great	Ecorse	MI	Detroit River	7,117
38	Weyerhaeuser Co.	Longview	WA	Columbia River	6,885
39	Uno-Ven Co. Lemont Refy.	Lemont	IL	Chicago Sanitary and Sh	6,624
40	PPG Ind. Inc.	New Martinsville	WV	Ohio River	6,490
41	Phillips 66 Co. Sweeny Comple	Sweeny	TX	Linnville Bayou	6,459

42	Bethlehem Steel Corp.	Sparrows Point	MD	Patapsco River	6,350
43	Ashland Petroleum Co.	Catlettsburg	KY	Big Sandy River	6,346
44	Exxon Baytown Refinery	Baytown	TX	Houston Ship Channel	6,312
45	Star Enterprise *	Delaware City	DE	Delaware River	5,607
46	Toshiba Display Devices Inc.	Horseheads	NY	Newton Creek, NY	5,058
47	GE Co. Silicone Prods.	Waterford	NY	Hudson River	4,520
48	Exxon Co. USA Baton Rouge	Baton Rouge	LA	Mississippi River	4,386
49	Allegheny Ludlum Corp.	Brackenridge	PA	Allegheny River	4,350
50	Phillips Chemical Co. Philtex	Borger	TX	Dixon Creek	4,125

** This facility had no discharges of reproductive toxins in 1996, the latest year of data available.*

Table 14. Waterways receiving the most reproductive toxins from direct discharges (1992-1996).

Rank	River/Waterbody	States discharging reproductive toxins to waterbody	Total pounds of reproductive toxins
1	Delaware River	DE, NJ, PA	220,782
2	Congaree River	SC	109,606
3	Holston River	TN	109,155
4	Thames River	CT	105,161
5	Watauga River	TN	100,250
6	Ohio River	IN, KY, OH, PA, WV	93,725
7	Mobile River	AL	67,174
8	Genesee River	NY	52,700
9	Brazos River	TX	52,587
10	Caribbean Sea	PR, VI	46,992
11	Mississippi River	AR, IA, IL, LA, MN, MO, M	42,781
12	Bouie River	MS	28,342
13	Calcasieu River	LA	24,159

14	Missouri River	MO, NE	20,955
15	Morses Creek	NJ	20,480
16	Neches River	TX	19,983
17	Allegheny River	PA	19,153
18	Indiana Harbor Ship Can	IN	17,341
19	Houston Ship Channel	TX	16,637
20	Old Road Bay	MD	16,400
21	Potato Creek, PA	PA	16,240
22	Las Mareas Bay	PR	16,013
23	Black Creek, AL	AL	15,309
24	Tombigbee River	AL	14,786
25	Dixon Creek	TX	14,325
26	Gravelly Run	VA	14,203
27	Cumberland River	TN	12,189
28	Kanawha River	WV	11,743
29	Grand Calumet River	IN	10,800
30	Rouge River	MI	10,313
31	Salt Creek, NE	NE	9,954
32	Buffalo Bayou	TX	9,499
33	Arkansas River	AR, CO, KS, OK	8,839
34	Detroit River	MI	8,626
35	Chicago Sanitary and Sh	IL	8,377
36	Columbia River	OR, WA	7,155
37	Linnville Bayou	TX	6,459
38	Patapsco River	MD	6,360
39	Big Sandy River	KY	6,346
40	Hudson River	NY	5,772
41	Newton Creek, NY	NY	5,083
42	Scioto River	OH	4,456

43	Shenango River	PA	4,133
44	Tittabawassee River	MI	4,077
45	Ouachita River	LA	3,772
46	Buffalo Creek, GA	GA	3,412
47	Flint River, GA	GA	3,406
48	Harmon Creek	WV	3,173
49	Connoquenessing Creek	PA	3,135
50	Oil Drain	UT	3,100

Source: U.S. PIRG. Compiled from U.S. EPA, Toxic Release Inventory 1992-1996.

Table 15. States with waters receiving the most reproductive toxins (1992-1996).

Rank	State	Total pounds of reproductive toxins
1	New Jersey	235,246
2	Tennessee	228,939
3	Texas	141,103
4	South Carolina	119,246
5	Alabama	109,405
6	Connecticut	107,849
7	West Virginia	90,049
8	Pennsylvania	86,845
9	New York	72,415
10	Louisiana	66,140
11	Puerto Rico	62,436
12	Indiana	39,051
13	Mississippi	35,526
14	Nebraska	33,593
15	Illinois	28,424
16	Michigan	27,125
17	Maryland	25,338
18	Ohio	24,287

19	Virginia	18,642
20	Kentucky	16,017
21	Georgia	13,231
22	Washington	12,363
23	Missouri	9,048
24	California	8,007
25	Colorado	7,433
26	Utah	6,015
27	Delaware	5,793
28	Arkansas	4,922
29	Kansas	4,736
30	North Carolina	3,956
31	Oklahoma	2,248
32	Wisconsin	2,097
33	Montana	1,689
34	Wyoming	1,493
35	Iowa	1,470
36	Massachusetts	1,114
37	Minnesota	750
38	Oregon	743
39	Virgin Islands	569
40	New Hampshire	550
41	Florida	292
42	Rhode Island	136
43	Alaska	39
44	New Mexico	28
45	Maine	27
46	South Dakota	25
47	Vermont	17
48	Hawaii	5
49	North Dakota	4

Source: U.S. PIRG. Compiled from U.S. EPA, TRI 1992-1996.

Table 16. Top polluters releasing persistent toxic metals to U.S. waters (1992-1996).

Rank	Facility Name	City	State	River/Waterbody	Total pounds of persistent toxic metals
1	Elkem Metals Co.	Marietta	OH	Ohio River	1,195,700
2	Amoco Chemical Co.	Decatur	AL	Tennessee River	699,800
3	Sharon Steel Corp. Sharon ASP	Farrell	PA	Shenango River	614,876
4	Eastman Kodak Co. Kodak Park	Rochester	NY	Genesee River	587,350
5	Kemira Pigments Inc.	Savannah	GA	Savannah River	520,100
6	Weirton Steel Corp.	Weirton	WV	Ohio River	470,902
7	Gulf Reduction Corp. Esperson *	Houston	TX	Buffalo Bayou	412,691
8	Bethlehem Steel Corp.	Sparrows Point	MD	Old Road Bay	324,529
9	Millennium Inorganic	Baltimore	MD	Patapsco River	300,000
10	Gulf States Steel Inc.	Gadsden	AL	Black Creek, AL	288,106
11	Amoco Chemicals Co. River	Wando	SC	Cooper River	282,100
12	Georgia-Pacific Corp.	Brunswick	GA	Turtle River	271,000
13	National Steel Corp. Great	Ecorse	MI	Detroit River	244,610
14	Chemetals Inc. Baltimore Plant *	Baltimore	MD	Curtis Creek, MD	235,796
15	Weirton Steel Corp.	Weirton	WV	Harmon Creek	210,274
16	International Paper Riverdale	Selma	AL	Alabama River	200,000
17	Pfizer Inc-Groton Site	Groton	CT	Thames River	198,350
18	Georgia-Pacific Ashdown Ops.	Ashdown	AR	Red River	190,000

19	Courtaulds Fibers Inc.	Axis	AL	Mobile River	182,670
20	Millennium Inorganic	Ashtabula	OH	Lake Erie	180,000
21	International Paper *	Jay	ME	Androscoggin River	174,611
22	Riverwood Intl. Corp.	West Monroe	LA	Ouachita River	174,565
23	Bowater Inc. Coated Paper &	Catawba	SC	Catawba River	171,937
24	Bethlehem Steel Corp. Burns	Burns Harbor	IN	Little Calumet Rive	157,450
25	Clinton Labs.	Clinton	IN	Wabash River	157,025
26	Bowater Newsprint Calhoun Ops.	Calhoun	TN	Hiwassee River	156,857
27	SCM Chemicals Americas Plant	Ashtabula	OH	Lake Erie	151,000
28	PCS Nitrogen Fertilizer L.P.	Geismar	LA	Mississippi River	136,529
29	Zinc Corp. Of America	Palmerton	PA	Aquashicola Creek	134,949
30	Macmillan Bloedel Packaging	Pine Hill	AL	Alabama River	123,000
31	NVF Co. Yorklyn Plant	Yorklyn	DE	Red Clay Creek	111,898
32	Rayonier Inc. Port Angeles	Port Angeles	WA	Straits of Juan De	110,600
33	International Paper Co.	Bastrop	LA	Staulkinghead Creek	102,046
34	Ford Motor Co. Nashville Glass *	Nashville	TN	Cumberland River	99,000
35	Granite City Steel	Granite City	IL	Horseshoe Lake	91,959
36	Potlatch Corp. Idaho Pulp &	Lewiston	ID	Snake River	86,200
37	DSC Ltd. Trenton Plant	Trenton	MI	Detroit River	84,175
38	Finch Pruyn & Co. Inc. *	Glens Falls	NY	Hudson River	83,000
39	Chevron USA Prods	El Segundo	CA	Santa Monica Bay	78,997

	Co.				
40	Kerr-Mcgee Chemical Corp.	Hamilton	MS	Dose Maie Creek	74,300
41	Tennessee Eastman Div.	Kingsport	TN	Holston River	69,087
42	Georgia-Pacific West Inc.	Bellingham	WA	Bellingham Bay	68,426
43	Union Camp Corp.	Savannah	GA	Savannah River	64,530
44	Weyerhaeuser	Rothschild	WI	Wisconsin River	60,090
45	Smurfit Newsprint Corp.	Newberg	OR	Willamette River	59,009
46	U.S. Steel USS Gary Works	Gary	IN	Grand Calumet River	58,800
47	Union Camp Corp.	Prattville	AL	Alabama River	58,000
48	Exxon Baytown Refinery	Baytown	TX	Houston Ship Channe	57,463
49	State Ind. Inc.	Ashland City	TN	Cumberland River	56,269
50	Dow Chemical Co.	Freeport	TX	Brazos River	55,559

** This facility released no persistent toxic metals in 1996, the latest year of data available.*

Table 17. Waterbodies receiving the most persistent toxic metals from direct discharges (1992-1996).

Rank	River/Waterbody	States	Total pounds of persistent toxic metals
1	Ohio River	IN, KY, OH, PA, WV	1,803,336
2	Tennessee River	AL, KY, TN	752,569
3	Shenango River	PA	631,134
4	Savannah River	GA, SC	615,009
5	Genesee River	NY	587,350
6	Mississippi Rive	AR, IA, IL, KY, LA, MN, MO, MS	477,472
7	Buffalo Bayou	TX	435,107
8	Alabama River	AL	385,254
9	Lake Erie	OH, PA	355,467
10	Patapsco River	MD	346,537

11	Detroit River	MI	330,055
12	Old Road Bay	MD	324,529
13	Black Creek, AL	AL	288,106
14	Cooper River	SC	285,368
15	Turtle River	GA	271,000
16	Curtis Creek, MD	MD	235,796
17	Harmon Creek	WV	210,274
18	Ouachita River	AR, LA	205,199
19	Thames River	CT	201,494
20	Red River	AR	190,000
21	Mobile River	AL	186,909
22	Androscoggin Riv	ME	179,711
23	Little Calumet R	IL, IN	178,449
24	Catawba River	NC, SC	173,096
25	Cumberland River	TN	170,662
26	Wabash River	IL, IN, OH	159,146
27	Hiwassee River	TN	157,036
28	Aquashicola Cree	PA	144,513
29	Hudson River	NY	140,604
30	Houston Ship Cha	TX	128,614
31	Red Clay Creek	DE	111,898
32	Straits of Juan	WA	110,600
33	Staulkinghead Cr	LA	102,046
34	Willamette River	OR	101,600
35	Arkansas River	AR, CO, KS, OK	93,771
36	Horseshoe Lake	IL	91,959
37	Susquehanna Rive	NY, PA	86,386
38	Snake River	ID	86,200
39	Wisconsin River	WI	84,087
40	Santa Monica Bay	CA	78,997
41	Dose Maie Creek	MS	74,300

42	Cape Fear River	NC	73,772
43	Holston River	TN	69,087
44	Fox River	IL, WI	68,786
45	Bellingham Bay	WA	68,426
46	Brazos River	TX	66,196
47	Bayou Verdine	LA	62,580
48	Grand Calumet Ri	IN	58,815
49	Tuscarawas River	OH	56,615
50	Allegheny River	PA	53,235

Source: U.S. PIRG. Compiled from U.S. EPA, Toxic Release Inventory 1992-1996.

Table 18. States with waters receiving the most persistent toxic metals (1992-1996).

Rank	State	Total pounds of persistent toxic metals
1	Ohio	1,888,992
2	Alabama	1,807,547
3	Pennsylvania	1,223,392
4	Georgia	1,040,795
5	Texas	984,772
6	Maryland	963,379
7	New York	909,872
8	Louisiana	732,884
9	West Virginia	730,207
10	South Carolina	600,330
11	Tennessee	554,741
12	Indiana	519,353
13	Michigan	484,394
14	Illinois	336,679
15	Arkansas	318,430
16	Washington	310,155
17	Maine	247,643

18	Connecticut	236,359
19	Mississippi	202,796
20	Wisconsin	190,509
21	Kentucky	165,490
22	California	146,694
23	North Carolina	135,224
24	Delaware	112,202
25	Oregon	110,672
26	Idaho	89,697
27	Nebraska	86,066
28	Virginia	84,296
29	New Jersey	57,442
30	Missouri	47,079
31	Oklahoma	40,881
32	Iowa	39,520
33	Minnesota	37,512
34	Utah	26,705
35	Kansas	25,142
36	Colorado	15,476
37	Florida	14,153
38	Massachusetts	13,506
39	Montana	3,144
40	Rhode Island	3,122
41	Puerto Rico	2,555
42	New Hampshire	2,224
43	Vermont	2,130
44	North Dakota	872
45	Arizona	819
46	Nevada	250
47	Alaska	181
48	New Mexico	58

49	Virgin Islands	47
50	Wyoming	45

Source: U.S. PIRG. Compiled from U.S. EPA's TRI, 1992-1996.