Wasting Our Waterways

Toxic Industrial Pollution and the Unfulfilled Promise of the Clean Water Act

Environment America Research & Policy Center

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Executive Summary

Industrial facilities continue to dump millions of pounds of toxic chemicals into America's rivers, streams, lakes and ocean waters each year—threatening both the environment and human health. According to the EPA, pollution from industrial facilities is responsible for threatening or fouling water quality in more than 10,000 miles of rivers and more than 200,000 acres of lakes, ponds and estuaries nationwide.

The continued release of large volumes of toxic chemicals into the nation's waterways shows that the nation needs to do more to reduce the threat posed by toxic chemicals to our environment and our health and to ensure that our waterways are fully protected against harmful pollution.

Industrial facilities dumped 232 million pounds of toxic chemicals into American waterways in 2007, according to the federal government's Toxic Release Inventory.

- Toxic chemicals were discharged to more than 1,900 waterways in all 50 states. The Ohio River ranked first for toxic discharges in 2007, followed by the New River and the Mississippi River.

- Nitrate compounds— which can cause serious health problems in infants if found in drinking water and which contribute to oxygen-depleted "dead zones" in waterways – are by far the largest toxic releases in terms of overall volume.

Large amounts of toxic chemicals linked to serious health effects were released to America's waterways in 2007.

- Industrial facilities discharged approximately 1.5 million pounds of chemicals linked to cancer to more than 1,300 waterways during 2007. The Ohio River received the greatest amount of cancer-causing chemical discharges, followed by the Catawba River in North and South Carolina and the Tennessee River. Pulp and paper mills, along with coal-fired power plants, were among the largest dischargers of cancer-causing chemicals.

- About 456,000 pounds of chemicals

Figure ES-1. Industrial Discharges of Toxic Chemicals to Waterways by State

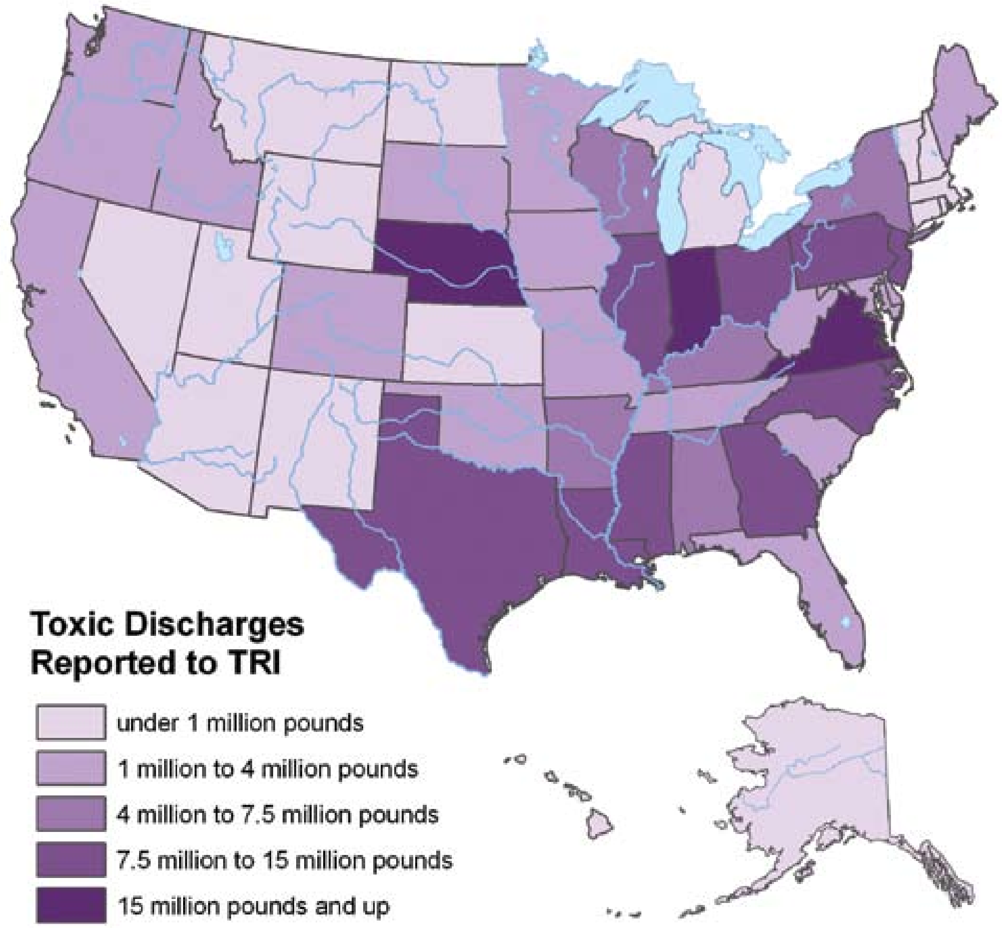


Table ES-1. Top 10 Waterways for Total Toxic Discharges

Waterway	Toxic discharges (lb.)
OHIO RIVER (IL, IN, KY, OH, PA, WV)	31,064,643
NEW RIVER (NC, VA, WV)	14,090,633
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	12,717,205
SAVANNAH RIVER (GA, SC)	7,683,500
DELAWARE RIVER (DE, NJ, PA)	7,449,555
CAPE FEAR RIVER (NC)	5,380,054
TRICOUNTY CANAL (NE)	5,256,876
MISSOURI RIVER (IA, KS, MO, ND, NE)	5,049,336
MUSKINGUM RIVER (OH)	4,994,243
SHONKA DITCH (NE)	4,375,761

linked to developmental disorders were discharged into more than 1,200 waterways. The Alabama River led the way in discharges of developmental toxicants, followed by the Verdigris River in Kansas and Oklahoma and the Mississippi River.

- Approximately 266,000 pounds of chemicals linked to reproductive disorders were released to more than 1,150 waterways. The Ohio River received the most discharges of reproductive toxicants, followed by the Verdigris River and the Mississippi River.

- Discharges of persistent bioaccumulative toxics (including dioxin and mercury), organochlorines and phthalates are also widespread. Safer industrial practices can reduce or eliminate discharges of these and other dangerous substances to America's waterways.

To protect the public and the environment from toxic releases, America should prevent pollution by requiring industries to reduce their use of toxic chemicals and restore and strengthen Clean Water Act protections for all of America's waterways.

The United States should revise its strategy for regulating toxic chemicals to encourage the development and use of safer alternatives. Specifically, the nation should:

- Require chemical manufacturers to test all chemicals for their safety and submit the results of that testing to the government and the public.

- Regulate chemicals based on their intrinsic capacity to cause harm to the environment or health, rather than basing regulation on resource-intensive and flawed efforts to determine "safe" levels of exposure to those chemicals.

- Require industries to disclose the amount of toxic chemicals they use in their facilities – safeguarding local residents' right to know about potential public health threats in their communities and creating incentives for industry to reduce its use of toxic chemicals.

- Require safer alternatives to toxic chemicals, where alternatives exist.

- Phase out the worst toxic chemicals.

The United States should restore Clean Water Act protections to all of America's waterways and improve enforcement of the Clean Water Act.

- The federal government should clarify that the Clean Water Act applies to headwaters streams, intermittent waterways, isolated wetlands and other waterways for which jurisdiction under the Clean Water Act has been called into question as a result of recent court decisions.

- The EPA and the states should strengthen enforcement of the Clean Water Act by, among other things, ratcheting down permitted pollution levels from industrial facilities, ensuring that permits are renewed on time, and requiring mandatory minimum penalties for polluters in violation of the law.

- The EPA should eliminate loopholes —such as the allowance of "mixing zones" for persistent bioaccumulative toxic chemicals—that allow greater discharge of toxic chemicals into waterways.

- The EPA should issue strong limits on releases of toxic heavy metals from power plants.

Introduction

In June 1969, the Cuyahoga River in Cleveland caught fire. It wasn't the first time the Cuyahoga burst into flames, but the 1969 fire came at a crucial moment—a time when Americans were finally beginning to pay serious attention to the impact of industrial pollution on the environment. The image of a major urban river on fire crystallized for many Americans the sense that our nation's waterways—once sources of beauty and inspiration as well as critical resources for human communities and wildlife alike—had too long been used as dumping grounds for industry.

Americans resolved to reclaim their waterways, and just three years later, they scored a major victory when Congress adopted the federal Clean Water Act. The Clean Water Act's goals were unambiguous—industrial discharges to America's waterways were not just to be reduced, but were to be *eliminated* in less than a generation, by 1985.

Forty years after the Cuyahoga River fire, America's waterways are much cleaner, but the nation is still a long way from meeting the goals of the Clean Water Act. Even today, industrial facilities dump millions of pounds of toxic chemicals into rivers, lakes and streams—with industrial discharges affecting thousands of waterways, large and small, in all 50 states.

Pollutant releases from factories, power plants and other industrial facilities are a key contributing factor to the pollution that leaves 46 percent of the nation's assessed rivers and streams and 61 percent of its assessed lakes unsafe for fishing, swimming or other uses.[1] But this pollution is not inevitable. With strong enforcement of the federal Clean Water Act and policies that encourage inherently safer practices on the part of industry, the nation can take a major step toward the restoration of our waterways—removing, once and for all, the threat of toxic chemical discharges to our rivers and streams.

Toxic Releases to Waterways Threaten the Environment and Public Health

The direct industrial discharge of toxic substances into waterways has a variety of impacts on our environment. Once in our waterways, toxic chemicals can contaminate sediments, pollute the bodies of aquatic organisms, and infiltrate drinking water supplies, creating a wide variety of problems for humans and the environment.

Toxic Releases and the Environment

Pollution from industrial facilities is a leading cause of water quality problems in our nation's rivers, streams and lakes. According to the EPA, industrial discharges are thought to be responsible for threatening or fouling water quality in more than 10,000 miles of rivers and more than 200,000 acres of lakes, ponds and estuaries nationwide.[2]

Impacts on Local Waterways

Perhaps the most immediate and severe result of toxic chemical releases on local waterways is the death of wildlife. Toxic chemical releases—whether deliberate or accidental—can trigger fish kills. In Maryland, for example, industrial discharges were responsible for 45 separate fish kill events between 1984 and 2008.[3] In North Carolina, toxic spills—including spills of sewage, industrial chemicals and sludge waste—triggered six fish kills in 2008 alone, claiming more than 25,000 fish.[4]

Dramatic fish kills may attract headlines, but routine toxic chemical discharges can have subtle and long-lasting impacts on aquatic life. In the Potomac River basin in 2005, for example, scientists discovered that 80 percent of the male smallmouth bass they captured bore female eggs—a sign that hormonal processes typically found only in female fish were being activated in males.[5] While the cause of the abnormalities was not known, scientists suspected that the change was the result of exposure to toxic chemicals that interfere with the normal functioning of the hormonal system in both humans and wildlife. Exposure to these hormone-disrupting chemicals can cause serious reproductive, developmental and immune system problems.

Some chemicals that are toxic also pose other, more indirect threats to the health of waterways. Nitrate compounds—which come from agricultural runoff as well as industrial sources—are toxic, but mainly threaten wildlife and ecosystems because they feed the growth of algae, which can deplete oxygen levels in local waterways.

Persistent Bioaccumulative Toxics—Local Pollutants with a Global Impact

Some toxic substances are long-lived and accumulate in animal tissue, becoming more and more concentrated further up the food chain. Decades after science first pointed to the dangerous impacts of persistent bioaccumulative toxics (PBTs)—a class of chemicals that includes such notorious chemicals as DDT and PCBs—those substances continue to turn up in the tissues of animals great distances from any known source of pollution, and some PBTs continue to be produced, used and discharged into America's waterways.

Discharges of persistent bioaccumulative toxics to waterways (along with discharges to the land and air) not only harm wildlife in those waterways, but can also impact wildlife thousands of miles away. Some persistent chemicals released to local waterways, for example, eventually evaporate and are carried by rain or snow to locations far away. In the early 1990s, for example, the Great Lakes, which had long received discharges of PCBs from industrial facilities, were a significant net *source* of PCBs to the air—contributing to contamination elsewhere.[6]

PCBs continue to be found in the tissues of polar bears three decades after the United States banned their manufacture.[7] PCB contamination has been linked to immune system and reproductive problems in the bears, which already face threats from another problem caused by pollution: global warming.[8] PCBs have also been linked to a mass die-off of North Sea and Baltic seals during the 1980s, and are among the environmental pollutants linked to health problems in salmon, mink and other species.[9]

While governments, including the U.S. government, have taken action to reduce or eliminate production of notorious toxic chemicals such as DDT and PCBs, other toxic chemicals continue to be produced in large quantities and show up in the tissues of wildlife around the globe. Brominated flame retardants (BFRs), which have been commonly used in furniture, computer circuit boards and clothing, share some characteristics with persistent bioaccumulative toxics. BFRs have been shown to cause a variety of health problems in animals during laboratory studies, and are accumulating rapidly in humans and animals. BFRs have been found in sperm whales, Arctic seals, birds and fish.[10] Direct industrial releases of BFRs, including discharges to waterways, are among the many ways that BFRs can find their way into the environment and into the bodies of animals and humans.[11]

The recent experience with brominated flame retardants shows the dangers of public policy that treats all chemicals as "innocent until proven guilty"—allowing widespread release to consumers and the environment *before* they are demonstrated to be safe. As the story of PCBs shows, the impacts of toxic chemical releases can last for generations, and be felt far away from the original source of the pollution.

Toxic Releases and Human Health

Toxic chemicals also have the ability to impact human health, with the potential to trigger cancer, reproductive and developmental problems, and a host of other health effects.

The state of California has developed

a list of more than 500 chemicals and substances known to cause cancer, as well as more than 250 chemicals linked to developmental problems and more than 75 chemicals liked to reproductive disorders in men, women or both.[12] It is likely that others among the 80,000 chemicals registered for commercial use in the United States trigger these or other health effects, as only a small percentage of chemicals have been fully tested for their impact on health.[13]

Once released into waterways, there are many potential pathways for toxic chemicals to impact human health. One pathway is through food. Bioaccumulative toxics build up in animal tissue and find their way into our bodies when we eat animal products. Mercury and dioxin contamination of fish are examples. Mercury enters waterways both directly, through the discharge of mercury-tainted wastewater from power plants and other industrial facilities, and indirectly through emissions from power plant smokestacks that precipitate back into waterways. Once in water, mercury can undergo a series of transformations that enable it to be absorbed and accumulated up the food chain.[14] Similarly, dioxin from sources such as pulp and paper mills that use chlorine can find its way into sediment, where it can be ingested by fish, becoming part of the food chain.

Another route of exposure is through drinking water. A 2005 investigation by the Environmental Working Group of tap water samples from across the country discovered 166 industrial pollutants in drinking water. Approximately 12 million people, for example, were exposed to levels of nitrates above recommended health limits.[15] Other industrial pollutants—including heavy metals such as lead and solvents such as tetrachloroethylene—have been found in the drinking water consumed by millions of Americans.[16] A recent investigative report by the *New York Times* found that roughly one in 10 Americans has been exposed to drinking water that either contained dangerous chemicals or failed to meet federal health standards.[17]

People can even be exposed to toxic chemicals before they are born and as newborns. Brominated flame retardants—which can enter the environment either via direct discharges from industrial plants or emissions from consumer products containing the chemicals—have been found in breast milk, with women in the United States showing the highest concentrations in the world.[18] Many chemicals can also cross the placental barrier, with the potential to disrupt the development of the fetus, creating problems that may be difficult to detect (for example, neurological problems) or may not manifest themselves until years later.

Toxic Releases to U.S. Waterways in 2007

The discharge of toxic chemicals to U.S. waterways has left a legacy of environmental damage and impacts on human health. While industrial pollution of rivers, streams and lakes has decreased over the last several decades as a result of the Clean Water Act, industrial facilities continue to discharge millions of pounds of toxic chemicals to our waterways each year.

This report uses data from the federal government's Toxic Release Inventory (TRI) to estimate releases of toxic chemicals to American waterways in 2007.

Under TRI, industrial facilities are required to release information about their discharges of a limited number of specific toxic chemicals. (See "The Toxic Release Inventory: What it Tells Us About Toxic Pollution … and What it Leaves Out," page 10.) Industrial facilities that report to the TRI reported the release of 244 toxic chemicals or classes of toxic pollutants to American waterways in 2007. Those chemicals vary greatly in their toxicity and the impacts they have on the environment and human health. Some pollutants that are released in large volumes, for example, may have less of an impact on the environment or human health than other highly toxic pollutants released in smaller volumes.

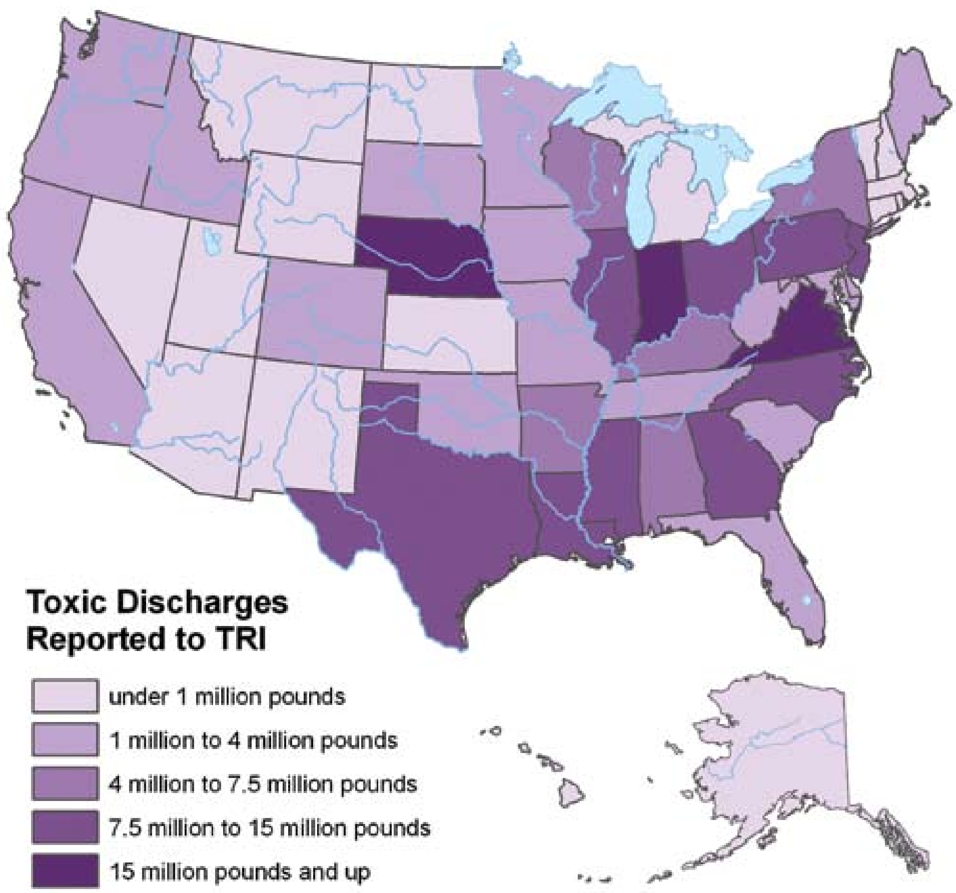
In this report, we examine data on toxic discharges through several lenses, presenting information on the volume of releases to American waterways of:

- All toxic chemicals listed under TRI;
- Toxic chemicals linked to specific health effects—cancer, reproductive disorders and developmental harm; and
- Certain chemicals that can have a significant impact on the environment and human health in small quantities—including persistent bioaccumulative toxics, organochlorines and phthalates.

232 Million Pounds of Toxic Chemicals Released to Waterways in 2007

At least 232 million pounds of toxic chemicals were released to America's waterways

Figure 1. Industrial Discharges of Toxic Chemicals to Waterways by State



in 2007. Toxic chemicals were released into more than 1,900 different waterways in all 50 states.

The state of Indiana led the nation in total volume of toxic discharges to waterways, with more than 27 million pounds of toxic discharges. Indiana was followed by Virginia, Nebraska, Texas and Louisiana for total toxic discharges. (See Figure 1.)

Releases of nitrate compounds represented 90 percent of the total volume of discharges to waterways reported under the TRI. Nitrates are toxic, particularly to infants consuming formula made with nitrate-laden drinking water, who may be susceptible to methemoglobinemia, or "blue baby" syndrome, a disease that reduces the ability of blood to carry oxygen throughout the body.[19] Nitrates have also been linked in some studies to organ damage in adults.[20]

Nitrates are also a major environmental threat as one of the leading sources of nutrient pollution to waterways. Nitrates and other nutrients can fuel the growth of algae blooms. As the algae decay, decomposition can cause the depletion of oxygen levels in the waterway, triggering the formation of "dead zones" in which aquatic life cannot be sustained. The dead zone that forms each summer in the Gulf of Mexico has been attributed to the massive flow of nutrients, including nitrates, from the Mississippi River basin. While fertilizer runoff from agricultural activities is the leading source of nitrates in the Mississippi, industrial discharge plays a small but significant role.[21]

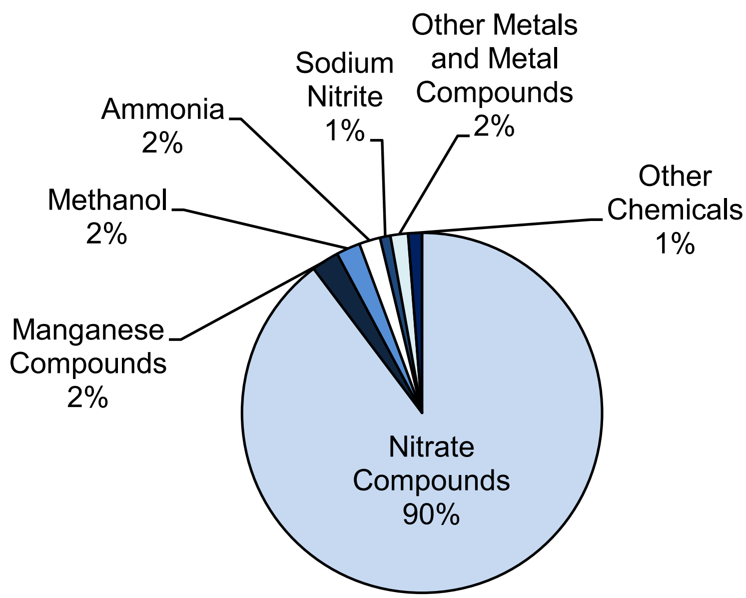
The Toxic Release Inventory: What it Tells Us About Toxic Pollution … and What it Leaves Out

The Environmental Protection Agency's Toxic Release Inventory (TRI) is the most comprehensive source of information available on the industrial release of toxic substances to America's environment. The TRI plays a critical role in informing communities about the potential environmental impacts of nearby industrial facilities and has been used time and again to encourage companies to reduce their toxic discharges and adopt safer practices.

While the TRI is an important source of information, it is not fool-proof. The TRI only covers industrial facilities, meaning that many other sources of toxic pollution—from wastewater treatment plants to agricultural facilities—are not reported. Industrial facilities are required to report only the releases of chemicals on the TRI list—meaning that releases of newer chemicals or those of more recent concern might not be reported at all. In addition, industrial facilities must report to the TRI only if they meet certain thresholds for the amount of toxic chemicals they manufacture, process or use in a particular year. As a result, some toxic releases to waterways by covered industries are not reported to the public.

In other words, TRI data do not provide a complete picture of the amount of toxic chemicals that flow into the nation's environment. But the TRI is the best and most complete set of data available. In this report, we use TRI data for 2007 to calculate the amount of toxic chemicals discharged by industrial facilities to America's waterways. For important details on how we analyzed the data to derive our conclusions, please see the "Methodology" section at the end of this report.

Figure 2. Toxic Releases by Chemical by Volume



Unsurprisingly, the waterways that rank high for total toxic releases will be those with large releases of nitrate compounds. Among the major sources of nitrate compounds are food and beverage manufacturing (slaughterhouses, rendering plants, etc.), primary metals manufacturing, chemical plants, and petroleum refineries. Waterways receiving discharges from these types of facilities, therefore, will tend to rank high on the list for total toxic releases.

The Ohio River topped all waterways for toxic discharges in 2007 with more than 31 million pounds of discharges to the waterway. (See Table 1.) Facilities along the Ohio River reported releases of 91 different toxic chemicals in 2007, including cyanide, chromium and arsenic compounds, lead, dioxin and benzene. Those releases came from 99 facilities in six states.

For some larger waterways, the amount of direct discharges may not tell the whole story of the impact of toxic pollution. The Muskingum River, for example, flows into the Ohio, which in turn empties into the Mississippi. All three rivers are among the top 10 for toxic releases into waterways.

Large waterways are not the only ones that receive large amounts of toxic discharges. Several smaller waterways, such as Nebraska's Shonka Ditch, rank among the top waterways for receiving toxic discharges nationwide.

For several waterways on the list, one company was responsible for all or the vast majority of the toxic discharges. The Tricounty Canal (Tyson Fresh Meats), the Cape Fear River (Smithfield Foods), Shonka Ditch (Cargill Meat Solutions); the Illinois River (Cargill), the Snake River (McCain Foods) and the Big Blue

Table 1. Top 20 Waterways for Total Toxic Discharges, 2007

Waterway	Toxic discharges (lb.)
OHIO RIVER (IL, IN, KY, OH, PA, WV)	31,064,643
NEW RIVER (NC, VA, WV)	14,090,633
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	12,717,205
SAVANNAH RIVER (GA, SC)	7,683,500
DELAWARE RIVER (DE, NJ, PA)	7,449,555
CAPE FEAR RIVER (NC)	5,380,054
TRICOUNTY CANAL (NE)	5,256,876
MISSOURI RIVER (IA, KS, MO, ND, NE)	5,049,336
MUSKINGUM RIVER (OH)	4,994,243
SHONKA DITCH (NE)	4,375,761
ILLINOIS RIVER (IL)	3,926,771
ROCK RIVER (IL, WI)	3,754,451
SNAKE RIVER (ID, OR)	3,111,068
ARKANSAS RIVER (AR, CO, KS, OK)	3,053,497
HOUSTON SHIP CHANNEL (TX)	2,967,305
BIG BLUE RIVER (NE)	2,903,675
SOUTH PLATTE RIVER (CO)	2,682,144
PICKENS CREEK (MS)	2,655,575
SUSQUEHANNA RIVER (NY, PA)	2,651,212
MORSES CREEK (NJ)	2,620,974

River (Farmland Foods) were among those with large releases from one company in the food or beverage processing industry. Large polluters in other industries also had outsized impacts on other small streams. Morses Creek in New Jersey, for example, receives discharges from the massive Conoco Philips Bayway refinery and chemical plant. Ohio's Hyde Run Ditch (which ranked 29th for total toxic discharges) receives discharges from one facility—the Brush Wellman factory in Elmore, Ohio, which is a major producer of beryllium.

Pollution of large water bodies may have the broadest impact on the public and receive the greatest attention. But as these examples show, small streams receive vast amounts of pollution as well—often from just a single large polluter—creating the potential for significant harm to local ecosystems and for pollution to be carried downstream to larger waterways.

Releases of Toxic Chemicals Linked to Human Health Problems Are Widespread

The high volume of toxic discharges to America's waterways is a tremendous concern for the ongoing health of our rivers, streams and lakes. But toxic chemicals vary in the impacts they have on human health, as well as in their toxicity. To gain a fuller understanding of the impact of toxic discharges, it is helpful to examine the releases of chemicals that, while released in smaller

Table 2. Top 20 Waterways for Discharges of Cancer-Causing Chemicals, 2007

Waterway	Discharges of cancer-causing chemicals (lbs.)
OHIO RIVER (IL, IN, KY, OH, PA, WV)	96,669
CATAWBA RIVER (NC, SC)	96,370
TENNESSEE RIVER (AL, KY, TN)	89,401
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	87,896
ALABAMA RIVER (AL)	54,205
SAVANNAH RIVER (GA, SC)	38,064
COOPER RIVER (SC)	38,052
COLUMBIA RIVER (OR, WA)	32,828
RED RIVER (AR, LA, OK)	32,775
HOLSTON RIVER (TN)	31,420
VERDIGRIS RIVER (KS, OK)	30,962
HUDSON RIVER (NY)	27,899
BRAZOS RIVER (TX)	27,526
ANDROSCOGGIN RIVER (ME, NH)	25,502
PACIFIC OCEAN (CA)	24,084
CUMBERLAND RIVER (KY, TN)	21,364
FENHOLLOWAY RIVER (FL)	19,226
BROAD RIVER (NC, SC)	18,801
TURTLE RIVER (GA)	18,795
DELAWARE RIVER (DE, NJ, PA)	18,211

volumes, are linked to severe and chronic health problems.

Cancer

In 2007, manufacturing facilities discharged approximately 1.5 million pounds of cancer-causing chemicals into waterways.[22] As was the case with total discharges, the Ohio River again led the way in discharges, followed closely by the Catawba River in North and South Carolina.

Cancer-causing chemicals were discharged into approximately 1,300 waterways nationwide in 2007. Several industries discharge large amounts of cancer-causing chemicals to waterways. The pulp and paper industry was the largest emitter of cancer-causing chemicals to waterways, discharging more than 640,000 pounds of those substances to waterways, or 44 percent of the total. The chemical industry ranked second, with 314,000 pounds, and utilities (including fossil-fuel fired power plants) third, with 276,000 pounds.

These industries produce and discharge a variety of cancer-causing chemicals, each with their own potential impact on the environment and health. (See Table 3.)

For example, metals such as cobalt, nickel, lead, chromium and arsenic can persist in the environment for long periods of time. Electric power plants—particularly those fueled by coal—are major sources of metal and metal compound discharges to waterways. Power plants account for 94 percent of water releases of arsenic compounds, 57 percent of cobalt compounds, 47 percent of nickel compounds, 46 percent of chromium compounds and 19 percent of lead compounds. These compounds are contaminants in coal and are often released to waterways as part of a power plant's wastewater stream.

Developmental and Reproductive Toxicants

Among the toxic chemicals discharged to America's waterways are those shown to impede the proper physical and mental development of fetuses and children. Among the potential health effects of these chemicals are fetal death, structural defects such as cleft lip/cleft palette and heart abnormalities, as well as neurological, hormonal and immune system problems.

In 2007, industrial facilities released approximately 456,000 pounds of developmental toxicants to more than 1,200 America's waterways. The Alabama River ranks number one for developmental toxicants due largely to releases of the pesticide

Table 3. Cancer-Causing Chemicals Discharged to Waterways

Chemical name	Water discharges (lb.)
ACETALDEHYDE	341,080
FORMALDEHYDE	278,335
COBALT COMPOUNDS	181,758
NICKEL COMPOUNDS	141,636
LEAD COMPOUNDS	81,351
CHROMIUM COMPOUNDS	67,404
ARSENIC COMPOUNDS	62,570
1 4-DIOXANE	56,996
CATECHOL	47,459
BENZENE	35,560

nabam and the biocide sodium dimethyldithiocarbamate from Weyerhaeuser's Pine Hill, Alabama, paper mill. The Verdigris River in Kansas and Oklahoma ranked second, due largely to releases from a single facility, the Coffeyville Resources refinery in Coffeyville, Kansas, which released significant amounts of benzene and toluene into the waterway. (See Table 4.)

As with the other categories of toxic chemical releases, larger waterways such as the Mississippi and Ohio rivers rank high for total discharges of developmental toxicants. But several smaller waterways also receive large amounts of developmental toxicants. Crooked Creek, a tributary of the Meramec River in Missouri, ranks ninth for total discharges of developmental toxicants due to large discharges of lead compounds from facilities operated by the Renco Group. (See "Lead Pollution in Missouri," below.)

Releases of reproductive toxicants into waterways totaled 266,000 pounds in 2007, with discharges occurring to more than 1,150 waterways nationwide. Because some high-volume developmental toxicants also have the potential to interfere with reproductive health, many of the same waterways that have received large amounts of developmental toxicants also rank high for reproductive toxicant releases. The Ohio River received the greatest amount of reproductive toxicant releases, followed by the Verdigris River and Mississippi River. (See Table 5, p.16.)

Lead Pollution in Missouri

During the 1970s, public health advocates achieved major victories in the battle to reduce exposure to toxic lead with the elimination of lead from paint and gasoline. But lead pollution continues to threaten waterways in parts of the country.

The Renco Group's Doe Run subsidiary mines lead at several locations in southeastern Missouri's "lead belt," and operates the world's largest secondary lead smelter in Iron County, Missouri.[23] Discharges from one of the company's Missouri mines and its Iron County secondary smelter flow into Crooked Creek. In 2007, Renco Group facilities released nearly 12,000 pounds of toxic chemicals, including more than 7,000 pounds of lead compounds, into Crooked Creek.

The Doe Run secondary lead smelter is a repeat violator of the Clean Water Act, with four violations of the law occurring between 2004 and 2006, according to a *New York Times* investigation.[24] Average lead levels in the sediment of parts of Crooked Creek have been measured at more than one and a half times the level at which toxic effects on wildlife are considered likely.[25] As a result, portions of Crooked Creek have been deemed by the state of Missouri to be "impaired" — meaning that they are not suitable for the protection of aquatic life.[26]

The experience of Crooked Creek shows that toxic discharges from a single industrial facility can have a large impact on our waterways and underscores the importance of maintaining Clean Water Act protections—and properly enforcing the law—for all of America's waterways.

Table 4. Top 20 Waterways for Releases of Developmental Toxicants, 2007

Waterway	Developmental toxicant releases (lb.)
ALABAMA RIVER (AL)	73,553
VERDIGRIS RIVER (KS, OK)	53,934
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	38,756
OHIO RIVER (IL, IN, KY, OH, PA, WV)	37,364
TENNESSEE RIVER (AL, KY, TN)	15,572
JAMES RIVER (VA)	13,914
KANAWHA RIVER (WV)	10,252
CONGAREE RIVER (SC)	9,900
CROOKED CREEK (MO)	7,306
CLINCH RIVER (TN, VA)	5,588
SABINE RIVER (TX)	5,483
KANSAS RIVER (KS)	5,444
KASKASKIA RIVER (IL)	5,277
BRAZOS RIVER (TX)	4,950
CAPE FEAR RIVER (NC)	4,775
LAKE ERIE (MI, NY, OH, PA)	4,332
HOLSTON RIVER (TN)	4,100
WABASH RIVER (IL, IN, OH)	4,079
INDIANA HARBOR SHIP CANAL (IN)	4,010
COOSA RIVER (AL, GA)	3,856

Releases of Small-Volume Toxic Chemicals Also Pose Concern

As noted earlier, toxic chemicals vary greatly in their toxicity and effects on the environment and health. Some toxic chemicals trigger severe health effects at low levels of exposure.

Some particular groups of relatively small-volume chemicals worthy of concern are the following:

Persistent Bioaccumulative Toxics

Persistent bioaccumulative toxicants (PBTs) are those that persist in the environment (that is, are difficult or impossible to destroy) and accumulate up the food chain. As humans are generally at the top of the food chain, PBTs pose particular problems for us. Consuming fish contaminated with mercury, for example, can impair the neurological development of fetuses and small children.[27]

Direct surface water discharges of PBTs are common across the United States. More than 600 waterways across the country received direct discharges of lead compounds in 2007. Polycyclic aromatic compounds, a family of cancer-causing chemicals released primarily by chemical plants and oil refineries, were discharged into more than 150 waterways. And dioxins, which are mainly released by the chemical industry, were discharged into more than 80 waterways nationwide.

Table 5. Top 20 Waterways for Releases of Reproductive Toxicants, 2007

Waterway	Reproductive toxicant releases (lb.)
OHIO RIVER (IL, IN, KY, OH, PA, WV)	29,665
VERDIGRIS RIVER (KS, OK)	27,030
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	24,418
BRAZOS RIVER (TX)	16,959
KANAWHA RIVER (WV)	10,181
CONGAREE RIVER (SC)	9,900
TENNESSEE RIVER (AL, KY, TN)	7,367
CROOKED CREEK (MO)	7,160
SABINE RIVER (TX)	5,466
KANSAS RIVER (KS)	5,444
INDIANA HARBOR SHIP CANAL (IN)	4,008
ALABAMA RIVER (AL)	3,509
DELAWARE RIVER (DE, NJ, PA)	3,471
BLACK RIVER (OH)	3,280
CHATTAHOOCHEE RIVER (AL, GA)	2,460
MONONGAHELA RIVER (PA, WV)	2,425
DES PLAINES RIVER (IL, WI)	2,261
CLINCH RIVER (TN, VA)	1,988
ILLINOIS RIVER (IL)	1,986
COLUMBIA RIVER (OR, WA)	1,896

Table 6. Water Discharges of Most Widely-Released Persistent Bioaccumulative Toxicants

Persistent Bioaccumulative Toxicant	Waterways Receiving Discharges	Waterway with Greatest Discharges
Lead Compounds	637	Crooked Creek, MO
Lead	382	Brazos River, TX
Mercury Compounds	233	Big Sioux River, SD
Polycyclic Aromatic Compounds	164	Monte Sano Bayou, LA
Dioxin and Dioxin-Like Compounds	86	Brazos River, TX
Benzo(ghi)perylene	86	Maumee Bay, OH and MI
Mercury	58	Mississippi River

Discharges of even small amounts of PBTs can have serious consequences. For example, industrial facilities reported releasing approximately 1.7 pounds of dioxin and dioxin-like compounds into waterways nationwide in 2007—representing less than one-millionth of a percent of total toxic discharges to waterways nationwide. However, given that the World Health Organization guidelines for dioxin recommend exposure of less than *one-billionth of a gram* per day, even this relatively small amount of dioxin discharges can have serious implications for public health.[28]

Organochlorines and Phthalates

Organochlorine pesticides and phthalates are both classes of chemicals with serious implications for health—and for which safer alternatives are available. Organochlorines, the family of pesticides that includes DDT, have been linked to a wide variety of impacts on the environment and human health, including cancer, interference with the endocrine system, immune system problems, and developmental and reproductive disorders.[29] While DDT and some other organochlorines have been banned, others remain in use today.

Phthalates are added to plastic products such as food wrapping and children's toys to make them flexible. Some phthalates have been linked to reproductive and developmental problems.[30]

Organochlorines and phthalates are not as widely released as many of the other toxic substances discussed in this report, but still impact dozens of waterways nationwide. Releases of organochlorines were reported to 21 waterways nationwide, with Alabama's Little Cahaba River receiving the greatest amount of total discharges. Emissions of pentachlorophenol (PCP) from the wood preservation industry accounted for most of the discharges. PCP was once a widely used herbicide in the United States, but over-the-counter sales of PCP were banned in the U.S. in 1987.[31] The chemical remains in use, however, as a fungicide in wood products such as utility poles, wharf pilings and railroad ties.[32] Phthalates were released to 15 waterways nationwide, with Tennessee's Holston River leading the way for total releases.

Direct discharges of organochlorines and phthalates by industrial facilities are not necessarily the most important routes of exposure to these chemicals—people are more likely to be exposed to phthalates, for example, in consumer products. The continued discharge of these chemicals to waterways, however, underscores the many ways in which these substances, once produced, find their way into our environment, and reinforces the need for pollution prevention to be the primary approach to reducing toxic health threats.

Protecting America's Waterways from Toxic Releases: Chemical Policy and the Clean Water Act

The millions of pounds of toxic discharges to America's waterways—coupled with the continued discharge of smaller amounts of hazardous substances such as lead, mercury and dioxin—suggest that there are deep flaws in the policy tools the United States uses to keep toxic chemicals out of our waterways.

Environmental policy in the United States has several weaknesses. It too often takes an "innocent until proven guilty" approach to potential health hazards. It focuses more on stopping pollution at the end of the pipe rather than encouraging inherently safer products and industrial practices. And it fails even in the task of stopping pollution at the end of the pipe because of gaping loopholes in environmental laws and inadequate enforcement. The result is the continued release of toxic chemicals into America's rivers, streams and lakes.

A New Chemical Policy in the U.S.: Protecting the Environment and Public Health

The best way to protect the public and the environment from toxic chemical discharges is to reduce the use and production of toxic chemicals in the first place. Reducing the use of toxic chemicals will not only reduce discharges to waterways, but can also reduce other forms of exposure to toxic chemicals, including releases to the air and land and exposure through consumer products.

Switching to Safer Alternatives

Safer alternatives exist for many toxic chemicals. Replacing these chemicals with safer alternatives can reduce threats at all stages of a product's lifespan—from manufacturing to use to disposal.

Many examples exist of safer alternatives to toxic chemicals released into America's waterways:

- Tetrachloroethylene (also known as perchloroethylene or perc) is a toxic solvent used in dry cleaning and textile processing and is a cancer-causing chemical.[33] Industrial facilities reported releasing more than 600 pounds of perc directly to U.S. waterways in 2007, but that figure does not include discharges by the thousands of smaller facilities nationwide that use the chemical but do not report to the TRI. Hundreds of dry cleaners across the country have switched to safer processes that do not rely on perc, including "wet" cleaning using water and the use of liquid carbon dioxide. With safer alternatives on the market, California has taken steps to phase out the use of perc at dry cleaners, with the chemical to be eliminated from use by 2023.[34]

- Formaldehyde is used in a wide variety of consumer products and has been linked to health effects ranging from allergies to cancer.[35] In 2007, industrial facilities reported releasing more than 278,000 pounds of formaldehyde to waterways. Safer alternatives for many uses of formaldehyde already exist, including adhesives based on non-toxic natural ingredients.

- Phthalates are a class of chemicals used to make hard plastics flexible, as ingredients in personal care products, and in other applications. California has listed five phthalates as developmental and/or reproductive toxics.[36] A wealth of safer alternatives exist, including plastics other than PVC (which typically includes phthalates) and alternative plasticizers for PVC.[37]

- Changes in industrial processes can reduce releases of toxic byproducts, such as dioxins. Oxygen-based processes, for example, can eliminate the need for chlorine bleaching in paper production, thereby eliminating the creation of dioxins.[38]

The importance of pursuing inherently safer alternatives, rather than relying solely on pollution controls at the end of the pipe, is demonstrated by coal-fired power plants. For decades, emissions from power plant smokestacks have been a major public health concern. In an effort to clean up the nation's air, power plants have increasingly been fitted with scrubbers that remove pollutants such as arsenic and heavy metals. However, these pollutants, once captured, can find their way into waterways, either via permitted liquid discharges from the plants themselves or the leaching of contaminants from coal ash into waterways.[39] The use of inherently safer alternatives—such as renewable energy—can reduce these threats.

Reforming Chemical Policy

Manufacturers, however, will face little incentive to develop and use safer alternatives to toxic chemicals without clear guidance from government. Chemical policy must be based both on appropriate science and on the imperative to protect the public from harmful exposures before they occur.

Among the cornerstones of this new chemical policy should be the following:

Regulation of chemicals based on their intrinsic hazards. America's system for testing and regulating toxic chemicals is based on time-consuming, resource-intensive and anachronistic forms of risk assessment. Much time and energy is wasted determining "safe" levels of exposure to toxic chemicals based on laboratory experimentation. These assessments often fail to investigate the impacts that chemical exposures can have on vulnerable populations or at vulnerable stages of development, nor do they assess the impact of cumulative exposures to a chemical over time, the synergistic effects of exposure to multiple chemicals, or the subtler potential impacts resulting from low-dose exposures. The result is that many chemicals with the potential to harm human health or the environment remain in use—and the process for evaluating all chemicals for safety is more difficult and time-consuming than it needs to be.

Instead, the United States should regulate chemicals based on their intrinsic hazards. That is, if evidence exists that a chemical causes cancer, for example, the presumption of public policy should be that public exposure to that chemical should be minimized, if not eliminated altogether.

Evaluation of all chemicals on the market. Chemical manufacturers should be required to test their chemicals for safety before they are put on the market. Manufacturers of existing chemicals should be required to disclose all relevant health and safety information to the public and to fill in the gaps in their health and safety assessments within a reasonable period of time.

Planned phase-out of hazardous chemicals. Once a chemical has been deemed hazardous, the goal of public policy should be to reduce, and then eliminate, exposures to that chemical. Chemicals for which safer alternatives already exist should be scheduled for phase out. Evaluations of safer alternatives should include not only the potential for chemical-for-chemical substitutions but also changes in manufacturing processes and product design that can reduce or eliminate the need for toxic chemicals. For chemicals for which safer alternatives do not yet exist, there should be strict limits on use and exposure to protect the public, as well as a targeted timeline for ultimate phase-out.

Required disclosure of industrial toxic chemical use. Facilities that use significant amounts of toxic chemicals should be required to disclose which chemicals they are using and in what amounts, so that nearby communities can be aware of potential threats and to create incentives for industrial facilities to reduce their use of toxic chemicals. In addition, facilities should be required to develop plans to reduce toxic chemical use and adopt safer alternatives. States such as Massachusetts and New Jersey that have aggressively adopted this pollution prevention approach have experienced declines in toxic chemical use, the creation of toxic byproducts, and toxic discharges to the environment.[40]

Setting clear standards designed to protect the public from toxic chemical exposures—and insisting upon the managed phase-out of dangerous chemicals—can unleash innovation in the design of safer products and industrial processes, while reducing threats to the public.

The Clean Water Act: Ensuring Strong Protection for All of America's Waterways

The federal Clean Water Act is the nation's primary bulwark against pollution of our waterways. Yet, for too long, implementation of the Clean Water Act has failed to live up to the vision of pollution-free waterways embraced by its authors. Moreover, the Clean Water Act is facing perhaps the most important test in its history as a result of recent judicial decisions that have limited the law's scope.

To protect the environment and human health from releases of toxic chemicals into our waterways, federal and state governments should take several steps to strengthen implementation of the Clean Water Act.

Protections for Small Waterways

A series of recent court decisions, culminating in the U.S. Supreme Court's 2006 decision in the case of *Rapanos v. United States*, have threatened the protection that intermittent and headwaters streams and isolated wetlands have traditionally enjoyed under the Clean Water Act. These waterways play important roles in local ecology, while protection of headwaters and intermittent streams is critical for maintaining water quality downstream.

The *Rapanos* decision left unclear exactly which waterways do enjoy protection under the Clean Water Act. Navigable waterways and those that cross state boundaries, along with their tributaries, retain their traditional protections. But the Supreme Court's unusual 4-1-4 ruling in the *Rapanos* case has left the courts and EPA torn between two different standards for Clean Water Act jurisdiction – the strict standard, embraced by four of the court's members, that eliminates protection for intermittent streams and those without a surface connection to covered waterways, and the less stringent legal standard, outlined in a concurring

Clean Water Act Protection for the Los Angeles River

The Los Angeles River has none of the glitz or glamour of the city that shares its name. Its banks are covered in concrete for much of its 51-mile length, and are lined with fences and "no trespassing" signs. The river is also notorious for its pollution. According to the Toxics Release Inventory, the Los Angeles River received discharges of lead, chromium and dioxin or related compounds in 2007.

But the L.A. River wasn't always this way. Prior to the massive changes made to the river in the name of flood control beginning in the 1930s, the Los Angeles River passed through wetlands and among stands of sycamore and cottonwood.[42] In recent years, Los Angelenos have rallied to restore the L.A. River to some of its past glory. New parks and bikeways are sprouting along the river's banks and more are planned for the future.

Unfortunately, the Los Angeles River isn't just an example of how an urban river can be reclaimed, but it is also an example of how judicial decisions to limit the scope of the Clean Water Act can affect important waterways. In June 2008, the Army Corps of Engineers ruled that only four miles of the L.A. River's 51-mile length were "traditionally navigable waters"—meaning that much of the rest of the river could be stripped of protection under the Clean Water Act.[43] The EPA stepped in to review the Corps' decision, but loss of protection under the Clean Water Act would make it impossible for the EPA to enforce existing water pollution laws along the river—jeopardizing the revitalization that many people in the Los Angeles region are working so hard to achieve and potentially allowing industrial facilities along the river to avoid compliance with the Clean Water Act.

Ensuring continued protection under the Clean Water Act is critical for the restoration of the L.A. River, as well as the health of countless waterways across the nation.

opinion by Justice Anthony Kennedy, that requires a "significant nexus" to exist with a navigable waterway for a waterbody to enjoy protection under the Clean Water Act.[41]

The *Rapanos* decision and other previous decisions threaten the protection enjoyed by thousands of waterways nationwide—with real consequences for the environment. In much of the American West, for example, perennial streams are uncommon. Only 3 percent of all streams in Arizona, for example, are perennial, along with 8 percent in New Mexico and 9 percent in Nevada.[44] Nationwide, the EPA estimates that 111 million people are served by drinking water systems that draw their water from headwaters streams or intermittent waterways.[45] These important waterways could completely lose protection under the federal Clean Water Act, leaving discharges to those waterways unregulated by the EPA.

Improve Enforcement of the Clean Water Act

The Clean Water Act is America's main source of protection against water pollution, but it has not always been adequately enforced. States (which are primarily responsible for enforcing the law in most of the country) have often been unwilling to tighten pollution limits on industrial dischargers and have often let illegal polluters get away with exceeding their permitted pollution levels without penalty or with only a slap on the wrist.

The EPA and states should tighten implementation of the Clean Water Act by:

- Ensuring that pollution permits are renewed on schedule and ratcheting down permitted pollution levels with each successive five-year permit period with the goal of achieving zero pollution discharge wherever possible. As of September 2007, nearly one out of every five discharge permits for major industrial facilities had expired.[46] Timely renewal of permits, coupled with reductions in the amount of pollution allowed at each permit renewal, can move the nation closer to achieving the original zero discharge goal of the Clean Water Act.

- Eliminating "mixing zones" for persistent bioaccumulative toxics. Mixing zones are areas of waterways near discharge points where the level of pollution can legally exceed water quality criteria without triggering action to reduce pollution levels. The idea behind mixing zones is that water from a discharge pipe might not meet water quality criteria, but that with dilution, the level of pollution would not harm the overall quality of the waterway. Mixing zones are a dubious concept at best from the perspective of protecting waterways from pollution and are wholly inappropriate for certain types of pollutants. Persistent bioaccumulative toxics—which have the capacity to contaminate sediment and/or accumulate in aquatic organisms—are among those for which mixing zones are particularly problematic. States should eliminate the use of mixing zones for PBTs and consider elimination for other toxic chemical discharges as well.

- Establishing strong standards for power plant discharges of toxic heavy metals. As described above, coal-fired power plants have increasingly employed scrubbers to remove dangerous substances from smokestack emissions. Unfortunately, these same pollutants now often wind up in power plants' water pollution streams—either through the discharge of wastewater from the plants or leakage from coal ash storage facilities. The EPA, which has not revised the rules for power plant discharges in more than a quarter century, has announced a target date of 2012 for new regulations to address the problem. Because of the significant harm this pollution can cause to wildlife and human health, the EPA should adopt regulations well before 2012, and require power plants to remove heavy metals from their wastewater discharges and to take steps to prevent pollution from coal ash disposal sites.

- Establishing mandatory minimum penalties for Clean Water Act violations. Often, violators of the Clean Water Act escape serious penalty. In recent years, the EPA has cut back on staffing for its environmental enforcement efforts and the agency has been unwilling to challenge states that have been inadequate in their enforcement of the law.[47] State and EPA officials are often resistant to penalizing polluters, even after multiple violations of the law. Establishing mandatory minimum penalties for violations of the Clean Water Act would ensure that illegal pollution does not go unpunished and act as a deterrent to illegal polluters. Congress should also ensure that the EPA receives adequate funding for enforcement staff to ensure that the nation keeps a sufficient number of environmental "cops on the beat."

Methodology

The data and analysis in this report are based on 2007 data from the federal Toxic Release Inventory, as downloaded from the Environmental Protection Agency's Envirofacts database on 18 May 2009. The Toxic Release Inventory is frequently revised after the posting of the national public data release, which is the basis for this report. The most recently updated data can be found at the EPA's TRI Explorer Web site at www.epa.gov/triexplorer/.

Totaling Toxic Releases by Waterway

Facilities reporting to TRI self-report the names of the waterways to which they release toxic substances. These waterway names are sometimes misspelled or inconsistent. Some facilities report releases to unidentified tributaries of other waterways. Moreover, many waterways cross state boundaries, such that total emissions to a waterway must be calculated for facilities in different states. The following procedures were used to "clean" the waterway names in the TRI database, assign discharges to the proper waterways, and to identify waterways that cross state boundaries.

1) Obvious spelling errors or differences in the formatting of waterways receiving discharges were repaired manually on a case-by-case basis.

2) Where TRI records indicated that a chemical was released to an unnamed tributary of another waterway, the releases were classified with those of the named waterway. In addition, where records indicated that releases reached a larger waterway via a smaller waterway, the releases were classified with the larger waterway.

3) Releases to waterways identified as "forks" or "branches" of a larger waterway were classified with the larger waterway (e.g. "West Fork of the Susquehanna River"). Releases to waterways identified as "Little" or "Big" rivers (e.g. "Little Beaver River," "Beaver River") were classified separately. Releases to waterways classified as within a given river basin were generally classified with that river.

4) Waterway names that were common across the boundaries of two adjacent

states were identified and reviewed manually using the EPA's "Surf Your Watershed" system. In cases where it was clear that only one waterway with a given name existed in both states, and the waterway was located near a state boundary, the waterway was assumed to cross state lines and discharges to that waterway from facilities in both states were summed. In cases in which it was unclear whether the discharges were to the same waterway, the discharges to the waterway(s) were listed separately by state.

There are two potential sources of error that cannot be addressed by this method. First is the case in which discharges in two different states are to the same waterway, but where it is not clear that that is the case. Second, in some states, multiple waterways share the same name even within state boundaries. Discharges to these waterways will be summed, making the total discharges to that waterway appear larger than they are in reality.

Linking Toxic Chemicals with Health Effects

Chemicals were determined to cause cancer or developmental or reproductive disorders based on their presence on the state of California's Proposition 65 list of *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*, last updated on 19 December 2008. Chemicals on the Proposition 65 list were matched to those in the TRI database using their Chemical Abstracts Service (CAS) identification numbers. Several classes of chemicals (e.g. dioxins, various metal compounds) are not identified by CAS number—these chemical classes in the TRI database were identified through manual comparison with the Proposition 65 list. In some cases, a particular chemical compound was listed in the Proposition 65 database, but there was no corresponding listing of that particular compound in the TRI database. It was then assumed that all compounds listed in the TRI chemical class exhibited that health effect. For some substances (usually metals) on the Proposition 65 list, we assumed that releases of compounds containing that substance as classified by TRI also exhibited the same health effect. Finally, for some substances on the Proposition 65 list that are identified as causing particular health effects when released in particular forms, it was impossible to determine whether the reported TRI releases of those substances were in the listed form. We therefore assumed that all releases listed under TRI were linked to the health effect listed on the Proposition 65 list.

Chemicals in other classifications of substances analyzed in this report were identified as follows:

- Persistent bioaccumulative toxics were identified based on their presence on the EPA's list of PBTs requiring reporting at lower thresholds under TRI, obtained from U.S. EPA, *TRI PBT Chemical List*, downloaded fromwww.epa.gov/tri/trichemicals/pbt%20chemicals/pbt_chem_list.htm, 20 May 2009.

- Organochlorines and phthalates were identified based on their listing in Centers for Disease Control and Prevention, *Third National Report on Human Exposure to Environmental Chemicals*, 2005.

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Appendix:
Detailed Data on Toxic Discharges to Waterways

Table A-1: Toxic Discharges to Waterways by State, 2007

State	All toxic releases		Cancer-causing chemicals		Developmental toxics		Reproductive toxics	
	releases (lbs.)	rank	releases (lbs.)	rank	releases (lbs.)	rank	releases (lbs.)	rank
Indiana	27,298,889	1	29,235	16	18,299	8	13,567	6
Virginia	18,381,310	2	15,214	24	16,081	10	3,166	21
Nebraska	17,409,779	3	820	38	1,050	33	800	35
Texas	13,204,291	4	87,844	5	21,493	6	28,647	2
Louisiana	12,811,400	5	114,729	3	36,511	3	22,376	3
Pennsylvania	10,706,605	6	28,803	17	9,645	15	7,969	12
Georgia	10,601,708	7	87,094	6	7,128	17	5,799	14
Ohio	9,304,554	8	42,995	11	27,300	4	20,773	4
North Carolina	9,156,743	9	169,686	1	11,384	14	3,795	15
Mississippi	9,058,061	10	13,065	26	2,148	26	2,107	25
Illinois	8,768,573	11	22,072	20	14,532	11	7,957	13
New Jersey	7,668,127	12	16,808	23	3,846	20	3,070	22
New York	6,400,905	13	40,607	12	5,113	18	3,276	20
Arkansas	6,084,676	14	50,188	9	3,462	22	3,379	18
Alabama	5,876,097	15	141,948	2	95,038	1	12,556	8
Kentucky	5,305,784	16	69,632	8	19,143	7	12,392	10
Wisconsin	4,100,243	17	12,658	28	1,310	31	1,282	28
California	3,900,865	18	27,492	18	1,428	30	1,375	27
South Carolina	3,685,824	19	81,824	7	13,208	12	12,666	7
Oklahoma	3,508,076	20	9,327	29	1,115	32	1,079	30
Iowa	3,445,959	21	8,072	31	3,073	23	1,958	26
Maine	3,374,134	22	37,065	14	1,047	34	1,038	32
Colorado	3,357,257	23	107	45	48	46	47	44
Idaho	3,185,716	24	18,456	22	893	36	888	33
Delaware	2,950,375	25	8,094	30	2,416	25	2,408	24
West Virginia	2,923,737	26	23,589	19	17,771	9	15,631	5
Oregon	2,847,886	27	21,988	21	2,664	24	2,627	23
Tennessee	2,705,547	28	107,512	4	21,565	5	10,952	11
South Dakota	2,424,482	29	642	40	1,915	28	642	36
Minnesota	2,072,875	30	7,471	32	3,741	21	3,729	17
Maryland	2,052,269	31	2,226	36	995	35	888	34
Missouri	1,690,965	32	14,359	25	12,752	13	12,555	9

Table A-1: Toxic Discharges to Waterways by State, 2007 (cont'd)

State	All toxic releases		Cancer-causing chemicals		Developmental toxics		Reproductive toxics	
	releases (lbs.)	rank	releases (lbs.)	rank	releases (lbs.)	rank	releases (lbs.)	rank
Washington	1,354,439	33	39,981	13	3,912	19	3,774	16
Florida	1,166,495	34	45,599	10	2,062	27	1,224	29
Kansas	586,162	35	31,061	15	59,803	2	32,547	1
Michigan	575,930	36	12,890	27	7,772	16	3,281	19
Hawaii	446,948	37	430	42	94	44	60	43
Connecticut	437,974	38	2,764	35	607	37	600	37
Vermont	179,592	39	0	50	217	42	0	50
Montana	170,145	40	2,002	37	449	39	448	39
Utah	94,394	41	3,522	34	1,463	29	1,071	31
North Dakota	82,123	42	597	41	515	38	508	38
Alaska	63,962	43	369	43	274	41	238	41
New Mexico	56,100	44	793	39	197	43	197	42
New Hampshire	42,824	45	75	46	45	47	45	45
Dist. Of Columbia	17,033	46	0	51	0	51	0	51
Massachusetts	12,727	47	7,386	33	299	40	280	40
Wyoming	9,916	48	40	48	40	48	40	46
Rhode Island	5,130	49	19	49	17	49	3	49
Arizona	4,364	50	143	44	69	45	29	47
Nevada	144	51	68	47	10	50	10	48
Guam	120,918		1		5		0	
Puerto Rico	13,674		448		76		70	
Virgin Islands	217,897		0		1		0	
TOTAL	231,922,602		1,459,812		456,040		265,822	

Table A-2. Top 50 Waterways for Total Toxic Discharges, 2007

Waterway	Toxic discharges (lb.)	Rank
OHIO RIVER (IL, IN, KY, OH, PA, WV)	31,064,643	1
NEW RIVER (NC, VA, WV)	14,090,633	2
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	12,717,205	3
SAVANNAH RIVER (GA, SC)	7,683,500	4
DELAWARE RIVER (DE, NJ, PA)	7,449,555	5
CAPE FEAR RIVER (NC)	5,380,054	6
TRICOUNTY CANAL (NE)	5,256,876	7
MISSOURI RIVER (IA, KS, MO, ND, NE)	5,049,336	8
MUSKINGUM RIVER (OH)	4,994,243	9
SHONKA DITCH (NE)	4,375,761	10
ILLINOIS RIVER (IL)	3,926,771	11
ROCK RIVER (IL, WI)	3,754,451	12
SNAKE RIVER (ID, OR)	3,111,068	13
ARKANSAS RIVER (AR, CO, KS, OK)	3,053,497	14
HOUSTON SHIP CHANNEL (TX)	2,967,305	15
BIG BLUE RIVER (NE)	2,903,675	16
SOUTH PLATTE RIVER (CO)	2,682,144	17
PICKENS CREEK (MS)	2,655,575	18
SUSQUEHANNA RIVER (NY, PA)	2,651,212	19
MORSES CREEK (NJ)	2,620,974	20
MONONGAHELA RIVER (PA, WV)	2,610,392	21
BIG SIOUX RIVER (SD)	2,369,185	22
SENECA RIVER (NY)	2,236,099	23
PACIFIC OCEAN (CA)	2,234,529	24
TENNESSEE RIVER (AL, KY, TN)	2,215,911	25
AROOSTOOK RIVER (ME)	2,203,543	26
KANAWHA RIVER (WV)	1,836,151	27
TALLABOGUE CREEK (MS)	1,755,317	28
HYDE RUN DITCH (OH)	1,743,099	29
WILLAMETTE RIVER (OR)	1,721,272	30
JAMES RIVER (VA)	1,686,939	31
GRAND CALUMET RIVER (IN)	1,643,268	32
BRAZOS RIVER (TX)	1,541,956	33
WYALUSING CREEK (PA)	1,533,376	34
TANKERSLEY CREEK (TX)	1,527,953	35
CURTIS BAY (MD)	1,520,467	36
GRAND NEOSHO RIVER (OK)	1,515,275	37
WISCONSIN RIVER (WI)	1,506,908	38
OKATOMA CREEK (MS)	1,341,330	39
SCHUYLKILL RIVER (PA)	1,262,143	40
RED RIVER (AR, LA, OK)	1,240,866	41
COTTONWOOD BRANCH (TX)	1,208,540	42
YAZOO RIVER (MS)	1,119,093	43
CALCASIEU RIVER (LA)	1,080,450	44
FOX RIVER (WI)	1,079,694	45
GILDERSLEEVE BROOK (NY)	1,057,702	46
HUDSON RIVER (NY)	1,048,179	47
CORPUS CHRISTI INNER HARBOR (TX)	1,042,724	48
ROANOKE RIVER (NC, VA)	1,013,527	49
LITTLE ATTAPULGUS CREEK (GA)	994,800	50

Table A-3 Top 50 Waterways for Discharges of Cancer-Causing Chemicals, 2007

Waterway	Discharges of cancer-causing chemicals (lbs.)	Rank
OHIO RIVER (IL, IN, KY, OH, PA, WV)	96,669	1
CATAWBA RIVER (NC, SC)	96,370	2
TENNESSEE RIVER (AL, KY, TN)	89,401	3
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	87,896	4
ALABAMA RIVER (AL)	54,205	5
SAVANNAH RIVER (GA, SC)	38,064	6
COOPER RIVER (SC)	38,052	7
COLUMBIA RIVER (OR, WA)	32,828	8
RED RIVER (AR, LA, OK)	32,775	9
HOLSTON RIVER (TN)	31,420	10
VERDIGRIS RIVER (KS, OK)	30,962	11
HUDSON RIVER (NY)	27,899	12
BRAZOS RIVER (TX)	27,526	13
ANDROSCOGGIN RIVER (ME, NH)	25,502	14
PACIFIC OCEAN (CA)	24,084	15
CUMBERLAND RIVER (KY, TN)	21,364	16
FENHOLLOWAY RIVER (FL)	19,226	17
BROAD RIVER (NC, SC)	18,801	18
TURTLE RIVER (GA)	18,795	19
DELAWARE RIVER (DE, NJ, PA)	18,211	20
ROANOKE RIVER (NC, VA)	17,665	21
SNAKE RIVER (ID, OR)	17,588	22
NEUSE RIVER (NC)	16,783	23
CAPE FEAR RIVER (NC)	14,203	24
OUACHITA RIVER (AR)	13,059	25
NECHES RIVER (TX)	12,153	26
ALTAMAHA RIVER (GA)	11,825	27
TOMBIGBEE RIVER (AL)	11,699	28
SULPHUR RIVER (TX)	11,671	29
HIWASSEE RIVER (TN)	10,882	30
PIGEON RIVER (NC, TN)	10,742	31
WISCONSIN RIVER (WI)	10,475	32
AMELIA RIVER (FL)	10,060	33
OUACHITA RIVER (LA)	10,060	34
ARKANSAS RIVER (AR, CO, KS, OK)	9,395	35
CHATTAHOOCHEE RIVER (AL, GA)	8,783	36
SAMPIT RIVER (SC)	8,515	37
JAMES RIVER (VA)	7,952	38
MONTE SANO BAYOU (LA)	7,915	39
CROOKED CREEK (MO)	7,781	40
PUGET SOUND (WA)	7,678	41
STAULKINGHEAD CREEK (LA)	7,653	42
KASKASKIA RIVER (IL)	7,254	43
LAKE CHAMPLAIN (NY, VT)	7,199	44
ST. CROIX RIVER (ME)	7,143	45
SABINE RIVER (TX)	6,876	46
ELEVEN MILE CREEK (FL)	6,773	47
DUGDEMONA RIVER (LA)	6,728	48
CLINCH RIVER (TN, VA)	6,610	49
PORT TOWNSEND BAY (WA)	6,484	50

Table A-4. Top 50 Waterways for Discharges of Developmental Toxicants, 2007

Waterway	Developmental toxicant releases (lb.)	Rank
ALABAMA RIVER (AL)	73,553	1
VERDIGRIS RIVER (KS, OK)	53,934	2
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	38,756	3
OHIO RIVER (IL, IN, KY, OH, PA, WV)	37,364	4
TENNESSEE RIVER (AL, KY, TN)	15,572	5
JAMES RIVER (VA)	13,914	6
KANAWHA RIVER (WV)	10,252	7
CONGAREE RIVER (SC)	9,900	8
CROOKED CREEK (MO)	7,306	9
CLINCH RIVER (TN, VA)	5,588	10
SABINE RIVER (TX)	5,483	11
KANSAS RIVER (KS)	5,444	12
KASKASKIA RIVER (IL)	5,277	13
BRAZOS RIVER (TX)	4,950	14
CAPE FEAR RIVER (NC)	4,775	15
LAKE ERIE (MI, NY, OH, PA)	4,332	16
HOLSTON RIVER (TN)	4,100	17
WABASH RIVER (IL, IN, OH)	4,079	18
INDIANA HARBOR SHIP CANAL (IN)	4,010	19
COOSA RIVER (AL, GA)	3,856	20
DELAWARE RIVER (DE, NJ, PA)	3,642	21
BLACK RIVER (OH)	3,281	22
CORPUS CHRISTI BAY (TX)	3,236	23
ILLINOIS RIVER (IL)	3,175	24
MONONGAHELA RIVER (PA, WV)	2,690	25
CHATTAHOOCHEE RIVER (AL, GA)	2,656	26
WARRIOR RIVER (AL)	2,535	27
HERRINGTON LAKE (KY)	2,401	28
DES PLAINES RIVER (IL, WI)	2,334	29
BLOCKHOUSE HOLLOW RUN (OH)	2,301	30
MOBILE RIVER (AL)	2,274	31
MUSKINGUM RIVER (OH)	2,228	32
TOMBIGBEE RIVER (AL)	2,159	33
CUMBERLAND RIVER (KY, TN)	2,135	34
LAKE SINCLAIR (GA)	2,012	35
MAYO RESERVOIR (NC)	1,948	36
ROUGE RIVER (MI)	1,935	37
LAKE MICHIGAN (IL, IN, MI, WI)	1,927	38
GENESEE RIVER (NY)	1,919	39
BIG SIOUX RIVER (SD)	1,909	40
COLUMBIA RIVER (OR, WA)	1,904	41
RED RIVER (AR, LA, OK)	1,757	42
BROAD RIVER (NC, SC)	1,727	43
PACIFIC OCEAN (OR)	1,700	44
LITTLE CALUMET RIVER (IL, IN)	1,652	45
GRAND CALUMET RIVER (IN)	1,542	46
GREAT SALT LAKE (UT)	1,431	47
INDIAN CREEK (MO)	1,353	48
HACKENSACK RIVER (NJ)	1,304	49
GREEN RIVER (KY)	1,292	50

Table A-5. Top 50 Waterways for Discharges of Reproductive Toxicants, 2007

Waterway	Reproductive toxicant releases (lb.)	Rank
OHIO RIVER (IL, IN, KY, OH, PA, WV)	29,665	1
VERDIGRIS RIVER (KS, OK)	27,030	2
MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	24,418	3
BRAZOS RIVER (TX)	16,959	4
KANAWHA RIVER (WV)	10,181	5
CONGAREE RIVER (SC)	9,900	6
TENNESSEE RIVER (AL, KY, TN)	7,367	7
CROOKED CREEK (MO)	7,160	8
SABINE RIVER (TX)	5,466	9
KANSAS RIVER (KS)	5,444	10
INDIANA HARBOR SHIP CANAL (IN)	4,008	11
ALABAMA RIVER (AL)	3,509	12
DELAWARE RIVER (DE, NJ, PA)	3,471	13
BLACK RIVER (OH)	3,280	14
CHATTAHOOCHEE RIVER (AL, GA)	2,460	15
MONONGAHELA RIVER (PA, WV)	2,425	16
DES PLAINES RIVER (IL, WI)	2,261	17
CLINCH RIVER (TN, VA)	1,988	18
ILLINOIS RIVER (IL)	1,986	19
COLUMBIA RIVER (OR, WA)	1,896	20
LAKE ERIE (MI, NY, OH, PA)	1,895	21
CUMBERLAND RIVER (KY, TN)	1,883	22
LAKE MICHIGAN (IL, IN, MI, WI)	1,841	23
RED RIVER (AR, LA, OK)	1,753	24
HOLSTON RIVER (TN)	1,724	25
PACIFIC OCEAN (OR)	1,700	26
CAPE FEAR RIVER (NC)	1,672	27
LITTLE CALUMET RIVER (IL, IN)	1,651	28
LAKE SINCLAIR (GA)	1,512	29
GRAND CALUMET RIVER (IN)	1,465	30
JAMES RIVER (VA)	1,450	31
INDIAN CREEK (MO)	1,353	32
HACKENSACK RIVER (NJ)	1,304	33
CUYAHOGA RIVER (OH)	1,131	34
WARRIOR RIVER (AL)	1,083	35
GREAT SALT LAKE (UT)	1,044	36
BEE FORK CREEK (MO)	1,021	37
GREEN RIVER (KY)	1,021	38
MUDDY CREEK (OH)	986	39
NECHES RIVER (TX)	975	40
BURNS DITCH (IN)	940	41
WHITE RIVER (AR)	919	42
OUACHITA RIVER (LA)	885	43
GENESEE RIVER (NY)	884	44
MUSKINGUM RIVER (OH)	879	45
BILL’S CREEK (MO)	789	46
EVERETT HARBOR (WA)	782	47
VALLEY CREEK (AL)	735	48
COOPER RIVER (SC)	730	49
PEARL RIVER (LA, MS)	730	50

Table A-6. Top 20 Facilities for Water Discharges of Toxic Pollutants, 2007

Facility Name	City	State	Water Body/ies Receiving Discharge	Toxic Releases (lbs.)
AK STEEL CORP. (ROCKPORT WORKS)	ROCKPORT	IN	OHIO RIVER (IL, IN, KY, OH, PA, WV)	24,120,227
U.S. ARMY RADFORD ARMY AMMUNITION PLANT	RADFORD	VA	NEW RIVER (NC, VA)	13,600,338
TYSON FRESH MEATS INC	LEXINGTON	NE	TRICOUNTY CANAL (NE)	5,256,876
SMITHFIELD PACKING CO INC TAR HEEL DIV	TAR HEEL	NC	CAPE FEAR RIVER (NC)	4,830,302
TYSON FRESH MEATS INC WWTP	DAKOTA CITY	NE	MISSOURI RIVER (IA, KS, MO, ND, NE)	4,652,730
DUPONT CHAMBERS WORKS	DEEPWATER	NJ	DELAWARE RIVER (DE, NJ, PA)	4,410,591
CARGILL MEAT SOLUTIONS CORP	SCHUYLER	NE	SHONKA DITCH (NE)	4,375,761
EXXONMOBIL REFINING & SUPPLY BATON ROUGE REFINERY	BATON ROUGE	LA	MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	4,211,142
AK STEEL CORP COSHOCTON WORKS	COSHOCTON	OH	MUSKINGUM RIVER (OH)	4,201,250
DSM CHEMICALS NORTH AMERICA INC	AUGUSTA	GA	SAVANNAH RIVER (GA, SC)	3,941,260
NORTH AMERICAN STAINLESS	GHENT	KY	OHIO RIVER (IL, IN, KY, OH, PA, WV)	3,607,952
TYSON FRESH MEATS INC JOSLIN IL	HILLSDALE	IL	ROCK RIVER (IL, WI)	3,063,360
CARGILL MEAT SOLUTIONS CORP	BEARDSTOWN	IL	ILLINOIS RIVER (IL)	3,053,330
MCCAIN FOODS USA	BURLEY	ID	SNAKE RIVER (ID, OR)	2,905,166
FARMLAND FOODS INC	CRETE	NE	BIG BLUE RIVER (NE)	2,759,935
TYSON FOODS CARTHAGE MS PROCESSING PLANT	CARTHAGE	MS	PICKENS CREEK (MS)	2,655,575
CONOCOPHILLIPS CO - BAYWAY REFINERY	LINDEN	NJ	MORSES CREEK (NJ)	2,619,601
CARGILL MEAT SOLUTIONS CORP	FORT MORGAN	CO	SOUTH PLATTE RIVER (CO)	2,606,583
USS - CLAIRTON WORKS	CLAIRTON	PA	PETERS CR. (PA)/MONONGAHELA R. (PA, WV)	2,509,701
JOHN MORRELL & CO	SIOUX FALLS	SD	BIG SIOUX RIVER (SD)	2,369,185
PREMCOR REFINING GROUP INC	DELAWARE CITY	DE	DELAWARE RIVER (DE, NJ, PA)	2,350,514

Table A-7. Top 20 Facilities for Water Discharges of Cancer-Causing Chemicals, 2007

Facility Name	City	State	Water Body/ies Receiving Discharge	Toxic Releases (lbs.)
MARSHALL STEAM STATION	TERRELL	NC	CATAWBA RIVER (NC, SC)	79,236
BP AMOCO CHEMICALS	DECATUR	AL	TENNESSEE RIVER (AL, KY, TN)	41,470
COFFEYVILLE RESOURCES REFINING & MARKETING	COFFEYVILLE	KS	VERDIGRIS RIVER (KS, OK)	30,579
INTERNATIONAL PAPER CO - SAVANNAH COMPLEX	SAVANNAH	GA	SAVANNAH RIVER (GA, SC)	30,055
DOW CHEMICAL CO FREEPORT FACILITY	FREEPORT	TX	BRAZOS RIVER (TX)	26,600
FINCH PAPER LLC	GLENS FALLS	NY	HUDSON RIVER (NY)	26,541
VERSO PAPER HOLDINGS LLC	JAY	ME	ANDROSCOGGIN RIVER (ME, NH)	24,903
EVERGREEN PULP ENTERPRISES	SAMOA	CA	PACIFIC OCEAN (CA)	24,030
INTERNATIONAL PAPER	PRATTVILLE	AL	ALABAMA RIVER (AL)	23,901
PREGIS INNOVATIVE PACKAGING INC	WURTLAND	KY	OHIO RIVER (IL, IN, KY, OH, PA, WV)	23,000
EASTMAN CHEMICAL CO TENNESSEE OPERATIONS	KINGSPORT	TN	HOLSTON RIVER (TN)	22,746
TAFT/STAR MANUFACTURING PLANT UNION CARBIDE CORP.	TAFT	LA	MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	21,007
BP AMOCO CHEMICAL CO - COOPER RIVER PLANT	WANDO	SC	COOPER RIVER (SC)	20,380
DOMTAR INDUSTRIES INC. ASHDOWN MILL	ASHDOWN	AR	RED RIVER (AR, LA, OK)	19,247
BUCKEYE FLORIDA LP	PERRY	FL	FENHOLLOWAY RIVER (FL)	19,226
BRUNSWICK CELLULOSE INC	BRUNSWICK	GA	TURTLE RIVER (GA)	18,795
CLIFFSIDE STEAM STATION	MOORESBORO	NC	BROAD RIVER (NC, SC)	18,776
POTLATCH CORP LEWISTON IDAHO	LEWISTON	ID	SNAKE RIVER (ID, OR)	17,563
DOMTAR PAPER CO PLYMOUTH MILL	PLYMOUTH	NC	ROANOKE RIVER (NC, VA)	16,556
ALABAMA RIVER PULP CO INC.	PERDUE HILL	AL	ALABAMA RIVER (AL)	16,429

Table A-8. Top 20 Facilities for Water Discharges of Developmental Toxicants, 2007

Facility Name	City	State	Water Body/ies Receiving Discharge	Toxic Releases (lbs.)
WEYERHAEUSER USA INC. PINE HILL OPERATIONS	PINE HILL	AL	ALABAMA RIVER (AL)	71,100
COFFEYVILLE RESOURCES REFINING & MARKETING	COFFEYVILLE	KS	VERDIGRIS RIVER (KS, OK)	53,839
PLACID REFINING CO L.L.C .	PORT ALLEN	LA	MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	13,226
FERRO CORP BATON ROUGE SITE	ZACHARY	LA	MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	12,166
ERAMET MARIETTA INC	MARIETTA	OH	OHIO RIVER (IL, IN, KY, OH, PA, WV)	10,223
BAYER CROPSCIENCE LP	INSTITUTE	WV	KANAWHA RIVER (WV)	10,116
EASTMAN CHEMICAL CO SOUTH CAROLINA OPERATIONS	WEST COLUMBIA	SC	CONGAREE RIVER (SC)	9,900
BUICK MINE/MILL	BOSS	MO	INDIAN CR. (MO)/STROTHER CR. (MO)/CROOKED CR. (MO)	9,144
DUPONT SPRUANCE PLANT	RICHMOND	VA	JAMES RIVER (VA)	7,911
OWENSBORO MUNICIPAL UTILITIES ELMER SMITH STATION	OWENSBORO	KY	OHIO RIVER (IL, IN, KY, OH, PA, WV)	6,860
U.S. TVA JOHNSONVILLE FOSSIL PLANT	NEW JOHNSONVILLE	TN	TENNESSEE RIVER (AL, KY, TN)	5,905
DUPONT SABINE RIVER WORKS	ORANGE	TX	SABINE RIVER (TX)	5,450
INNOVIA FILMS INC	TECUMSEH	KS	KANSAS RIVER (KS)	5,442
CHESTERFIELD POWER STATION	CHESTER	VA	JAMES RIVER (VA)	5,380
DYNEGY MIDWEST GENERATION INC BALDWIN ENERGY COMPLEX	BALDWIN	IL	KASKASKIA RIVER (IL)	5,277
DOW CHEMICAL CO FREEPORT FACILITY	FREEPORT	TX	BRAZOS RIVER (TX)	4,945
U.S. TVA WIDOWS CREEK FOSSIL PLANT	STEVENSON	AL	WIDOWS CREEK (AL)	4,929
ARCELORMITTAL WEIRTON INC	WEIRTON	WV	OHIO RIVER/HARMON CR. (WV)	4,772
U.S. TVA KINGSTON FOSSIL PLANT	HARRIMAN	TN	CLINCH RIVER (TN, VA)	4,300
EASTMAN CHEMICAL CO TENNESSEE OPERATIONS	KINGSPORT	TN	HOLSTON RIVER (TN)	4,037

Table A-9. Top 20 Facilities for Water Discharges of Reproductive Toxicants, 2007

Facility Name	City	State	Water Body/ies Receiving Discharge	Toxic Releases (lbs.)
COFFEYVILLE RESOURCES REFINING & MARKETING	COFFEYVILLE	KS	VERDIGRIS RIVER (KS, OK)	26,935
DOW CHEMICAL CO FREEPORT FACILITY	FREEPORT	TX	BRAZOS RIVER (TX)	16,958
FERRO CORP BATON ROUGE SITE	ZACHARY	LA	MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	12,162
ERAMET MARIETTA INC	MARIETTA	OH	OHIO RIVER (IL, IN, KY, OH, PA, WV)	10,223
BAYER CROPSCIENCE LP	INSTITUTE	WV	KANAWHA RIVER (WV)	10,115
EASTMAN CHEMICAL CO SOUTH CAROLINA OPERATIONS	WEST COLUMBIA	SC	CONGAREE RIVER (SC)	9,900
BUICK MINE/MILL	BOSS	MO	INDIAN CR. (MO)/STROTHER CR. (MO)/CROOKED CR. (MO)	9,144
OWENSBORO MUNICIPAL UTILITIES ELMER SMITH STATION	OWENSBORO	KY	OHIO RIVER (IL, IN, KY, OH, PA, WV)	6,234
DUPONT SABINE RIVER WORKS	ORANGE	TX	SABINE RIVER (TX)	5,450
INNOVIA FILMS INC	TECUMSEH	KS	KANSAS RIVER (KS)	5,442
ARCELORMITTAL WEIRTON INC	WEIRTON	WV	OHIO RIVER/HARMON CR. (WV)	4,772
ARCELORMITTAL INDIANA HARBOR LLC	EAST CHICAGO	IN	INDIANA HARBOR SHIP CANAL (IN)	3,910
REPUBLIC ENGINEERED PRODUCTS INC. LORAIN PLANT	LORAIN	OH	BLACK RIVER (OH)	2,840
FLINT HILLS RESOURCES LP	ROSEMOUNT	MN	MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	2,819
USS GARY WORKS	GARY	IN	LAKE MICHIGAN/GRAND CALUMET R. (IN)	2,781
TAFT/STAR MANUFACTURING PLANT UNION CARBIDE CORP.	TAFT	LA	MISSISSIPPI RIVER (AR, IA, IL, KY, LA, MN, MO, MS, TN, WI)	2,565
JOLIET GENERATING STATION (#9 & #29)	JOLIET	IL	DES PLAINES RIVER (IL, WI)	2,183
INTERNATIONAL PAPER - RIVERDALE MILL	SELMA	AL	ALABAMA RIVER (AL)	2,163
EDGE MOOR/HAY ROAD POWER PLANTS	WILMINGTON	DE	DELAWARE RIVER (DE, NJ, PA)	1,858
U.S. TVA JOHNSONVILLE FOSSIL PLANT	NEW JOHNSONVILLE	TN	TENNESSEE RIVER (AL, KY, TN)	1,703