Wasting Our Waterways

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

WISCONSIN ENVIRONMENT
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Cover photo: Georgia-Pacific's pulp mill in Brunswick, Georgia, on the banks of the Turtle River. Photo by James Holland, jameshollandphotography.com

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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 U.S. Environmental Protection Agency (EPA), toxic discharges from industrial facilities are responsible for polluting more than 17,000 miles of rivers and about 210,000 acres of lakes, ponds and estuaries nationwide.

Table ES-1. Industrial Toxic Releases by Watershed Region

Watershed Region	Total Pounds Released	Toxicity Weighted Pounds
Texas-Gulf	13,211,652	33,935,900
South Atlantic-Gulf	37,715,213	4,472,145
Lower Mississippi River	13,933,267	3,473,041
Pacific Northwest	6,472,813	1,292,540
Great Basin	1,275,484	1,070,625
Tennessee River	6,261,817	874,903
Arkansas-White-Red Rivers	13,005,273	611,570
Ohio River	43,103,836	496,583
Great Lakes	8,402,509	220,180
Souris-Red-Rainy Rivers	138,939	186,473
Upper Mississippi River	16,863,867	159,216
Mid Atlantic	23,690,915	131,270
Missouri River	14,878,771	105,362
Hawaii	435,662	40,131
New England	3,336,235	34,402
California	2,358,874	33,280
Upper Colorado River	22,143	2,038
Alaska	570,475	1,958
Lower Colorado River	3,632	1,906
Rio Grande River	35,857	333

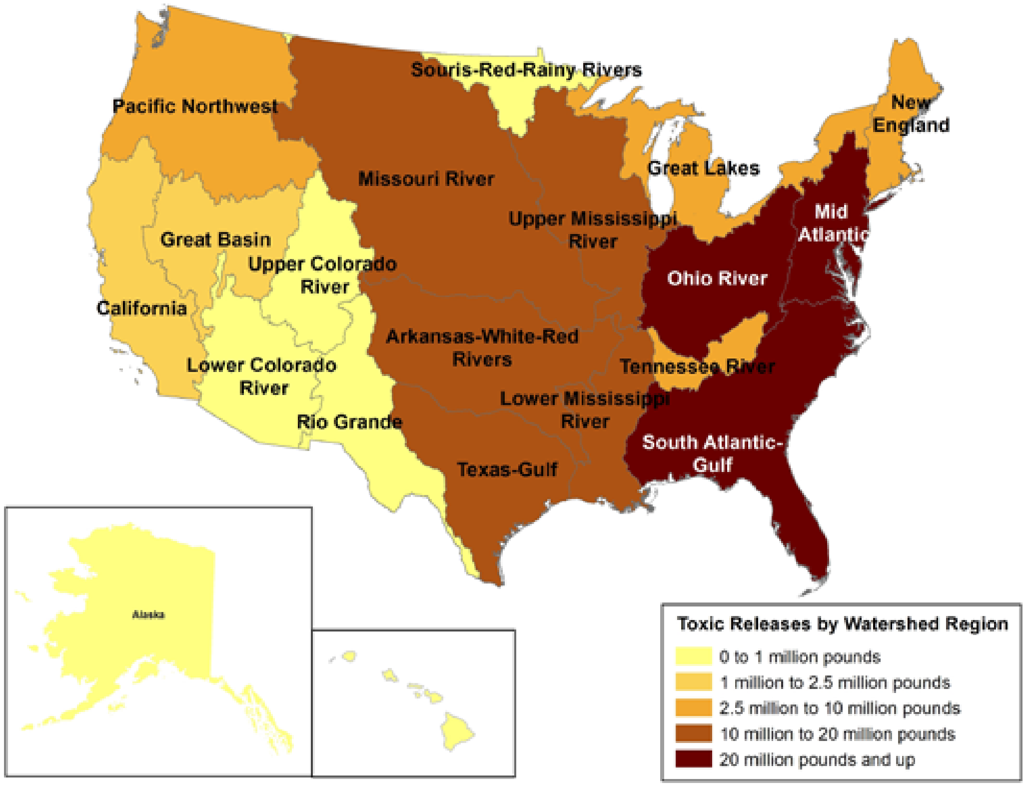
Several of these watershed regions contain multiple outlets to the ocean. Toxics released in these areas do not all follow the same path to the sea.

To curb this massive release of toxic chemicals into our nation's water, we must step up Clean Water Act protections for our waterways and require polluters to reduce their use of toxic chemicals.

Industrial facilities dumped 206 million pounds of toxic chemicals into American waterways in 2012, according to reports from those facilities to the national Toxics Release Inventory (TRI). (See Table ES-1 and Figure ES-1.)

- Our nation's iconic waterways are still threatened by toxic pollution – with polluters discharging chemicals into the following watersheds: Great Lakes (8.39 million pounds), Chesapeake Bay (3.23 million pounds), Upper Mississippi River (16.9 million pounds), and Puget Sound (578,000 pounds), among other national treasures. (See Figure ES-2.)
- Polluters released toxic chemicals to 850 local watersheds across the country. Indiana led the nation in total volume of toxic releases to waterways, with more than 17 million pounds of discharges from industrial facilities, followed by Texas and Louisiana. The top 10 states for toxic industrial releases to waterways were the same as in 2010. (See Table ES-2.)

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



- Watersheds receiving the highest volumes of toxic pollution were the Lower Ohio River-Little Pigeon River (Indiana, Illinois and Kentucky), the Upper New River (Virginia) and the Middle Savannah River (Georgia and South Carolina). (See Table ES-3.)

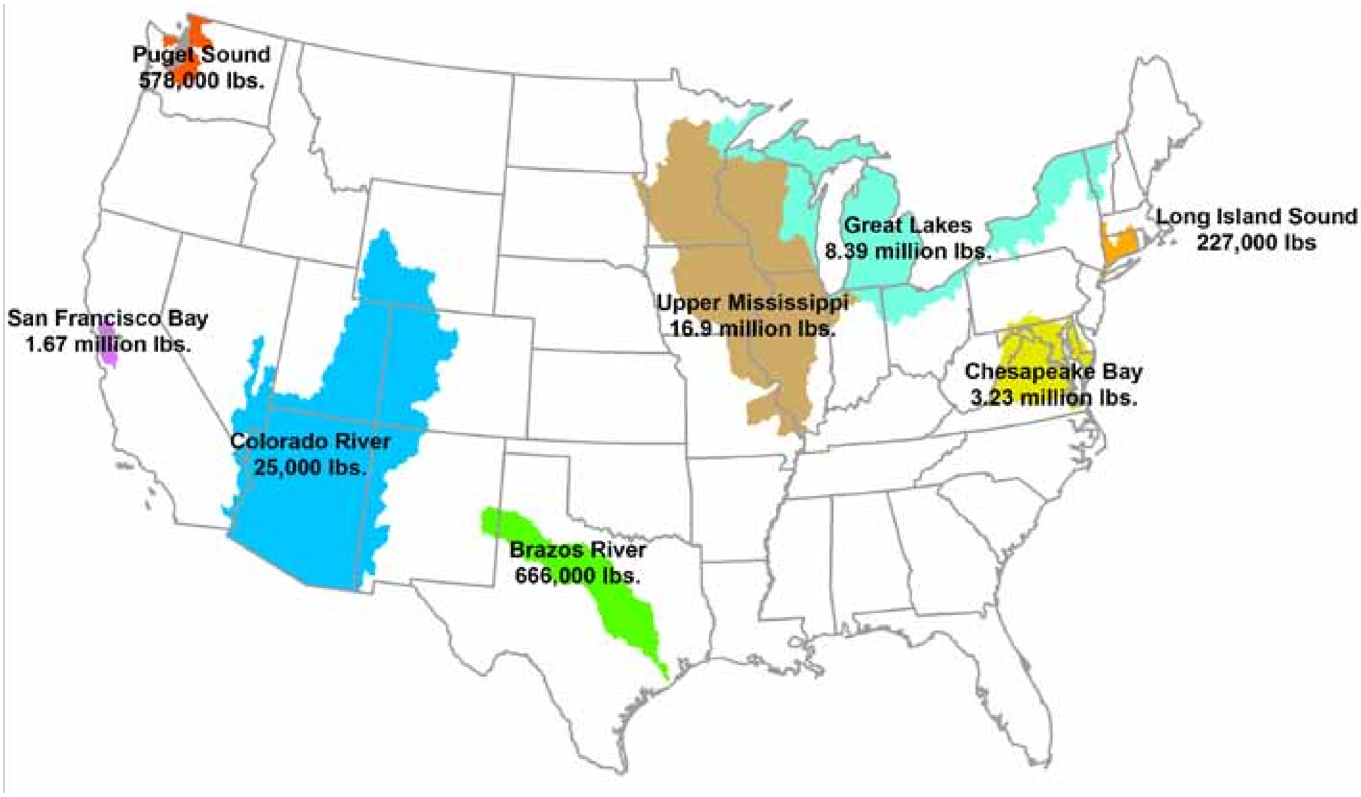
Table ES-2. Top 10 States for Toxic Releases to Water in 2012

State	Total Releases (lbs.)
Indiana	17,761,310
Texas	16,476,093
Louisiana	12,618,616
Alabama	12,287,252
Virginia	11,821,961
Nebraska	10,506,483
Pennsylvania	10,470,231
Georgia	10,132,268
North Carolina	8,897,062
Ohio	7,567,720

Table ES-3. Top 10 Local Watersheds Receiving Toxic Releases, Total Pounds.

Local Watershed	Total Releases (lbs.)
Lower Ohio-Little Pigeon Rivers (IN, IL, KY)	14,727,205
Upper New River (NC, VA)	7,338,166
Middle Savannah River (GA, SC)	5,025,161
Muskingum River (OH)	4,414,602
Blackbird-Soldier Rivers (IA, NE)	4,372,706
Lower Platte-Shell Rivers (NE)	3,726,866
Buffalo River-San Jacinto (TX)	3,557,254
Brandywine Creek-Christina River (DE, PA)	3,416,615
Middle Ohio-Laughery River (IN, OH)	3,328,548
Lower Des Moines River (IA)	2,902,489

Figure ES-2. Industrial Discharges of Toxic Chemicals to Nationally Iconic Watersheds



Toxic chemicals linked to serious health effects were released in large amounts to America's waterways in 2012.

- **Cancer**: Industrial facilities released more than 1.4 million pounds of chemicals linked to cancer into 688 local watersheds during 2012, including arsenic, benzene and chromium. The North Fork Humboldt River watershed in Nevada received the largest release of carcinogens among local watersheds, followed by the Lake Maurepas watershed in Louisiana.
- **Developmental damage**: More than 460,000 pounds of chemicals linked to developmental disorders were released into more than 600 local watersheds. Nevada's North Fork Humboldt River watershed suffered the most developmental toxicant releases among local watersheds, followed by the Lake Maurepas watershed in Louisiana.
- **Fertility problems**: Approximately 4.4 million pounds of fertility-reducing chemicals were released to more than 600 local watersheds. The Lower Chehalis River watershed in northwestern Washington, which flows into a bay surrounded by wildlife refuges, state parks and beaches, received the second-highest volume of reproductive-toxic releases in the nation.

- Discharges of **persistent bioaccumulative toxics** (including dioxin and mercury) are also widespread.

Industrial facilities – especially those operated by corporate agribusiness – continue to release high volumes of nitrates into America's waters.

- **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 – were by far the largest releases of toxic chemicals in terms of overall weight.

- **Corporate agribusiness facilities** – such as slaughterhouses and poultry plants – were responsible for approximately one-third of all direct discharges of nitrates to waterways. This is in addition to huge volumes of runoff pollution from factory farms and other agribusiness operations.

- Toxic releases continued in **already damaged waterways**. For example, Tankersley Creek in northeast Texas has long been the target of state and federal cleanup efforts, but a 30-year-old chicken-processing plant released four times more nitrates into Tankersley Creek in 2012 than it had in 2000.

Toxic chemicals vary in the severity of the threat they post to the environment and human health. When weighted by toxicity of releases, the watersheds receiving the most toxic discharges were the Lower Brazos River (Texas), the Lower Grand River (Louisiana), and the North Fork Humboldt River (Nevada). (See Table ES-4.)

To protect the public and the environment from toxic releases, the United States 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.

Table ES-4. Top 10 Local Watersheds Receiving Toxic Releases, Toxicity-Weighted Pounds Equivalent

Local Watershed	Toxicity Weighted Pounds Equivalent Released
Lower Brazos River (TX)	33,474,792
Lower Grand River (LA)	1,926,751
North Fork Humboldt River (NV)	1,042,622
Nooksack River (WA)	1,028,364
Noxubee River (AL, MS)	593,695
Lower Cape Fear River (NC)	550,152
Lower Sulphur River (AR, TX)	508,181
Lower Tennessee River (KY)	474,284
Bayou Sara-Thompson Creek (LA)	341,414
Middle Pearl-Silver Rivers (MS)	328,186

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

- Specifically, the Obama administration should finalize its proposed rule clarifying that the Clean Water Act applies to headwater streams, intermittent waterways, isolated wetlands and other waterways.

State and federal policies should move industrial polluters away from the use of toxic chemicals, in favor of safer alternatives. Specifically, state and federal officials should:

- Require the use of safer alternatives to toxic chemicals, where such alternatives already exist.

- Phase out the worst toxic chemicals.

The data in this report do not cover the entire volume of toxic chemicals released to the environment – just the ones released to surface waterways by industrial facilities that report to the U.S. EPA's Toxics Release Inventory. To expand understanding of toxic releases, policymakers should:

- Close loopholes that allow major polluters to avoid reporting their toxic releases. For example, the oil and gas industry should be required to report releases of fracking fluid and drilling waste to the Toxics Release Inventory.
- Ensure the public is informed about the storage of toxic chemicals, especially in light of the toxic spill that contaminated drinking water for 300,000 people in West Virginia in January 2014.

America's waterways, including nationally iconic ones, are threatened by toxic industrial pollution. We can protect them by using the full strength of the Clean Water Act.

Introduction

For thousands of years, people have been using Tankersley Creek in northeast Texas as a source of food and water. An archeological survey of the area around the creek found pottery, dart points and arrowheads indicating human reliance on the creek for nearly 5,000 years.[1]

Today, Tankersley Creek struggles to support a healthy ecosystem as the result of decades of pollution.

Starting in the early 20th century, several refineries began dumping various chemicals into Tankersley Creek.[2]

When Congress adopted the Clean Water Act in 1972, thousands of waterways like Tankersley Creek (and Ohio's Cuyahoga River) finally had some hope of restoration, of relief from pollution. The nation's flagship clean water law, the Clean Water Act set initial goals of making all of our nation's waterways safe for fishing and swimming by 1983, and then eliminating all direct discharges into our waters two years after that.[3]

And yet, while the Cuyahoga River no longer catches fire, something didn't work out for Tankersley Creek. In 1985, the very same year that the Clean Water Act had aimed to end all discharges to our waters, the Pilgrim's Pride chicken-processing plant opened on the banks of the Tankersley, discharging wastewater containing ammonia, nitrates and sulfuric acid into the creek. And from the plant's very first year of operations, the creek has repeatedly failed to meet water quality standards. Residents later reported fish kills.[4]

By 2007, the creek had enough fecal coliform bacteria to exceed state and federal standards.[5] And from 2011 to 2013, there was only one calendar quarter in which the chicken-processing plant was not either in violation of Clean Water Act standards, or late complying with a prior EPA cleanup order.[6]

In 2012, this same processing plant (now owned by Brazilian meat giant JBS) released 2,826,862 pounds of nitrates into the creek, four times as much as the facility released in 2000.[7]

And those are the discharges regulators know about. In June 2012, the company agreed to pay $50,000 to resolve a federal whistleblower-protection case regarding a former employee who was fired for making a report to the Texas Commission on Environmental Quality alleging that "process and storm water containing excessive amounts of chromium, lead and mercury were discharged into the environment."[8]

Clearly, the vision of the Clean Water Act remains unrealized for many of America's waterways, as the story of Tankersley Creek shows. Worse, a series of U.S. Supreme Court rulings over the last decade opened new loopholes in the Clean Water Act, putting the health of thousands of small streams and millions of acres of wetlands in peril.

However, thanks to another cornerstone environmental law – the Emergency Planning and Community Right-to-Know Act – facilities such as the plant along Tankersley Creek are at least required to tell the public about their releases of hundreds of chemicals linked to health problems for humans and wildlife.[9] This report uses these data – collected in the EPA's Toxics Release Inventory (TRI) – to highlight the waterways receiving the greatest volumes of toxic releases and the companies and facilities responsible.

Fortunately, we can stop this kind of industrial pollution. By restoring the protections of the Clean Water Act and strengthening enforcement and permitting, we can ensure that the Great Lakes, the Chesapeake Bay, and thousands of waterways like Tankersley Creek are made safe, healthy and clean – for us and for future generations.

Toxic Releases to Waterways Threaten the Environment and Public Health

The discharge of toxic chemicals into our waterways poses a direct threat to the environment and human health. Toxic chemicals can accumulate in fish, riverbeds and the water column itself. From there, toxics can be ingested or absorbed by humans, where they can cause infertility, developmental damage, or even cancer.

More than half – 53 percent – of rivers and streams in the U.S. assessed by the EPA remain too polluted for swimming, fishing and/or drinking, along with 67 percent of assessed lakes, ponds and reservoirs.[10]

Toxic Releases and the Environment

Industrial pollution is a major contributor to waterway degradation in the United States. According to the EPA, industrial pollution has left more than 17,000 miles of rivers and about 210,000 acres of lakes, ponds or reservoirs unable to support drinking, swimming, fishing or other uses.[11]

Impacts on Local Waterways

The dumping of toxic chemicals into our rivers can have immediate and devastating effects on the wildlife of our waterways.

Mass fish kills are the most extreme and visible examples of the effects toxic chemicals can have on the wildlife of our rivers and streams. In 2013, for example, a wastewater treatment plant in London, Ohio, released ammonia into Oak Run, where it killed more than 3,000 fish along six miles of the stream.[12]

Non-fatal effects of pervasive environmental contamination can also be significant. During studies that began in 2002, for instance, male fish throughout the Potomac River were found to have developed female sex characteristics, including the carrying of eggs inside male sex organs. Scientists suspect this is caused by endocrine-disrupting chemicals, and more specifically, exposure to chemicals that are "estrogenic/anti-androgenic" during early development. Among the sources of the unspecified contaminants, according to the U.S. Geological Survey, were chemicals released as a matter of normal practice by sewage plants and animal feedlots, and by pesticide applications on farms. [13]

Persistent Bioaccumulative Toxics

Some particularly dangerous substances break down extremely slowly, are preserved in animal tissue, and are easily transferred up the food chain. These chemicals – called persistent bioaccumulative toxics, or PBTs – can be found hundreds or thousands of miles from their original source, and can stick around long after their manufacture has ceased or been banned. They can also cycle readily between the air, water and soil, and may be carried by rivers, organisms and even clouds.

Among the most infamous and long-lasting toxics of this class are polychlorinated biphenyls, or PCBs. Manufactured for industrial usage in the United

States beginning in 1929, PCBs were banned nationally in 1979 after the public became aware of their damaging effects on human health and the environment.[14] PCBs have been demonstrated to be carcinogenic in animals, and found to cause other serious health problems including immune system dysfunction, reproductive disorders, nervous system damage, and problems of the endocrine system.[15] They have also been identified as a probable carcinogen in human beings.[16] Despite the ban, PCBs may leach into the surrounding environment from improperly disposed-of waste in landfills, from hazardous waste sites, and from the dumping of PCB waste, including into waterways.[17]

While the U.S. government acted long ago to ban or severely limit the production of dangerous chemicals like PCBs and the dangerous insecticide dichlorodiphenyltrichloroethane (DDT), other chemicals with similar effects and characteristics remain in use. Among the most worrisome are brominated flame retardants, or BFRs. These chemicals, used to slow the spread of fire in common consumer products like chairs, couches, and consumer electronics, have concerned the U.S. Environmental Protection Agency, which has stated that they may be "persistent, bioaccumulative, and toxic to both humans and the environment."[18] Most forms of BFRs, which can find their way into the environment via chemical discharges into waterways,[19] are now subject to an international agreement requiring countries to eliminate their use.[20]

Toxic Releases and Human Health

Toxic chemicals dumped into waterways have the potential to seriously and adversely impact human health, and can cause reproductive, neurological, developmental and other problems in humans. Many chemicals are also known to cause cancer.

While only a small percentage of chemicals in use in the U.S. have been thoroughly tested for safety in humans, the state of California has compiled a list of more than 500 chemicals known to be carcinogenic, as well as hundreds of chemicals that are linked to developmental or fertility problems.[21] California's list includes both industrial pollutants (such as those whose releases are reported to TRI) and those found in consumer products and other contexts. It is also not exhaustive, as the full health effects of the more than 80,000 chemicals used industrially in the U.S. are unknown.[22]

Toxic chemicals released to water can enter the human body in many ways. One way – particularly for PBTs – is by eating fish that have consumed contaminants, such as mercury, in their own food.

Humans may also be exposed to these toxic chemicals by swimming, fishing, boating or otherwise using contaminated waterways for recreation. And they may find contaminated drinking water at the tap, as was demonstrated by the tragic chemical leaks in West Virginia in 2014. (See page 20.) In that case, the local water utility did not know of any way to remove the chemical from the drinking-water supply.[23]

But the toxic threat to our drinking water is more pervasive than one high profile incident. In 2010, a report by the Environmental Working Group found that millions of people in 31 U.S. cities were drinking water with higher-than-acceptable levels of chromium-6, a carcinogen.[24] And in 2009, an Associated Press examination of EPA data showed that thousands of schools across the country had drinking water that contained unsafe levels of toxics, such as lead or pesticides.[25] High levels of lead – a potent toxin that has been shown to have devastating effects on human neurological health and brain development – are particularly worrisome in children.[26]

People can even be exposed to toxic chemicals before they are born and when they are very young. Chemicals released to water that get into a mother's system can be passed on to the growing fetus, causing birth defects and developmental problems.[27]

Toxic Releases to U.S. Waterways in 2012

This report uses data from the federal government's Toxics Release Inventory (TRI) to measure releases of toxic chemicals to American waterways in 2012. It is the third report in a series; our last report on this topic, released in 2012, was based on TRI data from 2010. The first in the series was released in 2009 using TRI data from 2007.

Under TRI, industrial facilities are required to report information about their discharges of a limited num-

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

The Environmental Protection Agency's Toxics Release Inventory (TRI) is the most comprehensive source of information available on the industrial release of toxic substances to America's environment. 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.

TRI data are self-reported by polluting facilities, which have little incentive to over-report their releases to the environment. In addition, TRI only covers industrial facilities, meaning that many other sources of toxic pollution – from publicly owned wastewater treatment plants to runoff from industrial cropland – are not reported. And some industrial activities, such as oil and gas drilling operations, are not required to report to TRI at all. Among non-industrial facilities, public sewage and wastewater treatment plants (officially designated as Publicly Owned Treatment Works or POTWs), stand out as particular releasers of TRI chemicals that do not report to TRI. They receive 28.6 million pounds of TRI-listed chemicals from facilities that report to TRI; what emerges from the treatment process is not disclosed to TRI. (It is estimated elsewhere, however, see text box "New Tool Allows Further Exploration of Pollution Reporting.")

Those industrial facilities that are covered must 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 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.

For these reasons, the actual volume of toxic substances released to our waters is almost certainly far greater than TRI numbers indicate. But while TRI data do not provide a complete picture of the amount of toxic chemicals that flow into the nation's environment, they are the best and most complete data available. In this report, we use TRI data for 2012 to calculate the amount of toxic chemicals released 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.

ber of specific toxic chemicals. (See text box "The Toxics Release Inventory: What It Tells Us About Toxic Pollution . . . and What It Leaves Out.")

Industrial facilities that report to TRI reported the release of 229 toxic chemicals or classes of toxic chemicals into American waterways in 2012. 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, even if those are 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, both in terms of total pounds released and toxicity-weighted pounds equivalent;
- Toxic chemicals linked to specific health effects – cancer, reproductive disorders and developmental harm; and
- Persistent bioaccumulative toxics, which are chemicals that can have a significant impact on the environment and human health in small quantities.

Quantifying Toxic Releases to Watersheds

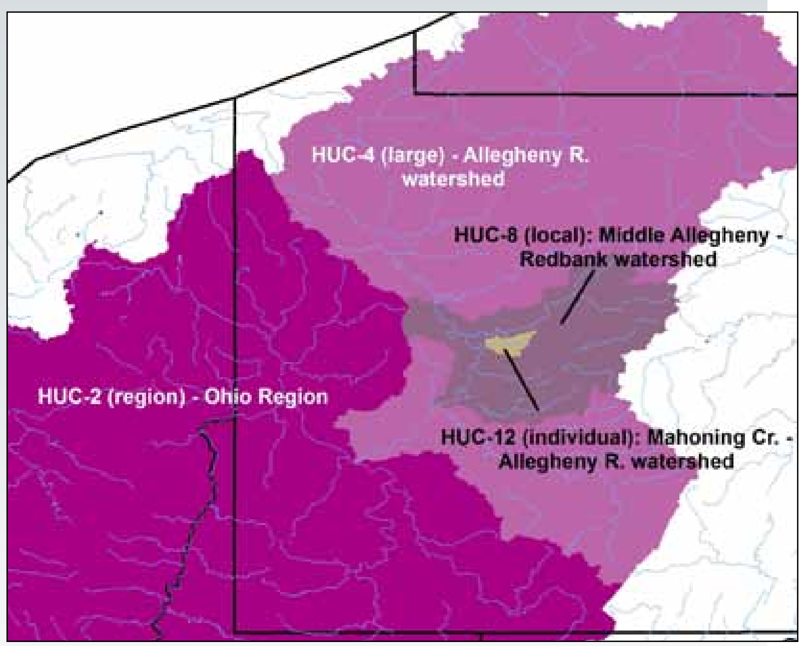
A watershed is defined by the EPA as "the area of land where all of the water that is under it or drains off of it goes into the same place."[28] An industrial facility located along a small creek sits within that creek's watershed. But because the creek flows into a larger river, the facility also simultaneously sits within *that* river's much larger watershed, which captures the drainage of many small creeks.

The U.S. Geological Survey has created watershed definitions for the United States that operate at various scales, from local watersheds surrounding a small creek or pond to the drainage of the continental-scale waterways like the Ohio River. These watersheds are denoted with numeric Hydrological Unit Codes (HUCs) – the more digits in the code, the smaller the watershed scale being described.

For example, the Mahoning Creek-Allegheny River watershed in western Pennsylvania is defined by a 12-digit HUC. Watersheds at this scale are called "individual" watersheds in this report. That watershed, in turn, sits within the Middle Allegheny-Redbank 8-digit HUC watershed (a "local" watershed in the parlance of this report), the Allegheny River 4-digit "large" watershed, and the Ohio River 2-digit "watershed region." (See Figure 1.)

Each of these levels of analysis is important. Large-volume toxic releases can be devastating to a small waterway, while the accumulated releases of hundreds of facilities in dozens of small watersheds can degrade water quality in a large waterway, like Puget Sound or the Chesapeake Bay. Unless otherwise noted, data in this report are presented for local (HUC-8) watersheds.

Figure 1: Illustration of Watershed Scales



206 Million Pounds of Toxic Chemicals Were Released to Waterways in 2012

Approximately 206 million pounds of toxic chemicals were released in America's waterways in 2012. Toxic chemicals were released in all 50 states, into 850 local watersheds.

Indiana topped this toxics list, with industrial facilities there discharging more than 17 million pounds of toxic substances into local waters. The top 10 states for volume of toxic industrial releases are the same as in 2010, though some exchanged ranks because of increases or decreases in discharges. (See Table 1.)

Table 1. Top 10 States for Toxic Releases in 2012, by Volume

State	Toxic Releases (lbs.)
Indiana	17,761,310
Texas	16,476,093
Louisiana	12,618,616
Alabama	12,287,252
Virginia	11,821,961
Nebraska	10,506,483
Pennsylvania	10,470,231
Georgia	10,132,268
North Carolina	8,897,062
Ohio	7,567,720

Not all chemicals are equally toxic – some are more toxic in small amounts than even large amounts of other chemicals. To allow for comparisons of chemical discharges that account for variations in the toxicity of various chemicals, EPA has created Toxic Weighting Factors (TWFs) – factors that, when multiplied by the volume of a particular toxic release – yield a measure called "Toxicity-Weighted Pounds Equivalent."[29] (See "Methodology" for more specifics.)

When viewed by toxicity of the chemicals, Texas had the most-toxic releases, followed by Louisiana and then Alabama. (See Table 2.)

Table 2. Top 10 States for Toxic Releases in 2012, by Toxicity

State	Toxicity Weighted Pounds Equivalent Released
Texas	34,443,534
Louisiana	3,177,143
Alabama	1,421,656
Mississippi	1,310,825
Washington	1,195,349
Nevada	1,044,451
North Carolina	697,158
Georgia	606,612
Kentucky	569,949
Florida	435,516

Among local watersheds, the Lower Ohio River-Little Pigeon River local watershed in Indiana, Illinois and Kentucky received the greatest volume of toxic releases, followed by the Upper New River watershed in Virginia and North Carolina and the Middle Savannah River watershed in Georgia and South Carolina. (See Table 3.)

Table 3. Top 10 Local Watersheds Receiving Toxic Releases, Total Pounds

Local Watershed	Total Releases (lbs.)
Lower Ohio-Little Pigeon Rivers (IN, IL, KY)	14,727,205
Upper New River (NC, VA)	7,338,166
Middle Savannah River (GA, SC)	5,025,161
Muskingum River (OH)	4,414,602
Blackbird-Soldier Rivers (IA, NE)	4,372,706
Lower Platte-Shell Rivers (NE)	3,726,866
Buffalo River-San Jacinto (TX)	3,557,254
Brandywine Creek-Christina River (DE, PA)	3,416,615
Middle Ohio River-Laughery Creek (IN, OH)	3,328,548
Lower Des Moines River (IA)	2,902,489

When weighted for toxicity, the Lower Brazos River watershed in Texas ranked first in the nation for toxic releases, followed by the Lower Grand River watershed in Louisiana and the North Fork Humboldt River watershed in Nevada. (See Table 4.)

Table 4. Top 10 Local Watersheds Receiving Toxic Releases, Toxicity-Weighted Pounds Equivalent

Local Watershed	Toxicity Weighted Pounds Equivalent Released
Lower Brazos River (TX)	33,474,792
Lower Grand River (LA)	1,926,751
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Lower Tennessee River (KY)	474,284
Bayou Sara-Thompson Creek (LA)	341,414
Middle Pearl River-Silver River (MS)	328,186

Nitrates Accounted for the Largest Volume of Toxic Releases in 2012

Chemicals that are not as toxic to humans pound-for-pound may still pose dangers to ecosystems and people, particularly when released in very large volumes. Releases of nitrate compounds represented almost 90 percent of the total volume of toxic discharges to waterways reported under 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.[30] Nitrates have also been linked in some studies to organ damage in adults.[31]

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 is another part of the overall picture.[33]

Agriculture Is a Major Nitrate Polluter

Industrial agribusiness is a major contributor to nitrate pollution of our nation's waters. Nearly one-third of industrial nitrate pollution comes from poultry and meat processing plants. In addition, fertilizer and other agricultural runoff (which are not accounted for in the Toxics Release Inventory) also account for a large volume of nitrate pollution.[32]

The Chesapeake Bay is another waterway heavily impacted by nitrate pollution. Each summer, pollution causes a dead zone that covers up to one-third of the bay. To address this problem, a group of environmental advocacy organizations worked with the EPA to set new limits on nutrient pollution in the bay in 2010.[34] Yet much work remains to be done to reduce pollution down to those limits, including curbing agricultural runoff pollution, and reducing releases from industrial dischargers. The TRI data show that in 2012, the Erachem Comilog chemical plant in Baltimore released 1 million pounds of nitrates into the Upper Chesapeake Bay large watershed, followed by the Babcock & Wilcox Nuclear Operations Group facility in Lynchburg, Virginia, which released 977,000 pounds of nitrates into the Lower Chesapeake Bay large watershed.

Newly Added Chemical Ranks High for Releases by Toxicity in 2012

One new piece of data in this year's report is the inclusion of releases of hydrogen sulfide. Hydrogen sulfide can easily become volatile, meaning that releases to water may wind up polluting the air,[35] where high concentrations can be fatal to humans. The chemical, which smells like rotten eggs, can also render water so odoriferous people will refuse to drink it.[36]

Though EPA added hydrogen sulfide to the TRI list in 1993, the agency delayed the reporting requirement pending further study. In 2011 it ruled that hydrogen sulfide releases should be reported starting in 2012,[37] saying that the chemical, which is often used in, or a byproduct of, chemical manufacturing and papermaking, "can . . . cause serious or irreversible chronic human health effects at relatively low doses" and is also toxic to ecosystems.[38]

In 2012, the first year of reporting has shown hydrogen sulfide ranks second for toxicity-weighted releases to U.S. waterways. This example illustrates why it is critical to require *all* industries to report *all* toxic discharges to the Toxics Release Inventory.

When it comes to chemicals that were reported to TRI prior to 2012, dioxin and dioxin-like compounds accounted for the largest share of 2012 releases when weighted for toxicity. Because they are so highly toxic, dioxin and chemicals like it – known human carcinogens and developmental disruptors[39] – accounted for about 90 percent of the toxicity-weighted pounds equivalent released into American waterways in 2012. The Dow Chemical Company plant in Freeport, Texas, was responsible for 79 percent of those toxicity-weighted pounds equivalent.

Table 5. Top Facilities Releasing Hydrogen Sulfide to Water, 2012

Facility Name	Facility Type	City	State	Receiving Local Watershed	Total Releases (lbs.)
GEORGIA-PACIFIC MONTICELLO LL C	Paperboard Mills	MONTICELLO	MS	Middle Pearl-Silver Rivers	115,457
CARGILL INC WET CORN MILLING - WAHPETON	Wet Corn Milling	WAHPETON	ND	Upper Red River	65,718
SMURFIT-STONE CONT STEVENSON MILL	Paperboard Mills	STEVENSON	AL	Guntersville Lake	48,809
ALABAMA RIVER CELLULOSE LLC	Pulp Mills	PERDUE HILL	AL	Lower Alabama River	46,900
BRUNSWICK CELLULOSE INC	Pulp Mills	BRUNSWICK	GA	Cumberland-St. Simons Rivers	44,129

Large Polluters Can Have a Major Impact on Local Watersheds

Most of the 50 local watersheds in the country with the largest toxicity-weighted releases of toxic chemicals receive more than 90 percent of their toxic releases from just one facility reporting to TRI, illustrating the tremendous impact that a single polluter can have on the health of a waterway.

When small streams receive vast amounts of pollution – often from just a single large polluter – the potential is created for significant harm to local ecosystems and for pollution to be carried downstream to larger waterways.

For example, in the Nooksack River watershed in northwestern Washington (ranked fourth for toxic releases when weighted for toxicity), nearly all of the toxic releases reported to TRI – mostly dioxin and dioxin-like compounds but also pentachlorophenol (a pesticide and disinfectant) – came from the Brooks Manufacturing Company wood products plant in Bellingham, which discharges into Whatcom Creek.[40] Whatcom Creek flows into the Strait of Georgia, part of the Puget Sound estuary system, home to seabirds, salmon and orca whales. Wildlife officials there have expressed concern about the level of those and other chemicals in the surrounding waters.[41]

River Systems Can Aggregate Pollution from Many Tributaries

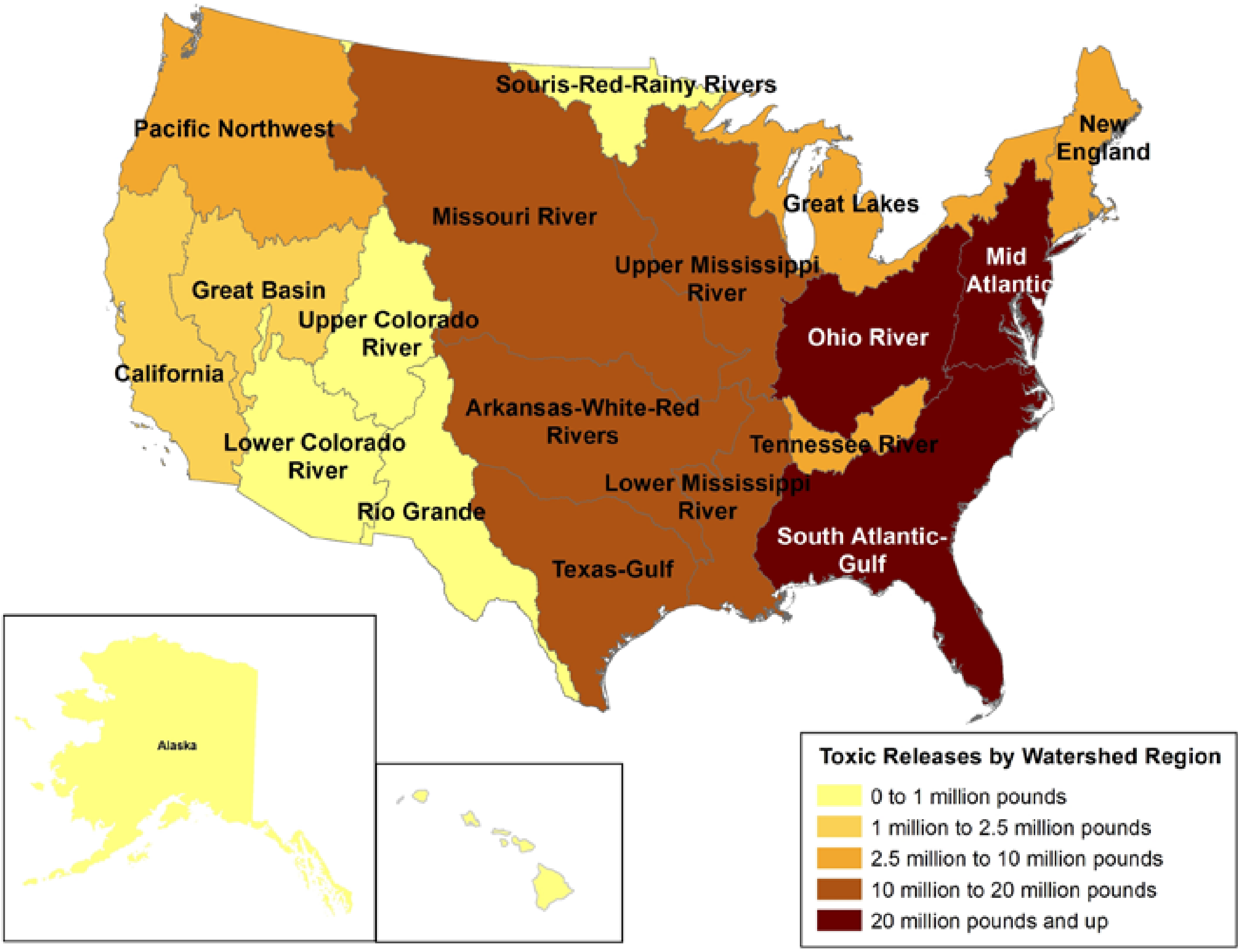
For some larger waterways, the amount of direct discharges may not tell the whole story of the impact of toxic pollution. By the time the Mississippi River, for instance, reaches the ocean, it is carrying a portion of the toxics dumped into many other rivers farther upstream (although some of those toxics will have also evaporated, settled into sediment, or otherwise ceased to flow downstream). Examining toxic releases by watershed region shows that the Ohio River region received the greatest volume of total toxic releases, followed by the South Atlantic-Gulf region and the Mid Atlantic region. When weighted for toxicity, the Texas-Gulf region received the greatest amount of releases in 2012, followed by the South Atlantic-Gulf and the Lower Mississippi River region. (See Table 6 and Figure 2.)

Table 6. Toxic Releases by Watershed Region

Watershed Region	Total Pounds Released	Toxicity Weighted Pounds
Texas-Gulf	13,211,652	33,935,900
South Atlantic-Gulf	37,715,213	4,472,145
Lower Mississippi River	13,933,267	3,473,041
Pacific Northwest	6,472,813	1,292,540
Great Basin	1,275,484	1,070,625
Tennessee River	6,261,817	874,903
Arkansas-White-Red Rivers	13,005,273	611,570
Ohio River	43,103,836	496,583
Great Lakes	8,402,509	220,180
Souris-Red-Rainy Rivers	138,939	186,473
Upper Mississippi River	16,863,867	159,216
Mid Atlantic	23,690,915	131,270
Missouri River	14,878,771	105,362
Hawaii	435,662	40,131
New England	3,336,235	34,402
California	2,358,874	33,280
Upper Colorado River	22,143	2,038
Alaska	570,475	1,958
Lower Colorado River	3,632	1,906
Rio Grande River	35,857	333

Several of these watershed regions contain multiple outlets to the ocean. Toxics released in these areas do not all follow the same path to the sea.

Figure 2. Industrial Discharges of Toxic Chemicals to Waterways by Watershed Region



Our nation's iconic waterways are still threatened by toxic pollution – with polluters discharging chemicals into the following watersheds: Great Lakes (8.39 million pounds), Chesapeake Bay (3.23 million pounds), Upper Mississippi River (16.9 million pounds), and Puget Sound (578,000 pounds), among other national treasures. (See Figure 3.)

In addition, major waterways around the country are affected by toxic discharges. Looking at large watersheds provides a view of toxic releases to these major waterways.

The Lower Ohio River large watershed tops the list for total toxic releases under this measure, followed by the Delaware River-Mid Atlantic Coastal large watershed and the Kanawha River large watershed in West Virginia. The top affected large watersheds are generally in the Southeast, but areas in the West, Midwest, Northwest, and Northeast are also affected. (See Table 7.)

When weighted for toxicity, the Lower Brazos River large watershed in Texas ranked first for toxic releases, followed by Lower Mississippi River-Lake Maurepas large watershed in Louisiana and Puget Sound in Washington. (See Table 8.)

Figure 3. Industrial Discharges of Toxic Chemicals to Nationally Iconic Watersheds[42]

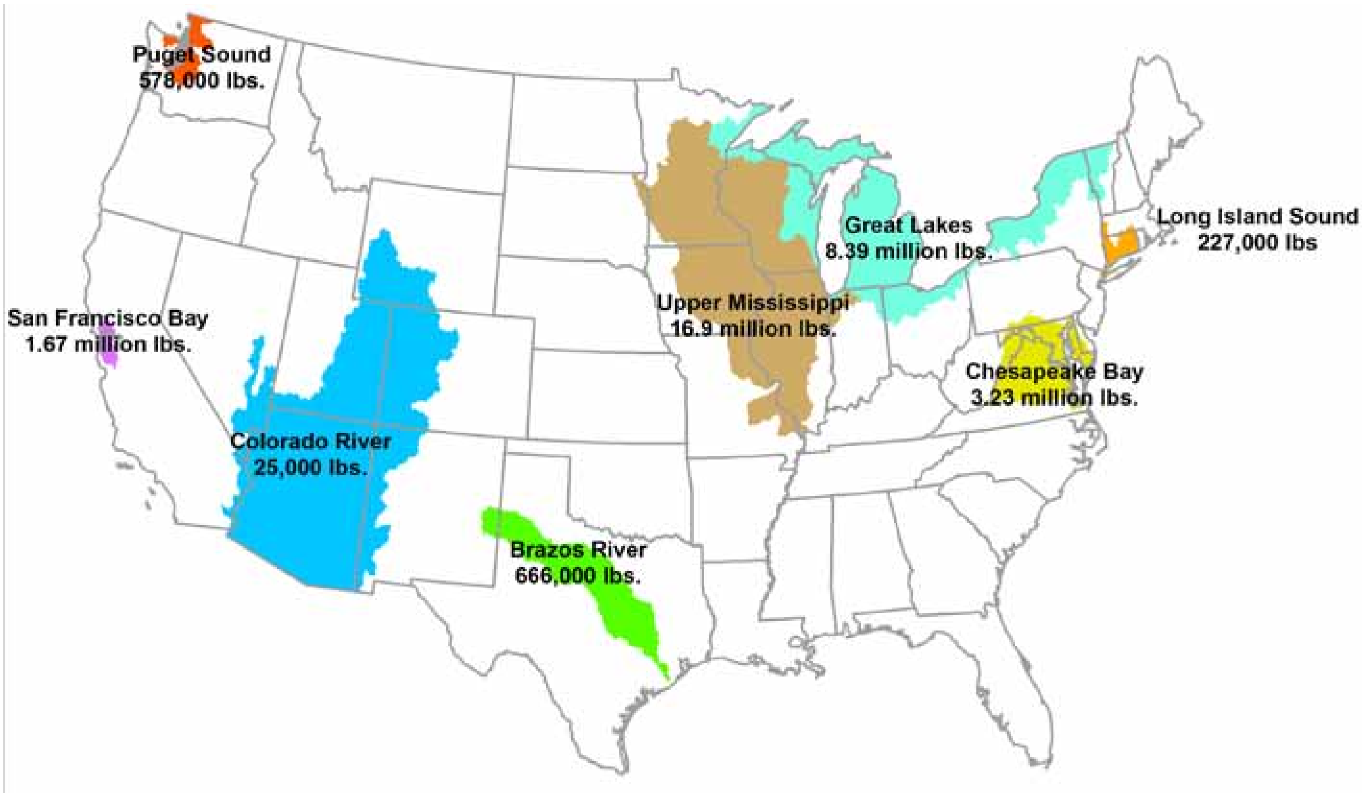


Table 7. Toxic Releases by Large Watershed, Total Pounds

Large Watershed	Total Releases (lbs.)
Lower Ohio River (IL, KY, IN)	15,299,487
Delaware River-Mid Atlantic Coastal (DE, NJ, PA)	12,561,208
Kanawha River (NC, VA, WV)	8,585,353
Galveston Bay-San Jacinto (TX)	8,118,871
Red-Sulphur Rivers (AR, LA)	7,904,718
Ogeechee-Savannah Rivers (GA)	7,020,511
Lower Mississippi River-Lake Maurepas (LA)	6,359,671
Mobile-Tombigbee Rivers (AL, MS)	5,767,962
Platte River (NE)	5,638,723
Muskingum River (OH)	4,453,879

Table 8. Toxic Releases by Large Watershed, Toxicity-Weighted Pounds Equivalent

Large Watershed	Toxicity-Weighted Pounds Released
Lower Brazos River (TX)	33,475,464
Lower Mississippi River-Lake Maurepas (LA)	2,563,835
Puget Sound (WA)	1,111,143
Black Rock Desert-Humboldt River (NV)	1,044,349
Mobile-Tombigbee Rivers (AL, MS)	1,014,431
Lower Tennessee River (KY, TN, MS)	620,506
Cape Fear River (NC)	552,416
Red-Sulphur Rivers (AR, LA)	551,805
Altamaha-St. Marys Rivers (FL, GA)	507,024
Alabama River (AL)	436,678

West Virginia Spill Shows Need for Increased Reporting of Toxic Chemical Storage, Use and Discharge

On January 9, 2014, 10,000 gallons of crude 4-metylcyclohexanemethanol (MCHM) spilled from a Freedom Industries storage tank on the banks of the Elk River in Charleston, West Virginia,[43] causing authorities to order 300,000 West Virginia residents not to drink their water for as much as a week.[44] The Elk is part of the Kanawha River large watershed, also called "Chemical Valley" because of the amount of chemicals used, stored and released there – intentionally and accidentally – over many decades.[45]

And yet, MCHM, like several other chemicals used in coal washing,[46] is not required to be reported to TRI. And facilities that only store chemicals and do not intend to release them to the environment are not required to report to TRI either.

The Freedom Industries spill demonstrates that TRI-reported releases of toxic substances by industry represent only the tip of the iceberg of the potential threats posed by industry storage, use and discharge of toxic chemicals to the health of our waterways. To fully protect the environment and the public, local, state and federal governments should collect more information regarding industrial use of toxic chemicals and make as much of that information as possible available to the public.

Releases of Small-Volume Toxic Chemicals Also Pose Concern

As noted before, even chemicals that are released in small volumes can be very toxic to the environment, humans or both. The most concerning chemicals are those that break down slowly (or not at all) in the environment, and that accumulate up the food chain. These are called persistent bioaccumulative toxicants (PBTs). 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.[51]

As the TRI data show, direct surface water discharges of PBTs are common across the United States. More than 75,000 pounds of PBTs were released to nearly 600 local watersheds in 2012.[52]

By toxicity, dioxin and dioxin-like compounds were far and away the most dangerous releases: four pounds, translating to 42 million toxicity-weighted pounds equivalent, were released into 87 local watersheds nationwide in 2012. Given that the World Health Organization guidelines for dioxin, a known carcinogen, 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.[53]

The leading industries discharging PBTs were chemical wholesalers, ready-mix concrete manufacturers, organic chemical manufacturers, rubber and plastics hose and belt manufacturing, and paper and wood-products plants. The Upper Black River watershed in Arkansas and Missouri received the most releases of PBTs among local watersheds, followed by the York River watershed in Virginia and the Little Calumet-Galien Rivers watershed in Illinois and Indiana. The most toxic PBT releases were of dioxin and dioxin-like compounds and hexachlorobenzene, a chemical so toxic that it is now banned in pesticides but is still produced as a by-product of certain chemical processes.[54]

Reporting Releases of Fracking Chemicals

Oil and gas extraction facilities, unlike oil refineries and other petroleum processing plants, are exempt from reporting to the Toxics Release Inventory (TRI).[47]

Adding oil and gas extraction to TRI would shed light on toxic chemical releases by companies employing fracking, a controversial and harmful technique for producing oil and gas from shale rock. Each fracking well uses large amounts of toxic chemicals, including some that would be reportable to TRI if discharged by other facilities,[48] and then must dispose of some of those chemicals, along with contaminated water from the oil or gas formation, often in underground injection wells.

Canada's equivalent to TRI already requires reporting from the oil and gas extraction industry, and environmental and public health advocates have petitioned the EPA to follow suit.[49]

Much remains unknown about toxic releases from fracking facilities, including the degree to which these facilities release toxic substances to surface waters. We do know, though, that an independent analysis of data submitted by fracking operators to FracFocus revealed that one-third of all fracking projects reported using at least one cancer-causing chemical.[50]

Expanding TRI to include oil and gas extraction will enable the public to gain a clearer picture of the environmental and public health impacts of fracking.

Toxic Releases Continue to Harm Already-Polluted Waterways

When pollution makes waterways unsafe for drinking, swimming, fishing or other recreational uses, those waterways are designated as "impaired."

According to EPA data, 1.5 million pounds of toxic chemicals were released into 140 local watersheds designated as "impaired" by the EPA for those types of chemicals in 2011.

For example, the Raccoon Creek-Symmes Creek watershed, on the border between Kentucky, Ohio and West Virginia, is impaired for the class of chemicals called "nutrients," substances including nitrogen and phosphorus that can alter ecosystems by encouraging algae blooms, which consume the dissolved oxygen that fish and other aquatic life need to survive.[55] Yet in 2011 industrial facilities released 260,114 pounds of those types of chemicals into the watershed – nearly all (254,826 pounds) of it ammonia from the Sands Hill Mining coal and lignite mine in Hamden, Ohio.[56]

Despite the fact that these waters are known to be in trouble, monitoring and remediation are not always timely: The most recent assessment of the Raccoon Creek local watershed section of the Mississippi River was done in 2010, and indicates that a watershed-wide limit for discharges of nutrients had not yet been set.[57]

Citizens can now track the amount of toxic chemicals released into polluted waterways using online tools available at the EPA's website. (See Appendix D.)

Releases of Toxic Chemicals Linked to Human Health Problems Are Widespread

The amount of toxic material discharged into America's waterways is a major concern. But in addition to their overall toxicity, some chemicals have particular toxic impacts on particular aspects of human health.

Cancer

In 2012, manufacturing facilities discharged 1.4 million pounds of cancer-causing chemicals into U.S. waterways.[58] The North Fork Humboldt River watershed in Nevada received the greatest volume of releases of cancer-causing substances, far exceeding the second-most affected local watershed, the Lake Maurepas watershed in Louisiana. The Wheeler Lake watershed in Alabama, Cooper River watershed in South Carolina and St. Marys River watershed in Florida and Georgia rounded out the top five. (See Table 9.)

BP Refinery Released Carcinogens into Lake Michigan

In 2012, the BP petroleum refinery in Whiting, Indiana, discharged more than 1,000 pounds of cancer-causing chemicals into Lake Michigan. This is not the first time that pollution from BP's facility has caused concern. In 2007, the company proposed increasing its toxic discharges into Lake Michigan, and advocacy organizations around the region, along with key members of Congress, launched a campaign to stop it.[59] Attention stayed on the refinery as it planned to expand to increase its processing capacity for Canadian tar sands oil.[60] In March 2014, the refinery spilled as much as 1,600 gallons of crude oil into the lake.[61]

Table 9. Top 20 Local Watersheds for Discharges of Cancer-Causing Chemicals, 2012

Local Watershed	Pounds Released	Rank
North Fork Humboldt River (NV)	283,979	1
Lake Maurepas (LA)	44,142	2
Wheeler Lake (AL)	43,557	3
Cooper River (SC)	42,742	4
St. Marys River (FL, GA)	33,973	5
Lake Michigan (MI)	31,098	6
Little Calumet-Galien Rivers (IN, IL)	30,028	7
Lower Columbia-Clatskanie Rivers (OR, WA)	22,087	8
South Fork Holston River (TN, VA)	21,791	9
Lower Brazos River (TX)	21,686	10
Middle Ohio River-Laughery Creek (IN, OH)	21,409	11
Lower Little Arkansas, Oklahoma Rivers (AR)	19,834	12
South Corpus Christi Bay (TX)	16,489	13
Bayou Sara-Thompson Creek (LA)	16,425	14
East Central Louisiana Coastal (LA)	16,389	15
Bayou Macon (AR, LA)	15,422	16
Lower Alabama River (AL)	15,181	17
Carolina Coastal-Sampit River (SC)	14,262	18
Bayou Bartholomew (AR, LA)	14,153	19
Lower Ohio-Little Pigeon Rivers (IN, IL, KY)	14,092	20

Cancer-causing chemicals were released into 688 local watersheds nationwide in 2012. Several industries discharge large amounts of cancer-causing chemicals to waterways.

The gold ore mining industry released the largest amount of carcinogens among those industries reporting to TRI. More than 95 percent of the releases were in the form of arsenic, arsenic compounds and other cancer-causing chemicals from the Jerritt Canyon Mine in Nevada.

Regionally, releases of carcinogenic chemicals are concentrated in the southeastern United States and the Great Basin in Utah, Idaho, Nevada and inland California (the major region of the United States where water does not flow to either ocean, instead leaving through evaporation).

Together the South Atlantic-Gulf and Great Basin regions received 43 percent of the country's carcinogenic releases reported to the TRI.

Chemicals that Interfere with Human Reproduction and Development

Reproductive toxics are chemicals that damage our ability to have children. Developmental toxics can cause birth defects and affect the way our children grow, learn and behave. More specifically, the risks of these chemicals include fetal death, cleft lip/cleft palate and heart abnormalities, as well as neurological, hormonal and immune system disorders.

In 2012, industrial facilities discharged 464,500 pounds of developmental toxics into 656 American local watersheds. Because some carcinogens also have the potential to interfere with reproduction and growth, many of the same watersheds that received large amounts of cancer-causing chemicals also rank high for other types of human-health toxins.

The largest release of developmental toxicants was from the Jerritt Canyon Mine in Nevada, in the form of 184,620 pounds of arsenic and arsenic compounds.

Regionally, the releases of developmental toxics were concentrated in the Great Basin and the Ohio River system.

Table 10. Top 20 Local Watersheds for Discharges of Developmental Toxicants, 2012

Local Watershed	Pounds Released	Rank
North Fork Humboldt River (NV)	184,620	1
Lake Maurepas (LA)	35,866	2
Lower Kanawha River (WV)	13,514	3
Upper Black River (AR, MO)	12,528	4
Middle Kansas River (KS)	11,045	5
Upper Ohio River (OH, PA)	10,148	6
Lower Columbia-Clatskanie Rivers (OR, WA)	9,377	7
Lower Ohio-Little Pigeon Rivers (IN, IL, KY)	8,910	8
Lower James River (VA)	7,660	9
Lower Brazos River (TX)	7,027	10
Northeast Cape Fear River (NC)	6,941	11
South Fork Holston River (TN, VA)	6,632	12
Middle Ohio River-Laughery Creek (IN, OH)	6,028	13
Little Calumet-Galien Rivers (IN, IL)	5,506	14
York River (VA)	4,628	15
Buffalo River -San Jacinto (TX)	3,613	16
Middle Chattahoochee River-Lake Harding (AL, GA)	3,532	17
Cuyahoga River (OH)	3,420	18
Raisin River (MI)	3,285	19
Upper White River (IN)	3,041	20

Releases of reproductive toxicants into waterways totaled 4.4 million pounds, into waterways in 645 local watersheds around the country.[62] The hardest hit by reproductive toxic discharges was the Castle Rock Flowage watershed in Wisconsin, which received 560,000 pounds of the industrial solvent methanol from a facility called the Water Quality Center in Wisconsin Rapids, Wisconsin, which is owned by NewPage, a paper company that has a nearby paper mill. (The flowage also received 3,400 pounds of methanol from another paper plant; that paper plant and another chemical plant combined to release just shy of 100 pounds of lead into the flowage as well.)

The Lower Chehalis River watershed in Washington received the second-most releases of reproductive toxics. That watershed discharges into Grays Harbor, a scenic bay that is surrounded by beaches, a National Wildlife Refuge, two state parks and two state wildlife areas. All of its 2012 reproductive toxics came from the Cosmo Specialty Fibers wood-veneer manufacturing plant in Aberdeen, Washington – 553,100 pounds of methanol and 80 pounds of lead and lead compounds.[63]

More than two-thirds of the reproductive toxics released nationwide came from pulp, paper and paperboard mills.

Regionally, releases of reproductive toxics were concentrated in the South Atlantic-Gulf region, which received more than one-fourth of all reproductive toxics discharged nationwide. The Lower Mississippi River region received 22 percent of the country's burden of reproductive toxics.

Table 11. Top 20 Local Watersheds for Discharges of Reproductive Toxicants, 2012

Local Watershed	Pounds Released	Rank
Castle Rock Flowage (WI)	563,566	1
Lower Chehalis River (WA)	553,180	2
Bayou De Chien-Mayfield River (KY)	549,492	3
Lower Alabama River (AL)	449,223	4
Lower Grand River (LA)	172,056	5
Lower Conecuh River (AL)	161,389	6
Wheeler Lake (AL)	98,627	7
Lower Penobscot River (ME)	82,330	8
Middle Savannah River (GA, SC)	80,762	9
Lower Columbia-Clatskanie Rivers (OR, WA)	80,280	10
Lower Pearl River (LA, MS)	64,171	11
Lower Androscoggin River (ME)	59,119	12
Carolina Coastal-Sampit River (SC)	56,019	13
Lower Leaf River (MS)	53,392	14
Bayou Sara-Thompson Creek (LA)	51,331	15
Bayou Pierre (LA)	50,265	16
Menominee River (WI, MI)	46,571	17
Lower Yazoo River (LA, MS)	46,173	18
Lower Roanoke River (NC)	44,286	19
South Fork Holston River (TN, VA)	43,086	20

New Tool Allows Further Exploration of Pollution Reporting

Because facilities self-report their releases of toxic chemicals to the Toxics Release Inventory, and because the TRI program only covers a limited universe of facilities (see text box "The Toxics Release Inventory: What It Tells Us About Toxic Pollution … and What It Leaves Out"), it has long been understood that TRI provides only a partial picture of toxic releases to America's waterways.

A new online data tool unveiled by the EPA in 2012 allows another view of toxic releases. The Discharge Monitoring Report (DMR) Pollutant Loading Tool estimates annual pollutant discharges to waterways based upon millions of individual reports of pollutant releases covered by National Pollutant Discharge Elimination System (NPDES) water pollution permits, which are used to assure compliance with the Clean Water Act. The NPDES program includes a far broader range of polluting facilities than TRI, including public wastewater treatment plants that receive discharges of toxic chemicals from industrial facilities and other sources.

Even among those facilities that do report to both programs, the facilities may report releases of different chemicals to each.

A review of a subset of reported releases in the 2011 TRI and DMR datasets offers a reality check that suggests the scope of toxic releases in the U.S. is far beyond what is reported in TRI data alone.

For example, of 746 facilities reporting releases of TRI-listed chemicals to impaired waterways, 585 (78.4 percent) filed only TRI reports; 72 (9.6 percent) filed only DMRs. Just 89 facilities (11.9 percent) filed both reports for 2011.[64]

The data filed by facilities that reported to both programs show that the reports rarely agree exactly, and at times the differences in the discharges reported are sizeable. There are several possible reasons for this, not all of which indicate noncompliance with environmental laws:

- Some facilities may be discharging toxic chemicals to waterways without reporting to TRI (e.g., some facilities are not required to submit TRI data to EPA).
- Other facilities may be reporting to TRI but do not have an effluent monitoring requirement in their permit for releases of toxic chemicals to waterways.
- Still other facilities may report dramatically different releases of toxic chemicals to TRI than they report when monitored for compliance with their water discharge permits.
- States authorized to implement the NPDES program do not necessarily share all facility, permit or discharge monitoring data with EPA's data system (ICIS-NPDES), meaning that some release data may not appear in the DMR Pollutant Loading Tool.
- DMR data may be manually entered into a state or EPA data system, which can lead to data-entry errors. EPA has an online tool for reporting errors; however, there are likely some significant DMR data errors yet to be corrected.

The DMR Pollutant Loading Tool provides a useful reminder that the scope of toxic releases to America's waterways exceeds that described by the TRI data used in this report. The tool also has the potential to provide a useful reality check of the accuracy of industry's self-reporting of toxic releases under TRI, while also helping to ensure the accuracy of discharge reports required by the Clean Water Act. **Regulators should ensure that industry reports of toxic discharges under both TRI and NPDES are full and accurate for environmental compliance purposes**. The tool can be found at cfpub.epa.gov/dmr.

Protecting America's Waterways from Toxic Releases

The continued discharge of millions of pounds of toxic chemicals to America's rivers, lakes, and streams clearly shows that we need stronger action to protect our water and our health.

As outlined in more detail below, curbing this toxic threat to our waters will require three critical steps. First, we must strengthen enforcement and permitting under our clean water laws – including immediately restoring protections of the Clean Water Act to all of our waterways.

Second, industrial polluters must reduce their use of toxic chemicals to prevent pollution in the first place. And third, we must expand the public's access to information about all toxic discharges to our waters, so that there is accountability and data to address toxic threats that currently remain hidden from public view.

The Clean Water Act: Ensuring Strong Protection for 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. Even the successes the law has achieved have faced a recent threat as a result of Supreme Court decisions that imperiled Clean Water Act protections for waterways across the country.

Restore Protections for All of America's Waters

Our great waterways – from the Chesapeake Bay to Puget Sound – depend on the health of the countless streams that feed them and the wetlands which help keep them clean. This hydrologic truth has manifested itself throughout the data in this report – from toxic discharges to Washington's Whatcom Creek and the wildlife of Puget Sound to the flow of pollution from the whole Mississippi River watershed to the dead zone in the Gulf of Mexico.

Yet a series of court cases brought by polluters, culminating in the U.S. Supreme Court's 2006 decision in the case of *Rapanos v. United States*, have threatened the protection that thousands of streams and millions of acres of wetlands have traditionally enjoyed under the Clean Water Act. Across the country, 58 percent of all streams are at risk of increased pollution due to these court decisions.[65] Nationwide, EPA estimates that 117 million people are served by drinking water systems that draw their water from headwaters streams or intermittent waterways.[66]

In April 2014, the U.S. Army Corps of Engineers and the EPA jointly addressed this threat by proposing a rule that would restore Clean Water Act protections to thousands of streams and wetlands across the country.

Appropriately, the public comment period on this critical rule opened on April 21, 2014, the day before Earth Day. **The administration should ensure that the Clean Water Act applies to headwaters streams, intermittent waterways, isolated wetlands and other waterways by approving a final rule by the end of this year.** Beyond that, the administration should work to restore protections to other waterways that may not be covered by the new rule.

Strengthen 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.

State and federal officials must take several steps to address these shortcomings, including but not limited to:

- 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 March 2013, nearly one out of every four discharge permits for major industrial facilities had expired.[67] 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.
- Requiring that all facilities that threaten our waters with pollution – including factory farms – obtain permits with clear numeric limits and enforceable standards.
- Boldly and regularly applying other Clean Water Act tools to restore and protect America's waters. These include requiring specific polluters to make real reductions to meet established pollution limits for waterways, such as the Chesapeake Bay Total Maximum Daily Load (TMDL), and protecting drinking water sources and other pristine waters with antidegradation designations. As examples of the latter, Environment New Jersey worked with then-DEP Commissioner Lisa Jackson to protect 900 miles of the state's waters from new sources of pollution,[68] and Environment North Carolina won similar "antidegradation" protections for Horsepasture River and other state waters.[69]
- Eliminating permit loopholes, such as "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.)
- Enforcing pollution limits by regularly imposing tough penalties for Clean Water Act violations. Too often, officials lack the resources or political will to penalize 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. One way or another, enforcement agencies must consistently apply tough penalties to create an adequate deterrent effect.

Preventing Water Pollution by Reducing Toxics Use

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.

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.[70] Industrial facilities reported releasing 389 pounds of perc directly to U.S. waterways in 2012, 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.[71]
- Formaldehyde is used in a wide variety of consumer products and has been linked to health effects ranging from allergies to cancer.[72] In 2012, industrial facilities reported releasing nearly 156,549 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 in hard plastics to make them flexible, as ingredients in personal care products, and in other applications. California has listed five phthalates as developmental and/or reproductive toxicants.[73] A wealth of safer alternatives exist, including plastics other than polyvinyl chloride (PVC, which typically includes phthalates) and alternative plasticizers for PVC.[74]
- 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.[75]

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.[76]

In addition, more stringent action is needed for the most toxic chemicals, including persistent bioaccumulative toxins. Where safe alternatives already exist, such toxic chemicals should be banned, as states have done with several toxic substances, including brominated flame retardants. 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. These pollution prevention approaches will not only protect our waters from toxic discharges but also protect our health from other pathways of toxic exposure – including air pollution, land contamination and consumer products.

Requiring Reporting of All Toxic Releases

The Toxics Release Inventory (TRI) is the nation's most comprehensive source of data about industrial releases of toxic chemicals to waterways, but it is far from complete. TRI excludes many important industrial sectors, does not include all toxic chemicals with the potential to harm people and the environment, and is subject to reporting thresholds that further limit the information available to the public. To improve the reporting of toxic chemical releases under TRI, the federal government should:

- **Require the oil and gas industry to report toxic fracking releases to TRI.** The recent rise of "fracking" for oil and gas in the United States has resulted in the use of vast amounts of toxic chemicals and even greater volumes of toxic wastewater.[77] The public deserves to know about all releases of such toxic substances. EPA should approve a petition filed by Environmental Integrity Project, PennEnvironment, and 16 other organizations to require the oil and gas industry to report its toxic fracking pollution to TRI.
- **Probe discrepancies in industry reports of toxic releases to TRI and other environmental compliance programs.** The launch of the EPA's DMR Pollutant Loading Tool has illustrated the discrepancies between industry reporting to TRI and systems that track compliance with water pollution permits. Many of these discrepancies can likely be explained as differences in calculation methods and variations in the legal requirements facing industries under the two programs. Some discrepancies, however, may be the result of industry non-reporting or under-reporting of toxic releases. The EPA and states should continue to refine and improve the quality of data available through the DMR Pollutant Loading Tool and use the tool to investigate conflicts in industry reporting of toxic chemical releases.
- **In addition, require reporting not just of releases of *all* toxic chemicals, but also of their storage, especially in high volumes.** As noted in our report, Freedom Industries did not have to report its storage of the chemical responsible for contaminating the drinking water of 300,000 people in West Virginia.

One of the great powers of the Toxics Release Inventory is that the data submitted by polluting facilities can be searched, sorted, and aggregated by the public. Indeed, that is what has made this report possible. By requiring reporting of *all* toxic releases to TRI, we provide nearby communities and the broader public with critical data to demand that polluters reduce toxic threats to their health and to their waters.

We all want our waters to be clean – for swimming, fishing, drinking, healthy ecosystems and future generations. Realizing this vision will take many bold steps, including reducing the use of many toxic chemicals. But there is one piece of the solution that is standing squarely before us right now: restoring protections of the Clean Water Act to thousands of waterways across the nation.

Methodology

The data and analysis in this report are based on 2012 data from the federal Toxics Release Inventory, as provided to us by the Environmental Protection Agency on 14 April 2014. The Toxics Release Inventory is frequently revised after the posting of the national public data release, which is the basis for this report. The most recent National Analysis dataset is available at www.epa.gov/triexplorer. The data are frequently updated, and the newest information is at www.epa.gov/enviro/.

The data supplied to the authors by the EPA differ slightly from those provided in the National Analysis dataset, as they reflect adjustments made by the EPA for integration of TRI data into the Discharge Monitoring Report (DMR) Pollutant Loading Tool. These changes and their implications for the data are described farther down in this section.

Assigning Toxic Releases to Watersheds

Discharges were assigned to watersheds based on the latitude/longitude coordinates of TRI facilities downloaded from the EPA's Federal Registry System (FRS) Geospatial Data Download Service (www.epa.gov/envirofw/geo_data.html) and on geospatial datasets defining the boundaries of various Hydrologic Units from the U.S. Geological Survey's Watershed Boundary Dataset (ftp://ftp.ftw.nrcs.usda.gov/wbd/WBD_Latest_Version_March2014/). Hydrologic Unit Codes (HUCs) were assigned to each TRI facility based on results of a spatial join conducted using ArcGIS software. Readers are advised that the point used to determine the estimated location of the facility in FRS is not necessarily the same location from which toxic chemicals are released into waterways; as a result, it is possible that releases from facilities near watershed boundaries may occur in a neighboring watershed rather than the watershed determined through the use of FRS.

The geospatial method of assigning facilities to watersheds was deemed superior to using the HUCs provided in the original data from EPA or from FRS, as recent changes in HUC definitions are not necessarily reflected in those datasets, leading to the possibility of erroneous matches and the exclusion of some facilities from the analysis.

The authors believe that the use of EPA-provided HUC-8 codes and USGS-defined watersheds is superior to the method used to assign releases to waterways in the previous two iterations of this report, which relied on industry self-reports of the names of waterways receiving releases. The prior method was prone to spelling errors, ambiguity and confusion among multiple waterways bearing the same name. This method also allows easier handling than in the past of data about releases into watersheds that cross state lines.

We selected HUC-8 (which this report calls "local watershed") as the primary level of aggregation of toxic releases.

Calculating Toxicity-Weighted Pounds Equivalent

To allow comparison between releases of different chemicals with varying toxicities, EPA has created a relative ranking measure called the Toxic Weighting Factor (TWF). Multiplying the pounds of a chemical by its TWF results in a Toxicity-Weighted Pound Equivalent, or TWPE. **Pollutants have different toxicities to human health and aquatic communities and the TWPE unit provides a relative measure of how the potential toxic nature of one pollutant compares against another pollutant. It is important to note that this value is not a measure of risk or potential for human health impacts.**

The list of chemicals and their TWFs was provided by EPA as an Excel spreadsheet called *TWF_Database_2007* on 30 April 2014.

Calculation of TWPE was done by multiplying the pounds of discharge reported to TRI by the TWF for that chemical. The figures for each chemical discharged from each facility were calculated separately before any aggregation.

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*, as updated on 4 April 2014. 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 and various metal compounds) are not identified by CAS numbers – these chemical classes in the TRI database were linked to the Proposition 65 list by manual comparison. 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. In these cases, it was assumed that every individual member of a TRI chemical class exhibited the health effects of the corresponding chemical from the Proposition 65 list. In some cases, we assumed that all compounds of a given substance (such as lead) exhibited the same health effects as the substance itself. Finally, some substances on the Proposition 65 list only cause health effects in particular chemical configurations. In cases where we could not determine the chemical configuration from the TRI database, we assumed that all releases exhibited the health effects of the corresponding chemical on the Proposition 65 list. (See Appendix C.)

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, *Persistent Bioaccumulative (PBT) Chemicals Covered by the TRI Program*, downloaded from www2.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-covered-tri, 6 May 2014.

Connecting TRI Facilities With Primary Industries and Parent Companies

A search of the EPA's Envirofacts database allows connection of TRI IDs with North American Industry Classification System (NAICS) codes, which in turn allows determination of what industry each TRI facility is primarily involved in and its parent company. NAICS definitions were downloaded from the U.S. Census Bureau. NAICS definitions from 2007 were used in lieu of updated definitions from 2012 as it was determined that many records in the Envirofacts database used the older version of the NAICS codes.

The download of this dataset on 28 April 2014 included 56 TRI IDs that were associated with more than one primary NAICS code. Of these, six had one TRI ID record with a valid NAICS code and a second whose NAICS code was "INVALD" or "NA" or was blank. For these, the valid NAICS code was used.

Four had a pair of records with the same NAICS code in both; the duplicate record was deleted.

For the remaining 46, multiple primary NAICS codes were listed, so those records' NAICS code values were changed to "Multiple Industry Codes Reported."

Differences from TRI 2012 National Analysis Dataset

The data used in this report were compiled for use in the EPA's DMR Pollutant Loading Tool (see text box "New Tool Allows Further Exploration of Pollution Reporting") and differ slightly from the publicly available data in the TRI 2012 National Analysis Datase. Prior to loading TRI data on releases to water into the DMR Pollutant Loading Tool, the EPA further processes data reported by industry to simplify understanding of metal releases, and to account for how certain other chemicals behave in water. These modifications, which reduce the total volume of reported releases by 0.6 percent of the amount reported in the TRI National Analysis, are as follows:

Metals and Metal Compounds

A metal (for example, zinc) and compounds involving that metal are reported separately to TRI, but are combined, for data-display purposes, into a single category (in this example, "zinc and zinc compounds"). The example EPA gives is "if a facility reported 5 pounds of zinc and 10 pounds of zinc compounds . . . the database would display that the facility has one entry of 15 pounds of 'zinc and zinc compounds.'"[78]

Sodium Nitrite

Sodium nitrite is "an ionic salt that will fully dissociate into nitrite and sodium ions" in water. The nitrite ions "are unstable in water and will oxidize to nitrate."[79] Because of this, sodium nitrite releases to water behave similarly to releases of nitrates, just in a different original chemical form. Facilities report to TRI the amount of sodium nitrite they release; EPA converts those reports to pounds of nitrogen equivalent and replaces the facility-reported number with the new, converted number.[80]

Phosphorus (Yellow or White)

Yellow phosphorus and white phosphorus "are hazardous chemicals that spontaneously ignite in air."[81] Other compounds involving phosphorus are included in the TRI list, and yellow and white phosphorus may be released to other environmental media included in TRI reporting. But EPA has determined that reports of releases of yellow and white phosphorus to water are in error, and therefore deletes those data.[82]

Chlorine and Chlorine Dioxide

EPA's guidance to industry is not to report releases of chlorine and chlorine dioxide to water, because under normal environmental and chemical circumstances, EPA does not expect those releases to actually occur.[83] As a result, reports that are made of releases of chlorine and chlorine dioxide are assumed to be in error, and therefore deleted.

Cleaning up Data Discrepancies

During the processing of data, several anomalies were discovered. Upon inquiry with EPA, and as a result of EPA's subsequent double-checking, EPA advised us to change the values of certain releases of certain chemicals at certain facilities. Specifically, the following:

- At the Carolina Pole wood-treatment facility in Leland, North Carolina, the release of dioxin and dioxin-related compounds was corrected to 0.041601 pounds.
- At Merrimack Station power-generating facility in Bow, New Hampshire, the release of ammonia was corrected to 406 pounds, the release of barium and barium compounds was corrected to 64 pounds, and the release of lead and lead compounds was corrected to 5.1 pounds.
- At the U.S. Navy submarine base in New London, Connecticut, the release of lead and lead compounds was corrected to 49 pounds.

- At the GM powertrain operations facility in Flint, Michigan, the release of copper and copper compounds was corrected to 12 pounds, the release of lead and lead compounds was corrected to 2.4 pounds, the release of manganese and manganese compounds was corrected to 260 pounds, the release of nickel and nickel compounds was corrected to 4 pounds, and the release of zinc and zinc compounds was corrected to 160 pounds.

- At the ExxonMobil petroleum terminal in Vernon, California, the release of zinc and zinc compounds was corrected to 1.39 pounds.

- At the BP West Coast Products refinery in Carson, California, the release of lead and lead compounds was corrected to 0.5 pounds, the release of nickel and nickel compounds was corrected to 1 pound, and the release of zinc and zinc compounds was corrected to 55 pounds.

- At the U.S. Naval Base Ventura County in Point Mugu, California, the release of lead and lead compounds was corrected to 15.61 pounds.

- At Portsmouth Naval Shipyard in Kittery, Maine, the release of lead and lead compounds was corrected to 8.2 pounds.

- At the PCC Structurals metal facility in Portland, Oregon, the release of chromium and chromium compounds was corrected to 9 pounds, the release of nickel and nickel compounds was corrected to 16 pounds, and the release of copper and copper compounds was corrected to 8 pounds.

Public Availability of Data

The version of the TRI data used in this report will be available to the public when EPA completes the inclusion of 2012 data in the DMR Pollutant Loading Tool, which is slated for later this year. The dataset will be made available upon request to the authors.

Appendix A: Detailed Data on Discharges to Waterways

Table A-1. Toxic Discharges to Waterways by State, 2012

State	Toxic Releases (lbs.)	*Rank*	Toxicity Weighted Pounds Equivalent Released	*Rank*
Alabama	12,287,252	*4*	1,421,656	*3*
Alaska	570,534	*37*	1,959	*43*
Arizona	1,177	*48*	564	*45*
Arkansas	4,250,250	*17*	238,342	*13*
California	2,358,922	*26*	33,280	*29*
Colorado	849,610	*36*	3,730	*39*
Connecticut	224,029	*40*	2,618	*40*
Delaware	3,777,909	*20*	31,847	*31*
District of Columbia	948	*49*	120	*50*
Florida	1,332,705	*32*	435,516	*10*
Georgia	10,132,268	*8*	606,612	*8*
Hawaii	435,695	*38*	40,131	*26*
Idaho	2,470,923	*25*	16,515	*37*
Illinois	6,117,685	*13*	37,123	*28*
Indiana	17,761,310	*1*	148,516	*15*
Iowa	6,827,801	*12*	17,564	*36*
Kansas	302,318	*39*	31,940	*30*
Kentucky	7,419,758	*11*	569,949	*9*
Louisiana	12,618,616	*3*	3,177,143	*2*
Maine	3,105,311	*22*	31,012	*32*
Maryland	1,084,388	*35*	2,685	*41*
Massachusetts	5,555	*47*	317	*46*

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State	Toxic Releases (lbs.)	*Rank*	Toxicity Weighted Pounds Equivalent Released	*Rank*
Michigan	1,779,720	*30*	129,752	*16*
Minnesota	1,773,690	*31*	95,852	*18*
Mississippi	4,951,785	*16*	1,310,825	*4*
Missouri	2,176,285	*27*	41,246	*25*
Montana	195,732	*41*	3,822	*38*
Nebraska	10,506,483	*6*	43,996	*23*
Nevada	1,169,685	*34*	1,044,451	*6*
New Hampshire	800	*50*	161	*49*
New Jersey	5,862,061	*14*	41,424	*24*
New Mexico	39,784	*45*	2,098	*42*
New York	5,303,190	*15*	39,185	*27*
North Carolina	8,897,062	*9*	697,158	*7*
North Dakota	151,310	*42*	199,101	*14*
Ohio	7,567,720	*10*	94,921	*19*
Oklahoma	4,199,650	*18*	24,468	*34*
Oregon	1,290,750	*33*	80,842	*20*
Pennsylvania	10,470,231	*7*	65,505	*21*
Rhode Island	618	*51*	298	*48*
South Carolina	3,296,697	*21*	272,189	*11*
South Dakota	1,895,734	*29*	1,623	*44*
Tennessee	4,115,176	*19*	253,185	*12*
Texas	16,476,093	*2*	34,443,534	*1*
Utah	105,815	*43*	26,121	*33*
Vermont	98,218	*44*	75	*51*
Virginia	11,821,961	*5*	46,910	*22*
Washington	2,714,912	*24*	1,195,349	*5*
West Virginia	2,126,306	*28*	120,866	*17*
Wisconsin	2,793,626	*23*	19,528	*35*
Wyoming	15,154	*46*	300	*47*

Table A-2. Releases of Chemicals Linked to Human Health Impacts to Waterways by State, 2012

	Cancer-Causing Chemicals		Developmental Toxics		Reproductive Toxics	
State	**Pounds Released**	***Rank***	**Pounds Released**	***Rank***	**Pounds Released**	***Rank***
Alabama	119,116	*2*	12,841	*12*	765,972	*1*
Alaska	418	*39*	280	*36*	338	*36*
Arizona	321	*42*	32	*48*	26	*46*
Arkansas	69,771	*7*	2,059	*26*	78,033	*12*
California	4,514	*31*	3,271	*19*	11,174	*29*
Colorado	52	*46*	39	*46*	36	*45*
Connecticut	2,404	*34*	550	*33*	1,567	*32*
Delaware	199	*44*	140	*42*	1,394	*33*
Florida	62,543	*8*	2,264	*25*	22,928	*20*
Georgia	55,565	*10*	7,302	*16*	185,765	*6*
Hawaii	458	*38*	55	*45*	51	*43*
Idaho	8,356	*28*	241	*38*	21,723	*22*
Illinois	12,287	*27*	7,870	*15*	39,391	*17*
Indiana	83,259	*4*	15,719	*8*	18,048	*25*
Iowa	16,394	*22*	2,985	*20*	19,523	*24*
Kansas	328	*41*	11,307	*13*	11,303	*28*
Kentucky	58,633	*9*	15,617	*9*	574,697	*4*
Louisiana	118,514	*3*	44,809	*2*	456,717	*5*
Maine	12,689	*25*	880	*31*	174,765	*7*
Maryland	951	*35*	369	*34*	321	*37*
Massachusetts	3,595	*33*	143	*41*	142	*42*
Michigan	12,502	*26*	6,698	*18*	50,874	*16*
Minnesota	13,285	*24*	270	*37*	280	*38*
Mississippi	23,445	*16*	2,794	*21*	117,849	*8*
Missouri	13,611	*23*	13,257	*11*	17,624	*26*
Montana	702	*36*	74	*44*	182	*40*
Nebraska	100	*45*	125	*43*	7,895	*30*
Nevada	284,592	*1*	184,843	*1*	8	*49*
New Hampshire	22	*48*	15	*50*	15	*48*
New Jersey	7,350	*29*	2,771	*22*	2,004	*31*

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	Cancer-Causing Chemicals		Developmental Toxics		Reproductive Toxics	
State	**Pounds Released**	***Rank***	**Pounds Released**	***Rank***	**Pounds Released**	***Rank***
New Mexico	203	*43*	168	*40*	164	*41*
New York	16,868	*20*	1,873	*27*	21,676	*23*
North Carolina	44,370	*11*	10,341	*14*	108,452	*9*
North Dakota	691	*37*	569	*32*	558	*35*
Ohio	32,659	*13*	16,302	*6*	30,169	*18*
Oklahoma	5,787	*30*	1,179	*30*	12,208	*27*
Oregon	22,630	*17*	2,447	*24*	58,961	*14*
Pennsylvania	25,118	*15*	6,953	*17*	24,444	*19*
Rhode Island	36	*47*	37	*47*	25	*47*
South Carolina	73,382	*6*	2,640	*23*	103,502	*10*
South Dakota	18	*49*	19	*49*	41	*44*
Tennessee	43,494	*12*	13,547	*10*	58,659	*15*
Texas	80,195	*5*	16,306	*5*	80,602	*11*
Utah	4,293	*32*	1,647	*28*	1,246	*34*
Vermont	0	*50*	349	*35*	0	*50*
Virginia	16,581	*21*	16,169	*7*	21,845	*21*
Washington	31,901	*14*	18,792	*4*	666,036	*2*
West Virginia	20,397	*18*	23,677	*3*	74,334	*13*
Wisconsin	16,870	*19*	1,336	*29*	602,266	*3*
Wyoming	398	*40*	204	*39*	204	*39*

Table A-3. Top 50 Local Watersheds for Total Toxic Releases, 2012

Local Watershed	Total Releases (lbs.)	*Rank*
Lower Ohio-Little Pigeon Rivers (IN, IL, KY)	14,727,205	*1*
Upper New River (NC, VA)	7,338,166	*2*
Middle Savannah River (GA, SC)	5,025,161	*3*
Muskingum River (OH)	4,414,602	*4*
Blackbird-Soldier Rivers (IA, NE)	4,372,706	*5*
Lower Platte-Shell Rivers (NE)	3,726,866	*6*
Buffalo River-San Jacinto (TX)	3,557,254	*7*
Brandywine Creek-Christina River (DE, PA)	3,416,615	*8*
Middle Ohio-Laughery Rivers (IN, OH)	3,328,548	*9*
Lower Des Moines River (IA)	2,902,489	*10*
Lake O'the Pines (TX)	2,855,042	*11*
Cohansey-Maurice Rivers (NJ)	2,569,092	*12*
Lower Rock River (IL)	2,559,779	*13*
Eastern Lower Delmarva (VA)	2,464,727	*14*
Bayou Sara-Thompson Creek (LA)	2,440,081	*15*
Middle Green River (KY)	2,394,817	*16*
Schuylkill River (PA)	2,364,274	*17*
Lumber River (NC)	2,339,770	*18*
Lower Roanoke River (NC)	2,316,547	*19*
Lower Monongahela River (PA)	2,305,961	*20*
Becaguimec Stream-Saint John River (ME)	2,245,256	*21*
Little Calumet-Galien Rivers (IN, IL)	2,240,529	*22*
Austin River-Oyster Creek (TX)	2,222,619	*23*
Lake Walcott (ID)	2,216,928	*24*
South Corpus Christi Bay (TX)	2,193,193	*25*
Sandy Hook-Staten Island (NJ)	2,097,907	*26*
Lower Tombigbee River (AL)	2,068,350	*27*
Wheeler Lake (AL)	1,965,714	*28*
Upper Susquehanna-Tunkhannock Rivers (PA)	1,913,464	*29*
Middle Platte-Buffalo Rivers (NE)	1,911,770	*30*
Lower Savannah River (GA)	1,861,281	*31*
Amite River (LA)	1,828,375	*32*

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Local Watershed	**Total Releases (lbs.)**	***Rank***
South Fork Holston River (TN, VA)	1,814,592	*33*
Lower Big Sioux River (IA, MN, SD)	1,775,381	*34*
Lower Iowa River (IA)	1,774,758	*35*
Lower Neosho River (OK, AR)	1,694,349	*36*
East Central Louisiana Coastal (LA)	1,680,615	*37*
Lower Calcasieu River (LA)	1,640,067	*38*
Lower Sangamon River (IL)	1,636,989	*39*
Upper Ohio-Shade Rivers (OH, WV)	1,579,884	*40*
Upper Pearl River (MS)	1,546,751	*41*
Lower Ochlockonee River (FL)	1,529,145	*42*
Middle Coosa River (AL)	1,511,458	*43*
Locust River (AL)	1,451,476	*44*
Upper Ohio River (OH, PA)	1,442,992	*45*
Lake Maurepas (LA)	1,420,835	*46*
Upper Cape Fear River (NC)	1,400,916	*47*
Oswego River (NY)	1,396,149	*48*
Castle Rock Flowage (WI)	1,347,857	*49*
Hudson-Hoosic Rivers (MA, NY)	1,329,696	*50*

Table A-4. Top 50 Local Watersheds for Releases of Cancer-Causing Chemicals, 2012

Local Watershed	Pounds Released	*Rank*
North Fork Humboldt River (NV)	283,979	*1*
Lake Maurepas (LA)	44,142	*2*
Wheeler Lake (AL)	43,557	*3*
Cooper River (SC)	42,742	*4*
St. Marys River (FL, GA)	33,973	*5*
Lake Michigan (MI)	31,098	*6*
Little Calumet-Galien Rivers (IN, IL)	30,028	*7*
Lower Columbia-Clatskanie Rivers (OR, WA)	22,087	*8*
South Fork Holston River (TN, VA)	21,791	*9*
Lower Brazos River (TX)	21,686	*10*
Middle Ohio River-Laughery Creek (IN, OH)	21,409	*11*
Lower Little Arkansas, Oklahoma Rivers (AR)	19,834	*12*
South Corpus Christi Bay (TX)	16,489	*13*
Bayou Sara-Thompson Creek (LA)	16,425	*14*
East Central Louisiana Coastal (LA)	16,389	*15*
Bayou Macon (AR, LA)	15,422	*16*
Lower Alabama River (AL)	15,181	*17*
Carolina Coastal-Sampit River (SC)	14,262	*18*
Bayou Bartholomew (AR, LA)	14,153	*19*
Lower Ohio-Little Pigeon Rivers (IN, IL, KY)	14,092	*20*
Lake Champlain (NY, VT)	13,825	*21*
Middle Pearl-Silver Rivers (MS)	13,823	*22*
Bayou Pierre (LA)	13,092	*23*
Lower Savannah River (GA)	12,869	*24*
Copperas-Duck Rivers (IA, IL)	12,822	*25*
Castle Rock Flowage (WI)	12,768	*26*
Upper Black River (AR, MO)	12,528	*27*
Lower Arkansas-Maumelle Rivers (AR)	12,439	*28*
Mobile-Tensaw Rivers (AL)	12,179	*29*
Upper Ohio River (OH, PA)	11,820	*30*
Puget Sound (WA)	11,707	*31*
Econfina-Steinhatchee Rivers (FL)	11,235	*32*

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Local Watershed	**Pounds Released**	***Rank***
Upper Dan River (NC, VA)	10,653	*33*
Silver-Little Kentucky Rivers (IN, KY)	10,518	*34*
Lower St. Johns River (FL)	9,971	*35*
Lower Neches River (TX)	9,894	*36*
Lower Roanoke River (NC)	9,664	*37*
Lower Ouachita River (LA)	8,879	*38*
Middle Green River (KY)	8,785	*39*
Lower Chattahoochee River (AL)	8,631	*40*
Lower Cape Fear River (NC)	8,581	*41*
Clearwater River (ID)	8,238	*42*
Lower Conecuh River (AL)	8,145	*43*
Buffalo River-San Jacinto (TX)	7,949	*44*
Upper Ohio River-Wheeling (OH, PA)	7,749	*45*
Raisin River (MI)	7,713	*46*
Middle Tombigbee-Chickasaw Rivers (AL)	7,692	*47*
Altamaha River (GA)	7,544	*48*
St. Croix River (ME)	7,447	*49*
Austin-Oyster Rivers (TX)	7,117	*50*

Table A-5. Top 50 Local Watersheds for Releases of Developmental Toxics, 2012

Local Watershed	Pounds Released	*Rank*
North Fork Humboldt River (NV)	184,620	*1*
Lake Maurepas (LA)	35,866	*2*
Lower Kanawha River (WV)	13,514	*3*
Upper Black River (AR, MO)	12,528	*4*
Middle Kansas River (KS)	11,045	*5*
Upper Ohio River (OH, PA)	10,148	*6*
Lower Columbia-Clatskanie Rivers (OR, WA)	9,377	*7*
Lower Ohio-Little Pigeon Rivers (IN, IL, KY)	8,910	*8*
Lower James River (VA)	7,660	*9*
Lower Brazos River (TX)	7,027	*10*
Northeast Cape Fear River (NC)	6,941	*11*
South Fork Holston River (TN, VA)	6,632	*12*
Middle Ohio River-Laughery Creek (IN, OH)	6,028	*13*
Little Calumet-Galien Rivers (IN, IL)	5,506	*14*
York River (VA)	4,628	*15*
Buffalo River-San Jacinto (TX)	3,613	*16*
Middle Chattahoochee River-Lake Harding (AL, GA)	3,532	*17*
Cuyahoga River (OH)	3,420	*18*
Raisin River (MI)	3,285	*19*
Upper White River (IN)	3,041	*20*
Guntersville Lake (AL, TN)	3,022	*21*
San Gabriel River (CA)	2,981	*22*
Upper Ohio-Wheeling Rivers (OH, PA)	2,954	*23*
Peruque-Piasa Rivers (IL)	2,781	*24*
Des Plaines River (IL)	2,690	*25*
Big Sandy River (KY)	2,678	*26*
Lower Coosa River (AL)	2,493	*27*
Muskingum River (OH)	2,079	*28*
Ohio Brush-Whiteoak Rivers (KY, OH)	2,029	*29*
East Central Louisiana Coastal (LA)	2,007	*30*
Detroit River (MI)	1,986	*31*
Siletz-Yaquina Rivers (OR)	1,962	*32*

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Local Watershed	**Pounds Released**	***Rank***
Mattaponi River (VA)	1,958	*33*
Lower White River (IN)	1,894	*34*
Middle Cedar River (IA)	1,832	*35*
Lower Tennessee-Beech River (TN, MS)	1,640	*36*
Jordan River (UT)	1,615	*37*
Cohansey-Maurice Rivers (NJ)	1,553	*38*
Emory River (TN)	1,450	*39*
Silver-Little Kentucky Rivers (IN, KY)	1,424	*40*
Upper Ohio-Shade Rivers (OH, WV)	1,347	*41*
Lower Monongahela River (PA)	1,273	*42*
Bayou Sara-Thompson Creek (LA)	1,209	*43*
Kentucky Lake (KY, TN)	1,164	*44*
Sandy Hook-Staten Island (NJ)	1,148	*45*
Conemaugh River (PA)	1,050	*46*
Lower Dan River (NC, VA)	1,020	*47*
East San Antonio Bay (TX)	1,018	*48*
Mulberry River (AL)	994	*49*
Puget Sound (WA)	992	*50*

Table A-6. Top 50 Local Watersheds for Releases of Reproductive Toxics, 2012

Local Watershed	Pounds Released	*Rank*
Castle Rock Flowage (WI)	563,566	*1*
Lower Chehalis River (WA)	553,180	*2*
Bayou De Chien-Mayfield River (KY)	549,492	*3*
Lower Alabama River (AL)	449,223	*4*
Lower Grand River (LA)	172,056	*5*
Lower Conecuh River (AL)	161,389	*6*
Wheeler Lake (AL)	98,627	*7*
Lower Penobscot River (ME)	82,330	*8*
Middle Savannah River (GA, SC)	80,762	*9*
Lower Columbia-Clatskanie Rivers (OR, WA)	80,280	*10*
Lower Pearl River (LA, MS)	64,171	*11*
Lower Androscoggin River (ME)	59,119	*12*
Carolina Coastal-Sampit River (SC)	56,019	*13*
Lower Leaf River (MS)	53,392	*14*
Bayou Sara-Thompson Creek (LA)	51,331	*15*
Bayou Pierre (LA)	50,265	*16*
Menominee River (WI, MI)	46,571	*17*
Lower Yazoo River (LA, MS)	46,173	*18*
Lower Roanoke River (NC)	44,286	*19*
South Fork Holston River (TN, VA)	43,086	*20*
Lower Little Arkansas, Oklahoma Rivers (AR)	39,414	*21*
Altamaha River (GA)	38,406	*22*
Cooper River (SC)	33,172	*23*
Pigeon River (NC, TN)	32,318	*24*
Lake Maurepas (LA)	32,286	*25*
Middle Wabash-Busseron River (IL, IN)	28,142	*26*
East Central Louisiana Coastal (LA)	27,299	*27*
Upper Kanawha River (WV)	27,284	*28*
Lower Sabine River (LA, TX)	27,031	*29*
Lower Cape Fear River (NC)	26,877	*30*
Puget Sound (WA)	26,057	*31*
Upper Ohio River (OH, PA)	25,303	*32*

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Local Watershed	**Pounds Released**	***Rank***
Middle Tombigbee-Chickasaw Rivers (AL)	25,227	*33*
Middle Columbia River-Lake Wallula (OR, WA)	25,177	*34*
Bayou Bartholomew (AR, LA)	25,088	*35*
Upper Willamette River (OR)	23,866	*36*
Lower Neches River (TX)	23,213	*37*
Clearwater River (ID)	21,616	*38*
Buffalo River-San Jacinto (TX)	20,487	*39*
Lower Ouachita River (LA)	20,017	*40*
St. Croix River (ME)	20,004	*41*
Lower Savannah River (GA)	18,421	*42*
Lower Kanawha River (WV)	17,659	*43*
Tuscarawas River (OH)	17,473	*44*
Copperas-Duck Rivers (IA, IL)	17,202	*45*
Lower Brazos River (TX)	16,064	*46*
Lake Dubay (WI)	15,405	*47*
Silver-Little Kentucky Rivers (IN, KY)	13,865	*48*
Lower Tombigbee River (AL)	13,821	*49*
Lower Kennebec River (ME)	13,121	*50*

Appendix B: Facilities and Companies Releasing Toxic Chemicals

Table B-1. Top 50 Facilities by Releases of All Toxic Chemicals, Pounds Released, 2012

Facility Name	Industry	City	State	Receiving Local Watershed	Total Releases (lbs.)	*Rank*
AK STEEL CORP (ROCKPORT WORKS)	Iron and Steel Mills	ROCKPORT	IN	Lower Ohio-Little Pigeon Rivers	14,525,927	*1*
US ARMY RADFORD ARMY AMMUNITION PLANT	National Security	RADFORD	VA	Upper New River	7,338,155	*2*
AK STEEL CORP COSHOCTON WORKS	Iron and Steel Mills	COSHOCTON	OH	Muskingum River	4,301,250	*3*
TYSON FRESH MEATS INC WWTP	Sewage Treatment Facilities	DAKOTA CITY	NE	Blackbird-Soldier Rivers	4,220,510	*4*
DSM CHEMICALS NORTH AMERICA INC	All Other Basic Organic Chemical Manufacturing	AUGUSTA	GA	Middle Savannah River	4,085,115	*5*
CARGILL MEAT SOLUTIONS CORP	Animal (except Poultry) Slaughtering	SCHUYLER	NE	Lower Platte-Shell River	3,717,157	*6*
DELAWARE CITY REFINERY	Petroleum Refineries	DELAWARE CITY	DE	Brandywine Creek-Christina River	3,412,494	*7*
NORTH AMERICAN STAINLESS	Iron and Steel Mills	GHENT	KY	Middle Ohio River-Laughery Creek	3,234,571	*8*
CARGILL MEAT SOLUTIONS CORP	Animal (except Poultry) Slaughtering	OTTUMWA	IA	Lower Des Moines River	2,889,989	*9*
PILGRIM'S PRIDE CORP MT PLEASANT COMPLEX	Poultry Processing	MOUNT PLEASANT	TX	Lake O'the Pines	2,827,637	*10*
DUPONT CHAMBERS WORKS	Petrochemical Manufacturing	DEEPWATER	NJ	Cohansey-Maurice Rivers	2,569,059	*11*
TYSON FRESH MEATS INC - JOSLIN IL	Animal (except Poultry) Slaughtering	HILLSDALE	IL	Lower Rock River	2,559,460	*12*
ACCOMAC PROCESSING PLANT	Poultry Processing	ACCOMAC	VA	Eastern Lower Delmarva Peninsula	2,412,005	*13*
SMITHFIELD PACKING CO INC TAR HEEL DIV	Animal (except Poultry) Slaughtering	TAR HEEL	NC	Lumber River	2,339,770	*14*

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Facility Name	Industry	City	State	Receiving Local Watershed	Total Releases (lbs.)	*Rank*
MCCAIN FOODS USA INC	Frozen Fruit, Juice, and Vegetable Manufacturing	EASTON	ME	Becaguimec Stream-Saint John River	2,245,256	*15*
MCCAIN FOODS USA	Frozen Fruit, Juice, and Vegetable Manufacturing	BURLEY	ID	Lake Walcott	2,216,928	*16*
USS - CLAIRTON WORKS	Iron and Steel Mills	CLAIRTON	PA	Lower Monongahela River	2,213,136	*17*
BASF CORP	All Other Basic Organic Chemical Manufacturing	FREEPORT	TX	Austin-Oyster Rivers	2,108,458	*18*
CONOCOPHILLIPS CO - BAYWAY REFINERY	Petroleum Refineries	LINDEN	NJ	Sandy Hook-Staten Island	2,085,940	*19*
EXXONMOBIL REFINING & SUPPLY BATON ROUGE REFINERY	Petroleum Refineries	BATON ROUGE	LA	Bayou Sara-Thompson Creek	2,039,579	*20*
USS GARY WORKS	Iron and Steel Mills	GARY	IN	Little Calumet-Galien Rivers	2,023,481	*21*
LEWISTON PROCESSING PLANT	Rendering and Meat Byproduct Processing	LEWISTON WOODVILLE	NC	Lower Roanoke River	1,991,203	*22*
PERDUE CROMWELL PROCESSING PLANT	Poultry Processing	BEAVER DAM	KY	Middle Green River	1,987,396	*23*
TYSON FRESH MEATS INC	Animal (except Poultry) Slaughtering	LEXINGTON	NE	Middle Platte-Buffalo Rivers	1,911,765	*24*
JOHN MORRELL & CO	Animal (except Poultry) Slaughtering	SIOUX FALLS	SD	Lower Big Sioux River	1,775,381	*25*
TYSON FRESH MEATS INC	Animal (except Poultry) Slaughtering	COLUMBUS JUNCTION	IA	Lower Iowa River	1,774,753	*26*
EASTMAN CHEMICAL CO TENNESSEE OPERATIONS	Plastics Material and Resin Manufacturing	KINGSPORT	TN	South Fork Holston River	1,753,458	*27*
THYSSENKRUPP STAINLESS USA LLC	Iron and Steel Mills	CALVERT	AL	Lower Tombigbee River	1,740,946	*28*
PRYOR SOLAE	Soybean Processing	PRYOR	OK	Lower Neosho River	1,693,433	*29*
CARGILL MEAT SOLUTIONS CORP	Meat Processed from Carcasses	BEARDSTOWN	IL	Lower Sangamon River	1,636,989	*30*
CARGILL MEAT SOLUTIONS CORP	Animal (except Poultry) Slaughtering	WYALUSING	PA	Upper Susquehanna-Tunkhannock Rivers	1,536,776	*31*
CARPENTER TECHNOLOGY CORP	Iron and Steel Mills	READING	PA	Schuylkill River	1,532,355	*32*
BASF CORP ATTAPULGUS OPS	Ground or Treated Mineral and Earth Manufacturing	ATTAPULGUS	GA	Lower Ochlockonee River	1,529,145	*33*

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Facility Name	**Industry**	**City**	**State**	**Receiving Local Watershed**	**Total Releases (lbs.)**	***Rank***
SYNGENTA CROP PROTECTION INC SAINT GABRIEL FACILITY	Pesticide and Other Agricultural Chemical Manufacturing	SAINT GABRIEL	LA	Amite River	1,465,419	*34*
TYSON FOODS INC BLOUNTSVILLE PROCESSING PLANT	Poultry Processing	BLOUNTSVILLE	AL	Locust River	1,435,271	*35*
ANHEUSER-BUSCH INC	Breweries	BALDWINSVILLE	NY	Oswego River	1,396,149	*36*
DEER PARK REFINING LP	Petroleum Refineries	DEER PARK	TX	Buffalo River-San Jacinto	1,392,117	*37*
CONOCOPHILLIPS LAKE CHARLES REFINERY	Petroleum Refineries	WESTLAKE	LA	Lower Calcasieu River	1,380,735	*38*
PILGRIM'S PRIDE CORP NATCHITOCHES PROCESSING PLANT	Poultry Processing	NATCHITOCHES	LA	Lower Red River-Lake Iatt	1,321,711	*39*
CF INDUSTRIES INC	Nitrogenous Fertilizer Manufacturing	DONALDSONVILLE	LA	East Central Louisiana Coastal	1,284,365	*40*
US ARMY FORT BRAGG	National Security	FORT BRAGG	NC	Upper Cape Fear River	1,264,081	*41*
JBS PLAINWELL	Animal (except Poultry) Slaughtering	PLAINWELL	MI	Kalamazoo River	1,215,326	*42*
JERRITT CANYON MINE	Gold Ore Mining	ELKO	NV	North Fork Humboldt River	1,165,667	*43*
TYSON FOODS INC BROKEN BOW PROCESSING PLANT	Poultry Processing	BROKEN BOW	OK	Upper Little River	1,161,840	*44*
JEWEL ACQUISITION LLC - MIDLAND PLANT	Iron and Steel Mills	MIDLAND	PA	Upper Ohio River	1,154,785	*45*
PILGRIM'S PRIDE CORP SANFORD FACILITY	Poultry Processing	SANFORD	NC	Deep River	1,153,341	*46*
FINCH PAPER LLC	Paper (except Newsprint) Mills	GLENS FALLS	NY	Hudson-Hoosic Rivers	1,146,123	*47*
MOTIVA ENTERPRISES LLC	Petroleum Refineries	PORT ARTHUR	TX	Sabine Lake	1,114,926	*48*
TYSON FOODS HOPE PROCESSING PLANT	Poultry Processing	HOPE	AR	McKinney-Posten Bayous	1,043,390	*49*
ERACHEM COMILOG INC - BALTIM ORE PLANT	All Other Basic Inorganic Chemical Manufacturing	BALTIMORE	MD	Gunpowder-Patapsco Rivers	1,036,593	*50*

Table B-2. Top 50 Facilities by Releases of All Toxic Chemicals, Toxicity-Weighted Pounds Equivalent Released, 2012

Facility Name	Industry	City	State	Receiving Local Watershed	Toxicity-Weighted Pounds Released	*Rank*
DOW CHEMICAL CO FREEPORT FACILITY	Multiple industry codes reported	FREEPORT	TX	Lower Brazos River	33,474,505	*1*
THE DOW CHEMICAL CO - LOUISIANA OPERATIONS	All Other Basic Organic Chemical Manufacturing	PLAQUEMINE	LA	Lower Grand River	1,876,478	*2*
JERRITT CANYON MINE	Gold Ore Mining	ELKO	NV	North Fork Humboldt River	1,042,622	*3*
BROOKS MANUFACTURING CO	All Other Miscellaneous Wood Product Manufacturing	BELLINGHAM	WA	Nooksack River	1,027,797	*4*
ELECTRIC MILLS WOOD PRESERVING LLC	Wood Preservation	SCOOBA	MS	Noxubee River	593,450	*5*
INTERNATIONAL PAPER TEXARKANA MILL	Paper (except Newsprint) Mills	QUEEN CITY	TX	Lower Sulphur River	506,659	*6*
WESTLAKE VINYLS INC	All Other Basic Organic Chemical Manufacturing	CALVERT CITY	KY	Lower Tennessee River	474,171	*7*
CAROLINA POLE LELAND	Wood Preservation	LELAND	NC	Lower Cape Fear River	440,802	*8*
GEORGIA-PACIFIC MONTICELLO LL C	Paperboard Mills	MONTICELLO	MS	Middle Pearl-Silver Rivers	328,102	*9*
HUXFORD POLE & TIMBER CO INC	Wood Preservation	HUXFORD	AL	Escambia River	327,162	*10*
FORMOSA PLASTICS CORP LOUISIANA	Plastics Material and Resin Manufacturing	BATON ROUGE	LA	Bayou Sara-Thompson Creek	269,350	*11*
PPG INDUSTRIES INC	Alkalies and Chlorine Manufacturing	WESTLAKE	LA	Lower Calcasieu River	268,639	*12*
PCS NITROGEN FERTILIZER LP	All Other Basic Inorganic Chemical Manufacturing	GEISMAR	LA	Lake Maurepas	255,530	*13*
RAYONIER PERFORMANCE FIBERS LLC	Pulp Mills	FERNANDINA BEACH	FL	St. Marys River	247,466	*14*
OXY VINYLS LP LA PORTE VCM PLANT	Multiple industry codes reported	LA PORTE	TX	Buffalo River-San Jacinto	241,794	*15*
BALDWIN POLE MISSISSIPPI	Wood Preservation	WIGGINS	MS	Black River	233,140	*16*
OCCIDENTAL CHEMICAL CORP	Alkalies and Chlorine Manufacturing	HAHNVILLE	LA	East Central Louisiana Coastal	202,058	*17*
WILLIAM C MEREDITH CO INC	Wood Preservation	EAST POINT	GA	Middle Chattahoochee River-Lake Harding	190,752	*18*

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Facility Name	Industry	City	State	Receiving Local Watershed	Toxicity-Weighted Pounds Released	*Rank*
CARGILL INC WET CORN MILLING - WAHPETON	Wet Corn Milling	WAHPETON	ND	Upper Red River	184,223	*19*
BROWN WOOD PRESERVING CO INC	Wood Preservation	KENNEDY	AL	Luxapallila River	168,277	*20*
CAHABA PRESSURE TREATED FOREST PRODUCTS INC	Wood Preservation	BRIERFIELD	AL	Cahaba River	167,238	*21*
SMURFIT-STONE CONT STEVENSON MILL	Paperboard Mills	STEVENSON	AL	Guntersville Lake	140,126	*22*
ALABAMA RIVER CELLULOSE LLC	Pulp Mills	PERDUE HILL	AL	Lower Alabama River	139,892	*23*
BRUNSWICK CELLULOSE INC	Pulp Mills	BRUNSWICK	GA	Cumberland-St. Simons Rivers	130,755	*24*
DUPONT CHEMICALS STARKE FACILITY	All Other Metal Ore Mining	STARKE	FL	Santa Fe River	126,746	*25*
GEORGIA-PACIFIC CROSSETT OPERATIONS	Multiple industry codes reported	CROSSETT	AR	Lower Ouachita River-Bayou De Loutre	116,874	*26*
GEORGIA-PACIFIC CONSUMER PRODUCTS LP	Pulp Mills	PENNINGTON	AL	Middle Tombigbee-Chickasaw Rivers	113,143	*27*
RAYONIER PERFORMANCE FIBERS JESUP MILL	Pulp Mills	JESUP	GA	Altamaha River	110,016	*28*
INTERNATIONAL PAPER RIEGELWOOD MILL	Pulp Mills	RIEGELWOOD	NC	Lower Cape Fear River	106,740	*29*
GEORGIA PACIFIC CEDAR SPRINGS LLC	Paperboard Mills	CEDAR SPRINGS	GA	Lower Chattahoochee River	99,074	*30*
KOPPERS INC (GRENADA MS)	Wood Preservation	GRENADA	MS	Yalobusha River	95,386	*31*
INTERNATIONAL PAPER GEORGETOWN MILL	Pulp Mills	GEORGETOWN	SC	Carolina Coastal-Sampit River	86,617	*32*
OCCIDENTAL CHEMICAL CORP	All Other Basic Organic Chemical Manufacturing	GREGORY	TX	North Corpus Christi Bay	84,808	*33*
GEORGIA-PACIFIC BREWTON LLC	Paperboard Mills	BREWTON	AL	Lower Conecuh River	82,803	*34*
PPG INDUSTRIES INC	Alkalies and Chlorine Manufacturing	NEW MARTINSVILLE	WV	Little Muskingum River-Middle Island	82,472	*35*
DOMTAR PAPER CO LLC PLYMOUTH MILL	Pulp Mills	PLYMOUTH	NC	Lower Roanoke River	76,390	*36*

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Facility Name	**Industry**	**City**	**State**	**Receiving Local Watershed**	**Toxicity-Weighted Pounds Released**	***Rank***
DUPONT JOHNSONVILLE PLANT	Inorganic Dye and Pigment Manufacturing	NEW JOHNSONVILLE	TN	Kentucky Lake	74,642	*37*
INTERNATIONAL PAPER PINE HILL MILL	Paper (except Newsprint) Mills	PINE HILL	AL	Middle Alabama River	74,200	*38*
THE DOW CHEMICAL CO	All Other Basic Organic Chemical Manufacturing	MIDLAND	MI	Tittabawassee River	73,315	*39*
BOISE WHITE PAPER LLC	Paper (except Newsprint) Mills	JACKSON	AL	Lower Tombigbee River	60,579	*40*
BOISE WHITE PAPER LLC	Pulp Mills	WALLULA	WA	Middle Columbia River-Lake Wallula	60,446	*41*
EVERGREEN PACKAGING	Paper (except Newsprint) Mills	PINE BLUFF	AR	Bayou Bartholomew	60,394	*42*
GEORGIA-PACIFIC TOLEDO LLC	Pulp Mills	TOLEDO	OR	Siletz-Yaquina Rivers	56,320	*43*
AK STEEL CORP (ROCKPORT WORKS)	Iron and Steel Mills	ROCKPORT	IN	Lower Ohio-Little Pigeon Rivers	55,794	*44*
BELL LUMBER & POLE CO	Wood Preservation	NEW BRIGHTON	MN	Twin Cities area	52,987	*45*
GEORGIA GULF CHEMICALS & VINYL S LLC	Plastics Material and Resin Manufacturing	PLAQUEMINE	LA	Lower Grand River	50,178	*46*
ABIBOW US INC CATAWBA OPERATIONS	Paper (except Newsprint) Mills	CATAWBA	SC	Lower Catawba River	50,022	*47*
WEYLCHEM US INC	All Other Basic Organic Chemical Manufacturing	ELGIN	SC	Wateree River	49,558	*48*
CHEVRON PRODUCTS CO - HAWAII REFINERY	Petroleum Refineries	KAPOLEI	HI	Oahu	39,814	*49*
COLFAX TREATING CO LLC	Wood Preservation	PINEVILLE	LA	Lower Red River	37,888	*50*

Table B-3. Top Discharging Facility by State, Pounds Released, All Toxic Chemicals, 2012

State	Facility Name	Industry	City	Receiving Local Watershed	Total Releases (lbs.)
Alabama	THYSSENKRUPP STAINLESS USA LLC	Iron and Steel Mills	CALVERT	Lower Tombigbee River	1,740,946
Alaska	POGO MINE	Gold Ore Mining	DELTA JUNCTION	Healy Lake-Tanana River	568,483
Arizona	FREEPORT-MCMORAN MIAMI INC	Copper Ore and Nickel Ore Mining	CLAYPOOL	Upper Salt River	781
Arkansas	TYSON FOODS HOPE PROCESSING PLANT	Poultry Processing	HOPE	McKinney-Posten Bayous	1,043,390
California	CONOCOPHILLIPS SAN FRANCISCO R EFINERY	Petroleum Refineries	RODEO	San Pablo Bay	741,459
Colorado	CARGILL MEAT SOLUTIONS CORP	Animal (except Poultry) Slaughtering	FORT MORGAN	Middle South Platte-Sterling Rivers	462,608
Connecticut	CYTEC INDUSTRIES INC	Plastics Material and Resin Manufacturing	WALLINGFORD	Quinnipiac River	89,388
Delaware	DELAWARE CITY REFINERY	Petroleum Refineries	DELAWARE CITY	Brandywine Creek-Christina River	3,412,494
District of Columbia	US ARMY CORPS OF ENGINEERS MCMILLAN WTP WASHI	Water Supply and Irrigation Systems	WASHINGTON	Middle Potomac-Anacostia-Occoquan Rivers	948
Florida	BUCKEYE FLORIDA LP	Pulp Mills	PERRY	Econfina-Steinhatchee Rivers	264,460
Georgia	DSM CHEMICALS NORTH AMERICA INC	All Other Basic Organic Chemical Manufacturing	AUGUSTA	Middle Savannah River	4,085,115
Hawaii	JOINT BASE PEARL HARBOR-HICKAM HAWAII	National Security	PEARL HARBOR	Oahu	380,000
Idaho	MCCAIN FOODS USA	Frozen Fruit, Juice, and Vegetable Manufacturing	BURLEY	Lake Walcott	2,216,928
Illinois	TYSON FRESH MEATS INC - JOSLIN IL	Animal (except Poultry) Slaughtering	HILLSDALE	Lower Rock River	2,559,460
Indiana	AK STEEL CORP (ROCKPORT WORKS)	Iron and Steel Mills	ROCKPORT	Lower Ohio-Little Pigeon Rivers	14,525,927
Iowa	CARGILL MEAT SOLUTIONS CORP	Animal (except Poultry) Slaughtering	OTTUMWA	Lower Des Moines River	2,889,989
Kansas	CARGILL MEAT SOLUTIONS CORP	Animal (except Poultry) Slaughtering	DODGE CITY	Coon-Pickerel Rivers	160,712

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State	Facility Name	Industry	City	Receiving Local Watershed	Total Releases (lbs.)
Kentucky	NORTH AMERICAN STAINLESS	Iron and Steel Mills	GHENT	Middle Ohio River-Laughery Creek	3,234,571
Louisiana	EXXONMOBIL REFINING & SUPPLY BATON ROUGE REFINERY	Petroleum Refineries	BATON ROUGE	Bayou Sara-Thompson Creek	2,039,579
Maine	MCCAIN FOODS USA INC	Frozen Fruit, Juice, and Vegetable Manufacturing	EASTON	Becaguimec Stream-Saint John River	2,245,256
Maryland	ERACHEM COMILOG INC - BALTIM ORE PLANT	All Other Basic Inorganic Chemical Manufacturing	BALTIMORE	Gunpowder-Patapsco Rivers	1,036,593
Massachusetts	ONYX SPECIALTY PAPERS INC - WILLOW MILL	Paper (except Newsprint) Mills	SOUTH LEE	Housatonic River	3,256
Michigan	JBS PLAINWELL	Animal (except Poultry) Slaughtering	PLAINWELL	Kalamazoo River	1,215,326
Minnesota	FLINT HILLS RESOURCES PINE BEND LLC	Petroleum Refineries	ROSEMOUNT	Rush-Vermillion Rivers	739,982
Mississippi	PECO FOODS INC	Poultry Processing	SEBASTOPOL	Upper Pearl River	969,391
Missouri	TYSON FOODS INC - PROCESSING PLANT	Poultry Processing	SEDALIA	Lamine River	743,235
Montana	CONOCOPHILLIPS CO BILLINGS REFINERY	Petroleum Refineries	BILLINGS	Upper Yellowstone River-Lake Basin	140,469
Nebraska	TYSON FRESH MEATS INC WWTP	Sewage Treatment Facilities	DAKOTA CITY	Blackbird-Soldier Rivers	4,220,510
Nevada	JERRITT CANYON MINE	Gold Ore Mining	ELKO	North Fork Humboldt River	1,165,667
New Hampshire	MERRIMACK STATION	Fossil Fuel Electric Power Generation	BOW	Merrimack River	1,425
New Jersey	DUPONT CHAMBERS WORKS	Petrochemical Manufacturing	DEEPWATER	Cohansey-Maurice Rivers	2,569,059
New Mexico	US DOD USAF HOLLOMAN AFB	National Security	HOLLOMAN AFB	Tularosa Valley	35,774
New York	ANHEUSER-BUSCH INC	Breweries	BALDWINSVILLE	Oswego River	1,396,149
North Carolina	SMITHFIELD PACKING CO INC TAR HEEL DIV	Animal (except Poultry) Slaughtering	TAR HEEL	Lumber River	2,339,770
North Dakota	CARGILL INC WET CORN MILLING - WAHPETON	Wet Corn Milling	WAHPETON	Upper Red River	65,771

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State	Facility Name	Industry	City	Receiving Local Watershed	Total Releases (lbs.)
Ohio	AK STEEL CORP COSHOCTON WORKS	Iron and Steel Mills	COSHOCTON	Muskingum River	4,301,250
Oklahoma	PRYOR SOLAE	Soybean Processing	PRYOR	Lower Neosho River	1,693,433
Oregon	SILTRONIC CORP	Semiconductor and Related Device Manufacturing	PORTLAND	Lower Willamette River	350,562
Pennsylvania	USS - CLAIRTON WORKS	Iron and Steel Mills	CLAIRTON	Lower Monongahela River	2,213,136
Rhode Island	BB & S TREATED LUMBER OF NE	Wood Preservation	NORTH KINGSTOWN	Narragansett River	307
South Carolina	INVISTA SARL CAMDEN MAY PLANT	Noncellulosic Organic Fiber Manufacturing	LUGOFF	Wateree River	775,297
South Dakota	JOHN MORRELL & CO	Animal (except Poultry) Slaughtering	SIOUX FALLS	Lower Big Sioux River	1,775,381
Tennessee	EASTMAN CHEMICAL CO TENNESSEE OPERATIONS	Plastics Material and Resin Manufacturing	KINGSPORT	South Fork Holston River	1,753,458
Texas	PILGRIM'S PRIDE CORP MT PLEASANT COMPLEX	Poultry Processing	MOUNT PLEASANT	Lake O'the Pines	2,827,637
Utah	CHEVRON PRODUCTS CO - SALT LAKE REFINERY	Petroleum Refineries	SALT LAKE CITY	Jordan River	92,917
Vermont	IBM CORP	Semiconductor and Related Device Manufacturing	ESSEX JUNCTION	Winooski River	97,511
Virginia	US ARMY RADFORD ARMY AMMUNITION PLANT	National Security	RADFORD	Upper New River	7,338,155
Washington	COSMO SPECIALTY FIBERS	Multiple industry codes reported	ABERDEEN	Lower Chehalis River	606,445
West Virginia	BAYER CROPSCIENCE LP	Pesticide and Other Agricultural Chemical Manufacturing	INSTITUTE	Lower Kanawha River	776,150
Wisconsin	MCCAIN FOODS USA INC	Frozen Fruit, Juice, and Vegetable Manufacturing	PLOVER	Castle Rock Flowage	697,315
Wyoming	PACIFICORP DAVE JOHNSTON PLANT	Fossil Fuel Electric Power Generation	GLENROCK	Middle North Platte-Casper Rivers	5,470

Table B-4. Top Discharging Facility by State, Toxicity-Weighted Pounds Equivalent Released, All Toxic Chemicals, 2012

State	Facility Name	Industry	City	Receiving Local Watershed	Toxicity-Weighted Pounds Released
Alabama	HUXFORD POLE & TIMBER CO INC	Wood Preservation	HUXFORD	Escambia River	327,162
Alaska	POGO MINE	Gold Ore Mining	DELTA JUNCTION	Healy Lake-Tanana River	819
Arizona	FREEPORT-MCMORAN MIAMI INC	Copper Ore and Nickel Ore Mining	CLAYPOOL	Upper Salt River	191
Arkansas	GEORGIA-PACIFIC CROSSETT OPERATIONS	Multiple industry codes reported	CROSSETT	Lower Ouachita River-Bayou De Loutre	116,874
California	CHEVRON PRODUCTS CO DIV OF CHEVRON USA INC	Petroleum Refineries	EL SEGUNDO	San Gabriel River	13,522
Colorado	CLIMAX MOLYBDENUM CO - CLIMAX MINE	All Other Metal Ore Mining	CLIMAX	Blue River	1,438
Connecticut	MIDDLETOWN STATION	Fossil Fuel Electric Power Generation	MIDDLETOWN	Lower Connecticut River	852
Delaware	DUPONT EDGE MOOR	Inorganic Dye and Pigment Manufacturing	EDGEMOOR	Brandywine Creek-Christina River	27,344
District of Columbia	US ARMY CORPS OF ENGINEERS MCMILLAN WTP	Water Supply and Irrigation Systems	WASHINGTON	Middle Potomac-Anacostia-Occoquan Rivers	120
Florida	RAYONIER PERFORMANCE FIBERS LLC	Pulp Mills	FERNANDINA BEACH	St. Marys River	247,466
Georgia	WILLIAM C MEREDITH CO INC	Wood Preservation	EAST POINT	Middle Chattahoochee River-Lake Harding	190,752
Hawaii	CHEVRON PRODUCTS CO - HAWAII REFINERY	Petroleum Refineries	KAPOLEI	Oahu	39,814
Idaho	CLEARWATER PAPER CORP	Pulp Mills	LEWISTON	Clearwater River	8,043
Illinois	TYSON FRESH MEATS INC - JOSLIN IL	Animal (except Poultry) Slaughtering	HILLSDALE	Lower Rock River	9,757
Indiana	AK STEEL CORP (ROCKPORT WORKS)	Iron and Steel Mills	ROCKPORT	Lower Ohio-Little Pigeon Rivers	55,794
Iowa	CARGILL CORN MILLING	Wet Corn Milling	EDDYVILLE	Lower Des Moines River	4,184
Kansas	INNOVIA FILMS INC	Cellulosic Organic Fiber Manufacturing	TECUMSEH	Middle Kansas River	30,897

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State	Facility Name	Industry	City	Receiving Local Watershed	Toxicity-Weighted Pounds Released
Kentucky	WESTLAKE VINYLS INC	All Other Basic Organic Chemical Manufacturing	CALVERT CITY	Lower Tennessee River	474,171
Louisiana	THE DOW CHEMICAL CO - LOUISIANA OPERATIONS	All Other Basic Organic Chemical Manufacturing	PLAQUEMINE	Lower Grand River	1,876,478
Maine	SD WARREN CO	Paper (except Newsprint) Mills	SKOWHEGAN	Lower Kennebec River	9,100
Maryland	ERACHEM COMILOG INC - BALTIMORE PLANT	All Other Basic Inorganic Chemical Manufacturing	BALTIMORE	Gunpowder-Patapsco Rivers	785
Massachusetts	DOMINION ENERGY BRAYTON POINT LLC	Fossil Fuel Electric Power Generation	SOMERSET	Narragansett River	133
Michigan	THE DOW CHEMICAL CO	All Other Basic Organic Chemical Manufacturing	MIDLAND	Tittabawassee River	73,315
Minnesota	BELL LUMBER & POLE CO	Wood Preservation	NEW BRIGHTON	Twin Cities area	52,987
Mississippi	ELECTRIC MILLS WOOD PRESERVING LLC	Wood Preservation	SCOOBA	Noxubee River	593,450
Missouri	BUICK MINE/MILL	Lead Ore and Zinc Ore Mining	BOSS	Upper Black River	13,511
Montana	CONOCOPHILLIPS CO BILLINGS REFINERY	Petroleum Refineries	BILLINGS	Upper Yellowstone River-Lake Basin	2,829
Nebraska	TYSON FRESH MEATS INC WWTP	Sewage Treatment Facilities	DAKOTA CITY	Blackbird-Soldier Rivers	22,532
Nevada	JERRITT CANYON MINE	Gold Ore Mining	ELKO	North Fork Humboldt River	1,042,622
New Hampshire	WATTS REGULATOR CO (DBA WEBSTER VALVE)	Other Metal Valve and Pipe Fitting Manufacturing	FRANKLIN	Merrimack River	92
New Jersey	DUPONT CHAMBERS WORKS	Petrochemical Manufacturing	DEEPWATER	Cohansey-Maurice Rivers	35,322
New Mexico	FREEPORT MCMORAN TYRONE INC	Copper Ore and Nickel Ore Mining	TYRONE	Upper Gila-Mangas Rivers	1,242
New York	EASTMAN KODAK CO EASTMAN BUSINESS PARK	Photographic Film, Paper, Plate, and Chemical Manufacturing	ROCHESTER	Lower Genesee River	12,151
North Carolina	CAROLINA POLE LELAND	Wood Preservation	LELAND	Lower Cape Fear River	440,802
North Dakota	CARGILL INC WET CORN MILLING - WAHPETON	Wet Corn Milling	WAHPETON	Upper Red River	184,223

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State	Facility Name	Industry	City	Receiving Local Watershed	Toxicity-Weighted Pounds Released
Ohio	AMERICAN ELECTRIC POWER CARDINAL PLANT	Fossil Fuel Electric Power Generation	BRILLIANT	Upper Ohio River-Wheeling	15,978
Oklahoma	VALERO REFINING CO -OKLAHOMA VALERO ARDMORE REFINERY	Petroleum Refineries	ARDMORE	Middle Washita River	5,197
Oregon	GEORGIA-PACIFIC TOLEDO LLC	Pulp Mills	TOLEDO	Siletz-Yaquina Rivers	56,320
Pennsylvania	EME HOMER CITY GENERATION LP	Fossil Fuel Electric Power Generation	HOMER CITY	Conemaugh River	11,474
Rhode Island	BB & S TREATED LUMBER OF NE	Wood Preservation	NORTH KINGSTOWN	Narragansett River	235
South Carolina	INTERNATIONAL PAPER GEORGETOWN MILL	Pulp Mills	GEORGETOWN	Carolina Coastal-Sampit River	86,617
South Dakota	JOHN MORRELL & CO	Animal (except Poultry) Slaughtering	SIOUX FALLS	Lower Big Sioux River	1,512
Tennessee	DUPONT JOHNSONVILLE PLANT	Inorganic Dye and Pigment Manufacturing	NEW JOHNSONVILLE	Kentucky Lake	74,642
Texas	DOW CHEMICAL CO FREEPORT FACILITY	Multiple industry codes reported	FREEPORT	Lower Brazos River	33,474,505
Utah	KENNECOTT UTAH COPPER SMELTER & REFINERY	Primary Smelting and Refining of Copper	MAGNA	Jordan River	12,731
Vermont	IBM CORP	Semiconductor and Related Device Manufacturing	ESSEX JUNCTION	Winooski River	75
Virginia	DOMINION RESOURCES INC YORKTOWN POWER STATION	Fossil Fuel Electric Power Generation	YORKTOWN	York River	10,415
Washington	BROOKS MANUFACTURING CO	All Other Miscellaneous Wood Product Manufacturing	BELLINGHAM	Nooksack River	1,027,797
West Virginia	PPG INDUSTRIES INC	Alkalies and Chlorine Manufacturing	NEW MARTINSVILLE	Little Muskingum River-Middle Island	82,472
Wisconsin	THILMANY	Paper (except Newsprint) Mills	KAUKAUNA	Lower Fox River	8,279
Wyoming	PACIFICORP DAVE JOHNSTON PLANT	Fossil Fuel Electric Power Generation	GLENROCK	Middle North Platte-Casper Rivers	133

Table B-5. Top Parent Companies by Discharges, All Company Facilities, Total Pounds Released[84]

Parent Company	Total Releases (lbs.)	Rank
TYSON FOODS INC	18,556,479	1
AK STEEL HOLDING CORP	14,525,927	2
US DEPARTMENT OF DEFENSE	10,868,190	3
CARGILL INC	10,619,393	4
PERDUE FARMS INC	7,472,092	5
KOCH INDUSTRIES INC	6,657,138	6
PILGRIMS PRIDE CORP	6,558,172	7
E I DU PONT DE NEMOURS & CO	5,518,146	8
US STEEL CORP	5,248,392	9
PHILLIPS 66 CO	5,233,947	10
MCCAIN FOODS USA INC	5,159,499	11
BASF CORP	4,930,958	12
AK STEEL CORP	4,551,201	13
THE SMITHFIELD FOODS INC	4,347,569	14
DSM HOLDING CO INC	4,085,115	15
PBF ENERGY	3,412,494	16
ACERINOX SA	3,234,571	17
EXXON MOBIL CORP	3,084,859	18
INTERNATIONAL PAPER CO	2,565,294	19
CF INDUSTRIES HOLDINGS INC	2,146,673	20

Table B-6. Top Parent Companies by Discharges, All Company Facilities, Toxicity-Weighted Pounds Equivalent[85]

Parent Company	Toxicity-Weighted Pounds Equivalent	Rank
THE DOW CHEMICAL CO	35,430,174	1
KOCH INDUSTRIES INC	1,184,721	2
VERIS GOLD CORP.	1,042,622	3
INTERNATIONAL PAPER CO	863,794	4
MCFARLAND CASCADE HOLDINGS INC	600,371	5
WESTLAKE CHEMICAL CORP	479,790	6
LELAND LAND LLC	440,802	7
RAYONIER INC	357,483	8
PPG INDUSTRIES INC	351,145	9
OCCIDENTAL CHEMICAL HOLDING CORP	291,690	10
E I DU PONT DE NEMOURS & CO	277,472	11
FORMOSA PLASTICS CORP USA	269,601	12
POTASH CORP OF SASKATCHEWAN INC	255,541	13
OCCIDENTAL PETROLEUM CORP	241,797	14
BALDWIN POLE & PILING CO INC	233,140	15
CARGILL INC	196,285	16
ROCK-TENN CO	176,715	17
CAHABA	167,238	18
DOMTAR CORP	154,627	19
BOISE INC	130,230	20

Appendix C: Links Between Toxic Chemicals and Human Health Effects[86]

Chemical name	CAS Number	Cancer effects	Developmental effects	Reproductive effects
1,1,1,2-TETRACHLOROETHANE	630206	x		
1,1,2,2-TETRACHLOROETHANE	79345	x		
1,1,2-TRICHLOROETHANE	79005	x		
1,1-DIMETHYL HYDRAZINE	57147	x		
1,2,3-TRICHLOROPROPANE	96184	x		
1,2-DIBROMO-3-CHLOROPROPANE	96128	x		x
1,2-DIBROMOETHANE	106934	x	x	x
1,2-DICHLOROETHANE	107062	x		
1,2-DICHLOROPROPANE	78875	x		
1,2-DIPHENYLHYDRAZINE	122667	x		
1,2-PHENYLENEDIAMINE	95545	x		
1,3-BUTADIENE	106990	x	x	x
1,3-DICHLOROPROPYLENE	542756	x		
1,4-DICHLORO-2-BUTENE	764410	x		
1,4-DICHLOROBENZENE	106467	x		
1,4-DIOXANE	123911	x		
2,4,6-TRICHLOROPHENOL	88062	x		
2,4-DIAMINOTOLUENE	95807	x		
2,4-DINITROTOLUENE	121142	x		x
2,6-DINITROTOLUENE	606202	x		x
2,6-XYLIDINE	87627	x		
2-ACETYLAMINOFLUORENE	53963	x		
2-ETHOXYETHANOL	110805		x	x
2-METHOXYETHANOL	109864		x	x

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Chemical name	CAS Number	Cancer effects	Developmental effects	Reproductive effects
2-NITROPROPANE	79469	x		
2-PHENYLPHENOL	90437	x		
3,3′-DICHLOROBENZIDINE	91941	x		
3,3′-DICHLOROBENZIDINE DIHYDROCHLORIDE	612839	x		
3,3′-DIMETHOXYBENZIDINE	119904	x		
3,3′-DIMETHOXYBENZIDINE DIHYDROCHLORIDE	20325400	x		
3,3′-DIMETHYLBENZIDINE	119937	x		
3-CHLORO-2-METHYL-1-PROPENE	563473	x		
4,4′-DIAMINODIPHENYL ETHER	101804	x		
4,4′-METHYLENEBIS(2-CHLOROANILINE)	101144	x		
4,4′-METHYLENEDIANILINE	101779	x		
4-AMINOAZOBENZENE	60093	x		
4-AMINOBIPHENYL	92671	x		
4-DIMETHYLAMINOAZOBENZENE	60117	x		
ABAMECTIN	71751412		x	
ACETALDEHYDE	75070	x		
ACETAMIDE	60355	x		
ACIFLUORFEN, SODIUM SALT	62476599	x		
ACRYLAMIDE	79061		x	x
ACRYLONITRILE	107131	x		
ALACHLOR	15972608	x		
ALDRIN	309002	x		
AMITROLE	61825	x		
ANILINE	62533	x		
ANTIMONY AND ANTIMONY COMPOUNDS	N010	x		
ARSENIC AND ARSENIC COMPOUNDS	N020	x	x	
ASBESTOS (FRIABLE)	1332214	x		
BENZENE	71432	x	x	x
BENZIDINE	92875	x		
BENZOIC TRICHLORIDE	98077	x		
BENZYL CHLORIDE	100447	x		

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Chemical name	CAS Number	Cancer effects	Developmental effects	Reproductive effects
BERYLLIUM AND BERYLLIUM COMPOUNDS	N050	x		
BIS(2-CHLORO-1-METHYLETHYL) ETHER	108601	x		
BIS(2-CHLOROETHYL) ETHER	111444	x		
BIS(CHLOROMETHYL) ETHER	542881	x		
BROMOFORM	75252	x		
BROMOXYNIL	1689845		x	
BROMOXYNIL OCTANOATE	1689992		x	
C.I. DIRECT BLUE 218	28407376	x		
C.I. SOLVENT YELLOW 34	492808	x		
CADMIUM AND CADMIUM COMPOUNDS	N078	x	x	x
CAPTAN	133062	x		
CARBARYL	63252	x	x	x
CARBON DISULFIDE	75150		x	x
CARBON TETRACHLORIDE	56235	x		
CATECHOL	120809	x		
CHLORDANE	57749	x		
CHLOROBENZILATE	510156	x		
CHLOROETHANE	75003	x		
CHLOROFORM	67663	x	x	
CHLOROMETHANE	74873		x	x
CHLOROMETHYL METHYL ETHER	107302	x		
CHLOROPRENE	126998	x		
CHLOROTHALONIL	1897456	x		
CHLORSULFURON	64902723		x	x
CHROMIUM AND CHROMIUM COMPOUNDS	N090	x	x	x
COBALT AND COBALT COMPOUNDS	N096	x		
CREOSOTE	8001589	x		
CUMENE	98828	x		
CYANAZINE	21725462		x	
CYANIDE COMPOUNDS	N106			x
DI(2-ETHYLHEXYL) PHTHALATE	117817	x	x	x
DIAMINOTOLUENE (MIXED ISOMERS)	25376458	x		
DIBUTYL PHTHALATE	84742		x	x

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Chemical name	CAS Number	Cancer effects	Developmental effects	Reproductive effects
DICHLOROBROMOMETHANE	75274	x		
DICHLOROMETHANE	75092	x		
DICHLORVOS	62737	x		
DIEPOXYBUTANE	1464535	x		
DIETHANOLAMINE	111422	x		
DIETHYL SULFATE	64675	x		
DIGLYCIDYL RESORCINOL ETHER	101906	x		
DIHYDROSAFROLE	94586	x		
DIMETHYL SULFATE	77781	x		
DIMETHYLCARBAMYL CHLORIDE	79447	x		
DINITROBUTYL PHENOL	88857		x	x
DINITROTOLUENE (MIXED ISOMERS)	25321146	x		x
DIOXIN AND DIOXIN-LIKE COMPOUNDS	N150	x	x	
DIURON	330541	x		
EPICHLOROHYDRIN	106898	x		x
ETHOPROP	13914484	x		
ETHYL ACRYLATE	140885	x		
ETHYL DIPROPYLTHIOCARBAMATE	759944		x	
ETHYLBENZENE	100414	x		
ETHYLENE OXIDE	75218	x	x	x
ETHYLENE THIOUREA	96457	x	x	
ETHYLENEBISDITHIOCARBAMIC ACID, SALTS AND ESTERS	N171	x		
ETHYLENEIMINE	151564	x		
ETHYLIDENE DICHLORIDE	75343	x		
FLUOROURACIL	51218		x	
FOLPET	133073	x		
FORMALDEHYDE	50000	x		
FURAN	110009	x		
HEPTACHLOR	76448	x	x	
HEXACHLORO-1,3-BUTADIENE	87683	x		
HEXACHLOROBENZENE	118741	x	x	
HEXACHLOROETHANE	67721	x		

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Chemical name	CAS Number	Cancer effects	Developmental effects	Reproductive effects
HYDRAZINE SULFATE	10034932	x		
HYDROGEN CYANIDE	74908			x
LACTOFEN	77501634	x		
LEAD AND LEAD COMPOUNDS	N420	x	x	x
LINURON	330552		x	
LITHIUM CARBONATE	554132		x	
M-DINITROBENZENE	99650			x
MERCURY AND MERCURY COMPOUNDS	N458		x	
METHAM SODIUM	137428	x	x	
METHANOL	67561			x
METHYL IODIDE	74884	x		
METHYL ISOBUTYL KETONE	108101	x	x	
METHYL ISOCYANATE	624839		x	x
MYCLOBUTANIL	88671890		x	x
NABAM	142596		x	
NAPHTHALENE	91203	x		
NICKEL AND NICKEL COMPOUNDS	N495	x		
NICOTINE AND SALTS	54115		x	
NITRAPYRIN	1929824	x	x	
NITRILOTRIACETIC ACID	139139	x		
NITROBENZENE	98953	x		x
NITROMETHANE	75525	x		
N-METHYL-2-PYRROLIDONE	872504		x	
N-METHYLOLACRYLAMIDE	924425	x		
N-NITROSODI-N-PROPYLAMINE	621647	x		
N-NITROSODIPHENYLAMINE	86306	x		
N-NITROSOMETHYLVINYLAMINE	4549400	x		
N-NITROSO-N-ETHYLUREA	759739	x		
N-NITROSO-N-METHYLUREA	684935	x		
N-NITROSOPIPERIDINE	100754	x		
O-ANISIDINE	90040	x		
O-DINITROBENZENE	528290			x

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Chemical name	CAS Number	Cancer effects	Developmental effects	Reproductive effects
O-TOLUIDINE HYDROCHLORIDE	636215	x		
OXYDIAZON	19666309	x	x	
P-CHLOROANILINE	106478	x		
P-CRESIDINE	120718	x		
P-DINITROBENZENE	100254			x
PENTACHLOROPHENOL	87865	x		
PENTOBARBITAL SODIUM	57330		x	
PHENYTOIN	57410	x	x	
POLYCHLORINATED BIPHENYLS	N575	x	x	
POLYCYCLIC AROMATIC COMPOUNDS	N590	x		
POTASSIUM BROMATE	7758012	x		
POTASSIUM DIMETHYLDITHIOCARBAMATE	128030		x	
POTASSIUM N-METHYLDITHIOCARBAMATE	137417	x		
P-PHENYLENEDIAMINE	106503	x		
PRONAMIDE	23950585	x		
PROPACHLOR	1918167	x		
PROPANE SULTONE	1120714	x		
PROPARGITE	2312358	x	x	
PROPYLENE OXIDE	75569	x		
PROPYLENEIMINE	75558	x		
PYRIDINE	110861	x		
QUINOLINE	91225	x		
S, S, S-TRIBUTYLTRITHIOPHOSPHATE	78488	x		
SAFROLE	94597	x		
SELENIUM AND SELENIUM COMPOUNDS	N725	x		
SODIUM DIMETHYLDITHIOCARBAMATE	128041		x	
SODIUM FLUOROACETATE	62748			x
STYRENE OXIDE	96093	x		
TETRACHLOROETHYLENE	127184	x		
TETRACYCLINE HYDROCHLORIDE	64755		x	
THIOACETAMIDE	62555	x		
THIODICARB	59669260	x		

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Chemical name	CAS Number	Cancer effects	Developmental effects	Reproductive effects
THORIUM DIOXIDE	1314201	x		
TOLUENE	108883		x	x
TOLUENE DIISOCYANATE (MIXED ISOMERS)	26471625	x		
TOXAPHENE	8001352	x		
TRIADIMEFON	43121433		x	x
TRICHLOROETHYLENE	79016	x	x	x
TRIPHENYLTIN HYDROXIDE	76879	x	x	
TRYPAN BLUE	72571	x		
URETHANE	51796	x	x	
VINYL CHLORIDE	75014	x		

Appendix D: Finding More Detailed Information

To find more detailed information on industrial facilities or specific watersheds of particular interest, the U.S. Environmental Protection Agency has several online interactive tools available.

TRI Explorer

This tool allows searching of the Toxics Release Inventory, the primary source for data for this report. Searching can be done nationally or limited by state and county, or even ZIP code. TRI reports collect not just toxic releases to water, but also to air, underground injection wells, and impoundment ponds, as well as chemicals transferred off-site for further handling.

Search by Chemical

iaspub.epa.gov/triexplorer/tri_release.chemical

This search a list of chemicals released in the selected geographic area. Clicking on the chemical brings up a list of facilities that released that chemical.

Search by Facility

iaspub.epa.gov/triexplorer/tri_release.facility

This search returns a list of facilities within the geographic region that reported releases to TRI for the given year. Clicking on an individual facility will bring up that facility's data for the current year, as well as material on previous years' releases.

Clicking "Click here for TRI Reporting Forms in Envirofacts database" will bring up the specific facility's full reporting form, which includes information on which, if any, streams or other water bodies, that facility has released toxic chemicals into.

Surf Your Watershed

cfpub.epa.gov/surf/locate/index.cfm

The easiest way to use this tool is with the map, which allows clicking on states and then local watersheds (HUC-8). Detailed information is available, including stream flow levels, water-quality monitoring data, and contact information for any citizen groups that are at work attempting to protect or improve water quality in the watershed.

How's My Waterway?

watersgeo.epa.gov/mywaterway/mywaterway.html

Choosing a location brings up a list of waterways around the location specified, and an option to display a map. Clicking on different waterways on that map brings up information on the amount of pollution, types of pollution, and likely sources, as well as access to data from past years.

DMR Pollutant Loading Tool

cfpub.epa.gov/dmr

This newest EPA tool combines data from many of the above systems, as well as Discharge Monitoring Reports, which are self-reported by a wide range of facilities engaged in a wide range of industries and governed by the National Pollutant Discharge Elimination System (NPDES) permits. Both simple and complex searches are available, including comparing reports of releases to the TRI and DMR systems. Results can be ranked or represented graphically.

Notes

1. Site characteristics: Wayne C. Young, Texas Department of Highways and Public Transportation, Highway Design Division, *Test Excavations at the Tankersley Creek Site, A Multicomponent Campsite in Titus County, Texas*, Publications in Archaeology, Report 22, July 1981. Dates: LeRoy Johnson Jr., Texas State Historical Association, "Fred Yarbrough Site," *Handbook of Texas Online*, 12 June 2010, accessed at tshaonline.org, 5 May 2014; U.S. Forest Service, *Kisatchie Heritage Program*, accessed at fs.usda.gov, 5 May 2014.

2. Texas Commission on Environmental Quality, *Dorchester Refining Company*, accessed at www.tceq.texas.gov/remediation/superfund/state/dorchester.html, 21 May 2014.

3. Title 33 U.S. Code, Chapter 26, subchapter 1, section 1251, *Congressional Declaration of Goals and Policies*.

4. Texas Public Employees for Environmental Responsibility, *Toxic Tour: Corporate Chicken Empire Saturates East Texas With Pollution*, 2000, accessed at www.txpeer.org/toxictour/pilgrim.html, 5 May 2014.

5. Amanda Thompson and Daniel Simoneau, Texas A&M University-Texarkana, *Bacteriological and Chemical Aspects of Water Quality in Tankersley Creek,* presented at Pathways Student Symposium, 2007; accessed at www.tamut.edu/~allard/Biology/index_files/Pathways_Student_Symposium_Poster.pdf, 5 May 2014.

6. U.S. Environmental Protection Agency, *Enforcement and Compliance History Online*, accessed at echo.epa.gov, 5 May 2014.

7. Ibid.

8. U.S. Occupational Safety and Health Administration, *U.S. Department of Labor's OSHA Settles Whistleblower Case Against Pilgrim's Pride in Mount Pleasant, Texas* (press release), 29 June 2012.

9. 42 U.S. Code, Chapter 116, *Emergency Planning and Community Right-to-Know Act.*

10. U.S. Environmental Protection Agency, *National Summary of State Information*, accessed at iaspub.epa.gov/waters10/attains_nation_cy.control, 5 May 2014.

11. Ibid.

12. Holly Zachariah, "Ammonia in Stream Killed 3,000 Fish," *Columbus Dispatch*, 20 July 2013.

13. Vicki Blazer, U.S. Geological Survey, *Science Summary – Indicators of Reproductive Endocrine Disruption in Fish in the Chesapeake Bay Watershed*, August 2012, accessed at chesapeake.usgs.gov/sciencesummary-reproductivedisruption.html, 8 June 2014.

14. U.S. Environmental Protection Agency, *Polychlorinated Biphenyls (PCBs): Basic Information*, 8 April 2013.

15. U.S. Environmental Protection Agency, *Polychlorinated Biphenyls (PCBs): Health Effects,* 13 June 2013.

16. Ibid.

17. See note 14.

18. U.S. Environmental Protection Agency, *Existing Chemicals: Polybrominated Diphenyl Ethers (PBDEs) Action Plan Summary*, 29 January 2014.

19. K.L. Kimbrough, W.E. Johnson, et al., National Oceanic and Atmospheric Administration, *An Assessment of Polybrominated Diphenyl Ethers (PBDEs) in Sediments and Bivalves of the U.S. Coastal Zone*, 2009.

20. Erik Stokstad, "U.N. Convention Bans Flame Retardant," *ScienceInsider*, 10 May 2013, accessed at news.sciencemag.org/climate/2013/05/u.n.-convention-bans-flame-retardant, 23 May 2014.

21. California Office of Environmental Health Hazard Assessment, *Current Proposition 65 List* (Microsoft Excel spreadsheet), 4 April 2014.

22. Rachel L. Gibson, Environment California Research & Policy Center, *Moving Toward a Green Chemical Future*, July 2008.

23. Ken Ward Jr., "300K Lack Water in Southern W. Va.," *West Virginia Gazette*, 10 January 2014.

24. CNN Health, *Report: Harmful Chemical Found in Tap Water of 31 U.S. Cities,* 20 December 2010, accessed at thechart.blogs.cnn.com/2010/12/20/carcinogen-found-in-31-of-35-cities-water-supply/, 8 April 2014.

25. The Associated Press, "Study: Unsafe Toxins Found in Drinking Water at Thousands of U.S. Schools," 25 September 2009.

26. Ibid.

27. Purdue University Radiological and Environmental Management, *Teratogens*, accessed at www.purdue.edu/rem/ih/terat.htm, 8 April 2014.

28. U.S. Environmental Protection Agency, *What Is A Watershed?*, accessed at water.epa.gov/type/watersheds/whatis.cfm, 23 May 2014.

29. For more on the role of TWFs and the process by which they are created, see Eastern Research Group, *Draft Toxic Weighting Factor Development in Support of CWA 304(m) Planning Process*, prepared for Environmental Protection Agency, 29 July 2005.

30. U.S. Environmental Protection Agency, *Integrated Risk Information System: Nitrate*, accessed at www.epa.gov/iris/subst/0076.htm, 12 June 2014.

31. Environmental Working Group, *Chemical Families: Nitrate Compounds*, accessed at www.ewg.org/chemindex/term/537, 7 February 2012.

32. U.S. Environmental Protection Agency, *The Facts About Nutrient Pollution*, accessed at water.epa.gov/polwaste/upload/nutrient_pollution_factsheet.pdf, 12 June 2014..

33. Donald A. Goolsby and William A. Battaglin, U.S. Geological Survey, *Nitrogen in the Mississippi Basin – Estimating Sources and Predicting Flux to the Gulf of Mexico* (fact sheet), December 2000.

34. Darryl Fears, "Alarming 'Dead Zone' Grows in the Chesapeake," *Washington Post*, 24 July 2011.

35. Ann T. Lemley, John J. Schwartz and Linda P. Wagenet, Cornell Cooperative Extension, College of Human Ecology, *Hydrogen Sulfide in Household Drinking Water*, 7 January 1999.

36. World Health Organization, *Hydrogen Sulfide in Drinking-Water, Background Document for Development of WHO Guidelines for Drinking-Water Quality*, 2003.

37. U.S. Environmental Protection Agency, *Hydogen Sulfide; Community Right-to-Know Toxic Chemical Release Reporting*, Federal Register Volume 76, Number 200, 64022-64037, 17 October 2011.

38. Ibid.

39. See note 21.

40. U.S. Environmental Protection Agency, *TRI Explorer*, accessed at iaspub.epa.gov/triexplorer/tri_release.facility, 6 May 2014.

41. U.S. Fish and Wildlife Service, *Protection Island and San Juan Islands National Wildlife Refuges: Comprehensive Conservation Plan and San Juan Islands Wilderness Stewardship Plan*, 28 September 2010.

42. For the purposes of this map, the Chesapeake Bay watershed does not include the Susquehanna River watershed, and does include the Potomac River watershed.

43. West Virginia Department of Environmental Protection, *Freedom Industries Revises Estimate For Spill* (press release), 27 January 2014.

44. National Public Radio, "How Industrial Chemical Regulation Failed West Virginia," *Fresh Air*, 29 January 2014.

45. Laura Parker, "A Century of Controversy, Accidents in West Virginia's Chemical Valley in Lead-up to Spill," *National Geographic Daily News*, 16 January 2014.

46. Richard D. Christie, Anthony E. Gross, and Randall J. Fortin*, U.S. Patent 4,915,825*, 10 April 1990.

47. FracFocus Chemical Disclosure Registry, *Chemicals and Public Disclosure*, accessed at fracfocus.org/chemical-use/chemicals-public-disclosure, 22 May 2014.

48. Elizabeth Ridlington, Frontier Group, and John Rumpler, Environment America, *Fracking by the Numbers: Key Impacts of Dirty Drilling at the State and National Level*, October 2013, 22.

49. Clean Water Action, *17 Groups Petition EPA for Public Reporting of Chemical Releases from Fracking, Other Oil and Gas Operations* (press release), 24 October 2012.

50. David Manthos, "Cancer Causing Chemicals Used in 34 Percent of Reported Fracking Operations," *EcoWatch*, 22 January 2013.

51. U.S. Environmental Protection Agency, *Mercury: Health Effects*, accessed at www.epa.gov/hg/effects.htm, 12 June 2014.

52. List of PBTs: U.S. Environmental Protection Agency, *Persistent Bioaccumulative Toxic (PBT) Chemicals Covered by the TRI Program*, accessed at www2.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-covered-tri, 8 May 2014.

53. WHO guidelines from U.S. Agency for Toxic Substances and Disease Registry, *ToxFAQs: Chemical Agent Briefing Sheets: Dioxin*, March 2006. Note: the WHO guidelines are for total daily intake of 1 to 4 picograms (trillionths of a gram) per kilogram of body weight per day.

54. Agency for Toxic Substances and Disease Registry, *Hexachlorobenzene*, accessed at www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=115, 12 June 2014.

55. U.S. Environmental Protection Agency, *The Facts About Nutrient Pollution*, May 2012.

56. U.S. Environmental Protection Agency, *TRI Explorer*, accessed at iaspub.epa.gov/triexplorer/tri_release.facility, 15 May 2014.

57. U.S. Environmental Protection Agency, *Watershed Assessment, Tracking and Environmental Results (WATERS)*, accessed at www.epa.gov/waters/ir/index.html, 15 May 2014.

58. Cancer-causing chemicals were identified as those listed on California's Proposition 65 list of substances known to cause cancer, as well as some compounds associated with cancer-causing materials. See "Methodology" for a complete description of how chemicals were identified for this report.

59. Libby Sander, "Chicagoans Protest as Indiana Lets a Refinery Add to Lake Pollution," *New York Times*, 31 July 2007.

60. Kari Lydersen, "Community is Torn Over Expansion of Oil Refinery," *New York Times*, 15 September 2011.

61. Michael Puente, "Emanuel Wants Answers on BP Oil Spill," *WBEZ.org*, 27 March 2014.

62. The volume of reproductive toxicant releases is substantially greater than that described in the 2012 version of this report due to the listing of hydrogen cyanide and cyanide salts as reproductive toxicants by the state of California in 2013. While releases of hydrogen cyanide are reported separately to TRI, releases of other cyanide compounds are reported under the general category of "cyanide compounds." As described in the methodology, this association results in all releases of "cyanide compounds" being associated with reproductive toxicity in the data presented in this report.

63. The data we received from the EPA labeled this as "Weyerhaeuser Pacific Veneer," the name of the plant before its parent company closed it in 2009. The plant, now under different ownership, has been known by several other names, according to U.S. Environmental Protection Agency, *Envirofacts*, accessed at oaspub.epa.gov/enviro/fii_query_dtl.disp_program_facility?p_registry_id=110000490709, 9 May 2014.

64. U.S. Environmental Protection Agency, *TRI Discharges to Impaired Waters* (Microsoft Excel spreadsheet), 8 May 2014.

65. U.S. Environmental Protection Agency, *Geographic Information System Analyses of the Surface Drinking Water Provided by Intermittent, Ephemeral, and Headwater Streams in the U.S.*, accessed at water.epa.gov/lawsregs/guidance/wetlands/surface_drinking_water_index.cfm, 12 June 2014.

66. U.S. Environmental Protection Agency, *Table 1: State-by-State NHD Analyses of Stream Categories and Drinking Water Data* (attachment to letter from EPA Assistant Administrator Benjamin H. Grumbles to Jeanne Christie, Executive Director, Association of State Wetland Managers), 9 January 2005.

67. U.S. Environmental Protection Agency, *Permit Status Report for Non-Tribal Individual Major Permits – March 2013*, accessed at www.epa.gov/npdes/pubs/grade_2013.pdf, 7 May 2014.

68. New Jersey Department of Environmental Protection, *DEP Delivers on Commitment to Protect New Jersey's Water Quality* (press release), 23 April 2007.

69. North Carolina Administrative Code, Title 15A, Chapter 2, Subchapter B, Section 0303, *Little Tennessee River Basin and Savannah River Drainage Area*; and North Carolina Administrative Code, Title 15A, Chapter 2, Subchapter B, Section 0306, *Broad River Basin*, accessed at ncrules.state.nc.us/ncac.asp, 9 June 2014.

70. See note 22.

71. Associated Press, "California Bans Dry-Cleaning Chemical," *MSNBC.com*, 25 January 2007.

72. Travis Madsen and Rachel Gibson, Environment California Research & Policy Center, *Toxic Baby Furniture: The Latest Case for Making Products Safe from the Start*, May 2008.

73. Environment California, *Phthalates Overview*, accessed at www.environmentcalifornia.org/environmental-health/stop-toxic-toys/phthalates-overview, 7 February 2012.

74. Jen Baker and Kyle Michael Brown, MASSPIRG Education Fund, *Unnecessary Harms: The Availability of Safer Alternatives to the "Toxic Ten,"* April 2006; alternative plasticizers: Alexander H. Tullo, "Cutting Out Phthalates," *Chemical & Engineering News*, 14 November 2005.

75. U.S. PIRG Education Fund, *Pulp Fiction: Chemical Hazard Reduction at Pulp and Paper Mills*, August 2007.

76. For a detailed discussion of the impact of the Massachusetts and New Jersey programs, see Dana O'Rourke and Eungkyoon Lee, "Mandatory Planning for Environmental Innovation: Evaluating Regulatory Mechanisms for Toxics Use Reduction," *Journal of Environmental Planning and Management*, 47(2):181-200, March 2004; New Jersey Department of Environmental Protection, *Industrial Pollution Prevention in New Jersey: A Trends Analysis of Materials Accounting Data 1994 to 2004*, Spring 2007.

77. See Elizabeth Ridlington and John Rumpler, Environment America Research & Policy Center, *Fracking by the Numbers: Key Impacts of Dirty Drilling at the State and National Level* (October 2013).

78. U.S. Environmental Protection Agency, *2011 Annual Effluent Guidelines Review Report*, December 2012, 3-24.

79. Ibid.

80. Ibid.

81. Ibid.

82. Ibid.

83. U.S. Environmental Protection Agency, "Industry Guidance: Chemical Distribution Facilities," *Section 313 of the Emergency Planning and Community Right-to-Know Act: Toxic Chemical Release Inventory*, January 1999, 4-39.

84. This combines all releases to all U.S. watersheds by facilities identified in TRI as having the same parent company. Companies with no U.S. parent company released, in total, 9,050,566 pounds. If all combined they would have ranked fifth on this table

85. This combines all releases to all U.S. watersheds by facilities identified in TRI as having the same parent company. Companies with no U.S. parent company released, in total, 1,925,185 toxicity-weighted pounds equivalent. If all combined they would have ranked second on this table.

86. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, *Chemicals Known to the State of California to Cause Cancer or Reproductive Toxicity,* 4 April 2014.