Introduction to the 2019 TRI National Analysis

Industries and businesses in the United States (U.S.) use many chemicals to make the products we depend on, such as pharmaceuticals, computers, paints, clothing, and automobiles. While most chemicals on the Toxics Release Inventory (TRI) chemical list are managed by these facilities in ways that minimize releases into the environment, releases still occur as part of normal business operations.

TRI Reporting

Under the Emergency Planning and Community Right-to-Know Act (EPCRA) and the Pollution Prevention Act (PPA), facilities that meet TRI reporting requirements must report details about their pollution prevention and waste management activities, including releases, of TRI-listed chemicals for the prior calendar year to EPA's TRI Program by July 1 of each year.

It is your right to know what TRI chemicals are being used in your community, how chemical waste is managed including how much is released into the environment, and whether such quantities are increasing or decreasing over time.

The TRI tracks the management of certain chemicals from the information reported to EPA each year by facilities located in the U.S. in industry sectors such as manufacturing, metal mining, electric utilities, and hazardous waste management. The data reported to TRI are compiled in a publicly available EPA database. For calendar year 2019, more than 21,000 facilities reported to EPA's TRI Program.

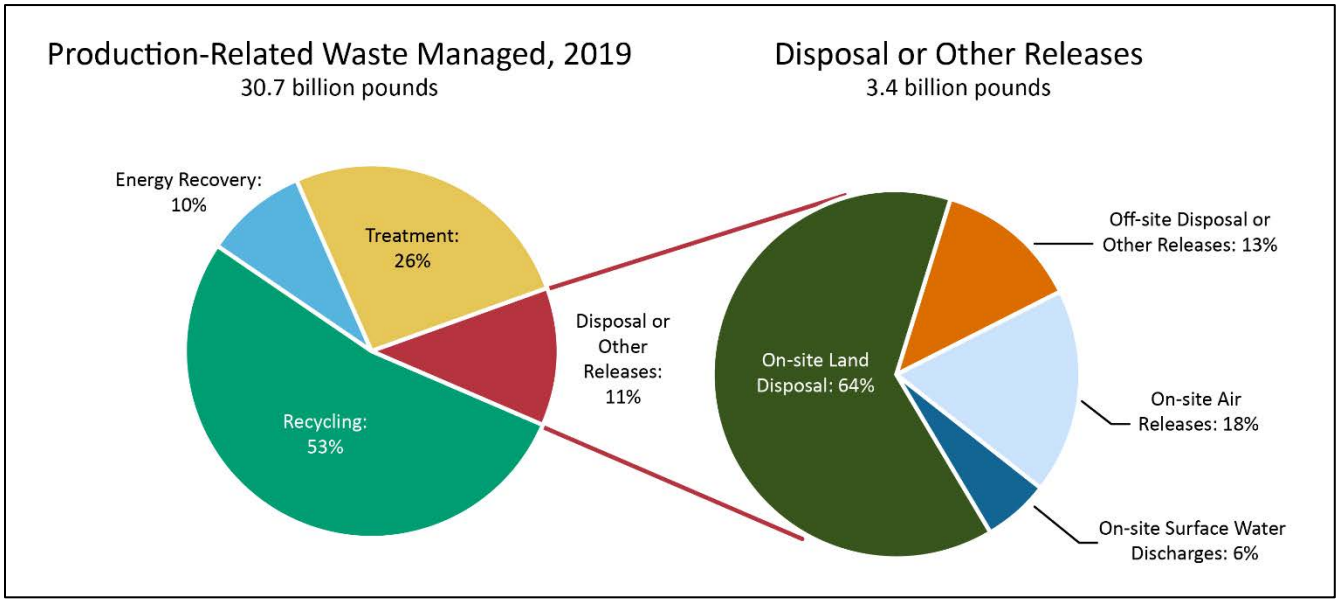
Please note that the most recent TRI dataset reflects chemical waste management information, including releases, that occurred during calendar year 2019, and therefore does not indicate any potential impacts from the COVID-19 pandemic, which began in the U.S. in early 2020.

Watch a short video about the TRI Program and your right to know.

Each year, in support of its mission to protect human health and the environment, EPA analyzes the most recent TRI data and publishes its findings in the TRI National Analysis.

Overview of the 2019 TRI data

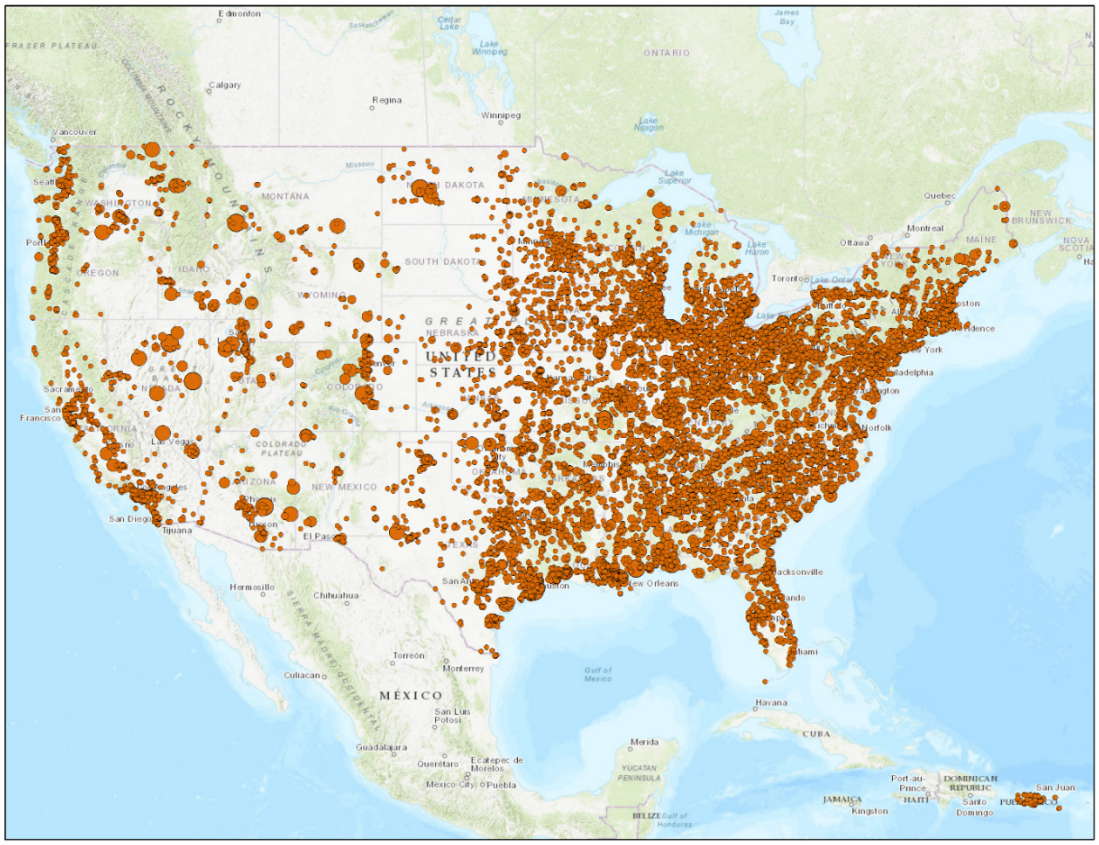
The two pie charts below summarize the most recent TRI data: 1) on how facilities managed production-related TRI chemical wastes through recycling, energy recovery, treatment, and disposal or other releases; and 2) for the quantities of the TRI chemical wastes released to the environment, the proportions released to air, water, and land.



Note: To avoid double counting, the Disposal or Other Releases pie on the right excludes quantities of TRI chemicals that are transferred off site from a TRI-reporting facility and subsequently released on site by a receiving facility that also reports to TRI. Percentages do not sum to 100% due to rounding.

- Facilities reported managing a total of 30.7 billion pounds of TRI-listed chemicals as production-related waste during 2019. Production-related waste is the quantity of TRI chemicals in waste generated from routine operations at facilities. This includes TRI chemicals in wastes that are recycled, combusted for energy recovery, treated, disposed of, or otherwise released into the environment.
    - Of this total, 89% was recycled, combusted for energy recovery, or treated. Only 11% was disposed of or otherwise released into the environment.
- For chemical wastes that were disposed of or otherwise released, facilities also reported whether the wastes were released to air, water, or land, the quantities released, and the locations of the releases. Most releases occur on site at facilities, but chemical waste may also be shipped off site for disposal, such as to a landfill. As shown in the pie chart on the right, most waste was disposed of to land, which includes landfills, underground injection, and other land disposal.
- To view these data in a table, see Quick Facts under TRI Data Considerations.

Where are the Facilities that Reported to TRI for 2019 Located?



Click on any of the locations to see a facility's TRI information.

View Larger Map

TRI Data Considerations

As with any dataset, there are several factors to consider when reviewing results or using Toxics Release Inventory (TRI) data. Key factors associated with the data presented in the TRI National Analysis are summarized below; for more information see *Factors to Consider When Using Toxics Release Inventory Data*.

- **Covered chemicals and sectors.** TRI includes information reported by many industry sectors on the quantities of certain chemicals that are released into the environment or otherwise managed as waste through recycling, combustion for energy recovery, or treatment. However, the TRI does not contain information on all chemicals, nor is every facility or every industry sector within the U.S required to disclose information on TRI chemicals. A list of the chemicals reportable to the TRI Program as well as a list of the sectors covered by the TRI Program is available on the TRI webpage. Facilities in covered sectors that manufacture, process, or otherwise use TRI-listed chemicals above listed threshold quantities must also employ at least ten full-time equivalent employees to be required to report to the TRI Program. For most TRI chemicals, the thresholds are 25,000 pounds of the chemical manufactured or processed, or 10,000 pounds of the chemical otherwise used during a calendar year.

TRI Reporting is Required

TRI reporting is required for facilities that meet the reporting criteria under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). EPA investigates cases of EPCRA non-compliance and may issue civil penalties, including monetary fines. Since the TRI Program's creation, EPA has taken more than 3,400 TRI-related enforcement actions. For more information, see the TRI Compliance and Enforcement webpage.

- **TRI trends**. The TRI chemical list has changed over the years. To make sure year-to-year data are comparable, trend graphs in the TRI National Analysis include only chemicals that were reportable for the entire time period presented. Results which focus only on the year 2019 include all chemicals reportable for 2019. Thus, results for the 2019 analyses may differ slightly from the results presented in trend analyses, which include 2019 and previous years.
- **Data quality.** Facilities use the best readily available data to determine the quantities of chemicals they report to TRI. Each year, EPA conducts an extensive data quality review that includes contacting facilities concerning potential errors in reported information. This data quality review process helps ensure that the TRI National Analysis is based on accurate and complete information.

- **Risk.** TRI data can be a useful starting point to evaluate whether TRI chemical releases pose a risk to human and environmental health. However, the quantity of a TRI chemical released is not necessarily an indicator of exposure to the chemical, or the health or environmental risks posed by the chemical after its release. In particular, note that:
    - The extent of human and environmental exposure to a chemical depends on many factors such as the where the chemical is released, the environmental media to which it is released (i.e., air, water, or land), the chemical's properties, and the chemical's environmental fate and movement, and
    - TRI-listed chemicals vary in their toxicity

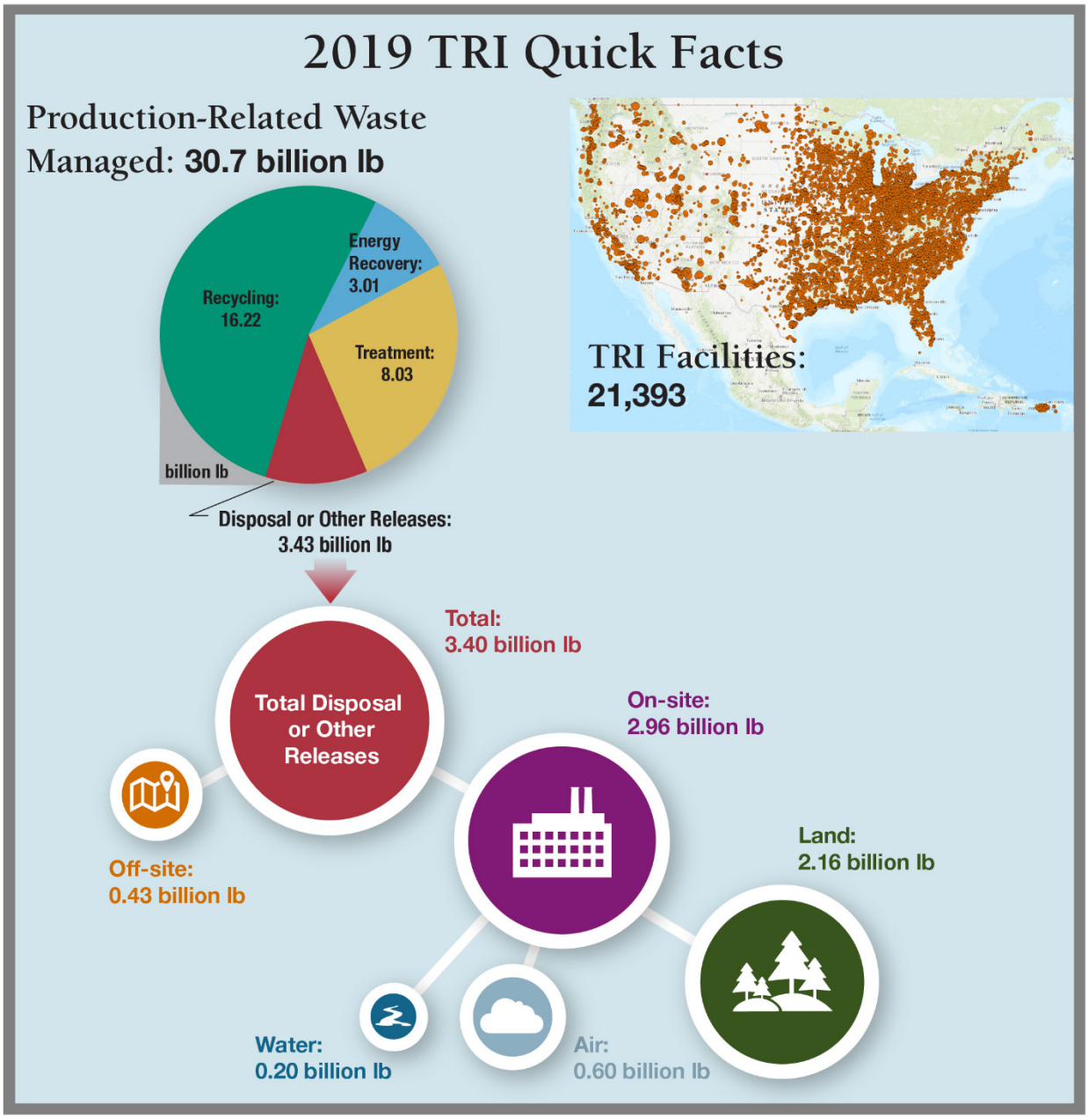
  Therefore, judgements about the potential health risks of chemical releases must consider all this information, in addition to the quantity released. For more information on the use of TRI data in exposure and risk evaluations, see the TRI and Estimating Potential Risk webpage and Hazard and Potential Risk of TRI Chemicals in the Releases section.
- **COVID-19.** The most recent TRI dataset reflects chemical waste management activities, including releases, that occurred during calendar year 2019. Therefore, none of the trend information or changes in waste management or release quantities from 2018 to 2019 indicate any potential impacts of the COVID-19 pandemic, which began in the U.S. in early 2020.

- **Late submissions, revisions and withdrawals.** TRI reporting forms submitted to EPA or revised after the July 1 reporting deadline may not be processed in time to be included in the National Analysis. After EPA's data quality review, the TRI data are frozen in October and this dataset is used to develop the National Analysis. Any revisions or late submissions received after this date, or withdrawals made after this date, will not be reflected in the National Analysis but are incorporated into the TRI dataset during the spring data refresh and will be reflected in next year's National Analysis where the data for that reporting year are referenced.
- **Double counting.** The National Analysis presents summaries of many quantitative data elements including releases to the environment, which occur on site and off site after chemical wastes are transferred to other businesses for further waste management. When aggregating releases across facilities, such as national totals, EPA adjusts off-site releases to eliminate double counting of releases if the receiving facility also reports to TRI.

Impact of Late Submissions and Revisions on the National Analysis

Comparing the 2018 TRI data available in October 2020 to those that were available a year earlier when the 2018 dataset was frozen reveals the impact on the 2018 TRI National Analysis from facilities that submitted late or revised TRI reporting forms after the data freeze. With the updated data, waste managed and release quantities are **lower** than originally reported: releases are 2.0% lower (primarily driven by one mining facility's revisions) and waste managed is 0.5% lower than was shown in the 2018 TRI National Analysis. While overall totals are lower when the updated data are considered, looking at the data by environmental medium reveals that releases to air are 3.5% (21 million lb) **higher** with the updated data. This increase is primarily due to two facilities' revisions to their air releases of ammonia–one with a 14.5-million-pound increase and the other with a 5-million-pound increase.

Quick Facts for 2019



In the figure, the value for “Disposal or Other Releases” in the production-related waste managed pie chart (3.43 billion lb) is greater than the value for “Total Disposal or Other Releases” (3.40 billion lb). There are several reasons that these quantities differ slightly, including:

- **Double counting.** Total disposal or other releases (3.40 billion pound value in the figure) removes "double counting" that occurs when a facility that reports to the TRI Program transfers waste to another TRI-reporting facility. For example, when Facility

A transfers a chemical off site for disposal to Facility B, Facility A reports the chemical as transferred off site for disposal while Facility B reports the same chemical as disposed of on site. In processing the data, the TRI Program recognizes that this is the same quantity of the chemical and includes it only once in the total disposal or other releases metric. The production-related waste managed metric in TRI, however, considers all instances where the waste is managed (first as a quantity sent off site for disposal and next as a quantity disposed of on site), and reflects both the off-site transfer and the on-site disposal. Typically, double counting accounts for most of the difference between the two release quantities in the 2019 TRI Quick Facts figure.

- **Non-production related waste**. Non-production-related waste refers to quantities of TRI chemical wastes that result from one-time events, rather than standard production activities. These events may include remedial actions, catastrophic events, or other events not associated with normal production processes. Non-production-related waste is included in a facility's total disposal or other releases but is not included in its production-related waste managed.

For more information on TRI, the chemicals and industry sectors it covers, the reporting requirements, and to access TRI data, visit the TRI website.

Pollution Prevention and Waste Management

Each year, the Toxics Release Inventory (TRI) collects information from more than 21,000 facilities on the quantities of TRI-listed chemicals they recycle, combust for energy recovery, treat for destruction, and dispose of or otherwise release both on and off site as part of their normal operations. These quantities are collectively referred to as the quantity of production-related waste managed.

Looking at production-related waste managed over time helps track facilities' progress in reducing the amount of chemical waste generated and in adopting waste management practices that are preferable to disposing of or otherwise releasing waste into the environment.

Pollution prevention is an essential component of sustainable manufacturing practices. EPA encourages facilities to first to reduce or eliminate the use of TRI-listed chemicals and the creation of chemical waste through source reduction activities such as material substitutions and process modifications. For waste that is generated, the preferred management method is recycling, followed by combusting for energy recovery, treatment, and, as a last resort, disposing of or otherwise releasing the chemical waste into the environment in a safe manner. This order of preference is consistent with the national policy established by the Pollution Prevention Act (PPA) of 1990. This waste management hierarchy is illustrated in the graphic above. While not specifically mentioned in the PPA of 1990, energy recovery is a preferred practice over treatment and disposal and is included in the hierarchy.

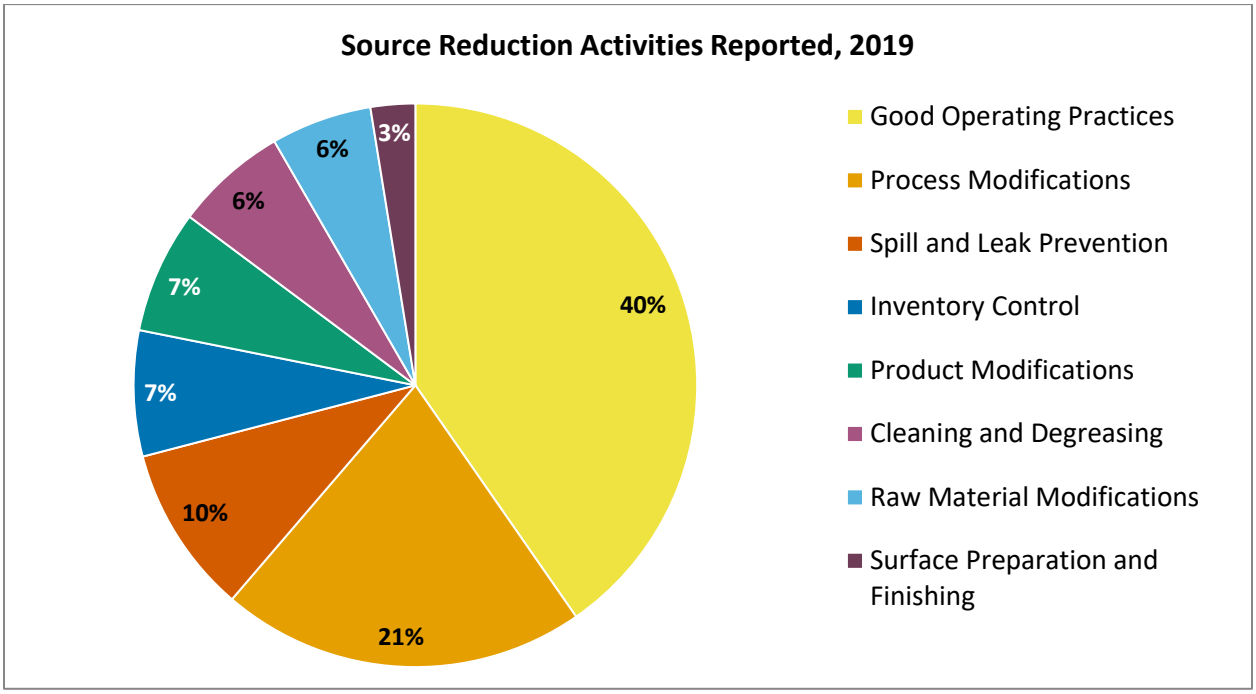
TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the Introduction. For more information see *Factors to Consider When Using Toxics Release Inventory Data*.

Source Reduction Activities Reported

Facilities are required to report new source reduction activities that they initiated or fully implemented during the year. Source reduction (also referred to as pollution prevention) includes activities that eliminate or reduce the use of TRI-listed chemicals and the generation of chemical waste. Other waste management practices, such as recycling and treatment, refer to how chemical waste is managed after it is generated and are not considered source reduction activities. The source reduction information the TRI Program collects can help facilities learn from each other's best practices and potentially reduce their own chemical releases.

For more information, see the TRI Source Reduction Reporting Fact Sheet.



Note: Facilities report their source reduction activities by selecting codes that describe their activities. These codes are organized into eight categories listed in the graph legend and are defined in the TRI Reporting Forms and Instructions.

- In 2019, 1,325 facilities (6% of all facilities that reported to TRI) implemented a combined 3,285 new source reduction activities.
- On their reporting forms, facilities select from 49 types of source reduction activities across the 8 categories shown in the graph. The most reported source reduction category is Good Operating Practices.
    - For example, a fabricated metal parts manufacturer used an automated system for applying sulfuric acid which improved operating efficiency and minimized sulfuric acid usage in the plating process. [Click to view facility details in the TRI P2 Search Tool]

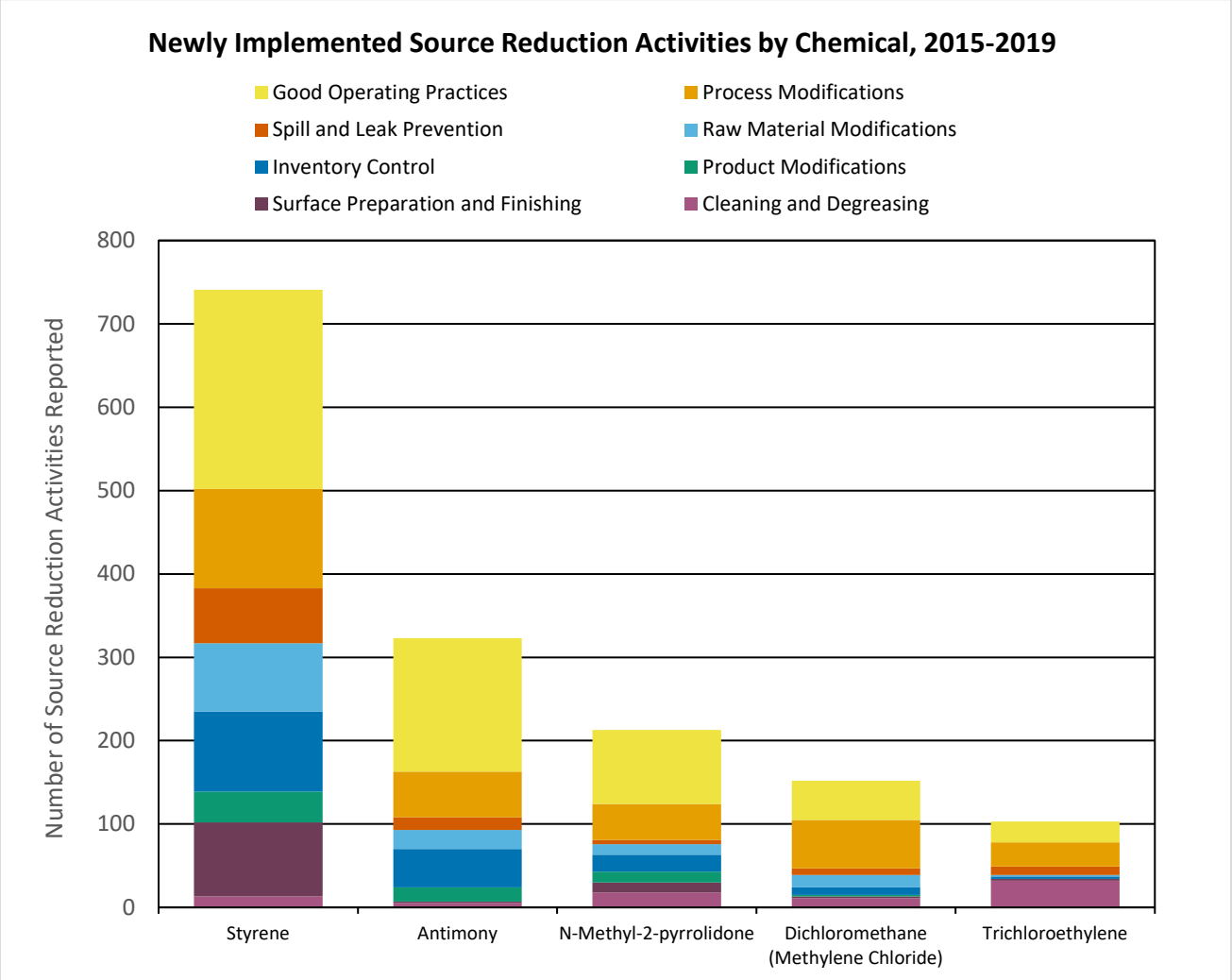
- Facilities also report the methods by which source reduction activities are identified. In 2019, the most commonly reported method for identifying source reduction opportunities was participative team management. Internal pollution prevention audits and vendor assistance were also commonly reported.

Additional Resources

- See the TRI P2 Data Overview Factsheet for more information on source reduction reporting in recent years.
- Note that facilities may have implemented source reduction activities in earlier years which are ongoing or completed projects. To see details of source reduction activities implemented for this year or in previous years, use the TRI P2 Search Tool.

Source Reduction Activities by Chemical

For the chemicals with the highest source reduction reporting rates over the last 5 years, this figure shows the number and types of activities implemented.



Note: 1) Limited to chemicals with at least 100 reports of source reduction activities from 2015-2019. 2) In this figure, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g. antimony is listed separately from antimony compounds). 3) Facilities report their source reduction activities by selecting codes that describe their activities from among eight categories, which are listed in the graph and are defined in the TRI Reporting Forms and Instructions.

From 2015 to 2019:

- TRI facilities reported 23,871 source reduction activities for more than 250 chemicals and chemical categories.

- Chemicals with the highest source reduction reporting rates were styrene, antimony and antimony compounds, N-methyl-2-pyrrolidone (NMP), dichloromethane (DCM, also known as methylene chloride), and trichloroethylene (TCE).
- The type of source reduction activities implemented for these chemicals varied depending on their use in industrial operations and the chemical's characteristics. For example:
    - **Raw material modifications** include the use of alternative materials in the manufacturing process, such as replacing styrene, a chemical used to make plastics such as polystyrene, and antimony compounds, which are used in electronics, batteries, and as a component of fire retardants.
    - **Cleaning and degreasing activities**, including changing to water-based cleaners, are implemented to reduce wastes of industrial solvents, such as trichloroethylene (TCE).
    - **Process modifications,** including optimizing reaction conditions and modifying equipment, layout, or piping, can help reduce the amount of solvents such as dichloromethane (DCM) needed for a process.

Facilities may also report additional details about their source reduction activities in an optional text field of the TRI reporting form.

Examples of optional source reduction information for 2019:

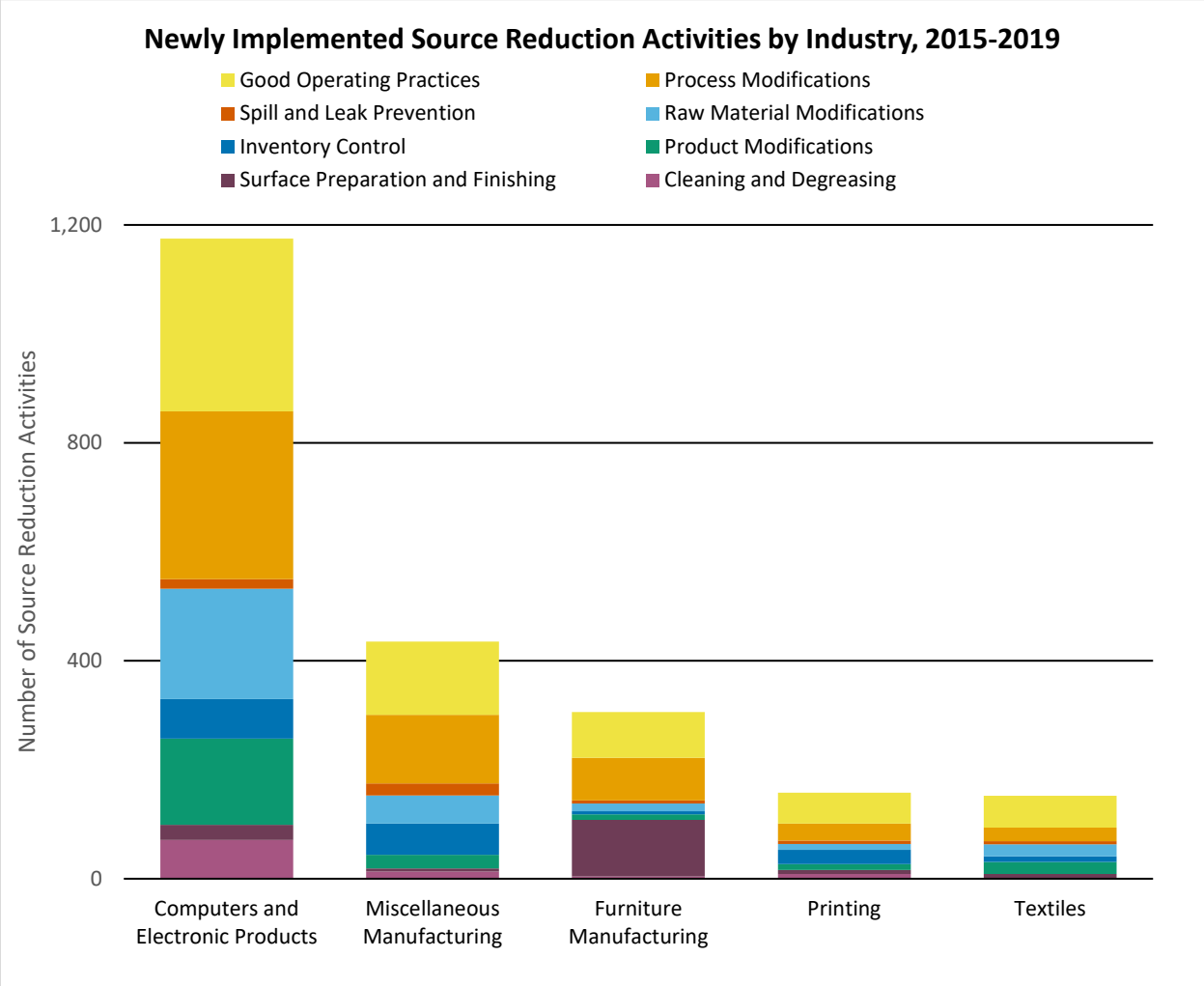
- **Styrene**: With supplier assistance, a fiberglass manufacturing facility began using gel coats with lower styrene content which reduced the facility's overall usage of styrene. [Click to view facility details in the TRI P2 Search Tool]
- **Antimony and antimony compounds**: A ceramic tile manufacturer added dry cutting lines so that antimony compounds which would otherwise be handled as waste could be recirculated within the system, reducing material usage. [Click to view facility details in the TRI P2 Search Tool]
- **N-Methyl-2-pyrrolidone**: A paint and coating manufacturing facility implemented better monitoring of shelf life and improved its "first-in, first-out" inventory method, which reduced the quantity of N-methyl-2-pyrrolidone waste generated. The facility also began manufacturing some products on demand rather than stocking inventory. [Click to view facility details in the TRI P2 Search Tool]

- **Dichloromethane**: A laboratory instrument manufacturing facility revised its rinse procedures to reduce waste and replaced dichloromethane with hexane, a less toxic chemical, in some processes. [Click to view facility details in the TRI P2 Search Tool]
- **Trichloroethylene**: A metal heat treating facility installed a newer degreaser with a lower temperature surface vapor control and a smaller surface which reduced trichloroethylene waste. [Click to view facility details in the TRI P2 Search Tool]

You can compare facilities' waste management methods and trends for any TRI chemical by using the TRI P2 Search Tool.

Source Reduction Activities by Industry

For the industries with the highest source reduction reporting rates over the last 5 years, this figure shows the number and types of activities these sectors implemented.



Note: 1) Limited to industries with at least 100 source reduction activities reported from 2015-2019. 2) Facilities report their source reduction activities by selecting codes that describe their activities. These codes fall into one of eight categories listed in the graph legend and are defined in the TRI Reporting Forms and Instructions.

From 2015 to 2019:

- The five industry sectors with the highest source reduction reporting rates were computers and electronic products, miscellaneous manufacturing (e.g., medical equipment), furniture manufacturing, textiles, and textile products.
- For most sectors, "Good operating practices" was the most frequently reported type of source reduction activity. Other commonly reported source reduction activities varied by

sector. For example, computers and electronic products manufacturers frequently reported modifications to their raw materials and products, often associated with the elimination of lead-based solder.

Facilities may also report additional details to TRI about their source reduction activities, as shown in the following examples.

Examples of optional source reduction information for 2019:

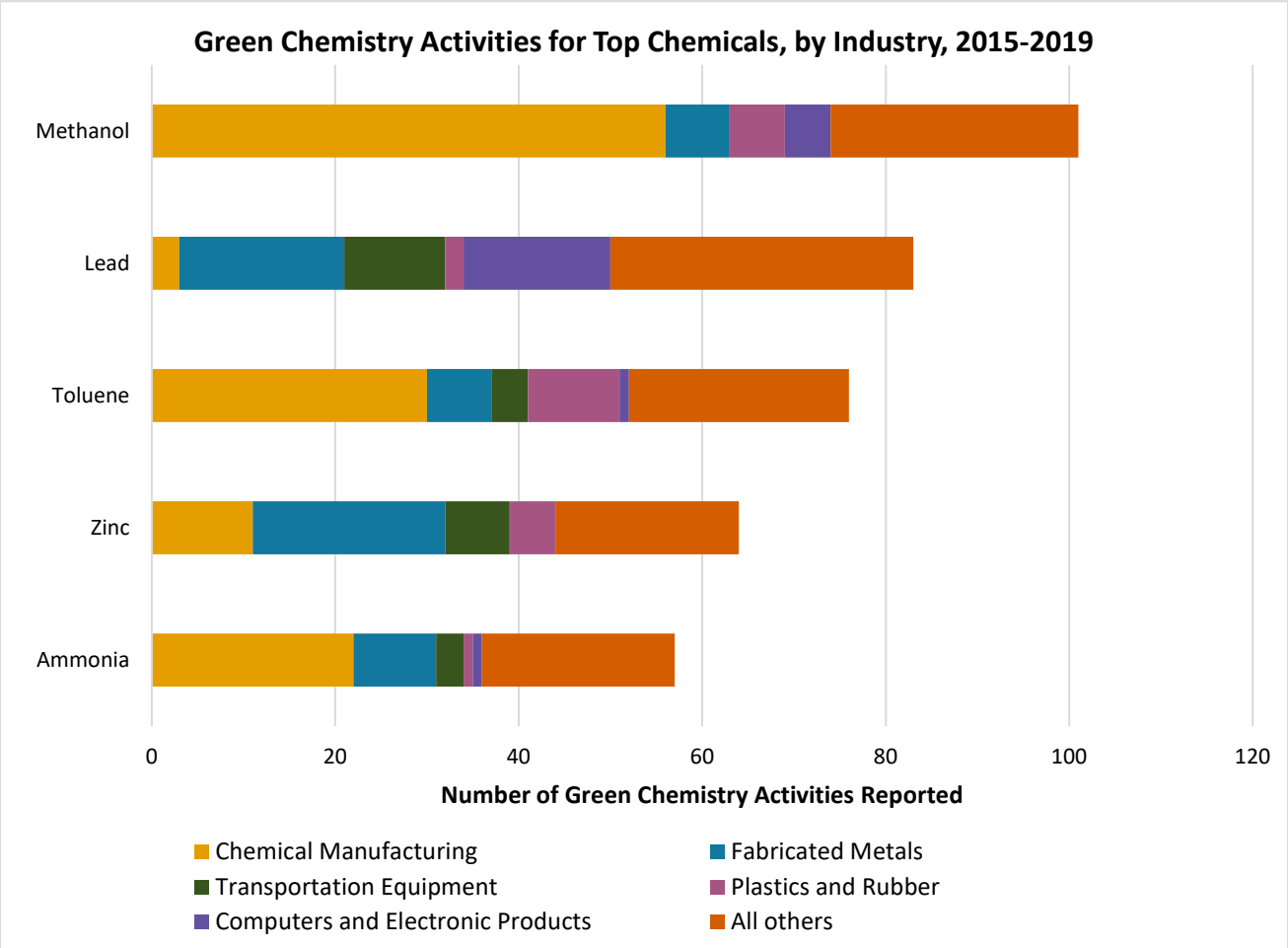
- **Computers and Electronic Products**: A printed circuit board manufacturer switched from a spray application, which generated an aerosol, to a flooded application of hydrochloric acid which flows solution on the product and reduces emissions. [Click to view facility details in the TRI P2 Search Tool]
- **Miscellaneous Manufacturing**: A casket manufacturing facility reduced its usage of certain glycol ethers by reducing the number of times clear coat is applied during the rerun process. [Click to view facility details in the TRI P2 Search Tool]
- **Furniture Manufacturing**: A wood cabinet manufacturer installed a point-of-use injection system which uses less 1,2,4-trimethylbenzene in their process. [Click to view facility details in the TRI P2 Search Tool]
- **Printing**: A printing facility focused on running similar jobs on the press to minimize downtime and reduce toluene waste. [Click to view facility details in the TRI P2 Search Tool]
- **Textiles**: A fabric coating mill reduced antimony usage by re-evaluating product specifications and removing antimony from products that were initially over-engineered. [Click to view facility details in the TRI P2 Search Tool]

You can view all reported pollution prevention activities and compare facilities' waste management methods and trends for any TRI chemical by using the TRI P2 Search Tool.

Green Chemistry Activities

Green chemistry is the design of chemical products and processes that use safer inputs and minimal energy while preventing the generation of waste. In the pollution prevention hierarchy, green chemistry is a way to achieve source reduction. Advancements in green chemistry allow industry to prevent pollution at its source by, for example, designing manufacturing processes that reduce or eliminate the use of TRI chemicals.

Six of the TRI source reduction codes facilities can choose from are specific to green chemistry activities, although green chemistry practices may also fit under other codes. This figure shows the chemicals for which the highest number of green chemistry activities were implemented over the last 5 years and the sectors that reported those activities.



Note: In this figure, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g. lead is listed separately from lead compounds).

- Since 2015, facilities have reported 1,233 green chemistry activities for 115 TRI chemicals and chemical categories.
    - Green chemistry activities were reported most frequently for methanol, lead and lead compounds, toluene, zinc and zinc compounds, and ammonia.
    - The chemical manufacturing, fabricated metals, and transportation equipment manufacturing sectors reported the highest number of green chemistry activities.
- Chemical manufacturers used green chemistry to reduce or eliminate their use of TRI solvent and reagent chemicals, such as methanol, toluene, and ammonia. For example:
    - An organic chemical manufacturing facility installed catalyst reduction equipment which decreased methanol usage. [Click to view facility details in the TRI P2 Search Tool]
- Fabricated metal producers and transportation equipment manufacturers applied green chemistry techniques to reduce or eliminate their usage of metals such as lead and zinc. For example:
    - A fabricated metal product manufacturer enhanced process monitoring and quality control which improved resource utilization and decreased waste generation, including metal waste. [Click to view facility details in the TRI P2 Search Tool]

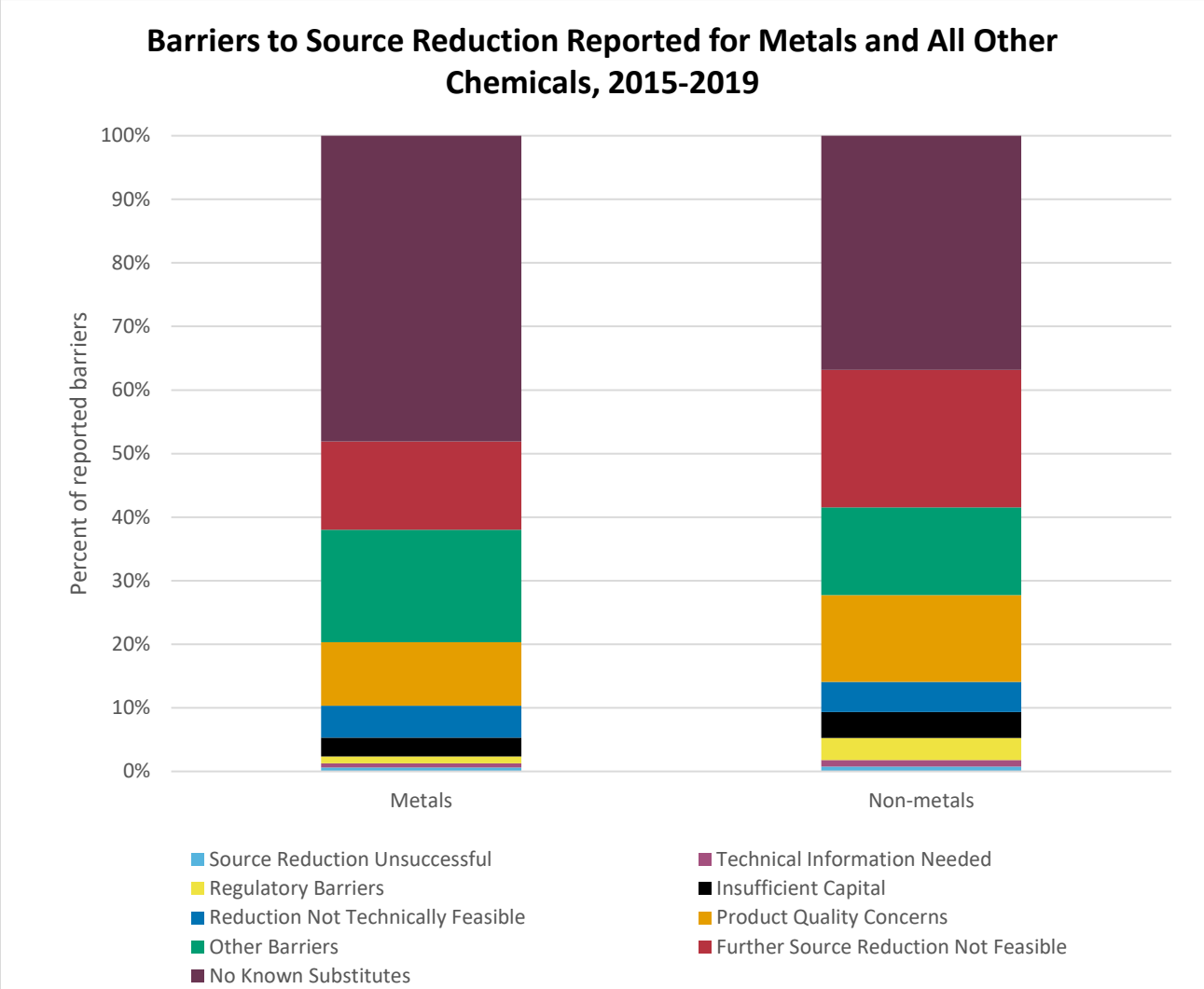
Additional Resources

Source reduction activities such as green chemistry are the preferred way to reduce the creation of chemical wastes. Find more information on green chemistry using these resources:

- EPA's TRI P2 Industry Profile Dashboard: green chemistry examples for a specific chemical and/or industry.
- EPA's Green Chemistry program: information about green chemistry and EPA's efforts to facilitate its adoption.
- EPA's Safer Choice program: information about consumer products with lower hazard.
- For more details on the types of green chemistry activities reported to TRI and trends in green chemistry reporting, see *The Utility of the Toxics Release Inventory (TRI) in Tracking Implementation and Environmental Impact of Industrial Green Chemistry Practices in the United States*.

Reported Barriers to Source Reduction

Facilities that did not implement new source reduction activities for a TRI chemical have the option to tell EPA about any barriers that prevented them from doing so. Analyzing the source reduction barriers reported to TRI helps identify where more research is needed, for example, to address technological challenges or promote development of viable alternatives. It may also allow for better communication between those that have knowledge of source reduction practices and those that are seeking additional help. This figure shows the types of barriers that facilities reported for metals and for all other (non-metal) TRI chemicals.



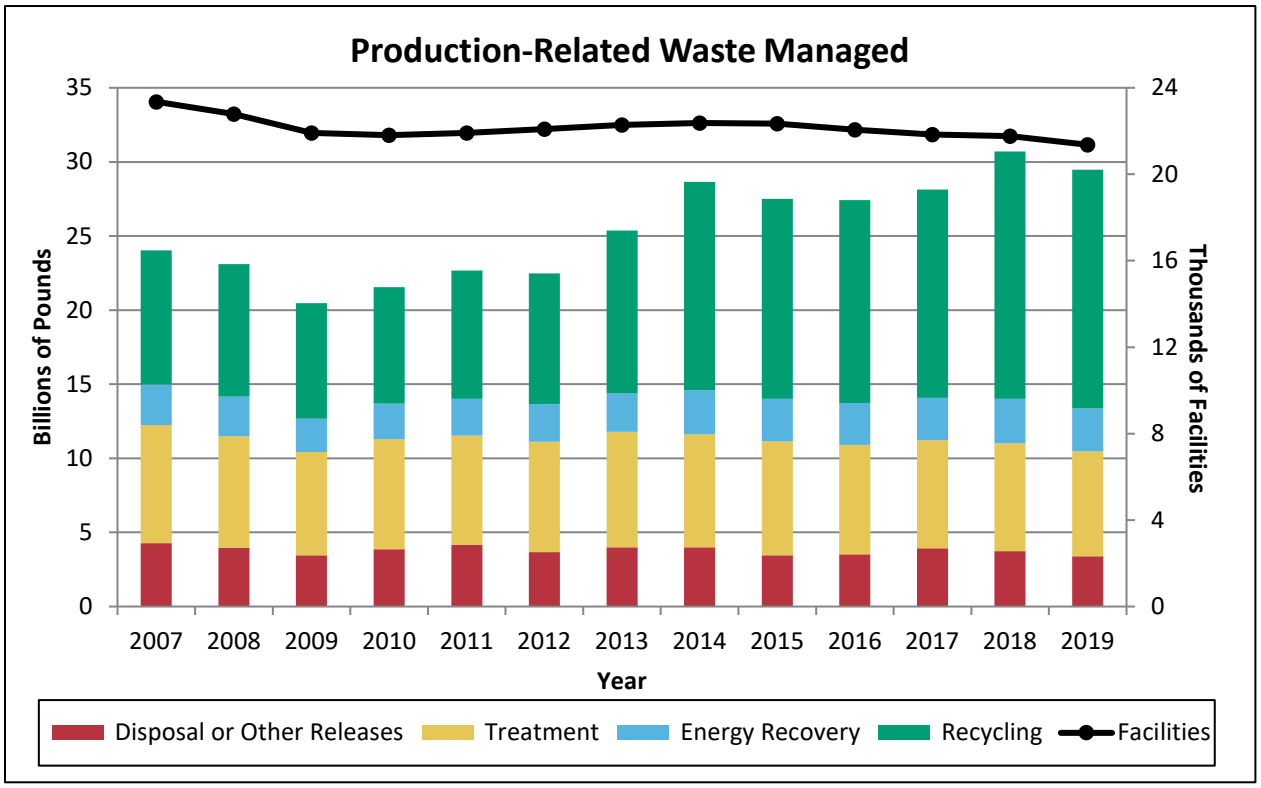
Note: Facilities report barriers to source reduction by selecting from nine codes. These codes are defined in the TRI Reporting Forms and Instructions.

From 2015 to 2019:

- Facilities reported barriers to source reduction for 321 chemicals and chemical categories.
- While *no known substitutes* was the most frequently reported barrier for both metals and non-metals, it accounted for almost half (48%) of the barriers reported for metals but made up a smaller portion (37%) of barriers reported for non-metals.
- For the *no known substitutes* barrier for metals, many facilities reported the presence of the TRI metal in their raw materials (e.g., metal alloys) as the reason they did not implement source reduction activities. Examples include:
    - A nonferrous metal forge reported that lead is present as a trace contaminant in the raw aluminum and there are no known alternatives for purchasing aluminum without the lead. [Click to view facility details in the TRI P2 Search Tool]
    - A printing facility reported that it continues to consider alternatives to lead anodes for hard chrome plating, but feasibility, testing, and quality standards would need to be met prior to implementation. [Click to view facility details in the TRI P2 Search Tool]
- *Further source reduction not feasible* was the next most commonly reported barrier for both metals and non-metals. Facilities select this barrier code when additional reductions do not appear feasible. For example:
    - A powder metallurgy part manufacturing facility previously implemented practices to minimize the use of bulk ammonia in furnace operations. The facility reported that further source reduction is not feasible because the alternative to ammonia requires the storage of hydrogen gas, an extremely flammable material. [Click to view facility details in the TRI P2 Search Tool]
- You can view source reduction barriers for any TRI chemical by using the TRI P2 Search Tool.

Waste Management Trends

Facilities report the quantities of TRI-listed chemicals that they dispose of or otherwise release into the environment as a result of normal industrial operations. In addition, facilities report the quantities of these chemicals that they manage through preferred methods including recycling, combusting for energy recovery, and treating for destruction. This figure shows the trend in these quantities, collectively referred to as production-related waste managed.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

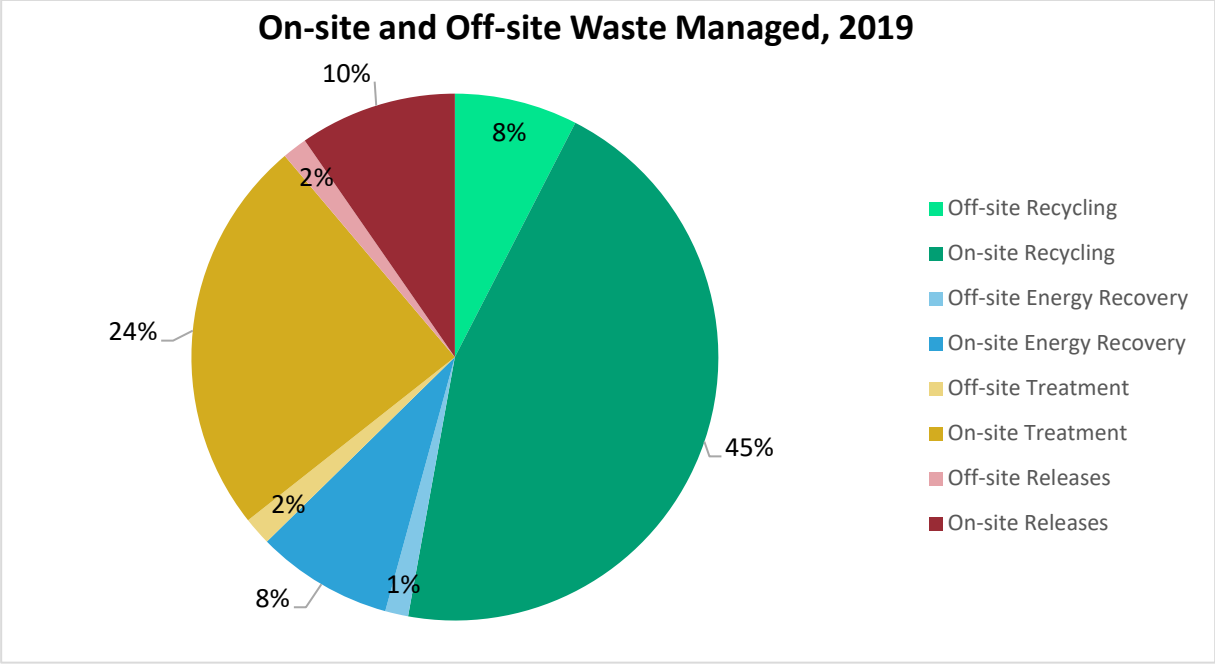
From 2007 to 2019:

- Production-related waste managed decreased during the recession from 2007 to 2009. Since 2009, production-related waste managed has generally increased as the U.S. economy has improved.
- Since 2007, production-related waste managed increased by 5.4 billion pounds (23%), driven by increased recycling.
    - Disposal and other releases decreased by 874 million pounds (-20%).
    - Treatment decreased by 887 million pounds (-11%).
    - Energy recovery increased by 124 million pounds (5%).

  - Recycling increased by 7.1 billion pounds (78%), a trend largely driven by three facilities in the chemical manufacturing sector that each reported recycling one billion pounds or more annually in recent years.

- The number of facilities that report to TRI has declined by 9% since 2007. Reasons for this decrease include facility closures, outsourcing of operations to other countries, and facilities reducing their manufacture, processing, or other use of TRI-listed chemicals to below the reporting thresholds.
- Please note that the most recent TRI dataset reflects chemical waste management activities that occurred during calendar year 2019, and therefore does not indicate any potential impacts of the COVID-19 pandemic, which began in the U.S. in early 2020.

Facilities report both on- and off-site waste management. The following chart shows the relative quantities of on-site and off-site waste management methods for 2019.

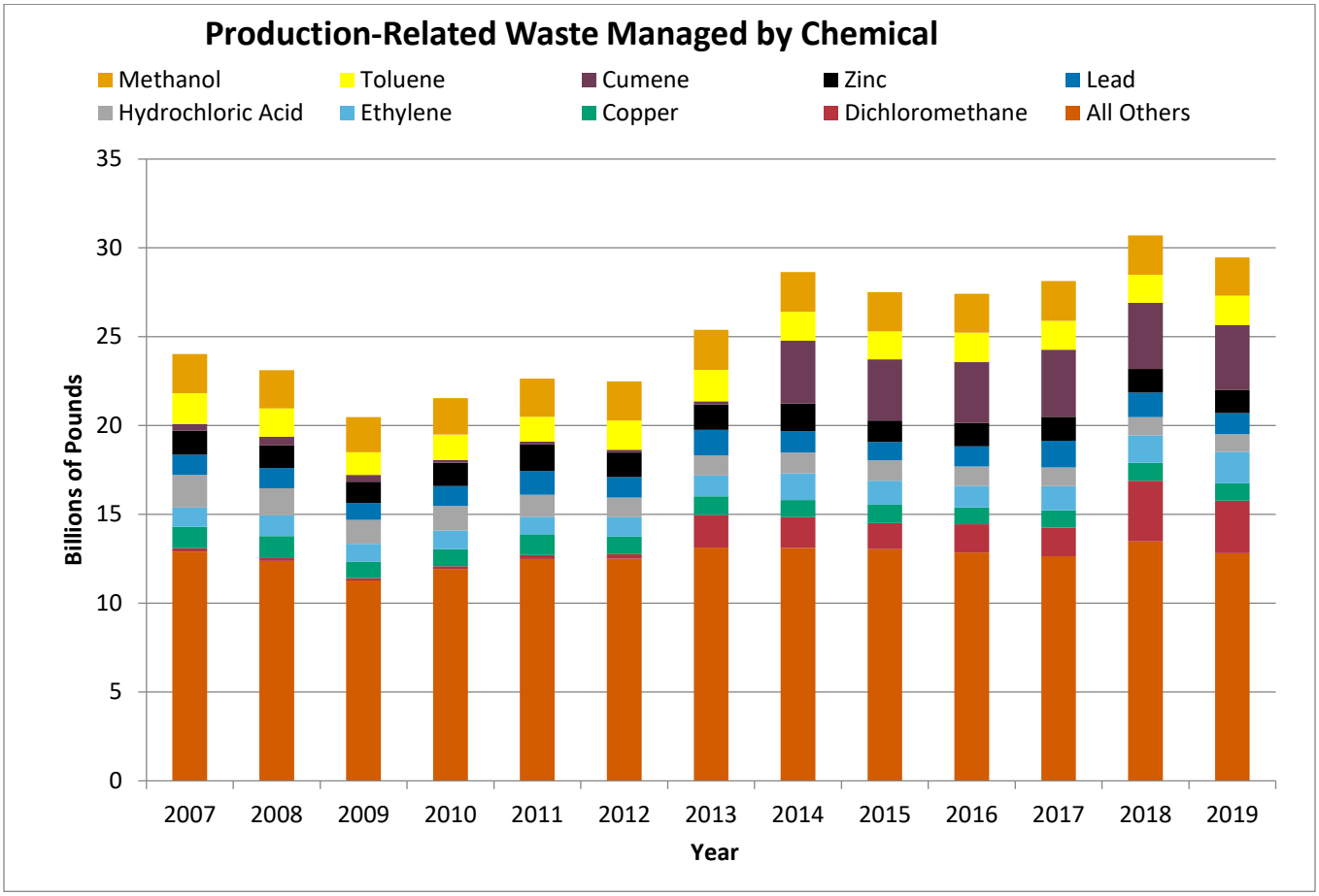


For 2019, 88% of production-related waste was managed on site.

- Most production-related waste managed off site is recycled. Most of this recycling is reported by the primary and fabricated metals sectors. Facilities in these sectors often send scrap metal off site for recycling.
- The 2019 distribution of waste managed on site and off site is similar to previous years.

Production-Related Waste Managed by Chemical

This figure shows the chemicals that were managed as waste in the greatest quantities from 2007 to 2019.



Note: 1) For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented. 2) In this figure, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g. lead is listed separately from lead compounds).

From 2007 to 2019:

- Facilities reported production-related waste managed for more than 500 chemicals and chemical categories from 2007 to 2019. The nine chemicals for which facilities reported the most production-related waste managed, shown above, represent 50% of the total production-related waste reported.
- Of the chemicals shown above, facilities reported increased quantities of waste managed for: dichloromethane (methylene chloride), lead and lead compounds, cumene, and ethylene.
    - Waste managed of ethylene increased by 701 million pounds (66%).

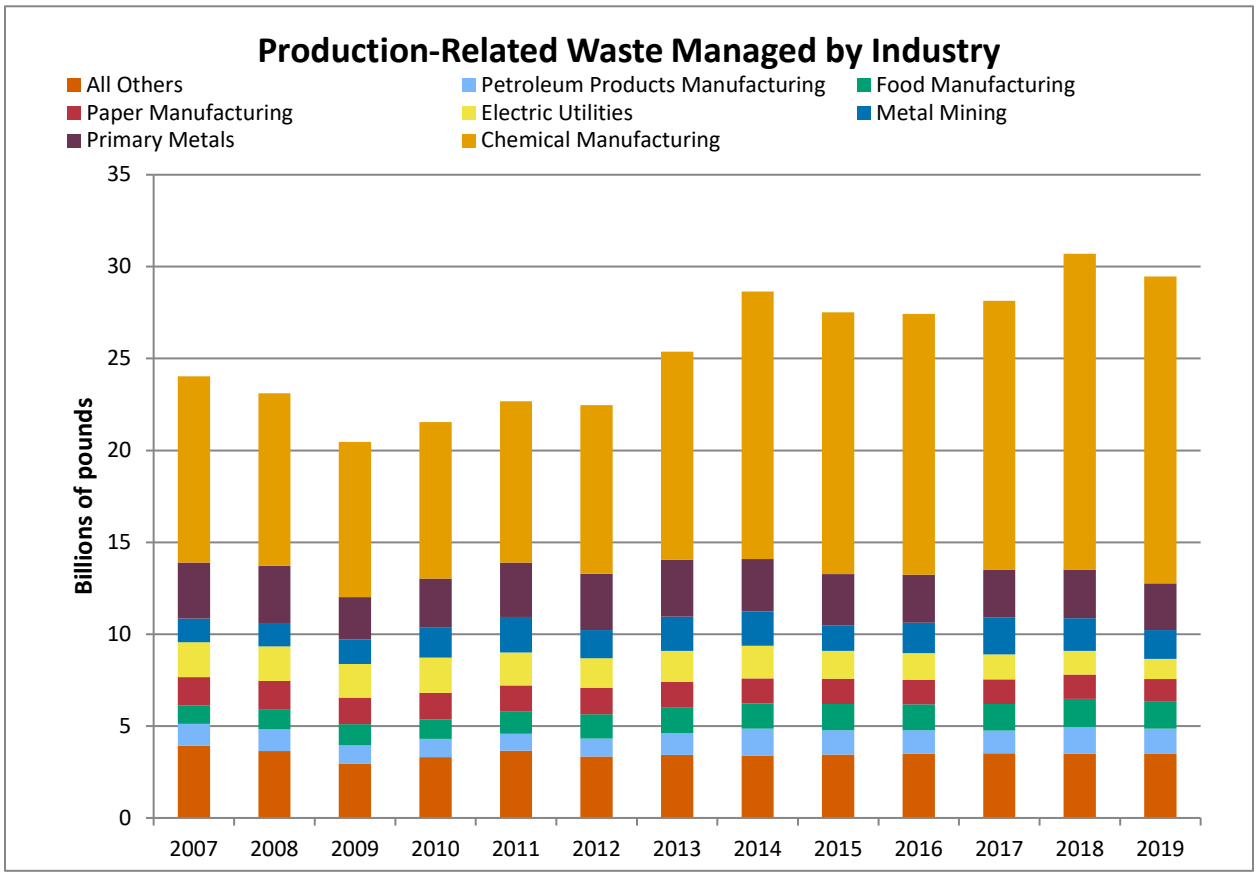
- Dichloromethane waste managed increased over 10-fold, due to 2 facilities that started recycling large quantities of the chemical, one starting in 2013 and the other starting in 2018.
- Cumene recycling increased eight-fold, mostly driven by one facility reporting recycling over 3.4 billion pounds of cumene annually from 2014 to 2019. [Click to view facility details in the TRI P2 Search Tool]

From 2018 to 2019:

- Quantities of TRI chemical waste decreased for numerous chemicals, including:
  - Lead and lead compounds decreased by 186.4 million pounds (-14%)
  - Methanol decreased by 58.8 million pounds (-3%)
  - Hydrochloric acid decreased by 26.4 million pounds (-3%)
  - Copper and copper compounds decreased by 26.4 million pounds (-3%)
- Dichloromethane waste managed decreased by 475 million pounds (-14%), mostly driven by one plastic manufacturing facility reporting a decrease of 367 million pounds of dichloromethane recycling from 2018 to 2019. [Click to view facility details in the TRI P2 Search Tool]
- Quantities of TRI chemical waste managed increased for other chemicals including:
  - Toluene increased by 95 million pounds (6%)
  - Ethylene waste managed increased by 232 million pounds (15%)

Production-Related Waste Managed by Industry

This figure shows the industry sectors that managed the most TRI chemical waste from 2007 to 2019.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- The percent contribution of each of the top sectors to production-related waste managed has remained relatively constant since 2007.
- Of the sectors shown in the graph, four increased their quantity of waste managed:
  - Chemical manufacturing increased by 6.6 billion pounds (65%)
  - Metal mining increased by 291 million pounds (23%)
  - Food manufacturing increased by 456 million pounds (46%)
  - Petroleum products manufacturing increased by 185 million pounds (16%)
- The quantity of waste generated in some industries fluctuates considerably from year to year, due to changes in production or other factors. For example, quantities of waste

managed reported by metal mining facilities can change significantly based on differences in the composition of waste rock.

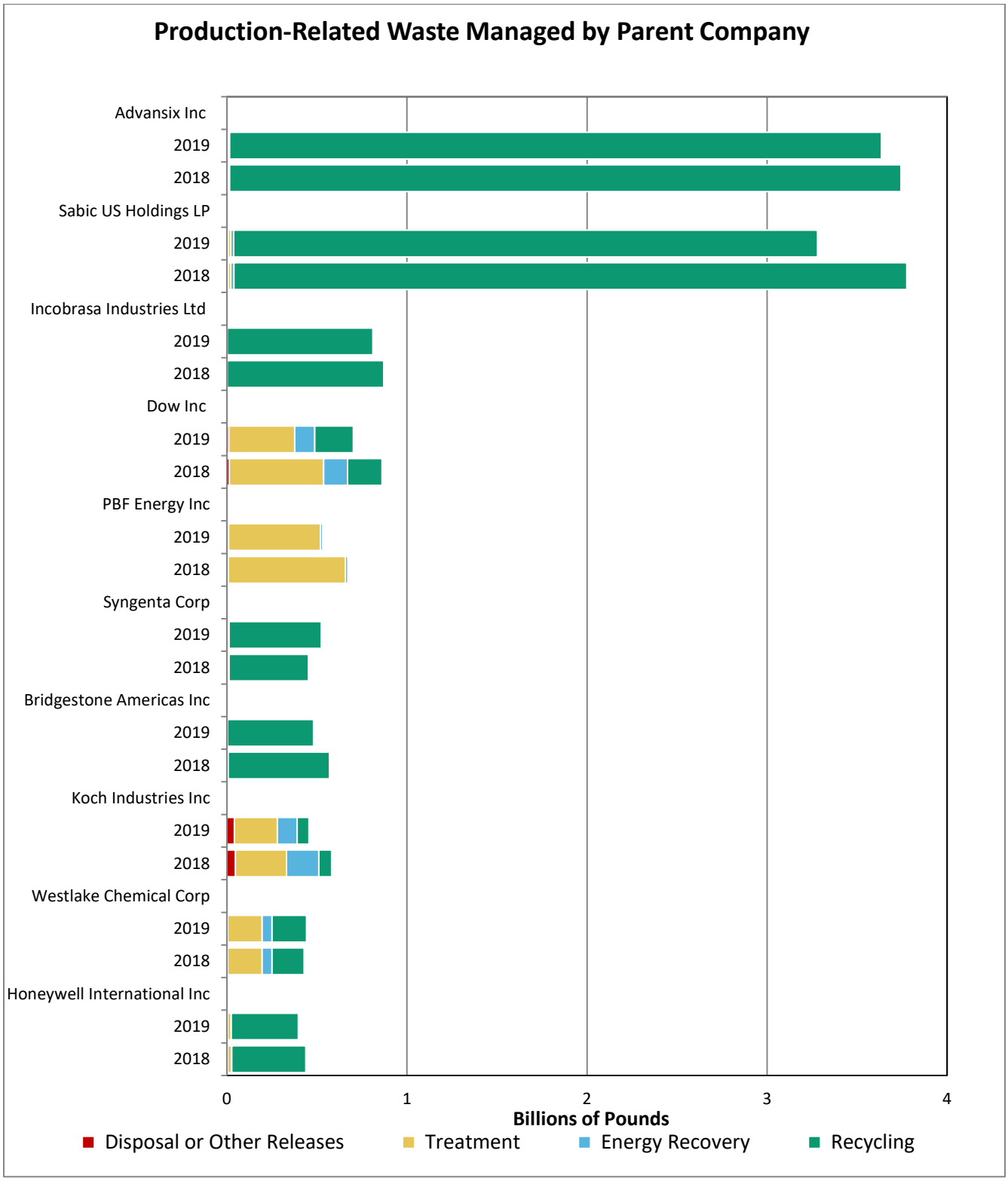
From 2018 to 2019:

- Industry sectors with the greatest reported changes in waste management quantities were:
    - Chemical manufacturing decreased by 501 million pounds (-3%)
    - Petroleum products manufacturing decreased by 260 million pounds (-11%)
    - Metal mining decreased by 226 million pounds (-13%)

Waste Management by Parent Company

Facilities that report to the Toxics Release Inventory (TRI) provide information on their parent company. For TRI reporting purposes, the parent company is the highest-level company located in the United States. This figure shows the parent companies whose facilities reported the most production-related waste managed for 2019. Facilities outside of the manufacturing sector, such as electric utilities and coal and metal mines, are not included in this chart because those sectors' activities do not lend themselves to the same types or degree of source reduction opportunities as the activities at manufacturing facilities.

Note that these manufacturing facilities manage the majority of their waste through EPA's preferred waste management methods–recycling, energy recovery, or treatment–rather than releasing it into the environment.



Notes: 1) This figure uses EPA's standardized parent company names. 2) To view facility counts by parent company in 2018 or 2019, mouse over the bar graph. 3) One facility, Incobrasa Industries Ltd, does not report a parent company but it is included in this figure because it has a comparable quantity of production-related waste managed. 4) Thirty of the facilities that submitted "Dow Inc" as their parent company name for 2019 submitted "DowDuPont Inc" as their parent company for 2018. Production-related waste for 2018 from these facilities is included in the figure above under "Dow Inc."

These parent companies' TRI-reporting facilities operate in the following industry sectors:

- **Chemical manufacturing:** Advansix Inc, Dow Inc, Syngenta Corp, Honeywell International Inc, Sabic US Holdings LP, Westlake Chemical Corp
- **Soybean processing:** Incobrasa Industries Ltd
- **Multiple sectors**, e.g. pulp and paper, petroleum refining, and chemicals: Koch Industries Inc
- **Tires and rubber products:** Bridgestone Americas Inc
- **Petroleum refining:** PBF Energy Inc

Five of these top parent companies reported implementing new source reduction activities in 2019. Some of these companies reported additional (optional) descriptive information about their pollution prevention activities.

Examples of additional pollution prevention-related information for 2019:

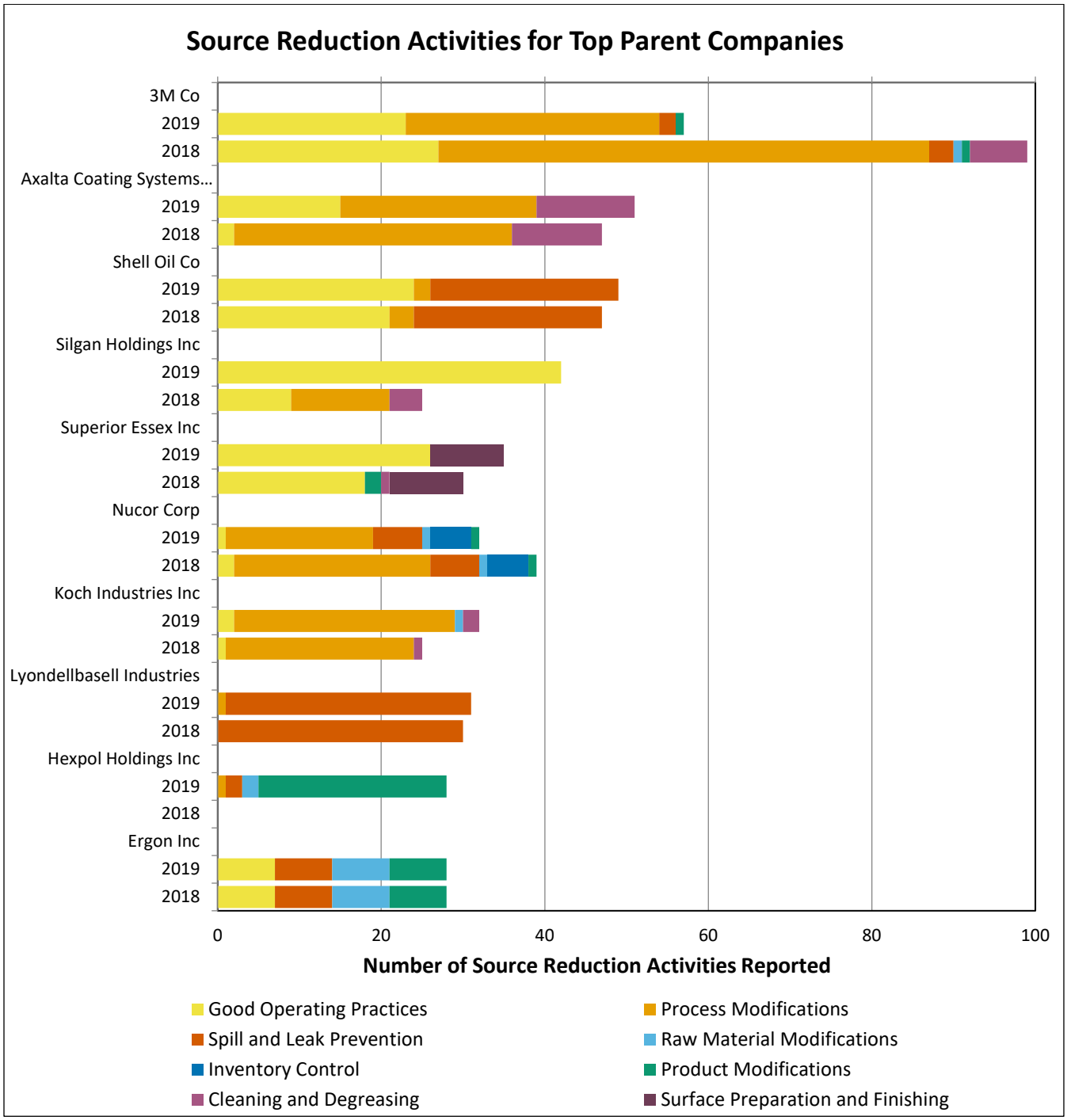
- A Koch Industries chemical manufacturing facility implemented process modifications that resulted in a 64% reduction in the site's air emissions of methanol. [Click to view facility details in the TRI P2 Search Tool]
- A plastic products manufacturing facility owned by Westlake Chemical Corporation reduced its usage of chromium compounds through reformulation and substitution of the products they use. [Click to view facility details in the TRI P2 Search Tool]

To conduct a similar type of parent company comparison for a given sector, chemical, or geographic location, use the TRI P2 Search Tool.

Source Reduction Activities by Parent Company

This figure shows the parent companies whose facilities implemented the most source reduction activities during 2019. Facilities outside of the manufacturing sector, such as electric utilities and coal and metal mines, are not included in this chart because those sectors' activities do not lend themselves to the same source reduction opportunities as the activities at manufacturing facilities. For example, metal mining involves dislodging and moving large volumes of earth that contain metals included on the TRI chemical list from below ground or from a mining pit to the surface to get to the target metal ore. This activity, which metal mines report as a release of the TRI chemicals, is inherent in mining operations.

Facilities report their source reduction activities by selecting codes that describe their activities. These codes fall into one of eight categories listed in the graph legend and are defined in the TRI Reporting Forms and Instructions.



Notes: 1) This figure uses EPA's standardized parent company names. 2) To view facility counts by parent company in 2018 or 2019, mouse over the bar graph.

These parent companies' facilities primarily operate in the following industries:

- **Chemical manufacturing**: 3M Co, Axalta Coating Systems LLC, Lyondellbasell Industries
- **Steel manufacturing**: Nucor Corp
- **Plastics and rubber manufacturing**: Hexpol Holdings Inc
- **Fabricated metals manufacturing:** Silgan Holdings Inc
- **Wire and cable manufacturing**: Superior Essex Inc
- **Petroleum products manufacturing**: Shell Oil Co
- **Multiple sectors**, e.g. pulp and paper, petroleum refining, and chemicals: Koch Industries Inc, Ergon Inc

Good operating practices, such as improving maintenance scheduling and installation of quality monitoring systems, are the most commonly reported types of source reduction activities for these parent companies. Spill and leak prevention and process modifications are also commonly reported.

Some of these parent companies submitted additional optional text on their TRI reporting forms describing their pollution prevention activities.

Examples of additional pollution prevention-related information for 2019:

- A chemical manufacturing facility owned by Koch Industries Inc. began collecting styrene from line breaks, sampling activities, or line bleedings to use as feedstock in other processes. The styrene collected from these activities would have historically been treated as waste. [Click to view facility details in the TRI P2 Search Tool]
- A 3M facility participated in a water waste reduction project which resulted in fewer changeovers and cleanings between products. This reduced the amount of barium compounds landfilled. [Click to view facility details in the TRI P2 Search Tool]

You can find P2 activities reported by a specific parent company and compare facilities' waste management methods and trends for any TRI chemical by using the TRI P2 Search Tool.

Releases of Chemicals

Release or disposal of chemical waste into the environment occur in several ways. Facilities may release chemical waste directly into the air or water or dispose of it on land, or ship (transfer) wastes that contain TRI chemicals to an off-site location for disposal. Release and disposal practices are subject to a variety of regulatory requirements and restrictions designed to minimize potential exposure or harm to human health and the environment.

Facilities are required to report the quantities of TRI-listed chemicals they released to the environment. Evaluating release data can help to:

- identify potential concerns in communities,
- better understand potential risks chemical releases may pose, and
- identify opportunities for government and communities to work with facilities to reduce chemical releases and potential associated risks.

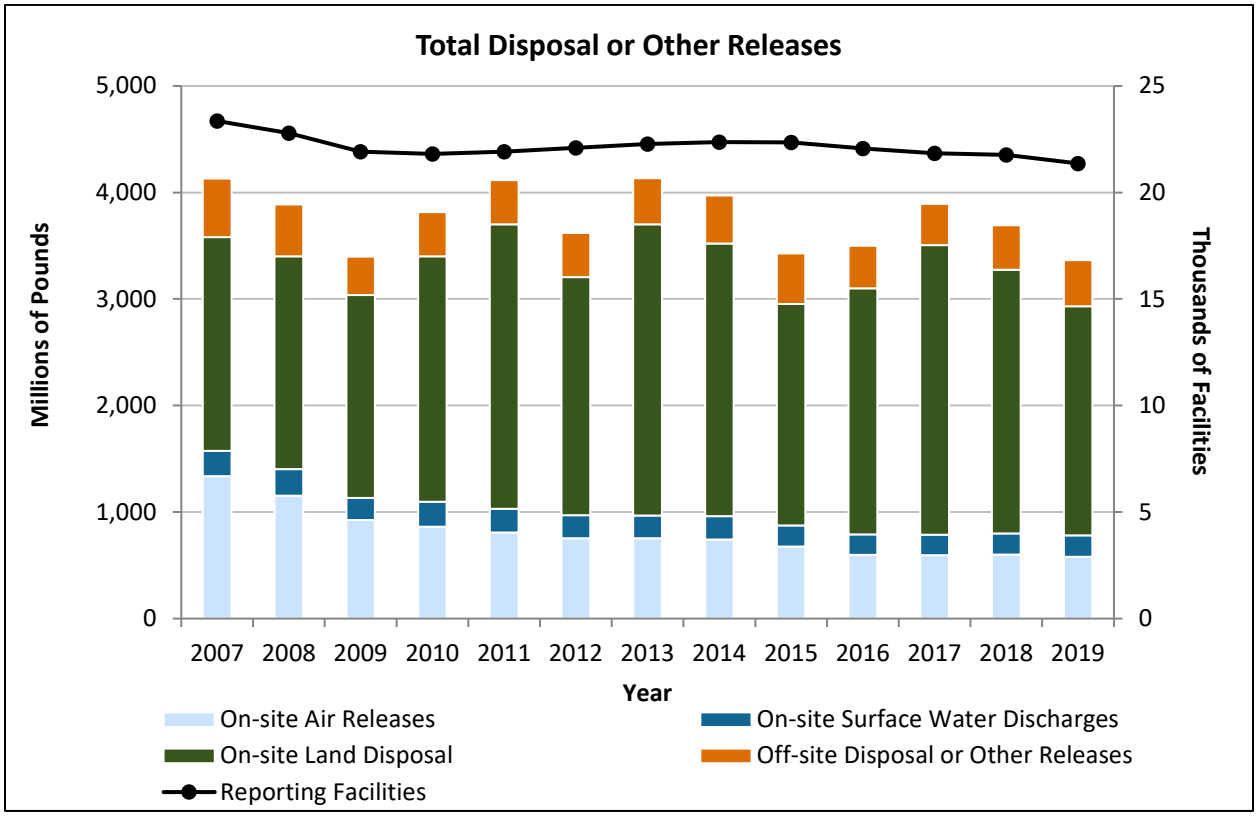
It is important, however, to understand that the quantity of releases is not necessarily an indicator of health impacts posed by the chemicals. Potential risks to human health from releases of TRI chemicals are determined by many factors, as discussed in the Hazard and Potential Risk of TRI Chemicals section.

The following graph shows the change in total disposal or other releases of TRI chemicals (also referred to as "total releases") over time. Many factors can affect trends in releases at facilities, including production rates, management practices, the composition of raw materials used, and the installation of control technologies.

Helpful Concepts

What is a release?

In the context of TRI, a "release" of a chemical generally refers to a chemical that is emitted to the air, discharged to water, or disposed of in some type of land disposal unit. The majority of TRI releases happen during routine production operations at facilities. To learn more about what EPA is doing to help limit the release of TRI chemicals into the environment, see the EPA laws and regulations webpage.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Total disposal or other releases of TRI chemicals decreased by 19%.
  - Excluding the metal mining sector, releases decreased by 37%.
  - Reduced hazardous air pollutant (HAP) emissions, such as hydrochloric acid, from electric utilities were the most significant contributor to the decline.
- Releases to air decreased by 57%, discharges to surface water decreased by 16%, and off-site disposal decreased by 21%.
- Releases to land, driven by the metal mining sector, increased by 7%.
- The number of facilities that reported to TRI declined by 9%.

From 2018 to 2019:

- Total disposal or other releases decreased by 9%.
  - On-site land disposal decreased by 13%, which is the main driver for the decrease in total releases.
  - Quantities released to air on site decreased slightly, while quantities discharged on site to surface water and transferred off site for disposal increased slightly.

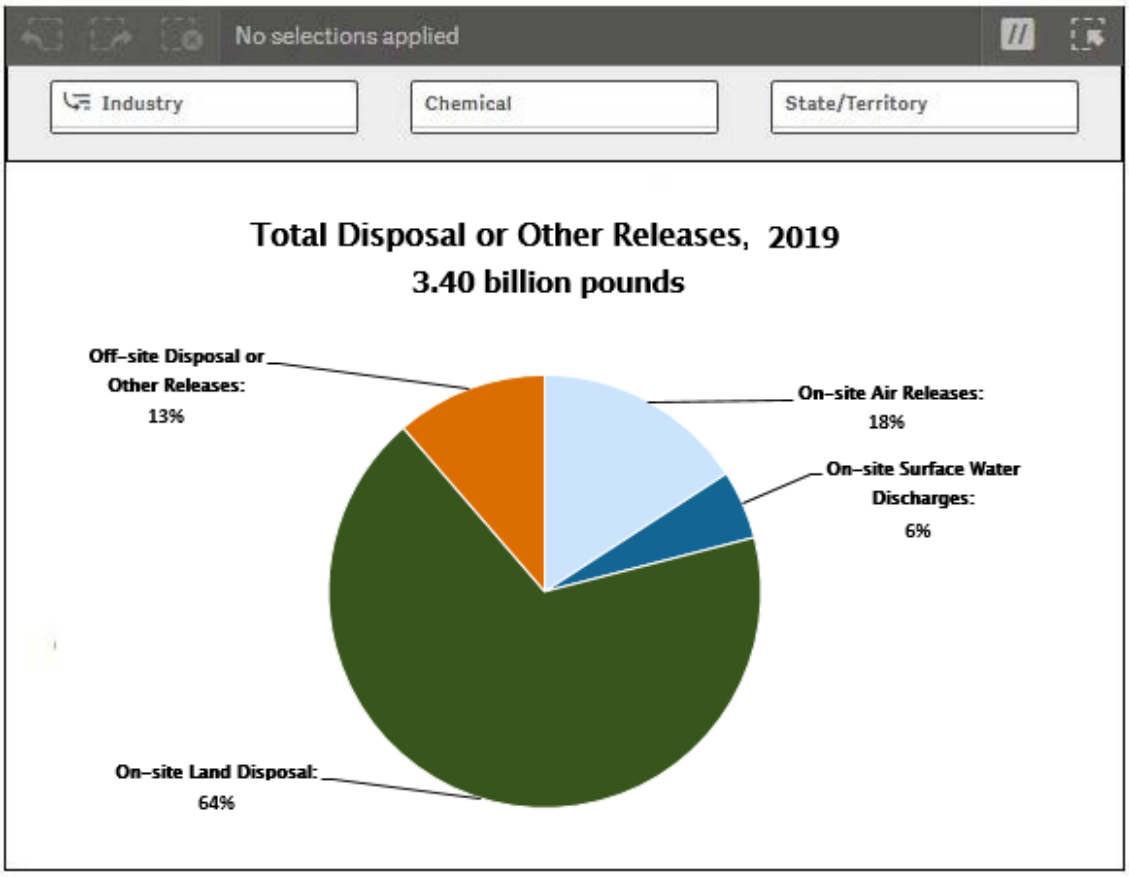
- Please note that the most recent TRI dataset reflects chemical waste management activities that occurred during calendar year 2019, and therefore does not indicate any potential impacts of the COVID-19 pandemic, which began in the U.S. in early 2020.

TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the Introduction. For more information see *Factors to Consider When Using Toxics Release Inventory Data*.

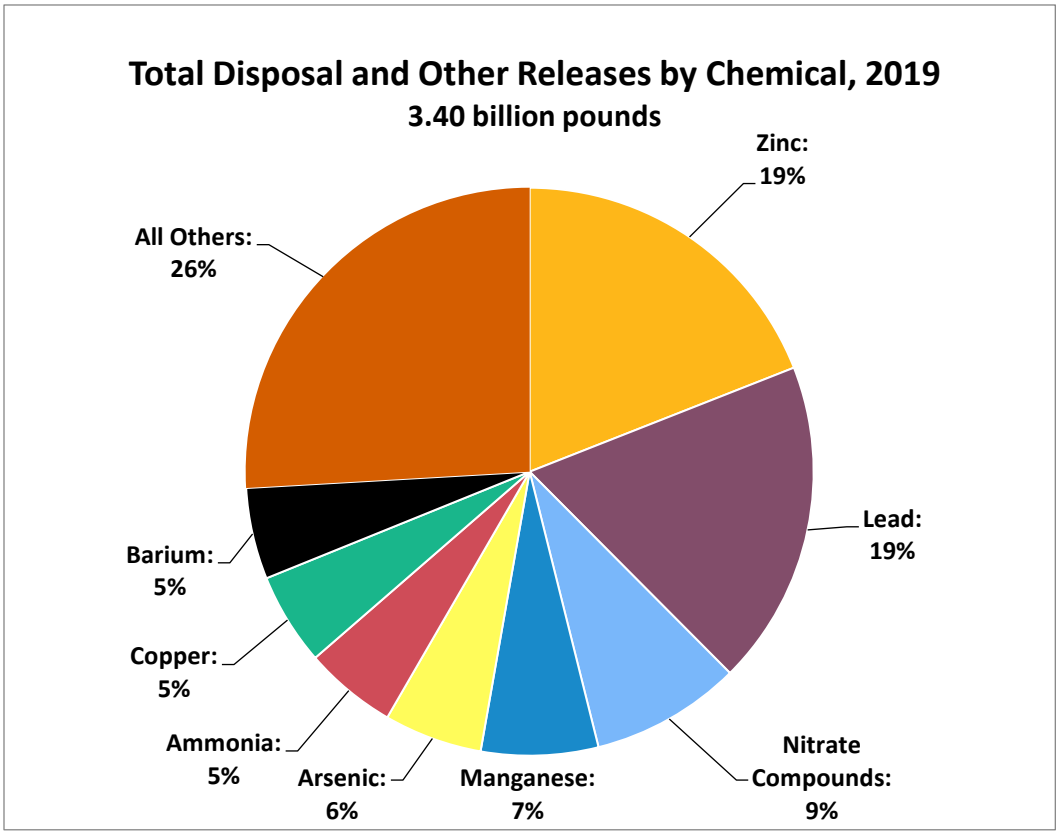
Releases in 2019

Use the interactive chart below to explore the 2019 TRI chemical releases by industry sector, chemical, or state/territory. Visit the full TRI National Analysis data visualization dashboard to explore even more information about releases of chemicals.



Releases by Chemical

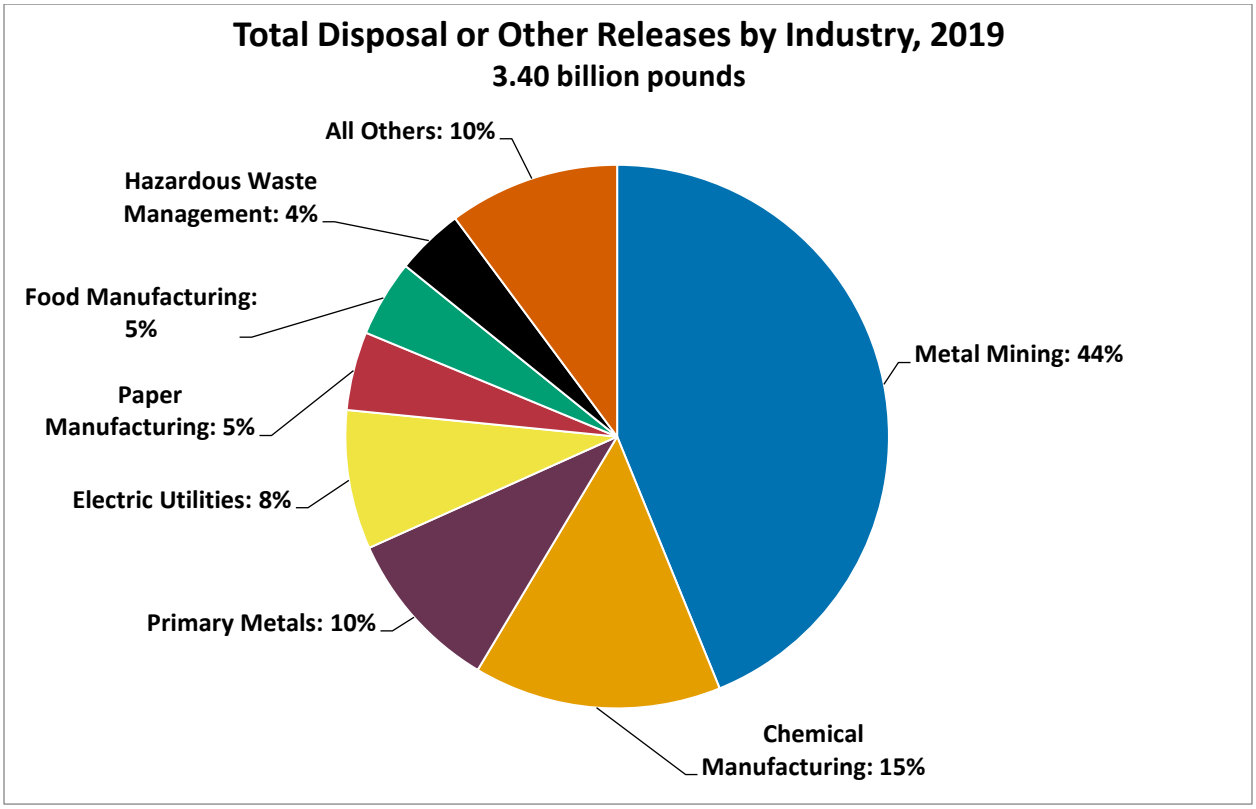
Release quantities of 8 chemicals made up 74% of total releases.



Note: 1) In this figure, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g. lead is listed separately from lead compounds). 2) Percentages do not sum to 100% due to rounding.

Releases by Industry

The metal mining sector accounted for 44% of releases (1.49 billion pounds), which were primarily in the form of on-site land disposal. Learn more about this sector in the Metal Mining profile.



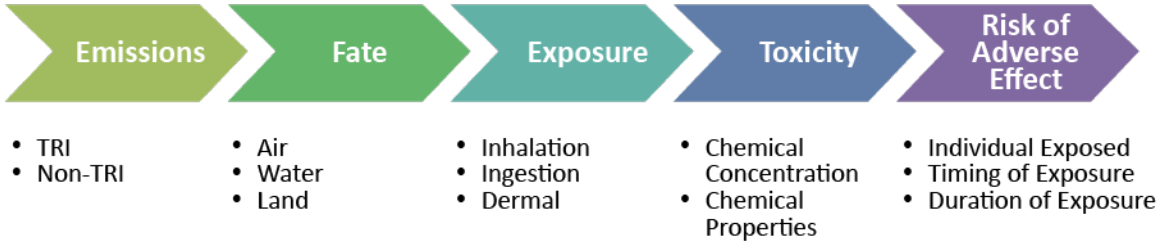
Note: Percentages do not sum to 100% due to rounding.

Hazard and Potential Risk of TRI Chemicals

The chemical release data collected and made publicly available in the Toxics Release Inventory (TRI) are reported in pounds, with the exception of dioxin and dioxin-like compounds, which are reported in grams. Pounds or grams of releases, however, is not necessarily an indicator of environmental or human health impacts posed by the chemical releases, as described in EPA's *Factors to Consider When Using Toxics Release Inventory Data*. Although TRI data generally cannot indicate to what extent individuals have been exposed to chemicals, TRI can be used as a starting point to evaluate exposure and potential risks to human health and the environment.

Human health risks that may result from exposure to chemicals are determined by many factors, as shown in the figure below. TRI contains some of this information, including what chemicals are released from industrial facilities; the amount of each chemical released; and the amounts released to air, water, and land.

Overview of Factors that Influence Risk



It is important to keep in mind that while TRI includes information on many chemicals used by industry, it does not cover all facilities, all chemicals, or all sources of TRI chemicals in communities. Other potential sources, such as exhaust from cars and trucks, chemicals in consumer products, and chemical residues in food and water, are not tracked by TRI.

To provide context on the relative hazard and potential for risks posed by certain waste management activities of TRI chemicals (e.g., from releases to the environment), the TRI Program uses EPA's Risk-Screening Environmental Indicators (RSEI) model.

Helpful Concepts

The ***hazard*** of a chemical is its inherent ability to cause an adverse health effect(s) (e.g., cancer, birth defects).

The likelihood that a toxic chemical will cause an adverse health effect following its release into the environment is often referred to as ***risk***. Risk is a function of hazard and exposure.

RSEI is a screening-level model that provides additional context for human health impacts from TRI release data by considering chemical toxicity, the fate and transport of the chemical

through the environment, and potential human exposure. For chemicals reported to TRI as released to air or water, transferred to publicly-owned treatment works (POTWs), or transferred off site for incineration, the model produces a RSEI Score, which is a numerical descriptor that provides a relative estimate of potential human health risk to help identify situations of greatest potential risk and evaluate trends over time. RSEI does not currently model other waste management activities or release pathways reported to TRI, such as those associated with land disposal. In addition to RSEI Scores, the model produces RSEI Hazard estimates, also called toxicity-weighted pounds.

- RSEI **Hazard** estimates consist of the pounds released multiplied by the chemical's toxicity weight. They do not include any exposure modeling or population estimates.
- A RSEI risk **Score** is an estimate of relative potential human health risk. It is a unitless value that accounts for the magnitude of the release quantity of a chemical, the fate and transport of the chemical throughout the environment, the size and locations of potentially exposed populations, and the chemical's inherent toxicity.

RSEI: Risk-Screening Environmental Indicators

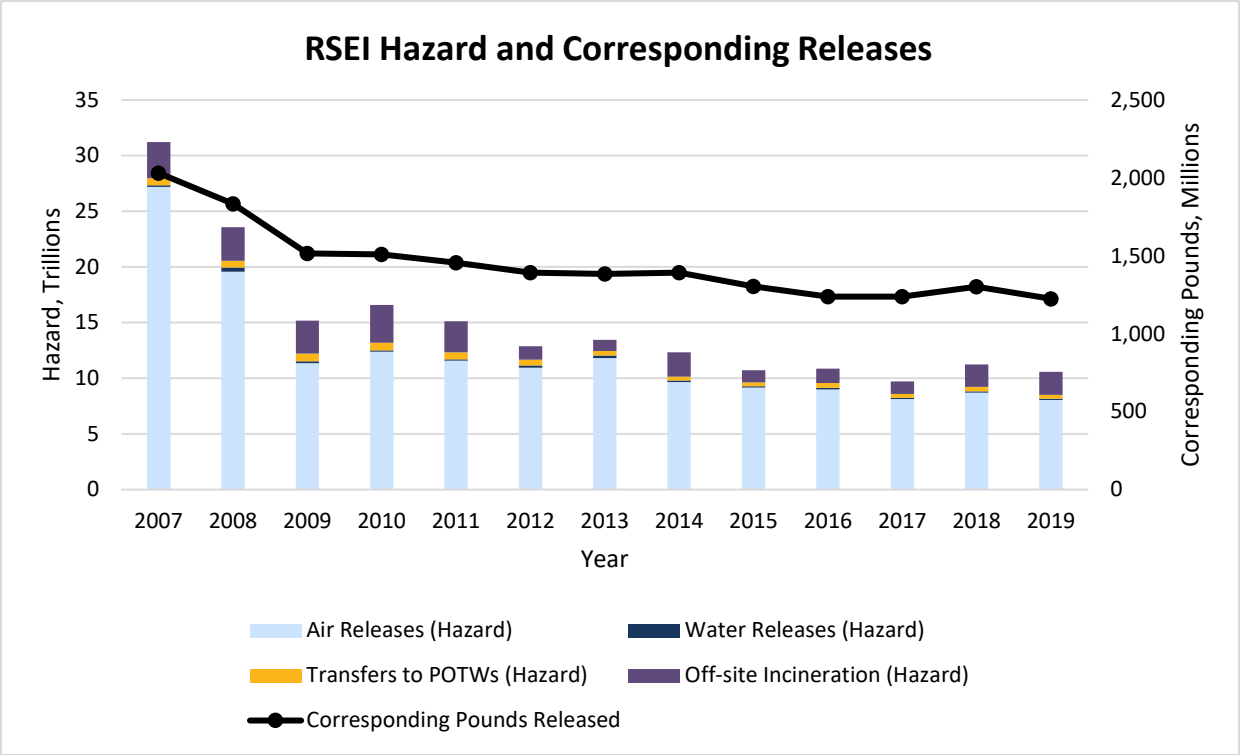
- **RSEI *Hazard*** results consider:
  - Quantity of the chemical released
  - Toxicity of the chemical
- **RSEI *Scores*** consider:
  - Quantity of the chemical released
  - Toxicity of the chemical
  - Location of releases
  - Environmental fate and transport
  - Human exposure pathway

Important notes about RSEI:

- RSEI is not a stand-alone source of information for making conclusions or decisions about the risks posed by any particular facility or environmental release of a TRI chemical.
- RSEI does not assess risk. It provides relative risk rankings from air emissions and water discharges of TRI-listed chemicals.
- RSEI results should not be used to determine whether a facility is in compliance with federal or state regulations.
- RSEI results should only be used for screening-level activities, such as:
  - trend analyses comparing potential relative risks from year to year, and
  - ranking and prioritizing chemicals, industry sectors, or geographic regions for strategic planning.
- RSEI can be used with other data sources and information to help policy makers, researchers, and communities establish priorities for further investigation and to look at changes in potential human health impacts over time.
- RSEI can help identify situations of greatest potential risk and evaluate trends over time.

Hazard Trend

RSEI Hazard estimates provide greater insight on the potential impacts of TRI chemical releases than consideration of the release quantities alone. RSEI Hazard is calculated by multiplying release and certain transfer quantities by the toxicity weight of the chemicals. The following graph shows the trend in RSEI Hazard compared to the trend in the corresponding pounds of TRI chemical releases that are included in the RSEI model. Modeled releases include on-site releases to air and water, and off-site transfers to POTWs or incineration.



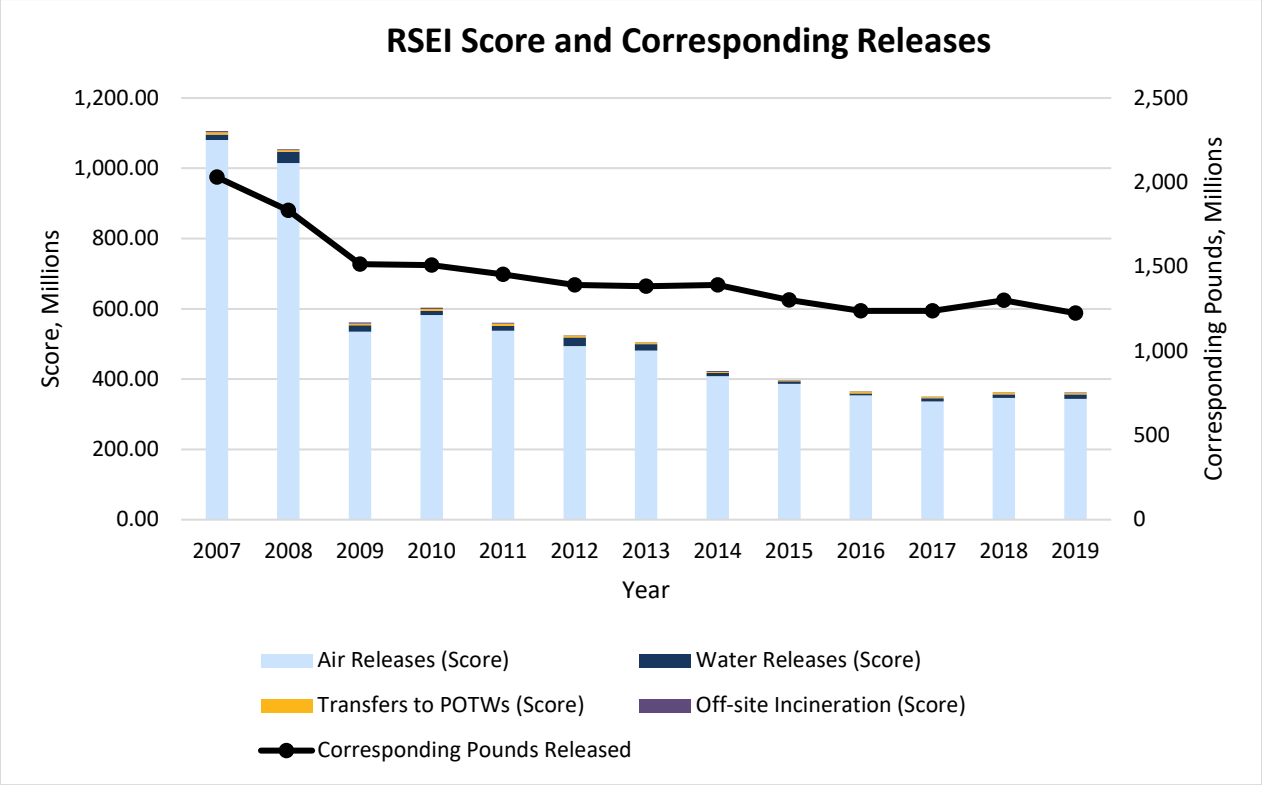
Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- The overall RSEI Hazard estimate decreased by 66%, while corresponding pounds released decreased by 40%. Thus, in recent years, TRI-reporting facilities are not only releasing fewer pounds of TRI chemicals, they may be releasing proportionally fewer pounds of the more toxic TRI chemicals relative to the less toxic TRI chemicals.
- The decrease in the RSEI Hazard estimate from 2008 to 2009 was driven by a large decrease in chromium releases to air from three facilities.

Risk-Screening Trend

EPA's RSEI model also provides risk "scores" that represent relative human health risk from long-term exposure to TRI chemicals. These scores can be compared to RSEI-generated risk scores from other years. RSEI Scores are different from RSEI Hazard estimates in that RSEI Scores consider the location of the release, chemical fate and transport throughout the environment, and the route and extent of potential human exposure. The following graph shows the trend in the RSEI Score compared to the trend in the corresponding pounds of TRI chemical releases that are included in the RSEI model. Modeled releases include on-site releases to air and water, and off-site transfers to POTWs or incineration.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- The overall RSEI Score estimate decreased by 67%, while corresponding pounds released decreased by 40%.
- Of the types of releases modeled by RSEI, air releases, by far, contributed the most to the RSEI Scores.

- RSEI Scores for releases to water have increased in recent years, due in part to increased releases of mercury to water.

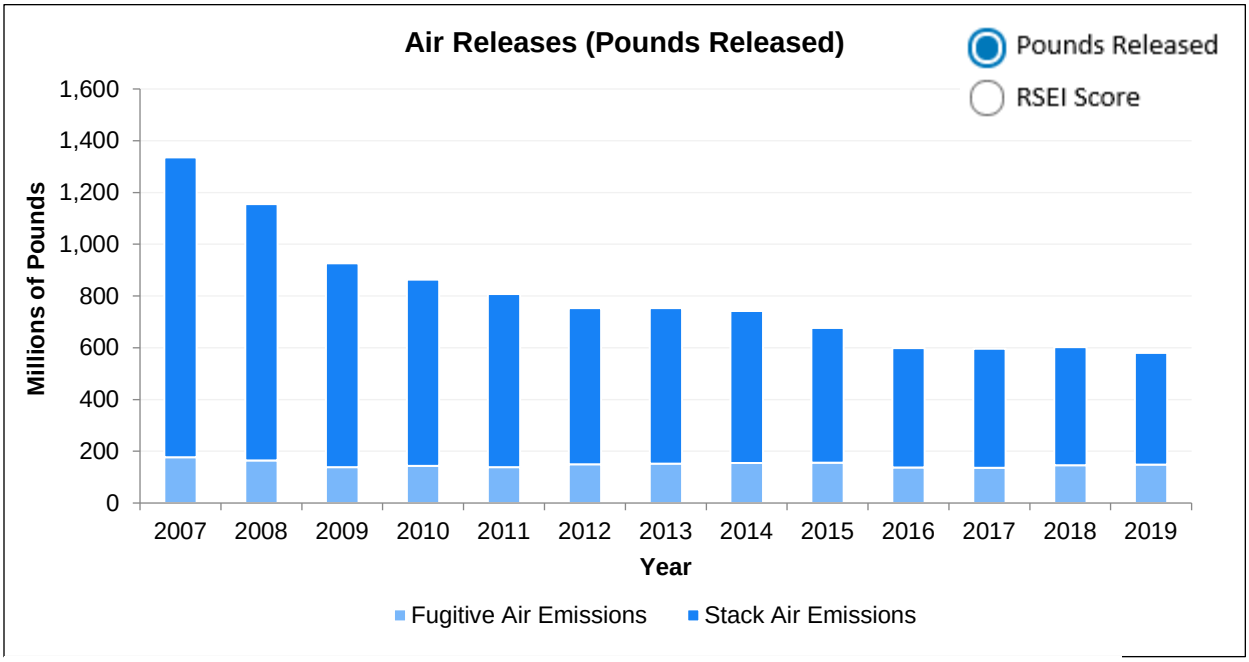
RSEI Dashboard

- Use the EPA's Risk-Screening Environmental Indicators (RSEI) EasyRSEI dashboard to view the national trend in RSEI Hazard and RSEI Score, or use the Dashboard's filter capabilities to view RSEI information for a specific chemical or location of interest.

Air Releases

Emissions of TRI chemicals to air continue to decline, serving as a primary driver of decreased total releases. Releases to air include both fugitive air emissions and stack air emissions.

This graph shows the trend in the pounds of chemicals released to air. EPA regulates air emissions under the Clean Air Act, which requires major sources of air pollutants to obtain and comply with an operating permit.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Releases to air decreased by 57% (-756 million pounds).
  - Since 2007, hydrochloric acid, sulfuric acid, hydrogen fluoride, methanol, toluene, and xylene had the greatest reductions in releases to air.
  - The decrease was driven by electric utilities due to: decreased emissions of hydrochloric acid and sulfuric acid; a shift from coal to other fuel sources (e.g., natural gas); and the installation of pollution control technologies at coal-fired power plants.
    - Note that only those electric utilities that combust coal or oil to generate power for distribution into commerce are covered under TRI reporting requirements. Therefore, electric utilities that shift from combusting coal

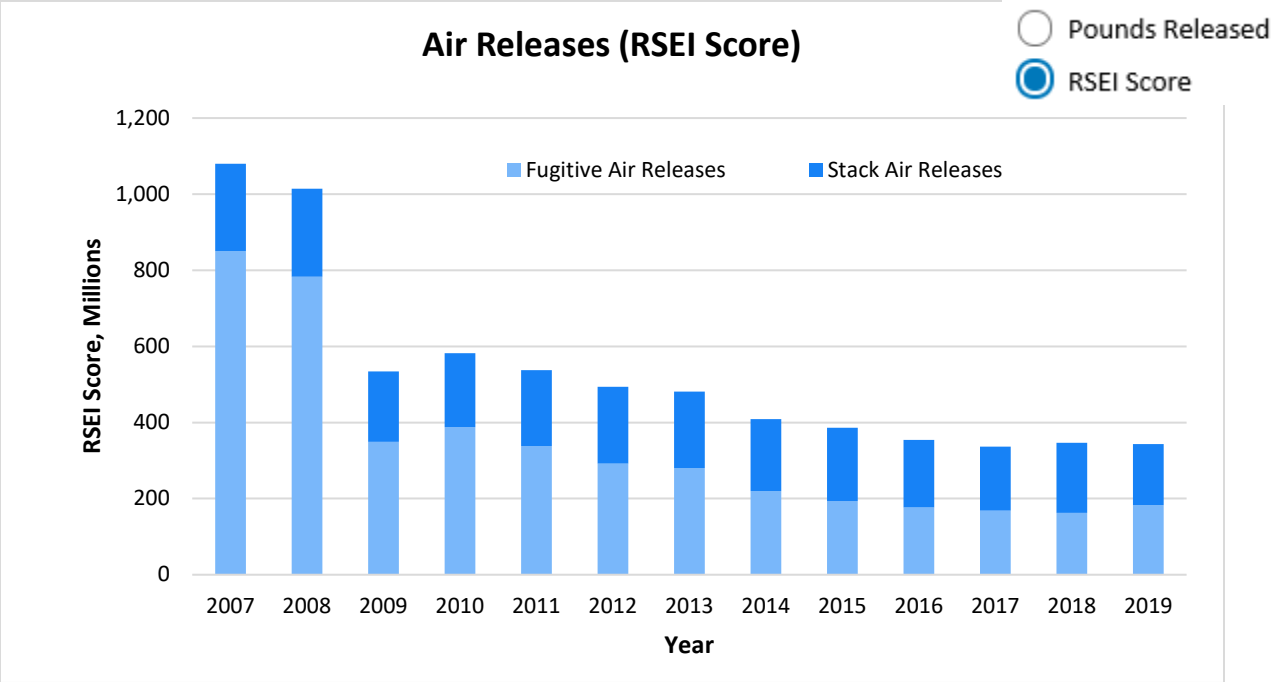
or oil to entirely using other fuel sources (such as natural gas) are not required to report to TRI.

- Air releases of chemicals classified as carcinogens by the Occupational Safety and Health Administration (OSHA) also decreased; see the Air Releases of OSHA Carcinogens figure.
- For trends in air releases of other chemicals of special concern, including lead and mercury, see the Chemicals of Special Concern section.

In 2019:

- The TRI chemicals released in the largest quantities were ammonia and methanol.
- Releases of TRI chemicals to air decreased by 3.7% since 2018.

This graph shows the trend in the RSEI Scores for TRI air releases.



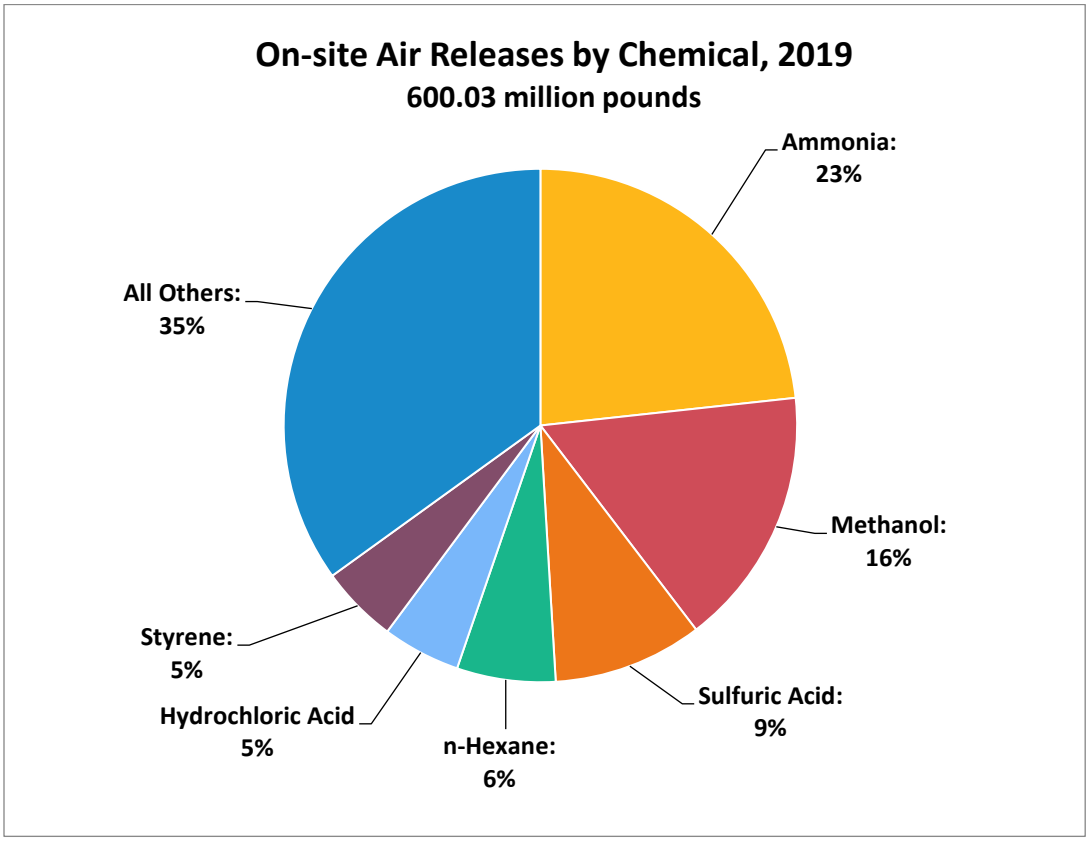
Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- Stack air releases reported to TRI are considerably higher in pounds than fugitive air releases, but their relative contributions to the RSEI Score have been similar in recent years. This is because chemicals released through stacks tend to get dispersed over a wider area than fugitive air releases, resulting in lower average concentrations, and as a result, surrounding populations have a lower potential to be exposed to TRI chemicals released to air through stacks compared to fugitive emissions.
- For a complete, step-by-step description of how RSEI models and derives RSEI Scores from stack air emissions and fugitive air emissions, see "Section 5.3: Modeling Air Releases" in Chapter 5 ("Exposure and Population Modeling") of EPA's Risk-Screening Environmental Indicators (RSEI) Methodology, RSEI Version 2.3.8.
- For general information on how RSEI Scores are estimated, see Hazard and Potential Risk of TRI Chemicals.

Air Releases by Chemical and Industry

Air Releases by Chemical

This pie chart shows which TRI chemicals were released to air in the greatest quantities during 2019.



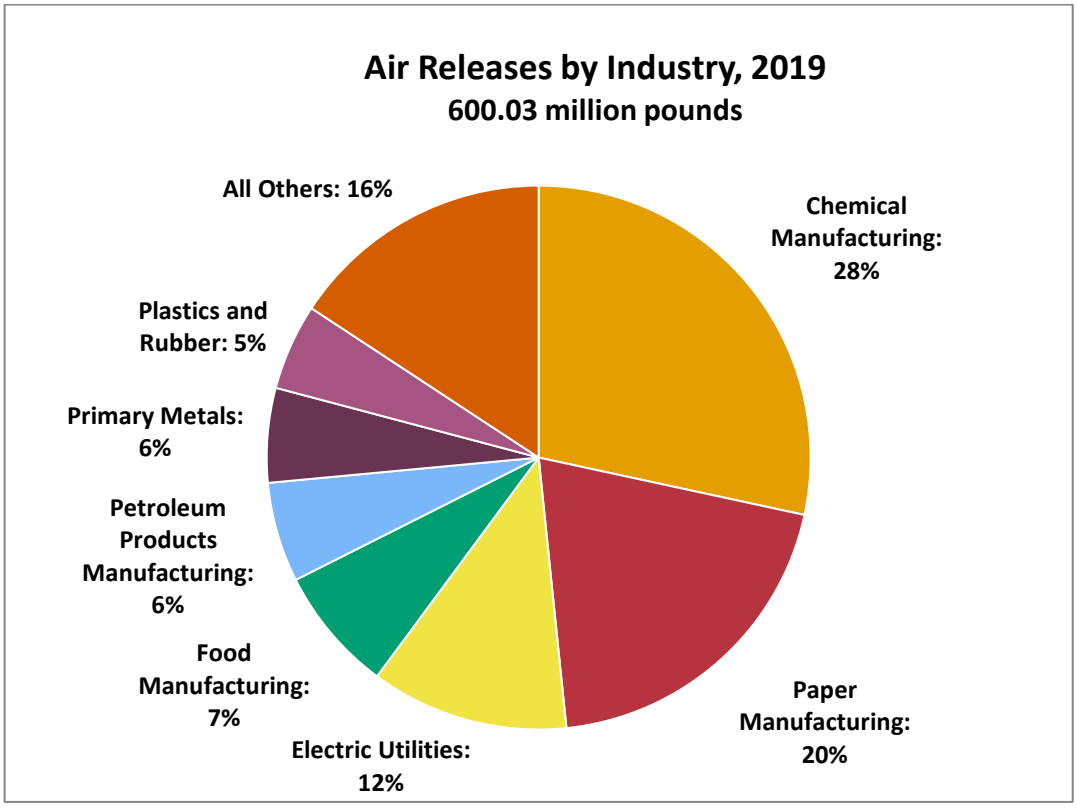
Note: Percentages do not sum to 100% due to rounding.

- Facilities that manufacture nitrogen-based fertilizers accounted for more than one third of the quantities of ammonia released to air, as reported to TRI for the past eight years.
- Releases of methanol to air were primarily from facilities in the paper manufacturing sector and have decreased by 26% since 2007.
- Air releases of *n*-hexane were primarily from food manufacturing facilities. Air releases of *n*-hexane have increased by 6% since 2007.

- In 2019, 79% of sulfuric acid and 29% of hydrochloric acid emissions to air were reported by facilities in the electric utilities sector. The quantities of these two chemicals released to air by electric utilities have decreased considerably since 2007. One reason is the increase in the use of natural gas as a fuel for electricity generation. Power plants that combust only fuels other than coal or oil, such as natural gas, are not required to report to TRI.

Air Releases by Industry

This pie chart shows the TRI-covered industry sectors that reported the largest releases of TRI chemicals to air during 2019.



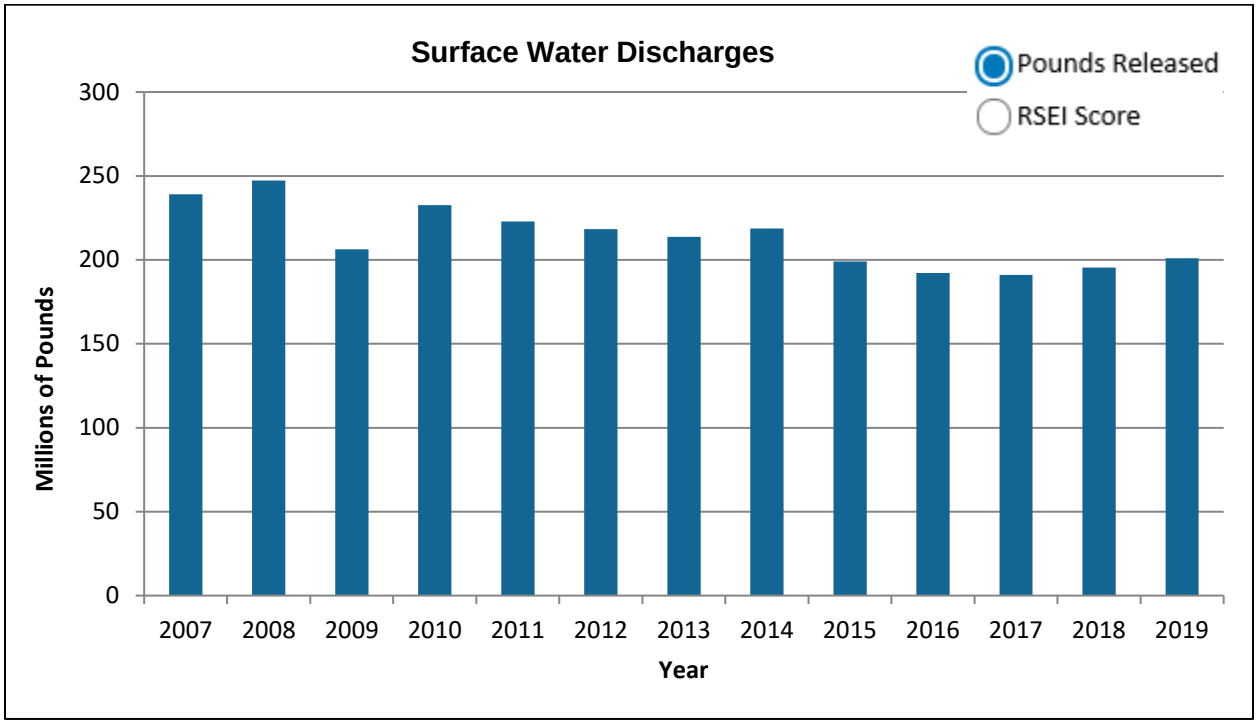
- The chemical manufacturing, paper manufacturing, and electric utility sectors accounted for the largest releases of TRI chemicals to air during 2019, although air releases of TRI chemicals by these industries have decreased since 2018:
    - Chemical manufacturing: 2.2 million pound decrease (-1%)
    - Paper manufacturing: 4.1 million pound decrease (-3%)

- Electric utilities: 10.5 million pound decrease (-13%)

Water Releases

Releases of TRI chemicals to water typically occur as direct discharges to streams or other water bodies. Surface water discharges are often regulated by other programs and require permits such as Clean Water Act National Pollutant Discharge Elimination System (NPDES) permits.

The following graph shows the trend in the pounds of TRI chemical waste discharged to water bodies.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

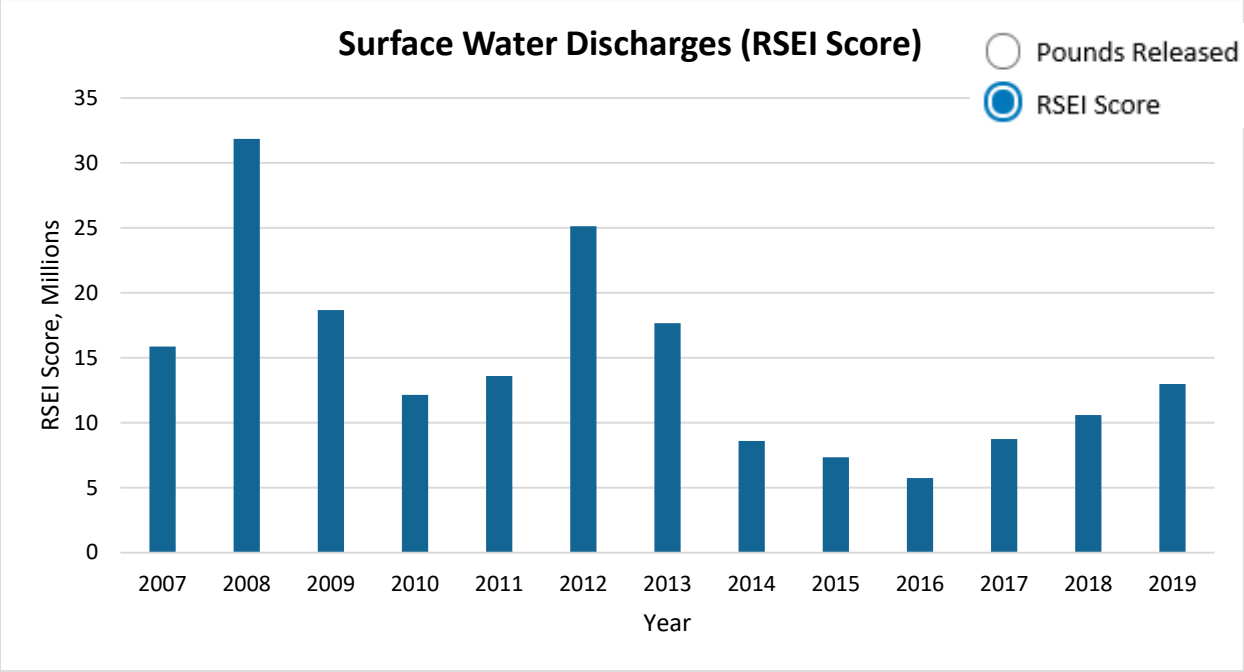
From 2007 to 2019:

- Discharges of TRI chemicals to surface water decreased by 38 million pounds (-16%). Most of this decline was due to reduced releases of nitrate compounds to water.
    - Nitrate compounds are often formed as byproducts during wastewater treatment processes such as when nitric acid is neutralized, or when nitrification takes place to meet standards under EPA's effluent guidelines. More pounds of nitrate compounds are released to water than any other TRI chemical.

In 2019:

- Nitrate compounds alone accounted for 89% of the total quantity of all TRI chemicals discharged to surface waters.

The following graph shows the trend in the RSEI Scores for TRI chemicals released to water bodies.

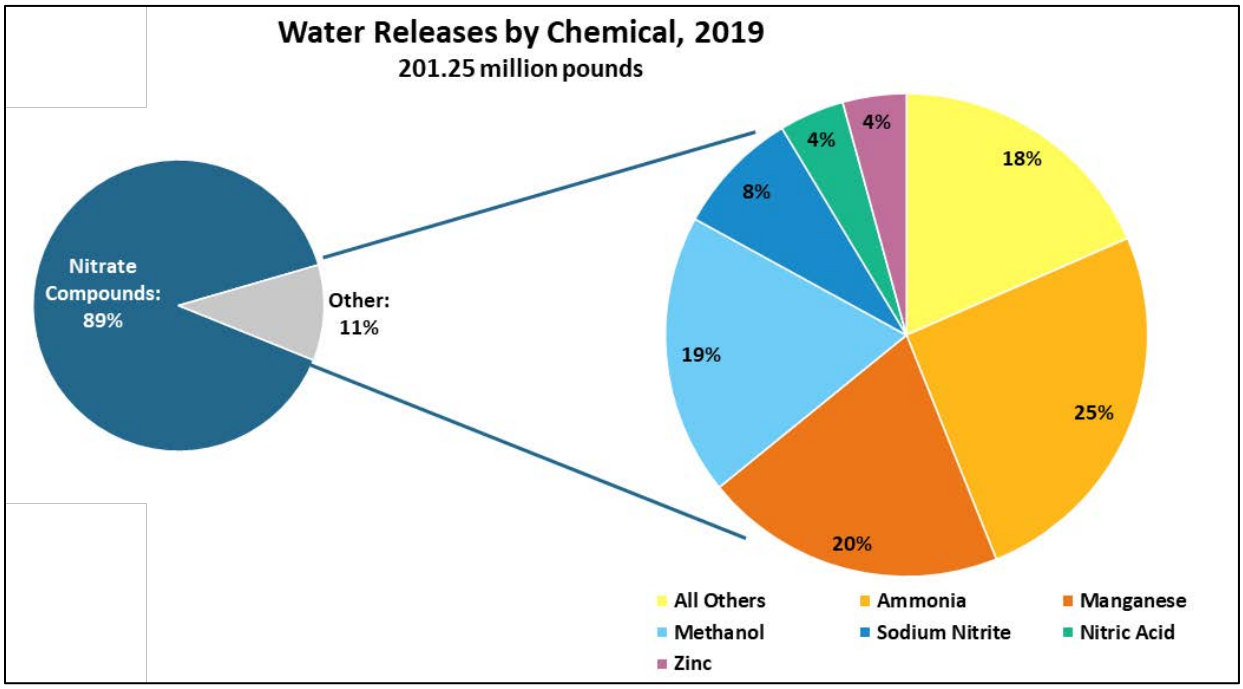


- The biggest contributor to RSEI Scores for releases to water from 2007 to 2018 was arsenic compounds. For 2019, the largest contributor to RSEI Scores for releases to water was mercury compounds.
- The high RSEI Score for discharges to water in 2008 includes a large one-time release of arsenic compounds due to a coal fly ash slurry spill, and a release of benzidine, which is highly toxic (benzidine is known to cause cancer in humans).
- The increase in RSEI Score for releases to water beginning in 2017 is driven in part by an increase in discharges of mercury compounds to water by a mining facility in Florida.

- For a complete, step-by-step description of how RSEI derives RSEI Scores from surface water discharges of TRI chemicals, see "Section 5.4: Modeling Surface Water Releases" in Chapter 5 ("Exposure and Population Modeling") of EPA's Risk-Screening Environmental Indicators (RSEI) Methodology, RSEI Version 2.3.8.
- For general information on how RSEI Scores are estimated, see Hazard and Potential Risk of TRI Chemicals.

Water Releases by Chemical

This pie chart shows which TRI-listed chemicals were released to water bodies in the largest quantities during 2019.



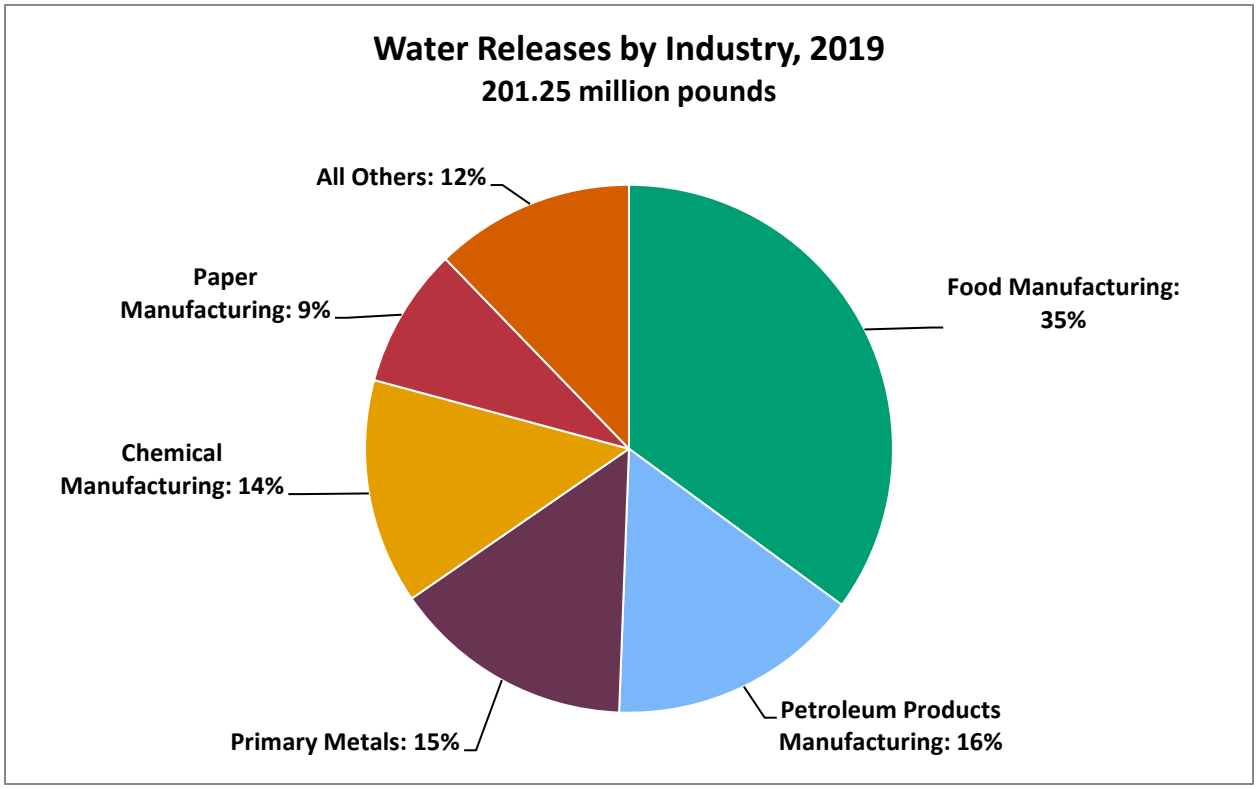
Note: 1) In this chart, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g. manganese is listed separately from manganese compounds). 2) Percentages do not sum to 100% due to rounding.

- Nitrate compounds accounted for 89% of the total quantity of TRI chemicals released to water in 2019. Nitrate compounds dissolve in water and are commonly formed as part of facilities' on-site wastewater treatment processes. The food manufacturing sector contributed 39% of total nitrate compound releases to water, due to the treatment required for biological materials in wastewater, such as from meat processing facilities.
    - While nitrate compounds are less toxic to humans than many other TRI chemicals, in nitrogen-limited waters, nitrates have the potential to cause increased algal growth leading to eutrophication in the aquatic environment. See EPA's Nutrient Pollution webpage for more information about the issue of eutrophication.

- Ammonia, manganese compounds, and methanol were the chemicals released in the next-largest quantities, and, in terms of combined mass, accounted for 7% of the chemicals released to water.

Water Releases by Industry

This pie chart shows the TRI-covered industry sectors that reported the greatest releases of TRI chemicals to water bodies during 2019.



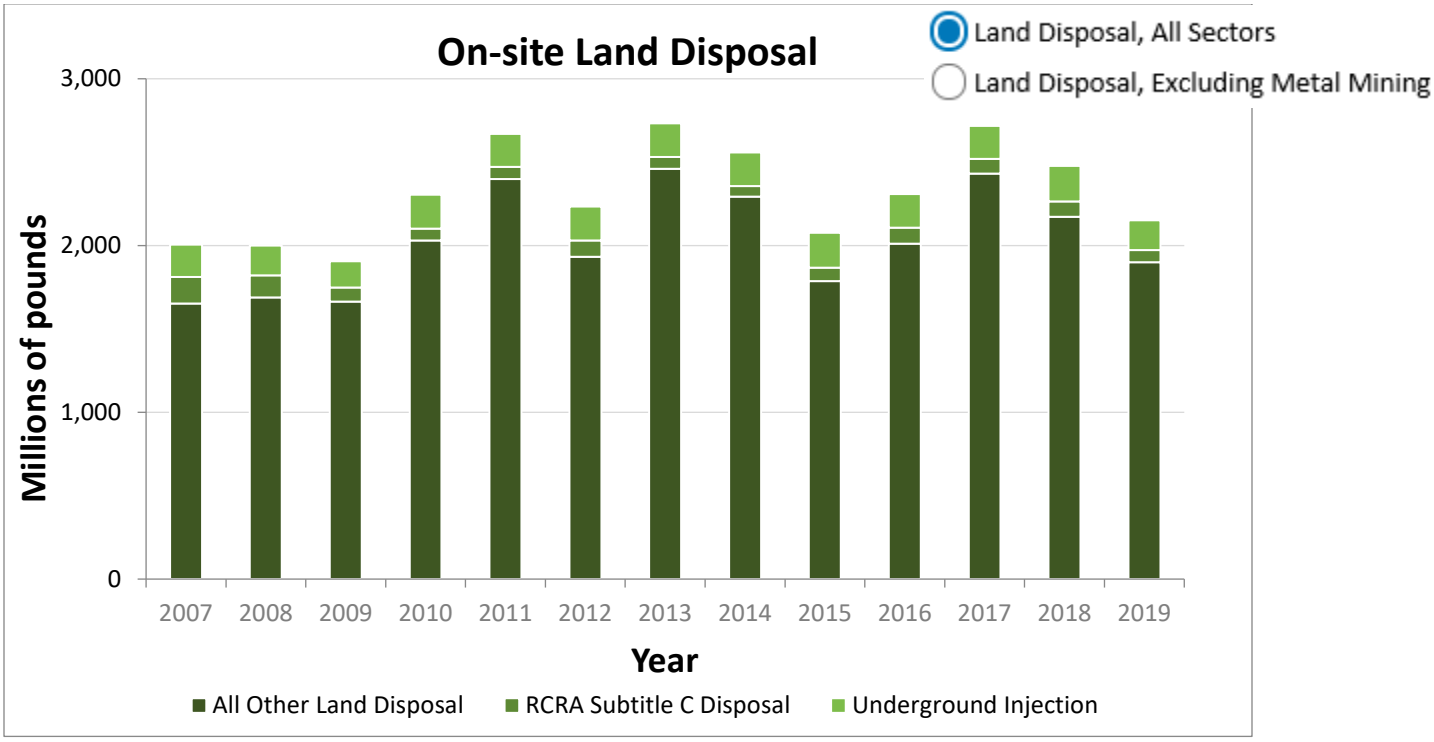
Note: Percentages do not sum to 100% due to rounding.

- The food manufacturing sector accounted for 35% of the total quantity of TRI chemicals released to water during 2019, which was similar to its contribution over the past 10 years.
    - Nitrate compounds accounted for 99% of the total quantity of TRI chemicals released to water from the food manufacturing sector. Nitrate compounds are relatively less toxic to humans than many other TRI chemicals discharged to surface waters but are formed in large quantities by this sector during wastewater treatment processes due to the high biological content of wastewater.

Land Disposal

Land disposal includes disposal of TRI chemicals in landfills, underground injection wells, or to other types of containment. Land disposal of chemicals is often regulated by EPA under the Resource Conservation and Recovery Act (RCRA).

This graph shows the trend in chemicals reported to TRI that were disposed of to land on site. The metal mining sector accounts for most of this disposal.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- On-site land disposal increased by 7% (from 2.0 to 2.2 billion pounds).
- Recent fluctuations were primarily due to changes in TRI chemical quantities disposed of on site to land by metal mines.

- "All Other Land Disposal" in the figure includes disposal: in landfills and surface impoundments that are not regulated under RCRA Subtitle C; to soil (land treatment/application farming); and any other land disposal. Most of the TRI chemical quantities reported as "other land disposal" were from the disposal of TRI chemicals contained in waste rock at metal mines.

Helpful Concepts

What is underground injection?

Underground injection involves placing fluids underground in porous formations through wells.

What is RCRA Subtitle C disposal?

The RCRA Subtitle C Disposal category in TRI includes disposal to landfills and surface impoundments authorized to accept hazardous waste under the Resource Conservation and Recovery Act (RCRA). RCRA design standards include a double liner, a leachate collection and removal system, and a leak detection system. Operators must also comply with RCRA inspection, monitoring, and release response requirements.

In 2019:

Trends in land disposal were largely driven by the metal mining sector, which accounted for 69% of land disposal quantities. Select the “Land Disposal, Excluding Metal Mining” button to view the land disposal trend without data from metal mines.

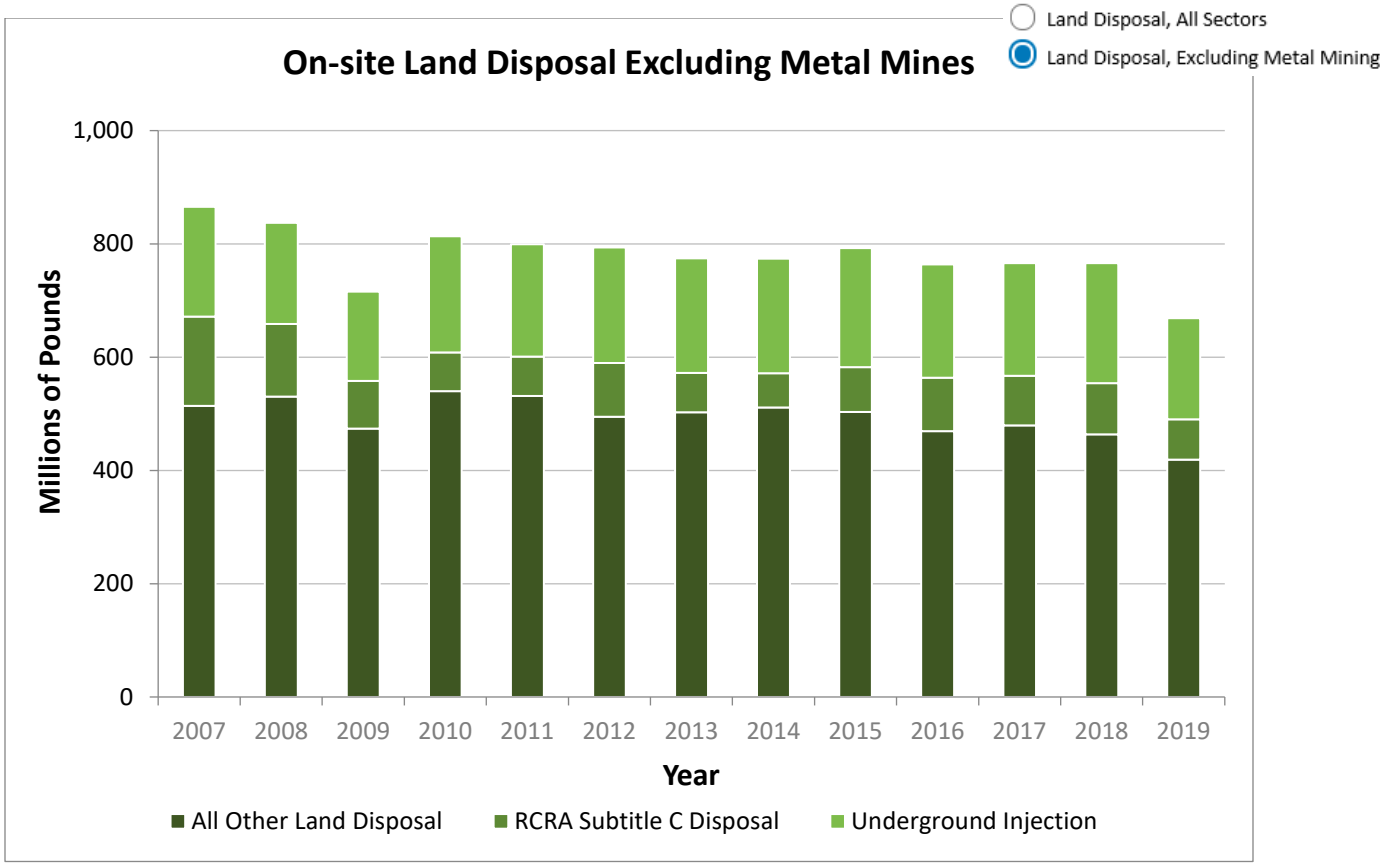
- Most of the land disposal quantities from the metal mining sector were made up of either lead compounds (39%) or zinc compounds (31%).

Metal mining facilities typically handle large volumes of material. In this sector, even a small change in the chemical composition of the mineral deposit being mined can lead to big changes in the amount of TRI-listed chemicals reported. Besides production volume, one factor commonly cited by facilities as a contributor to the changes in quantities of waste managed is the chemical composition of the extracted ore, which can vary substantially from year to year. In some cases, small changes in the ore’s composition can impact whether TRI chemicals in ore qualify for a concentration-based exemption from TRI reporting in one year but not in the next year or vice versa.

Regulations require that waste rock, which contains TRI chemicals, be placed in engineered piles, and may also require that waste rock piles, tailings impoundments, and heap leach pads be stabilized and re-vegetated to provide for productive post-mining land use.

For more information on the mining industry, see the Metal Mining sector profile.

This graph shows the trend in chemicals reported to TRI that were disposed of to land on site, excluding quantities reported by the metal mining sector. The metal mining sector accounts for most of the TRI chemical quantities disposed of to land.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Total on-site land disposal for all industries other than metal mining decreased by 23%.
- The decrease in land disposal for industries other than metal mining was driven by reduced releases to land from electric utilities, chemical manufacturing facilities, and hazardous waste management facilities.

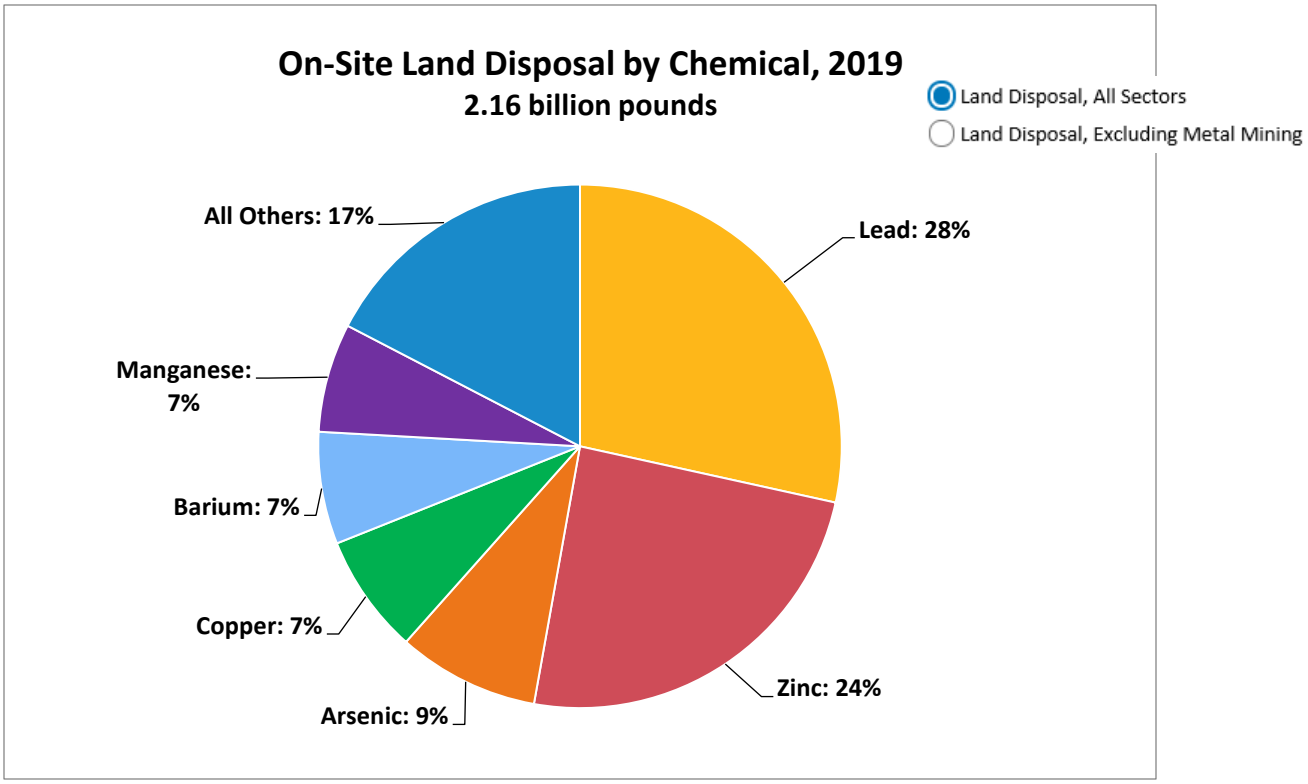
In 2019:

- Excluding the quantities of TRI chemicals disposed of on site to land at metal mines, the chemicals disposed of to land in the largest quantities were: barium and barium compounds (17%), manganese and manganese compounds (13%), and zinc and zinc compounds (10%).

- Excluding the quantities of TRI chemicals disposed of on site to land at metal mines, most land disposal quantities were reported by the chemical manufacturing, electric utilities, primary metals, and hazardous waste management sectors.

Land Disposal by Chemical

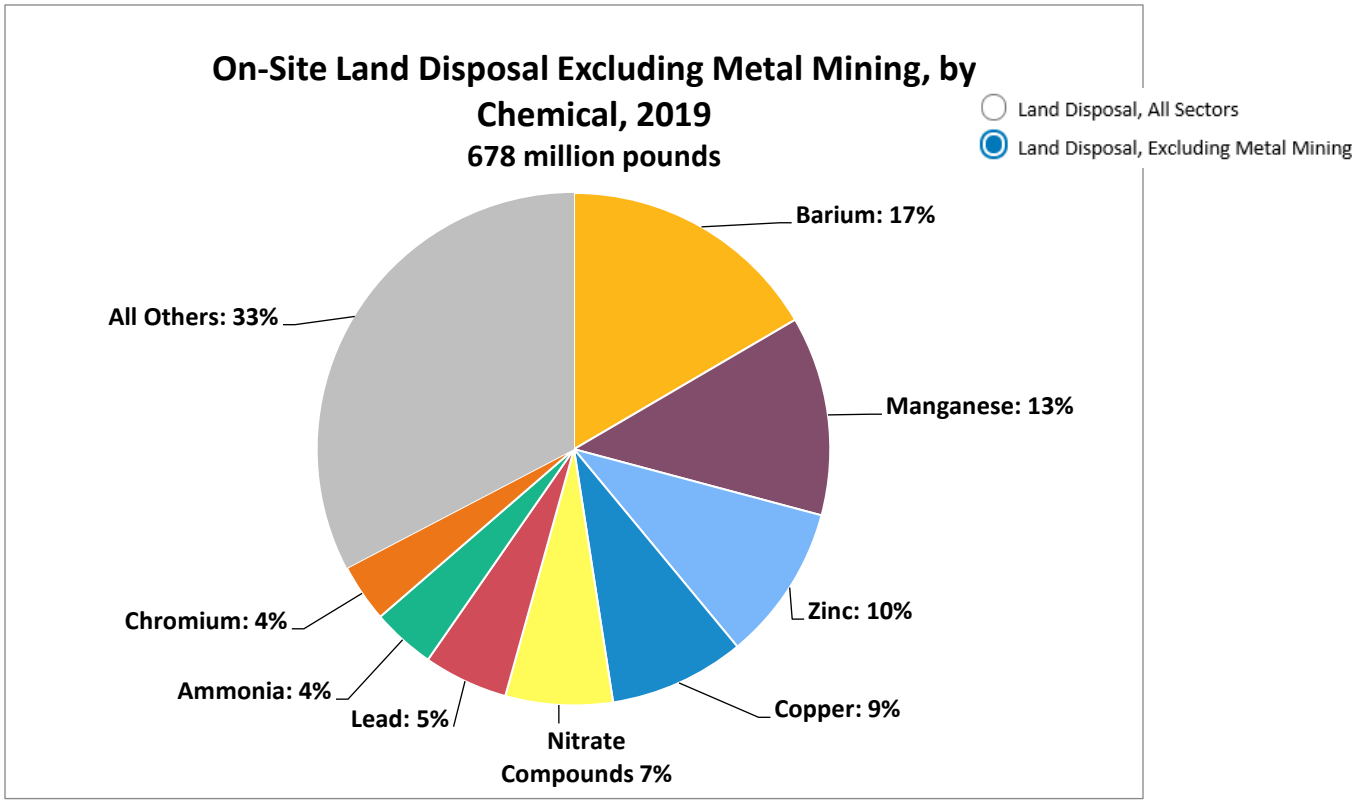
This pie chart shows the chemicals disposed of to land on site in the greatest quantities during 2019. The metal mining sector accounts for most of this disposal. To view the chemicals disposed of to land by sectors other than metal mining, toggle to the "Land Disposal, Excluding Metal Mining" chart.



Note: In this chart, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g. lead is listed separately from lead compounds). Percentages do not sum to 100% due to rounding.

The metal mining sector alone was responsible for 94% of the lead and lead compounds and 87% of the zinc and zinc compounds disposed of to land in 2019. Annual fluctuations occur in land disposal quantities reported by metal mines because even a small change in the chemical composition of the mineral deposit being mined can lead to big changes in the amount of TRI-listed chemicals reported nationally.

This pie chart shows the chemicals disposed of to land on site in the greatest quantities during 2019, excluding quantities disposed of by facilities in the metal mining sector.



Note: In this chart, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g. lead is listed separately from lead compounds). Percentages do not sum to 100% due to rounding.

From 2007 to 2019:

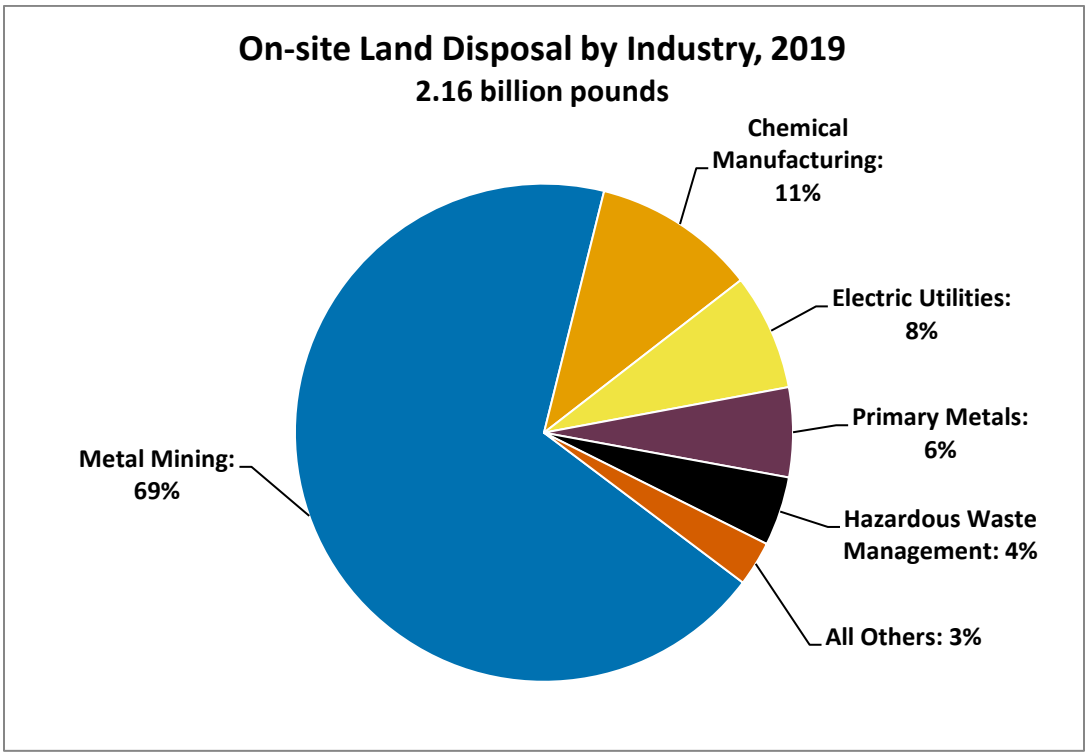
- Barium: Releases decreased 40%.
- Manganese: Releases decreased 23%.
- Zinc: Releases decreased 55%.

In 2019:

- When the metal mining sector is excluded, a wider variety of chemicals contribute to most of the land releases. Seven different chemicals, for example, comprised 64% of land releases, as opposed to three chemicals comprising a comparable 62% of releases when metal mining is included.

Land Disposal by Industry

This pie chart shows the TRI-covered industry sectors that reported the greatest quantities of on-site land disposal of TRI chemicals during 2019.



Note: Percentages do not sum to 100% due to rounding.

- The metal mining sector accounted for most of the TRI chemicals disposed of to land in 2019, mostly due to TRI chemicals contained in waste rock.
- The relative contribution by each industry sector to on-site land disposal has not changed considerably in recent years.

Chemicals of Special Concern

In this section, we take a closer look at some Toxics Release Inventory (TRI) chemicals that are of special concern due to their potential effects on human health and the environment: 1) persistent bioaccumulative toxic (PBT) chemicals; and 2) known or suspected human carcinogens.

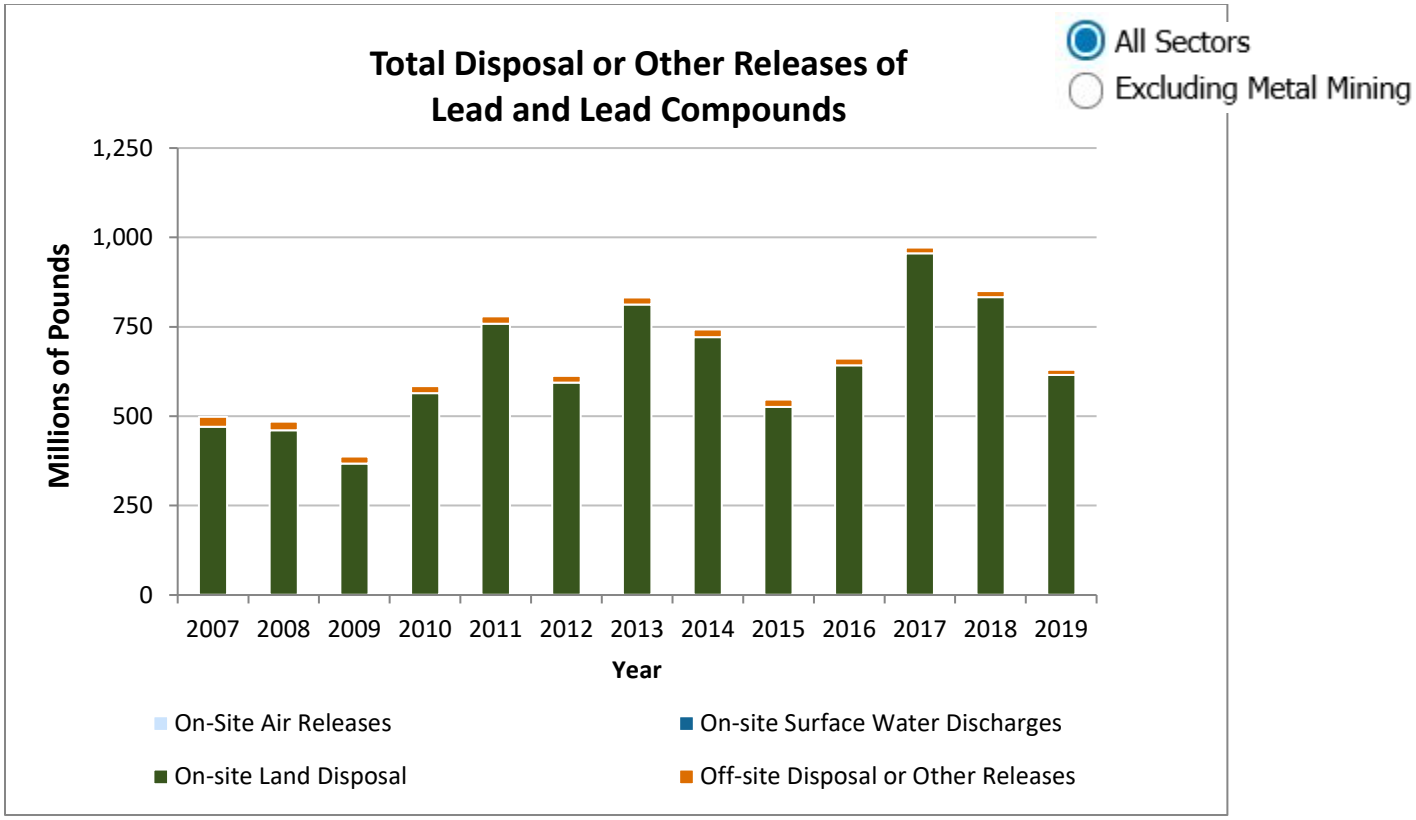
Chemicals designated as PBTs are toxic and remain in the environment for a long time where they tend to build up in the tissues of aquatic or other organisms throughout the food web. These organisms serve as food sources for other organisms, including humans, that are sensitive to the toxic effects of PBT chemicals.

Reporting thresholds for the 16 chemicals and 5 chemical categories designated as PBTs on the TRI chemical list are lower than for other TRI chemicals. Thresholds vary by chemical but range from 10 pounds to 100 pounds for most PBTs, or 0.1 grams for dioxin and dioxin-like compounds. This section focuses on the following PBT chemicals: lead and lead compounds; mercury and mercury compounds; and dioxin and dioxin-like compounds.

There are also chemicals on the TRI chemical list that the Occupational Safety and Health Administration (OSHA) includes on its list of carcinogens. This section presents the trend in air emissions for the OSHA carcinogens reported to TRI and one OSHA carcinogen, ethylene oxide, is highlighted individually. A list of the TRI carcinogens can be found on the TRI basis of OSHA carcinogens webpage.

Lead Releases Trend

This graph shows the trend in the pounds of lead and lead compounds disposed of or otherwise released by facilities in all TRI reporting industry sectors including metal mines, manufacturing facilities, hazardous waste management facilities and electric utilities.



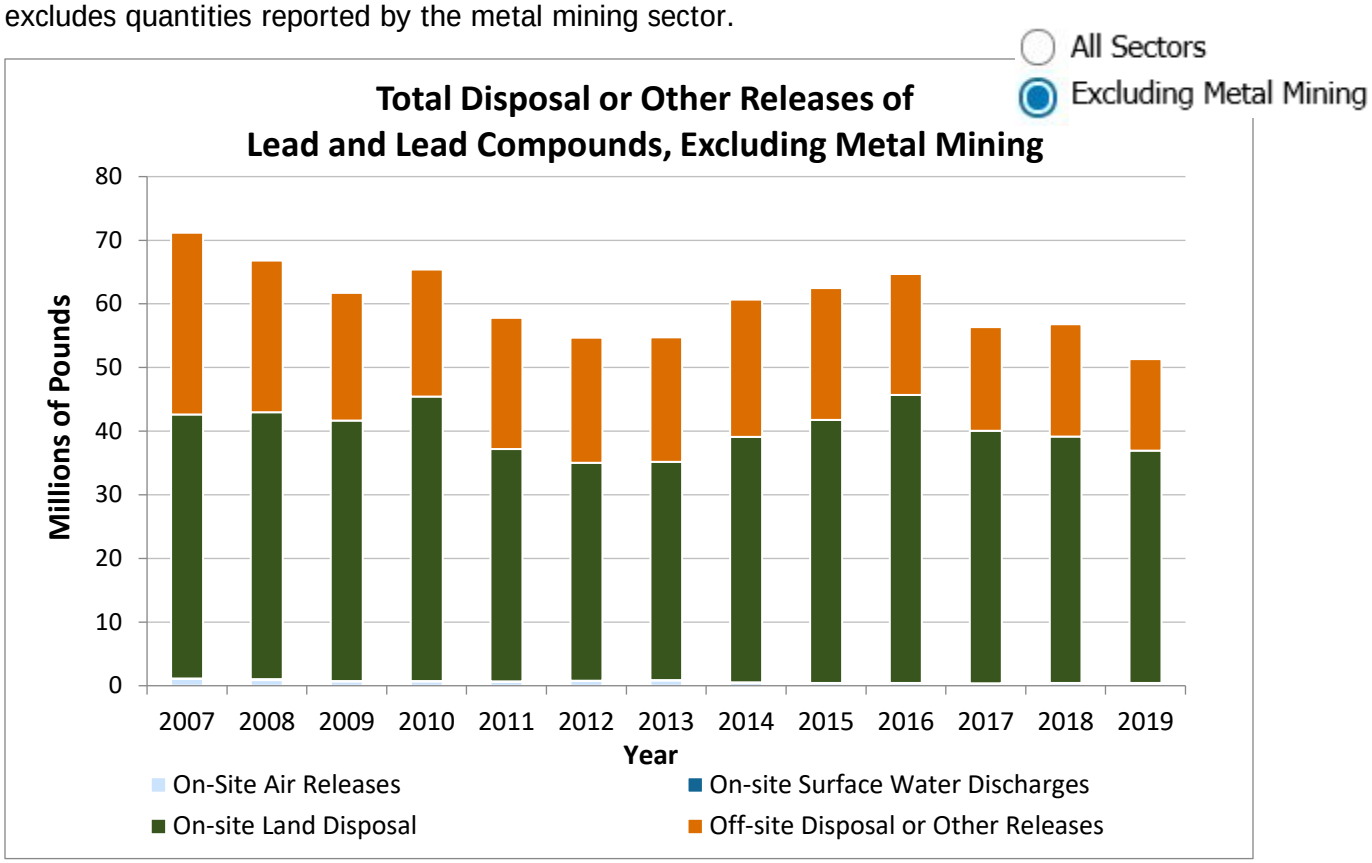
From 2007 to 2019:

- Releases of lead and lead compounds rose and fell between 2007 and 2019, with an overall increase of 26%.
- The metal mining sector accounts for most of the lead and lead compounds disposed of on site to land, driving the overall trend. For 2019, for example, metal mines reported 94% of total lead and lead compounds disposed of to land on site.

From 2018 to 2019:

- Total releases of lead and lead compounds decreased by 26% (221 million pounds), driven by a 215-million-pound decrease in releases of lead compounds from the metal mining sector.

This graph shows the trend in lead and lead compounds disposed of or otherwise released, but excludes quantities reported by the metal mining sector.

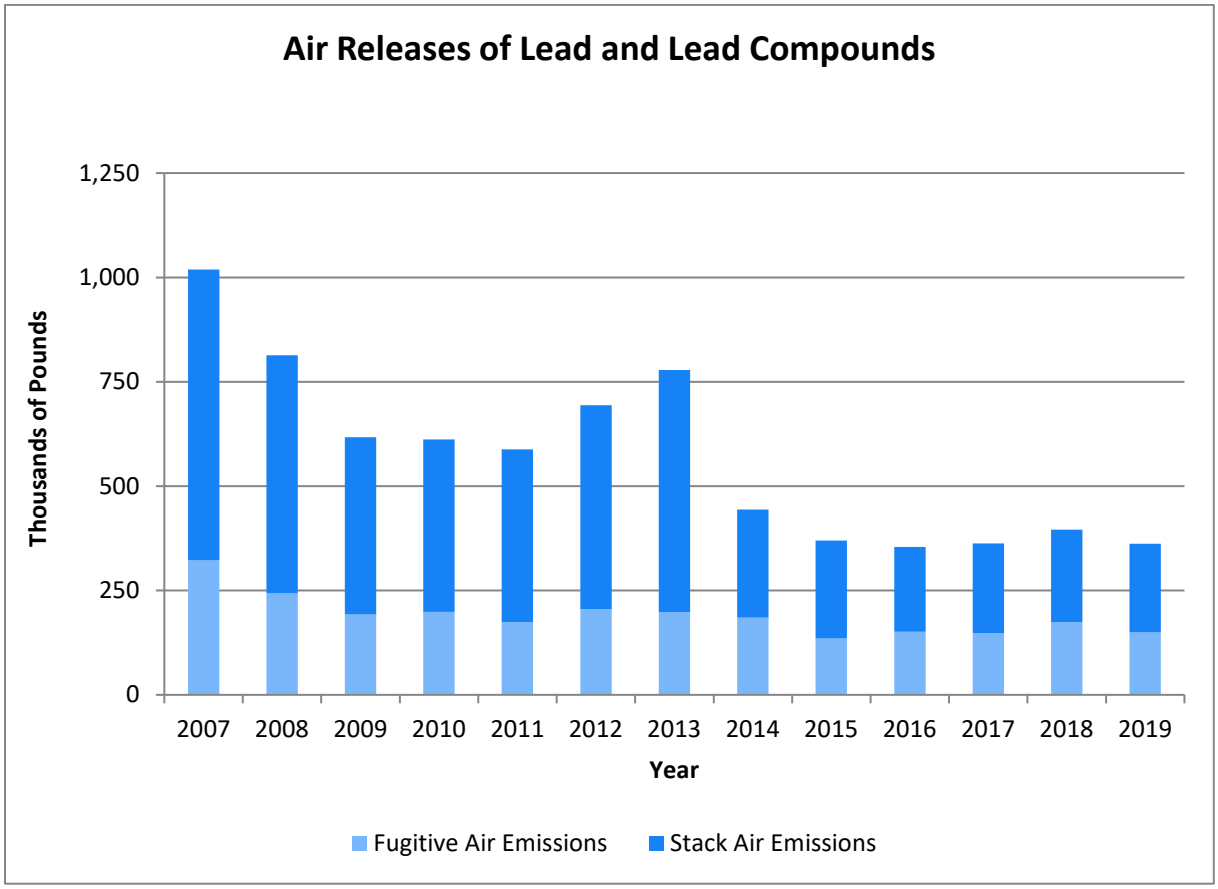


From 2007 to 2019:

- Among sectors other than metal mining, releases of lead and lead compounds have decreased by 28% (19.7 million pounds).
- Among sectors other than metal mining, most releases of lead and lead compounds were from the primary metals and hazardous waste management sectors.

Lead Air Releases Trend

This graph shows the trend in the pounds of lead and lead compounds released to air.



From 2007 to 2019:

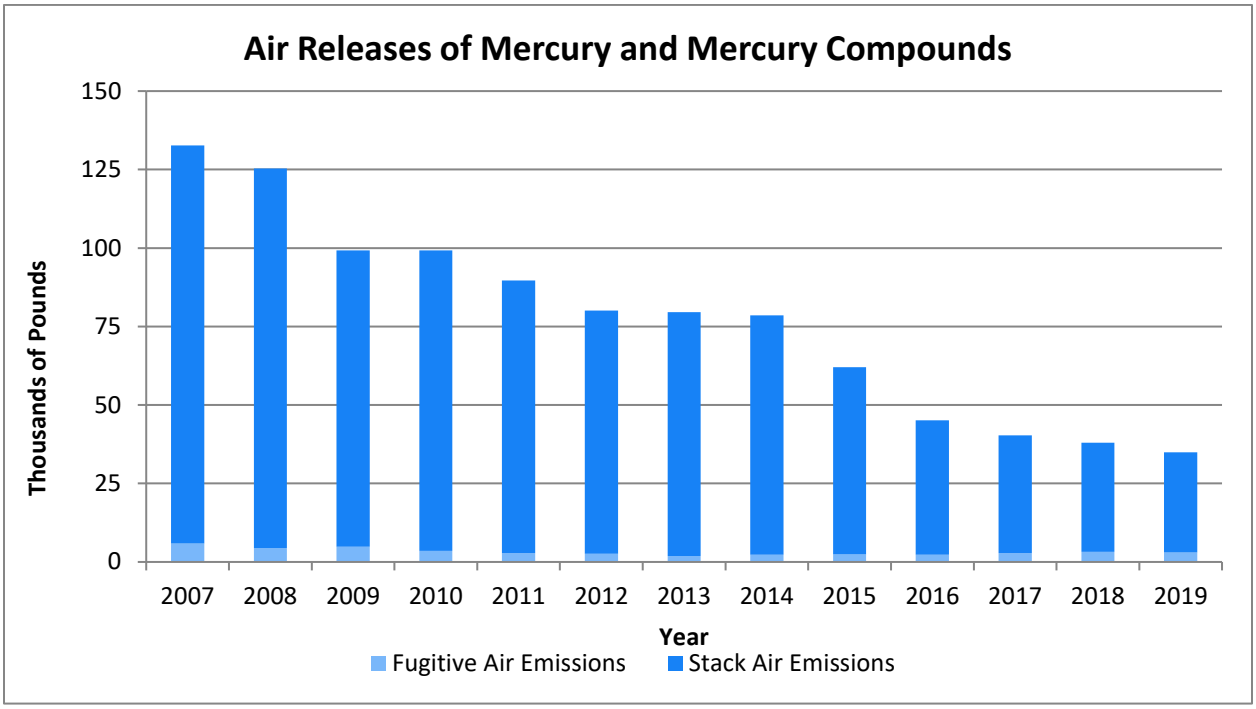
- Air releases of lead and lead compounds decreased by 64%. The primary metals and electric utilities industry sectors have driven this decrease.
- The primary metals sector, which includes iron and steel manufacturers and smelting operations, reported the greatest quantities of releases of lead and lead compounds to air.

From 2018 to 2019:

- Air releases of lead and lead compounds decreased by 9%. This is largely due to a single facility in the primary metals sector, although air emissions of lead and lead compounds decreased in most sectors.
- In 2019, 41% of air releases of lead were from the primary metals industry sector.

Mercury Air Releases Trend

This graph shows the trend in the pounds of mercury and mercury compounds released to air by facilities that reported to TRI.



From 2007 to 2019:

- Releases of mercury and mercury compounds to air decreased by 73%.
- Electric utilities drove the decline in mercury air emissions, with a 91% reduction (-86,000 pounds).

From 2018 to 2019:

- Releases of mercury and mercury compounds to air decreased by 6%.
- The primary metals sector, which includes iron and steel manufacturers and smelting operations, accounted for 37% of the air emissions of mercury and mercury compounds reported to TRI for 2019.

Dioxins Releases Trend

Dioxin and dioxin-like compounds ("dioxins") are persistent bioaccumulative toxic (PBT) chemicals characterized by EPA as probable human carcinogens. Dioxins are the byproducts of many forms of combustion and several industrial chemical processes.

TRI requires facilities to report data on the 17 individual members, or congeners, that make up the TRI dioxin and dioxin-like compounds category. While each of the dioxin congeners causes the same toxic effects, they do so at different levels of exposure, as indicated by their varying toxic potencies. As a result, the mix of dioxins from one source can have a very different toxic potency than the same total amount of a different mix of dioxins from another source.

Helpful Concepts

Toxic Equivalent Factor (TEF)

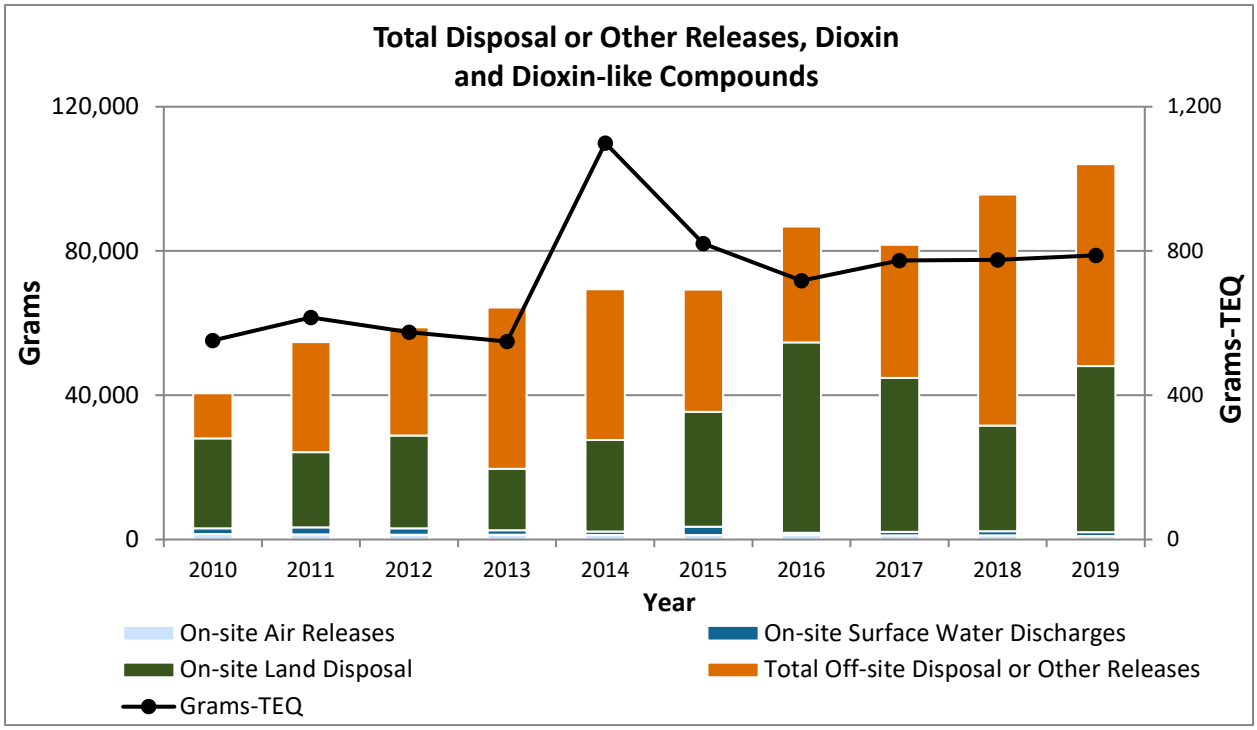
Each dioxin congener is assigned a TEF that provides that compound's toxicity relative to the most toxic compound in the dioxin and dioxin-like compounds category.

Toxic Equivalency (TEQ)

A TEQ is calculated by multiplying the reported grams released of each congener by its corresponding TEF and summing the results, referred to as grams-TEQ.

EPA accounts for the differences in toxic potency of the dioxin congeners using Toxic Equivalency (TEQ) values. TEQs help the public better understand the toxicity of dioxins releases and are useful when comparing disposal or other releases of dioxins from different sources or different time periods, where the mix of congeners may vary.

This graph shows the trend in the grams of dioxins disposed of or otherwise released by TRI-reporting facilities from 2010 to 2019. Note that the dioxins chemical category is reported to TRI in grams while all other TRI chemicals are reported in pounds. A shorter timeframe is presented for the dioxins release trend than for other trend graphs because of the limited availability of TEQ information prior to 2010.



From 2010 to 2019:

- Dioxin releases increased by 157%. This increase was largely driven by three facilities that together released 67% of all TRI-reported dioxins.
    - Increases in off-site releases of dioxins were largely driven by the same three facilities, two basic organic chemical manufacturing facilities and one smelting and refining facility.
    - Toxicity-equivalents (grams-TEQ) increased by 43%, indicating that releases of the less potent dioxin congeners increased more than the releases of the more potent dioxin congeners from 2010 to 2019.

From 2018 to 2019:

- Releases of dioxins increased by 9%.
    - On-site disposal to land increased by 57% and was driven by two facilities. One of these facilities is in the primary metals sector and regularly reports large year-to-year variance in its releases of dioxins. The other is a hazardous waste

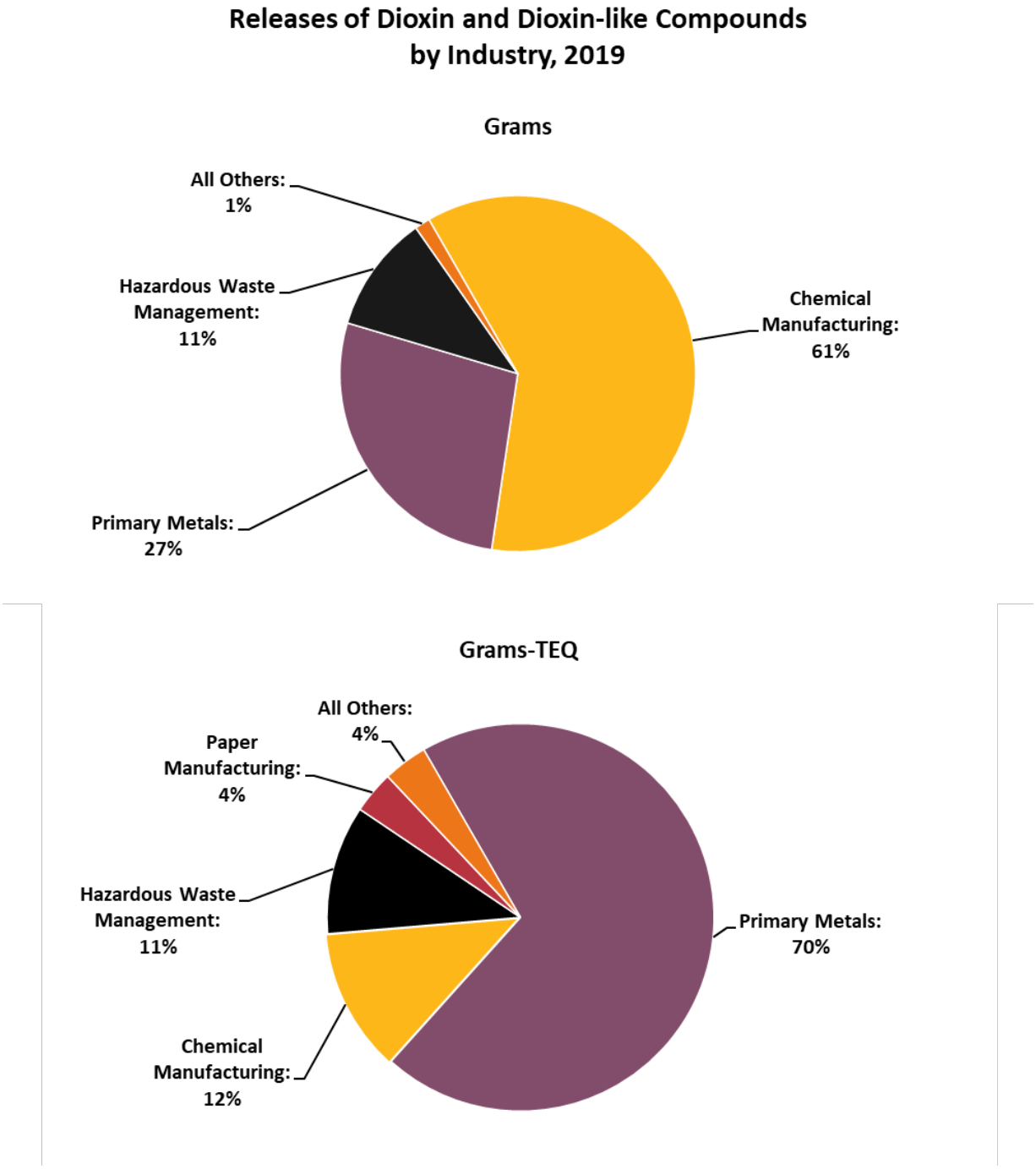
management facility, which reported receiving a dioxin-contaminated debris stream in 2019.

  - Toxicity-equivalents (grams-TEQ) increased by 2%.

- In 2019, most of the TRI-reported dioxin quantity released was disposed or otherwise released off site (54%) or disposed of on site to land (44%).

Dioxins Releases by Industry

The following two pie charts show: 1) the TRI-covered industry sectors that reported the largest releases of dioxin and dioxin-like compounds in grams, compared to 2) the industry sectors that reported the greatest releases of grams in toxicity equivalents (grams-TEQ). Note that only data from those TRI reports that included the congener detail for calculating grams-TEQ are included in these charts.



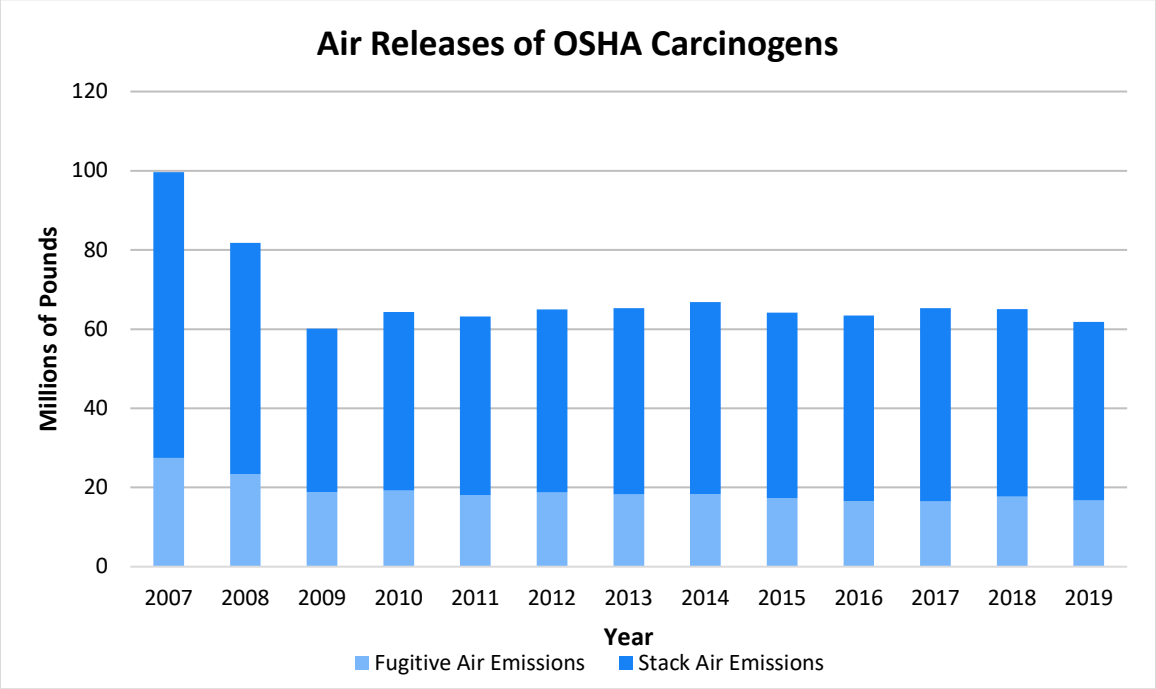
Note: Percentages do not sum to 100% due to rounding.

- Various industry sectors may dispose of or otherwise release very different mixes of dioxin congeners.

- The chemical manufacturing industry accounted for 61% and the primary metals sector for 27% of total grams of dioxins released.
- However, in terms of toxicity equivalents the primary metals sector accounted for 70% and the chemical manufacturing sector for 12% of the total grams-TEQ.

Occupational Safety and Health Administration (OSHA) Carcinogens Air Releases

Among the chemicals that are reportable to the TRI Program, some are also included on OSHA's list of carcinogens. EPA refers to these chemicals as TRI OSHA carcinogens. This graph shows the trend in the pounds of TRI-reported OSHA carcinogens released to air.



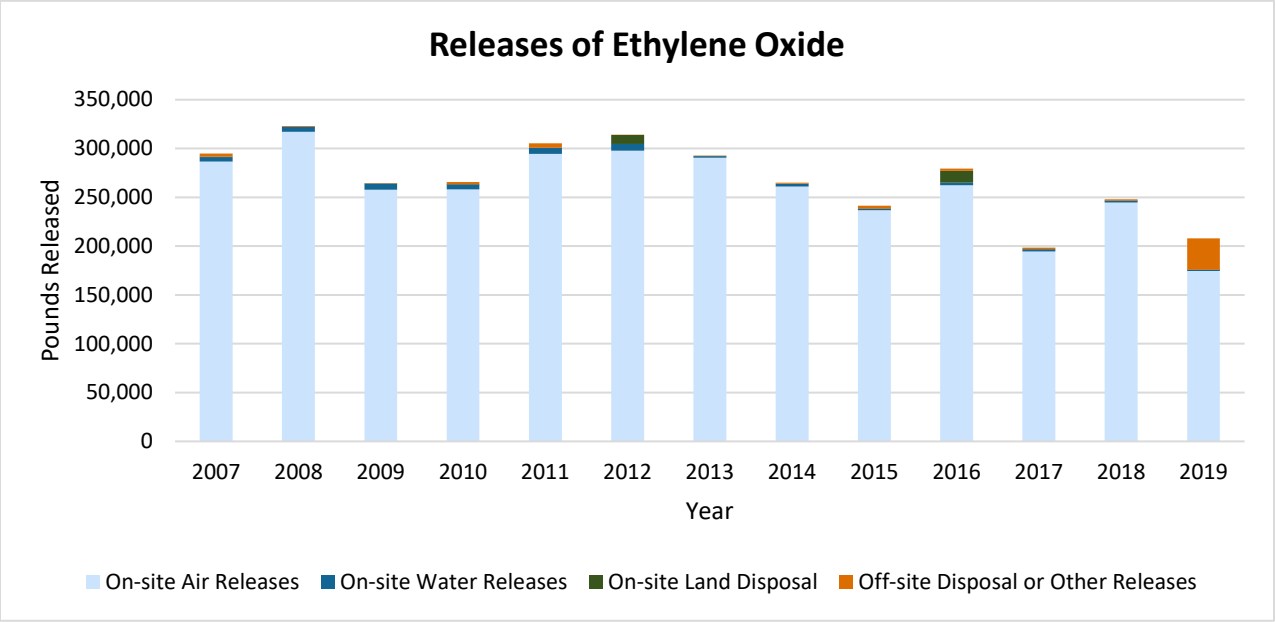
Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Releases of these carcinogens to air decreased by 38%.
- The long-term decreases in releases of OSHA carcinogens to air were driven by decreases in releases of many chemicals across multiple sectors. Almost every TRI-covered industry sector decreased its releases of carcinogens to air from 2007 to 2019.
- In 2019, releases of OSHA carcinogens to air consisted primarily of styrene (47% of the air releases of all OSHA carcinogens), acetaldehyde (12%) and formaldehyde (8%).

Ethylene Oxide Releases Trend

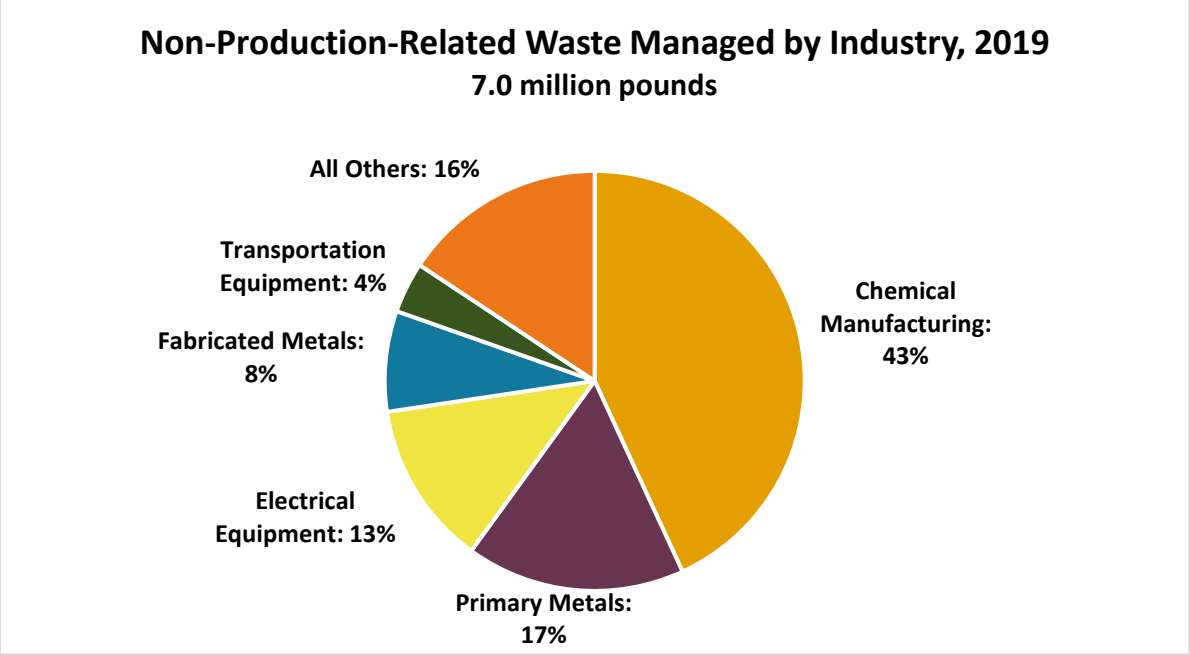
In 2019, EPA announced a suite of actions to address emissions of ethylene oxide, an OSHA carcinogen, from some types of industrial facilities. The figure below presents the trend in releases of this chemical, as reported to TRI.



- From 2007 to 2019, releases of ethylene oxide decreased by 86.9 million pounds (-29%), driven by reductions in releases to air.
- For 2019, the increase in off-site transfers was driven by one hazardous waste management facility. This facility originally claimed it transferred over 30,000 pounds of ethylene oxide off site for disposal in landfills. EPA questioned this claim, and the facility indicated that the quantity transferred off site was not exclusively ethylene oxide gas, and the quantity of ethylene oxide manufactured, processed, or otherwise used in 2019 was less than the TRI threshold quantity. The facility indicated that they intend to withdraw their TRI report for ethylene oxide. As of January 4th, 2021, the facility has not done so.
- For 2018, one chemical manufacturer in Texas reported a one-time (not production-related) air release of ethylene oxide. This release drove an increase in total releases of ethylene oxide from 2017 to 2018 and drove the decrease in total releases of ethylene oxide from 2018 to 2019.

Non-Production-Related Waste

Non-production-related waste refers to quantities of Toxics Release Inventory (TRI) chemicals disposed of or released, or transferred off site, as the result of one-time events, rather than due to standard production activities. These events may include remedial actions, catastrophic events such as natural disasters, or other one-time events not associated with normal production processes. Non-production-related waste is included in a facility's total disposal or other releases but is not included in its production-related waste managed. The following graph shows the quantities of non-production-related waste reported to TRI for 2019.



- For 2019, 551 facilities reported a total of 7.0 million pounds of one-time, non-production-related releases of TRI chemicals. This represents 0.02% of total waste managed in 2019.
- Non-production-related waste from all facilities was below 35 million pounds every year since 2007, except for 2013 when one facility reported a one-time release of 193 million pounds.

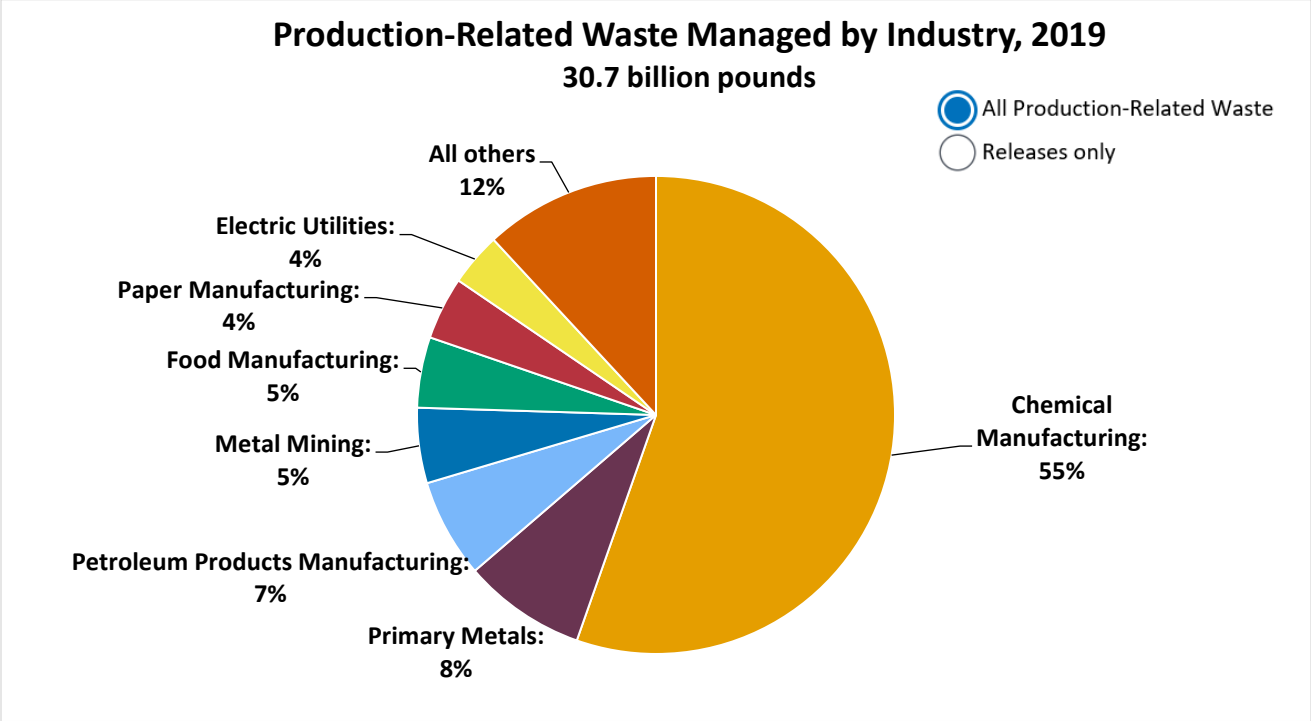
Comparing Industry Sectors

This section examines how different industrial sectors manage their TRI chemical waste. This sector-specific approach can highlight progress made in improving environmental performance, identify emerging issues, and reveal opportunities for better waste management practices.

Industries subject to TRI reporting requirements vary substantially in size, scope, and business type. As a result, the amounts and types of chemicals used, generated, and managed by facilities across industrial sectors often differ. For facilities in the same sector, however, the processes, products, and regulatory requirements are often similar, resulting in similar manufacture, processing, or other use of chemicals. This section presents trends in key sectors' production-related waste managed which includes TRI chemical releases to the environment.

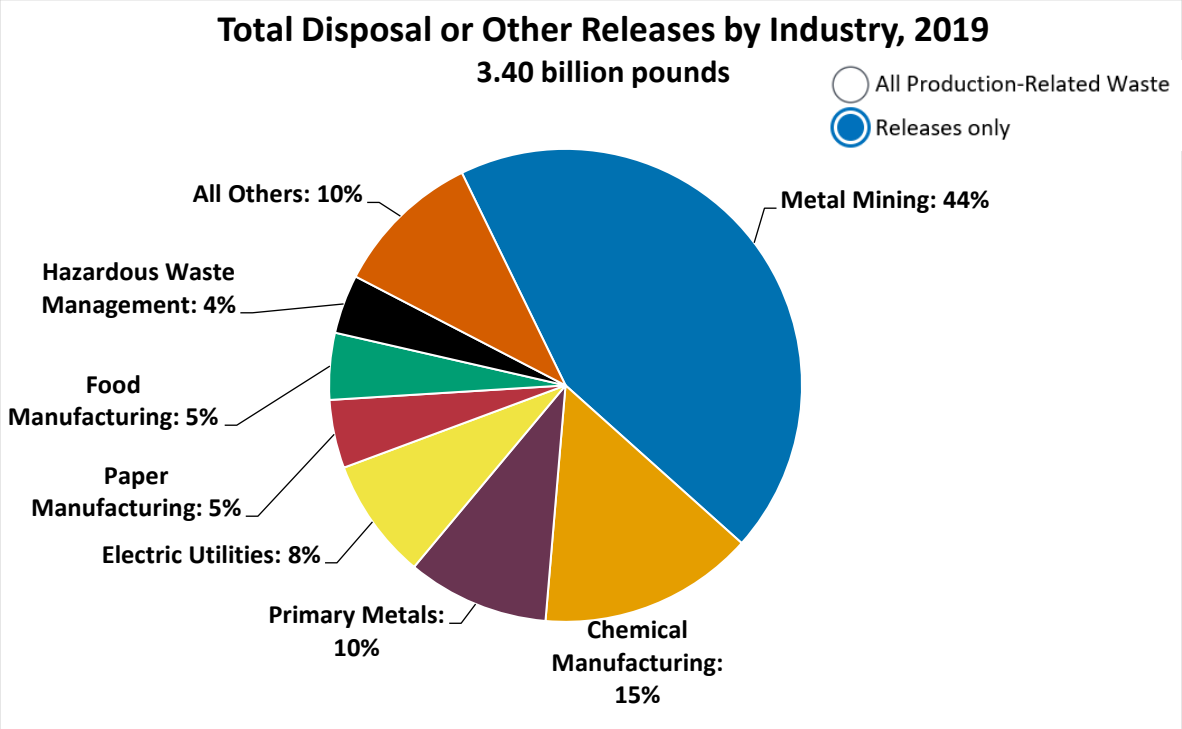
For analytical purposes, the TRI Program has aggregated the North American Industry Classification System (NAICS) codes at the 3- and 4-digit levels, creating 29 industry sector categories. To learn more about which business activities are subject to TRI reporting requirements, see this list of covered NAICS codes.

The following pie chart shows the quantities of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases. For more details on quantities released, toggle to the "Releases only" figure.



Seven industry sectors reported 88% of the TRI production-related waste managed in 2019. The majority of this waste originated from the chemical manufacturing sector (55%).

The following pie chart shows the industry sectors that reported the most releases for 2019.



This pie chart shows that 4 of the 29 TRI sectors accounted for 77% of the quantities of TRI chemicals disposed of or otherwise released: metal mining (44%), chemical manufacturing (15%), primary metals (10%), and electric utilities (8%).

For more details on how the amounts and proportions of TRI chemicals managed as waste have changed over time, see the production-related waste managed by industry trend graph.

For more information on the breakdown of these releases by environmental medium, see air releases by industry, water releases by industry and land disposal by industry.

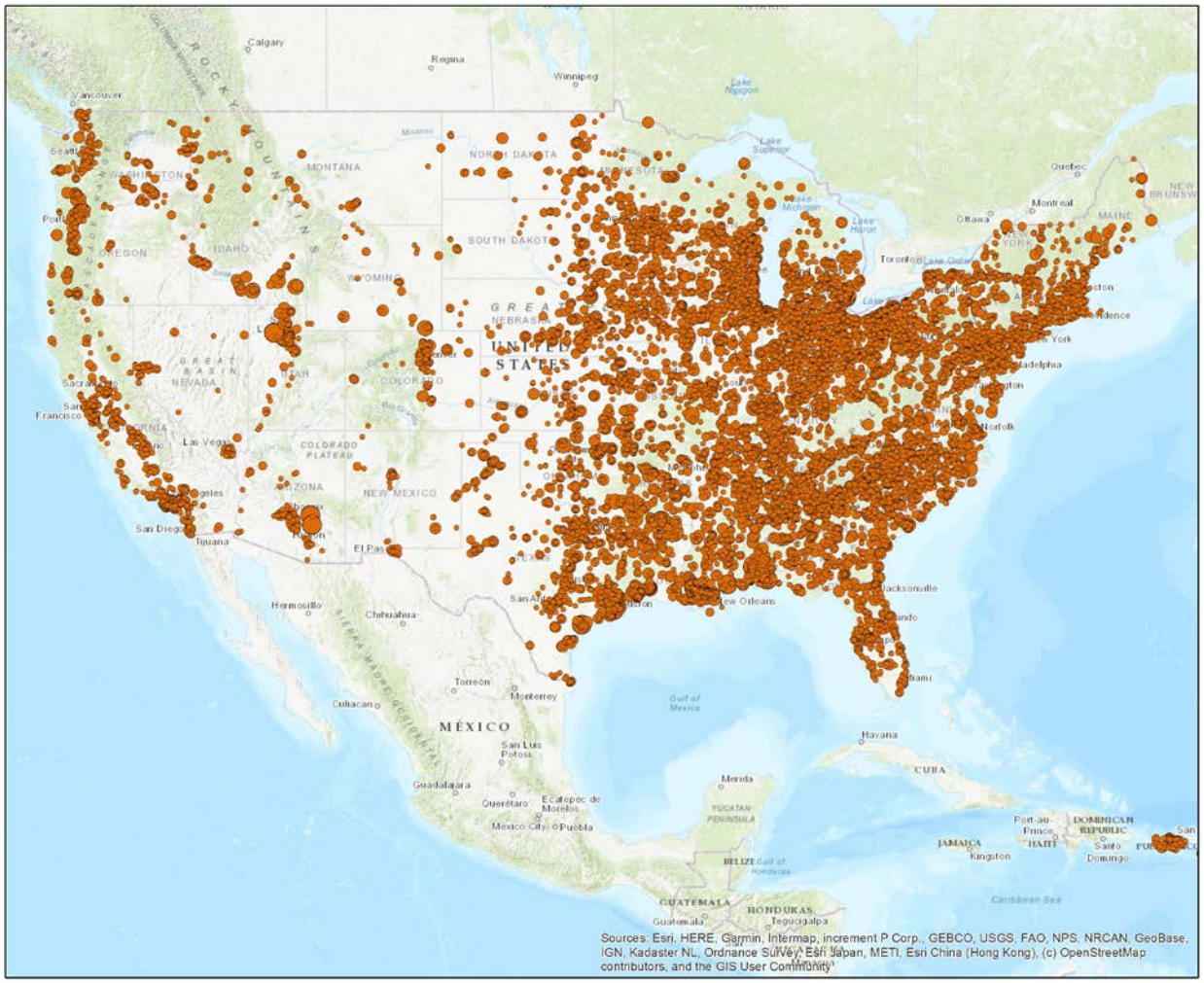
TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the Introduction. For more information see *Factors to Consider When Using Toxics Release Inventory Data*.

Manufacturing Sectors

This section examines how TRI chemical wastes are managed in the manufacturing sectors (defined as facilities reporting their primary NAICS codes as 31-33).

This map shows the locations of the manufacturing facilities that reported to TRI for 2019, sized by their relative releases. Click on a facility for details on its TRI reporting.



Manufacturing Facilities Reporting to TRI, 2019

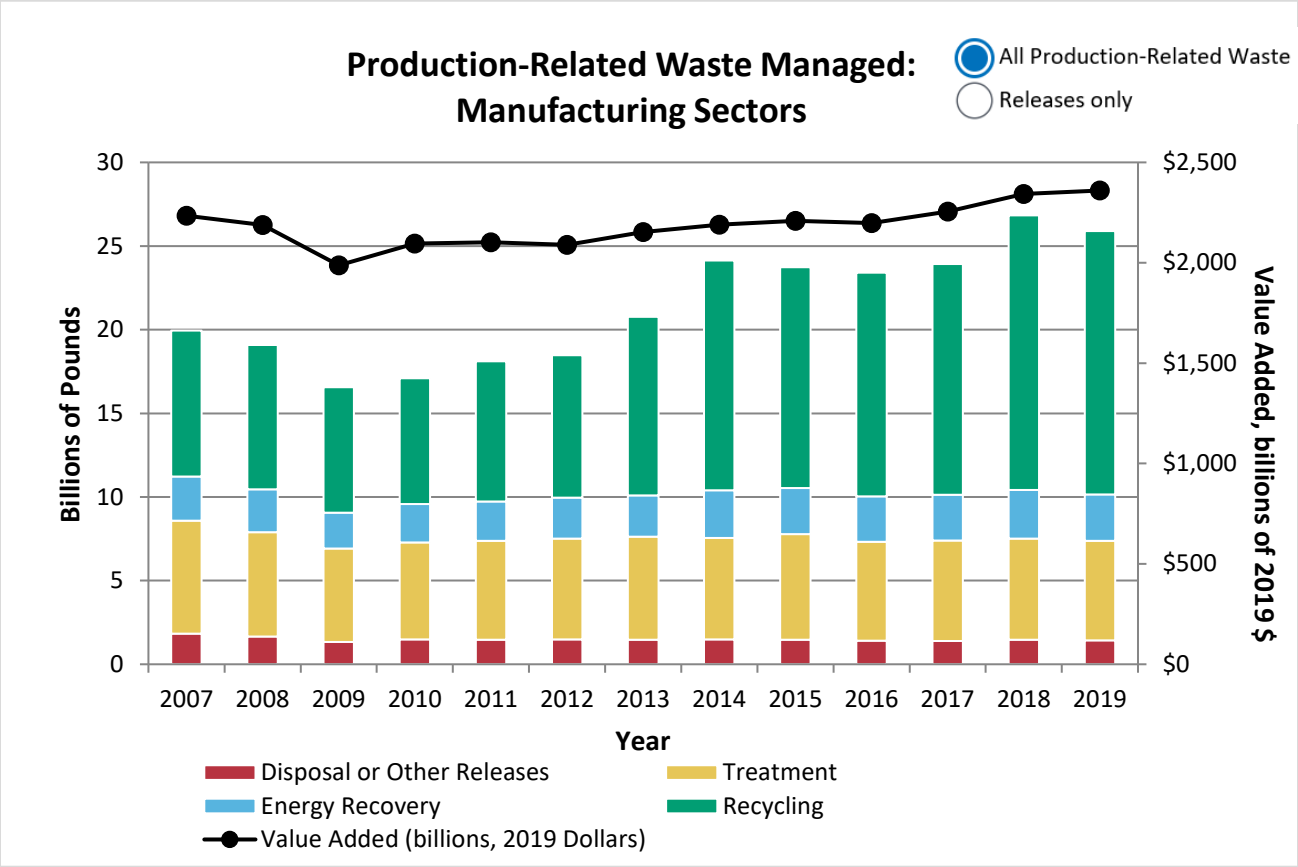
View Larger Map

For 2019, nearly 90% of the facilities that reported to TRI were in a manufacturing sector. The manufacturing sectors accounted for most (88%) of the 30.7 billion pounds of production-related waste managed reported to TRI for 2019. Two subsectors of manufacturing, chemical manufacturing and fabricated metals, are highlighted in more detail later in this section.

The TRI-covered industry sectors not categorized under manufacturing include metal mining, coal mining, electric utilities, chemical wholesalers, petroleum terminals, hazardous waste management, and others.

Manufacturing Waste Management Trend

The following graph shows the annual quantities of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by the manufacturing sectors. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Quantities of production-related waste managed by the manufacturing sectors decreased through 2009, following the trend of reduced production resulting from the economic recession. Since 2009, quantities of waste managed have increased.
    - Quantities of waste released and treated decreased, while quantities combusted for energy recovery and recycled increased.
- It is important to consider the influence the economy has on production and production-related waste generation. This figure includes the trend in the manufacturing sectors'

value added (represented by the black line as reported by the Bureau of Economic Analysis, Value Added by Industry). Since 2007, value added by the manufacturing sectors increased by 27%.

What is Value Added?

An industry's value added is the market value it adds in production; it is the difference between the price at which it sells its products and the cost of the inputs it purchases. Value added for all U.S. industries combined is equal to the nation's gross domestic product.

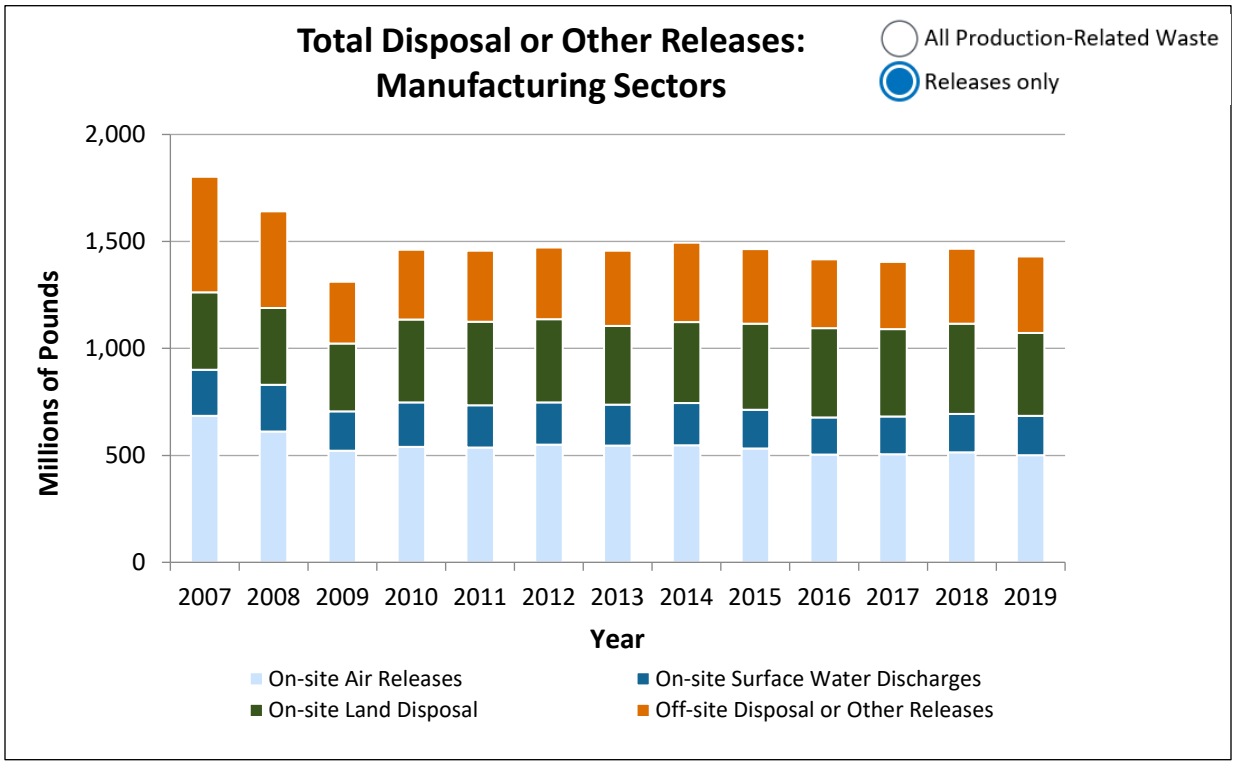
- Production-related waste managed by the manufacturing sectors increased by 30% since 2007, driven by increased recycling. The large increase in recycled chemical waste starting in 2014 was primarily due to an increase in the quantity of cumene recycled by one facility and dichloromethane (methylene chloride) recycled by two other facilities.

From 2018 to 2019:

- Production-related waste managed decreased by 996 million pounds (-4%), while value added increased slightly. Annual changes in production-related waste quantities are driven by a few facilities.
- In 2019, 5% of the manufacturing sectors' production-related waste generated was released into the environment, while the rest was managed through treatment, energy recovery, and recycling.

Manufacturing Releases Trend

The following graph shows the annual quantities of TRI chemicals released by the manufacturing sectors.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- TRI chemical releases by the manufacturing sectors decreased by 21%. This is primarily due to a reduction in air emissions and off-site disposal or other releases.
- Releases to water also declined, while on-site land disposal increased by 7%.

From 2018 to 2019:

- Releases decreased by 36 million pounds (-2%). This is largely due to a decrease in on-site land disposal reported by facilities in the chemical manufacturing sector.

Source Reduction in the Manufacturing Sectors:

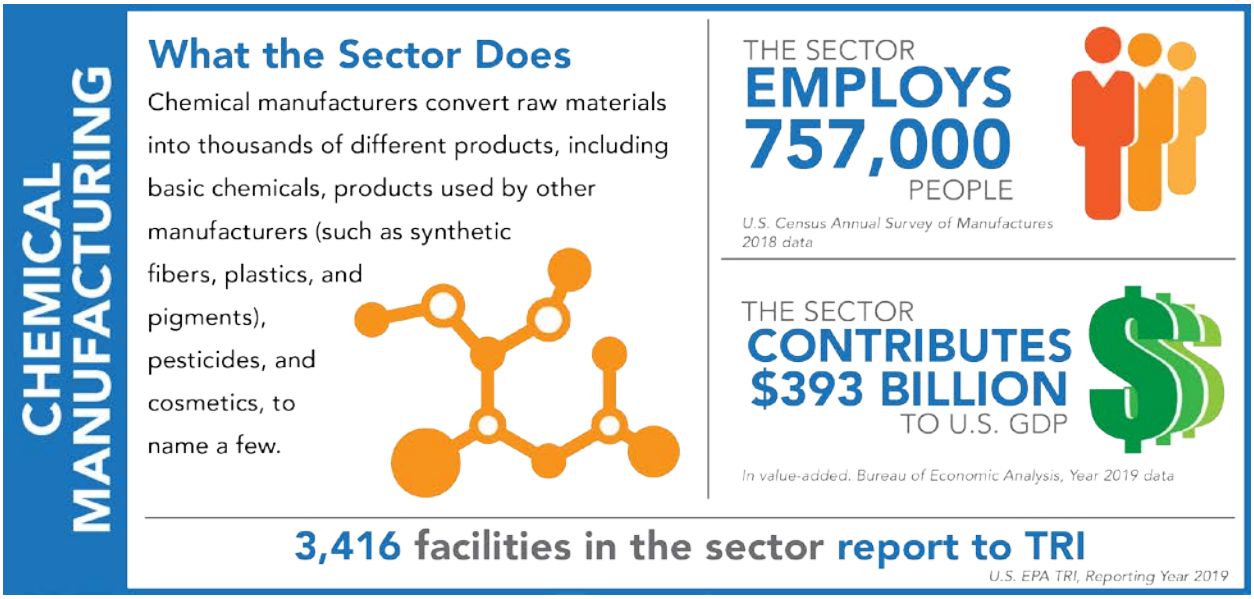
In 2019, 7% of manufacturing facilities initiated nearly 3,000 source reduction activities to reduce TRI chemical use and waste generation. The most commonly reported types of source reduction activitites were good operating practices and process modifications. For example:

- A circuit board manufacturing facility established new criteria for bath changes to extend bath life, reducing the amount of certain glycol ethers waste generated. [Click to view facility details in the TRI P2 Search Tool]
- A rubber products manufacturer modified loss-in-weight feeders with pipe-in-pipe and flexible rubber boot systems to keep transferred material contained, reducing their releases of zinc compounds. [Click to view facility details in the TRI P2 Search Tool].

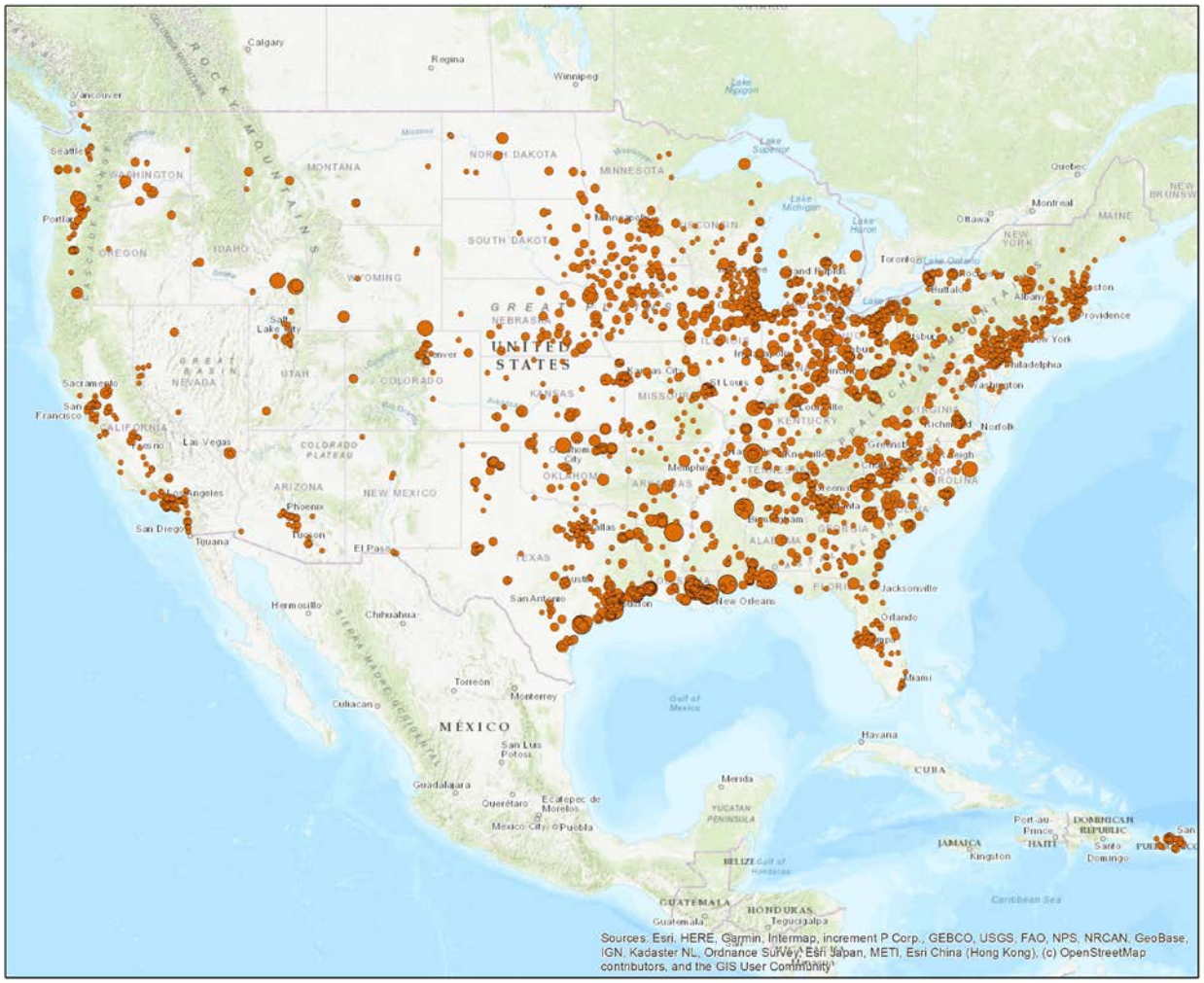
You can learn more about pollution prevention opportunities in this sector by using the TRI P2 Search Tool.

Chemical Manufacturing

This section examines how TRI chemical wastes are managed in the chemical manufacturing sector (defined as facilities reporting their primary NAICS code as 325).



This map shows the locations of the chemical manufacturing facilities that reported to TRI for 2019, sized by their relative releases. Click on a facility for details on its TRI reporting.

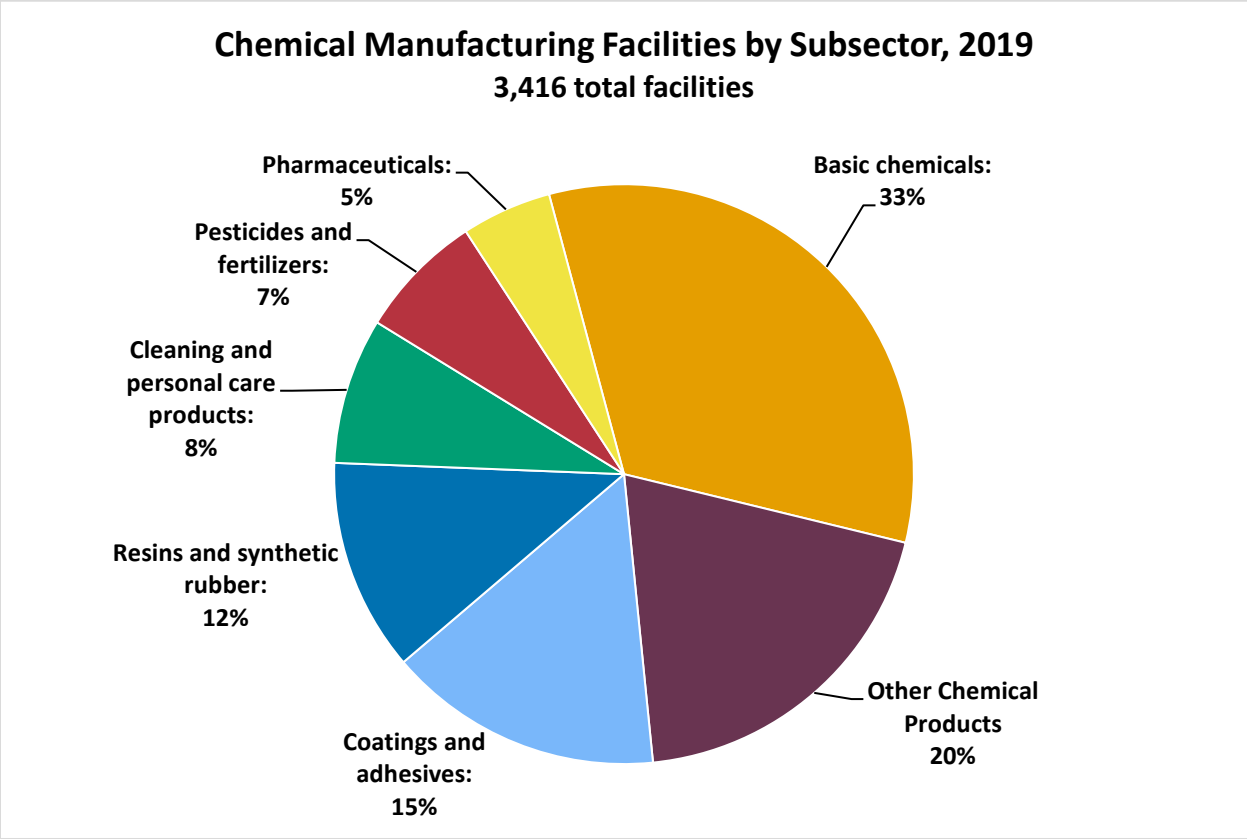


Chemical Manufacturing Facilities Reporting to TRI, 2019

View Larger Map

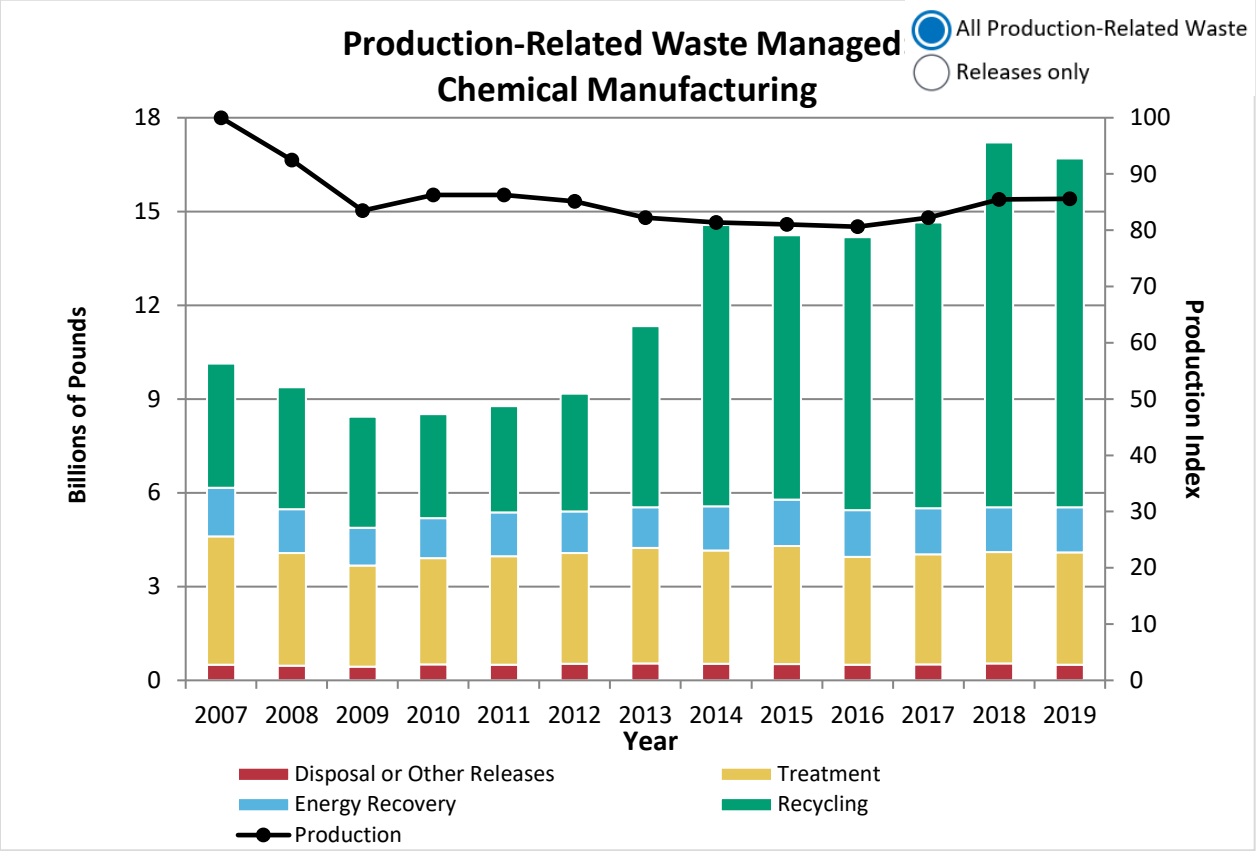
For 2019, more facilities reported to TRI from the chemical manufacturing sector than any other TRI-covered industry sector (3,416; 16% of facilities that reported for 2019). This sector reported 55% of all production-related waste managed, more than any other sector.

This large and diverse sector includes facilities producing basic chemicals and those that manufacture products through further processing of chemicals. The chart below shows the number of facilities by chemical manufacturing subsectors that reported to TRI for 2019.


Chemical Manufacturing Facilities by Subsector, 2019
3,416 total facilities
Pharmaceuticals: 5%
Basic chemicals: 33%
Pesticides and fertilizers: 7%
Cleaning and personal care products: 8%
Resins and synthetic rubber: 12%
Other Chemical Products 20%
Coatings and adhesives: 15%

Chemical Manufacturing Waste Management Trend

The following graph shows the annual quantities of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by the chemical manufacturing sector. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Quantities of production-related waste managed by the chemical manufacturing sector increased by 65%, while production volume (represented by the black line as reported by the Federal Reserve Board, Industrial Production Index) decreased by 14%. In recent years, production has been fairly constant, with an increase from 2017 to 2018.
    - The large increase in chemical waste recycled starting in 2014 compared to previous years was primarily due to increased quantities of recycling reported by chemical manufacturers, with an increase in the quantity of cumene recycled by

one facility and dichloromethane (methylene chloride) recycled by two other facilities.

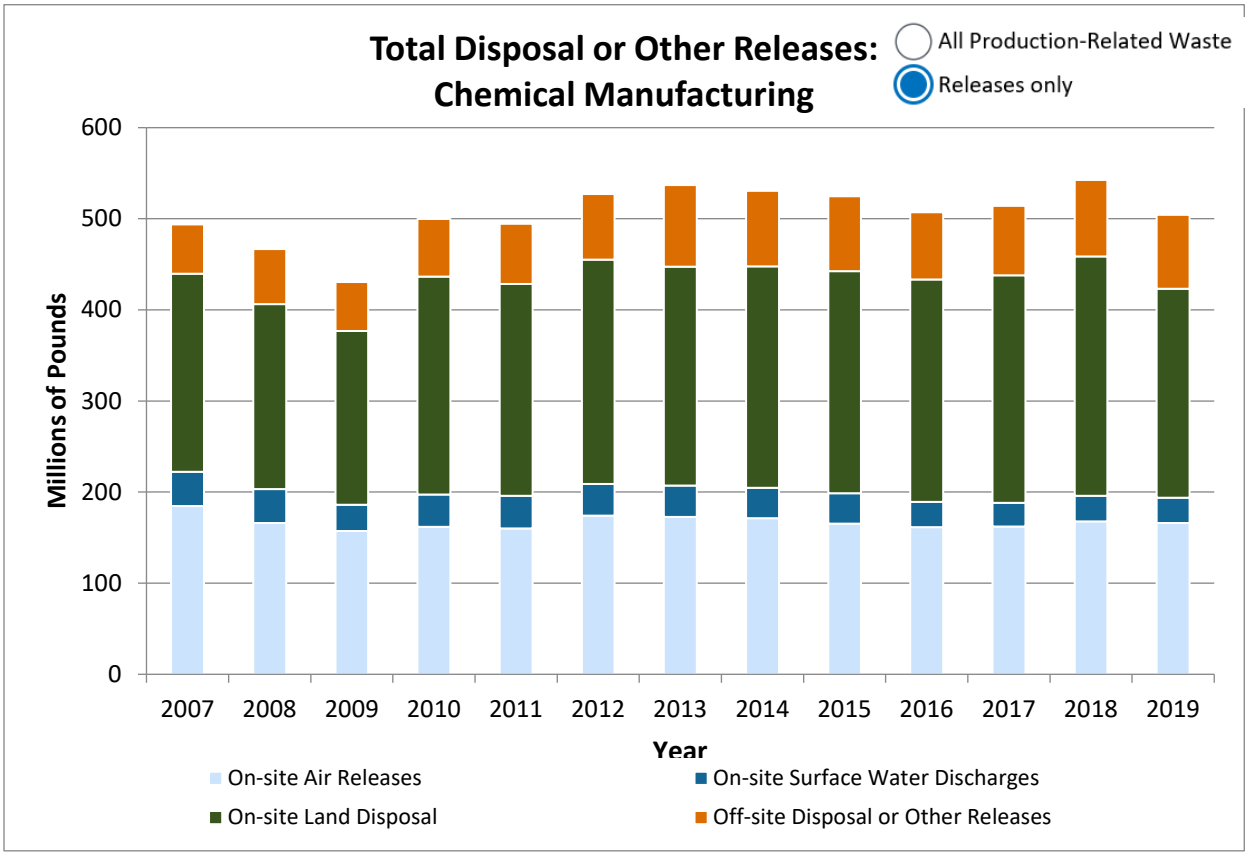
- Quantities of TRI chemicals treated or combusted for energy recovery decreased, while the quantities of TRI chemicals recycled increased. There was very little change in the quantities of TRI chemicals released.

From 2018 to 2019:

- Production-related waste managed at chemical manufacturing facilities decreased by 501 million pounds (-3%), driven by a reduction in quantities recycled by three facilities in the sector.
- In 2019, 3% of this sector's waste was released into the environment, while the rest was managed through treatment, energy recovery, and recycling.

Chemical Manufacturing Releases Trend

The following graph shows the annual quantities of TRI chemicals released by the chemical manufacturing industry.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

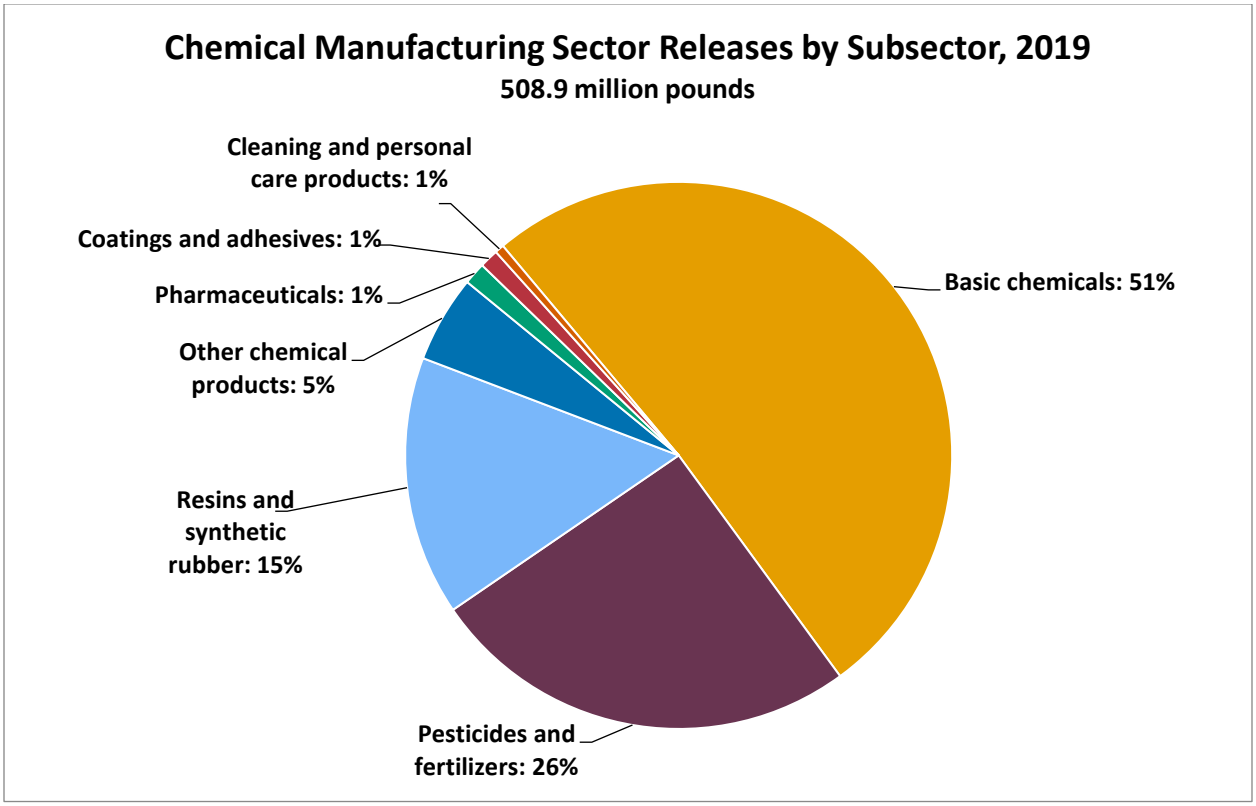
From 2007 to 2019:

- TRI chemical releases by the chemical manufacturing sector increased by 2%.
- The proportions of on-site land releases and off-site disposal increased during this time, while air releases now make up a smaller fraction of total releases.

From 2018 to 2019:

- Releases decreased by 39 million pounds (-7%). This trend is driven by large decreases in land disposal for numerous facilities.

- For 2019, the chemical manufacturing sector reported larger air release quantities than any other sector, accounting for 28% of all reported quantities of TRI chemicals emitted to air.
- For 2019, the basic chemicals manufacturing subsector accounted for 51% of chemical manufacturing releases. This subsector includes facilities manufacturing products such as organic and inorganic chemicals, industrial gases, and petrochemicals.



Source Reduction in the Chemical Manufacturing Sector:

Although the chemical manufacturing sector has consistently managed the most production-related waste of any TRI-covered sector, 284 facilities (8% of facilities) in this sector initiated source reduction activities in 2019 to reduce their TRI chemical use and waste generation. The most commonly reported types of source reduction activities were good operating practices and process modifications. For example:

- A paint and coatings manufacturing facility reduced xylene waste by scheduling batches to minimize waste produced during cleanouts between batches. [Click to view facility details in the TRI P2 Search Tool]
- An organic chemical manufacturing facility reduced its use of diphenylamine by changing the reaction formulation to increase batch yield and minimize the amount of unreacted material produced as waste. [Click to view facility details in the TRI P2 Search Tool]

Additional Resources

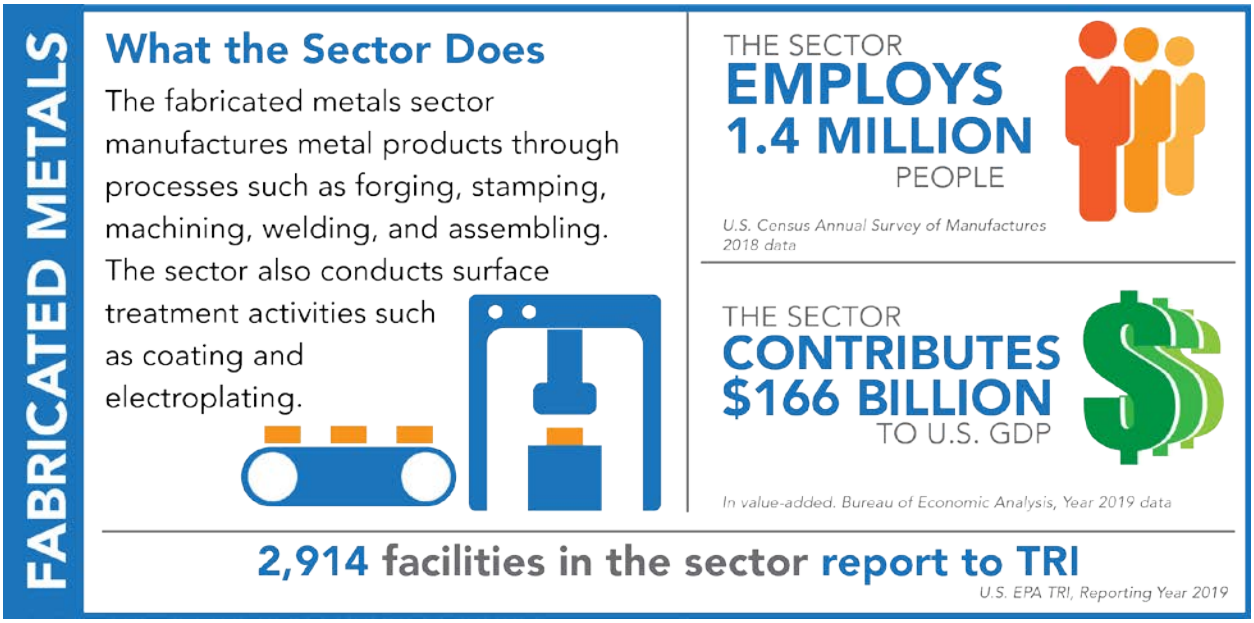
EPA's Smart Sectors Program is partnering with chemical manufacturing trade associations to develop sensible approaches to industrial operations that better protect the environment and public health.

TRI's P2 Industry Profile Dashboard can help you learn more about releases, other waste management trends, and pollution prevention opportunities in this sector.

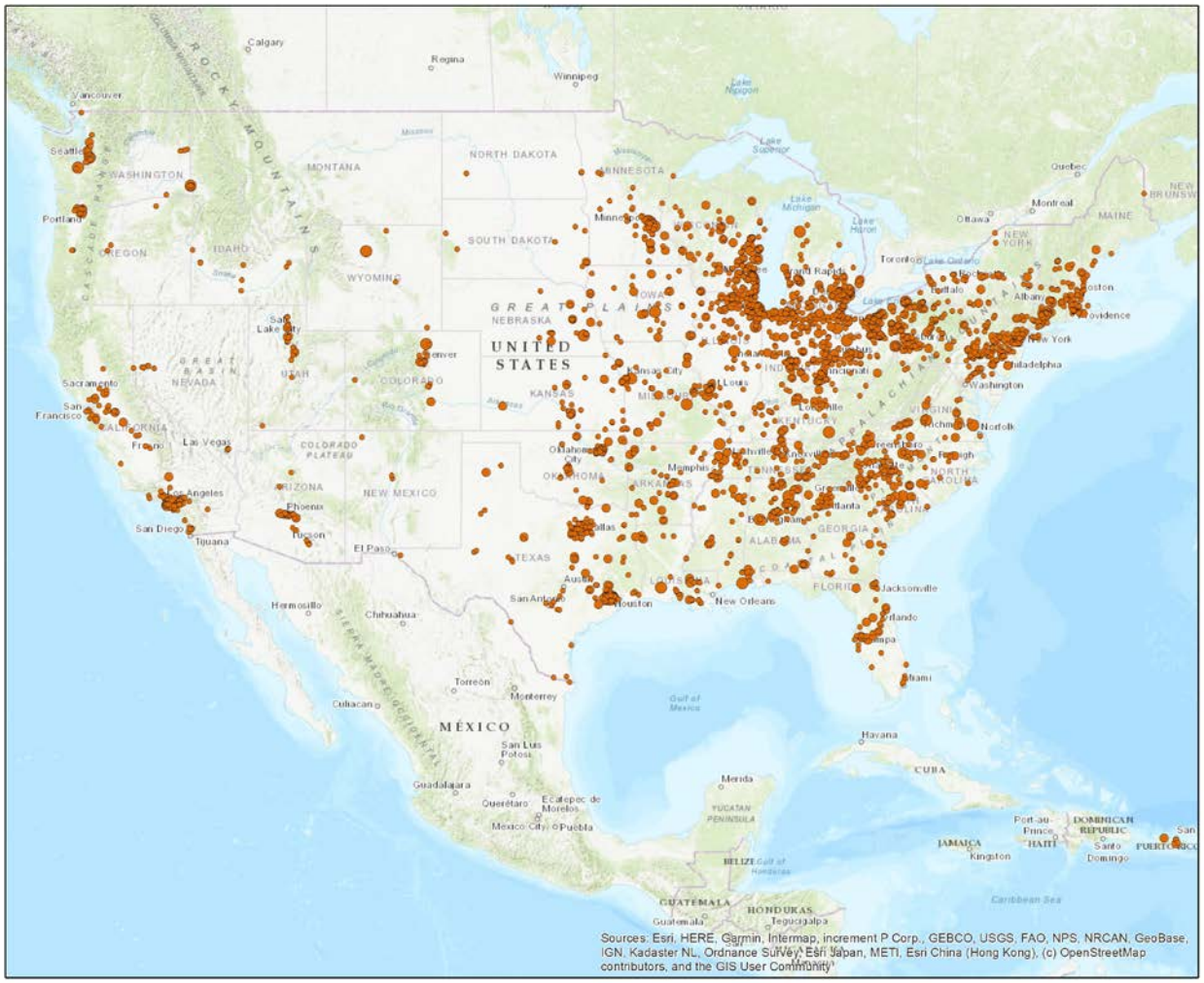
For more information on how this and other industry sectors can choose safer chemicals, visit EPA's Safer Choice Program pages for Alternatives Assessments and the Safer Choice Ingredients List.

Fabricated Metals Manufacturing

This section examines how TRI chemical wastes are managed in the fabricated metal product manufacturing sector (defined as facilities reporting their primary NAICS code as 332).



This map shows the locations of the fabricated metal product manufacturing facilities that reported to TRI for 2019, sized by their relative releases. Click on a facility for details on its TRI reporting.



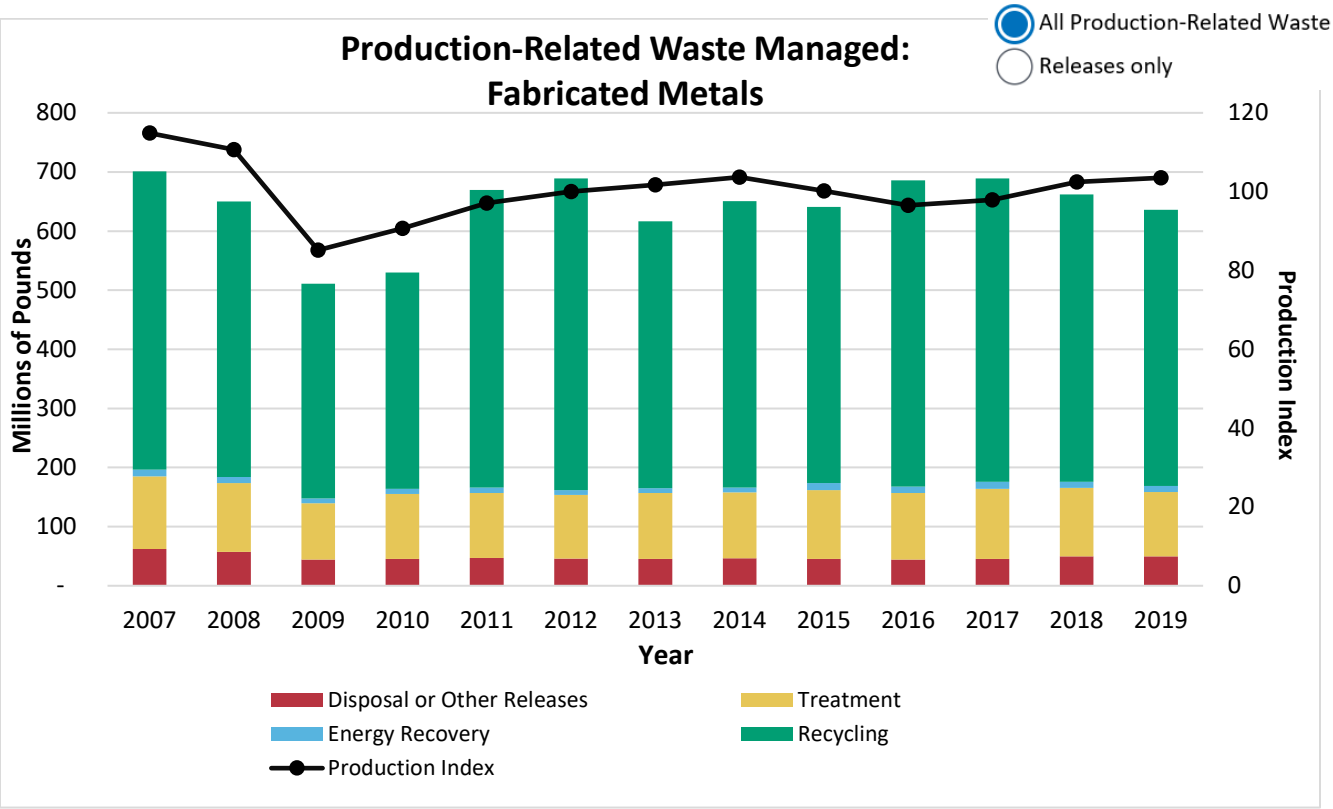
Fabricated Metals Manufacturing Facilities Reporting to TRI, 2019

View Larger Map

For 2019, 2,914 facilities in the fabricated metal product manufacturing sector reported to TRI, more than any other sector except chemical manufacturing.

Fabricated Metals Manufacturing Waste Management Trend

The following graph shows the annual quantities of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by facilities in the fabricated metal product manufacturing sector. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Quantities of production-related waste managed by the fabricated metal product manufacturing sector decreased by 65 million pounds (-9%), while production volume (represented by the black line as reported by the Federal Reserve Board, Industrial Production Index) decreased by 10%. In recent years, production has been increasing.
- Quantities of TRI chemical waste managed through recycling, combustion for energy recovery, treatment, and release all decreased.

From 2018 to 2019:

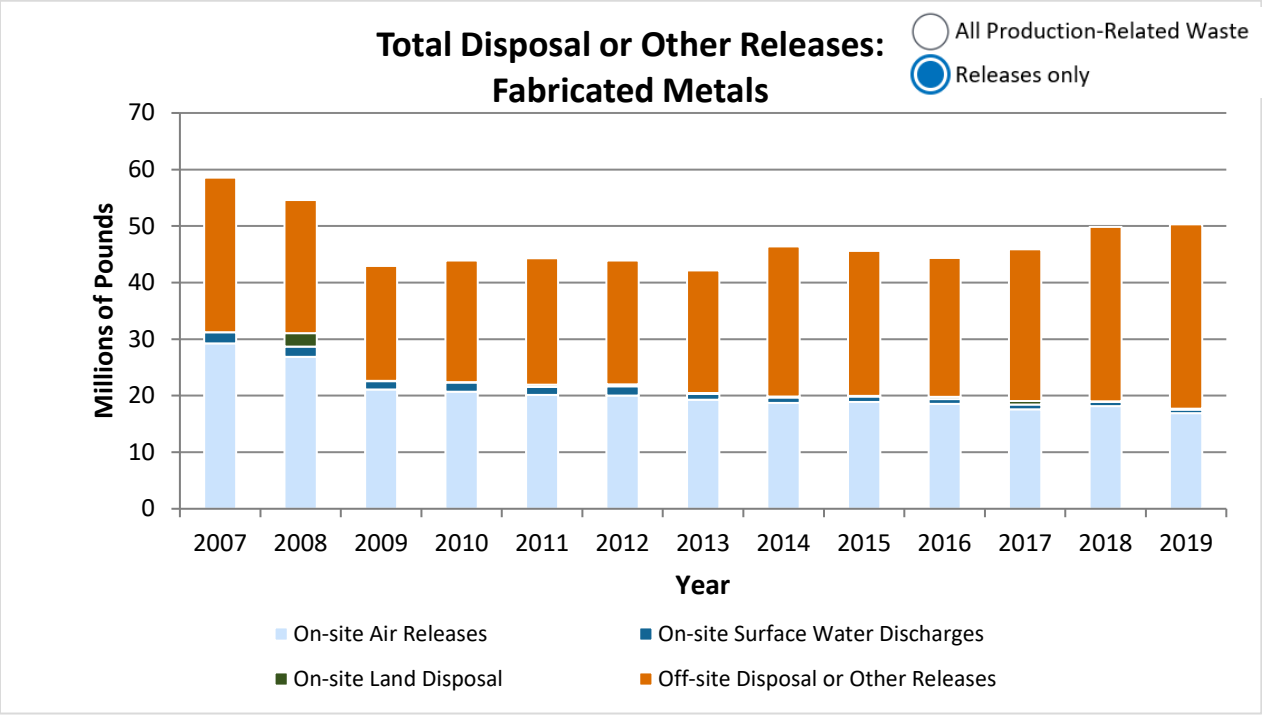
- Production-related waste managed at fabricated metal product manufacturing facilities decreased by 26 million pounds (-4%), while production volume increased by 1%. This

decrease in production-related waste managed was driven by decreased recycling and treatment.

- During 2019, 8% of this sector's waste was released into the environment, while the rest was managed through treatment, energy recovery, and recycling.

Fabricated Metals Manufacturing Releases Trend

The following graph shows the annual quantities of TRI chemicals released by the fabricated metal product manufacturing industry.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- TRI chemical releases by the fabricated metals manufacturing sector decreased by 8.3 million pounds (-14%).
    - The decrease was driven by releases to air, which decreased by 12 million pounds from 2007 to 2019.
    - Off-site disposal quantities increased, driven by off-site releases of nitrate compounds, which increased by 5 million pounds from 2007 to 2019.
    - On-site releases to water decreased by 1.3 million pounds (-68%) and on-site land releases increased by 87,000 pounds (160%). On-site releases to water and land combined make up 3% of all releases from the fabricated metal product sector.

From 2018 to 2019:

- Releases increased by 0.4 million pounds (1%).
- For 2019, 14% of all facilities reporting to TRI were in the fabricated metals sector, but facilities in this sector accounted for less than 2% of all releases reported to TRI. On average, facilities in this sector reported fewer releases per facility than facilities in most other TRI-covered sectors.

Source Reduction in the Fabricated Metal Product Manufacturing Sector:

For 2019, 188 facilities in this sector (6% of facilities) reported implementing 500 new source reduction activities. Several facilities in this sector reported initiating source reduction activities to reduce scrap generation. Note that minimizing the generation of scrap metal is a source reduction activity, while recycling scrap metal is a waste management practice. Examples of source reduction activities reported by the sector include:

- A machine shop reduced chromium compounds in waste by installing new racks which reduce damage to parts in production. [Click to view facility details in the TRI P2 Search Tool]
- A plumbing fixture manufacturer began using one copper part in two places instead of creating two separate parts, reducing copper residue and saving money. [Click to view facility details in the TRI P2 Search Tool]

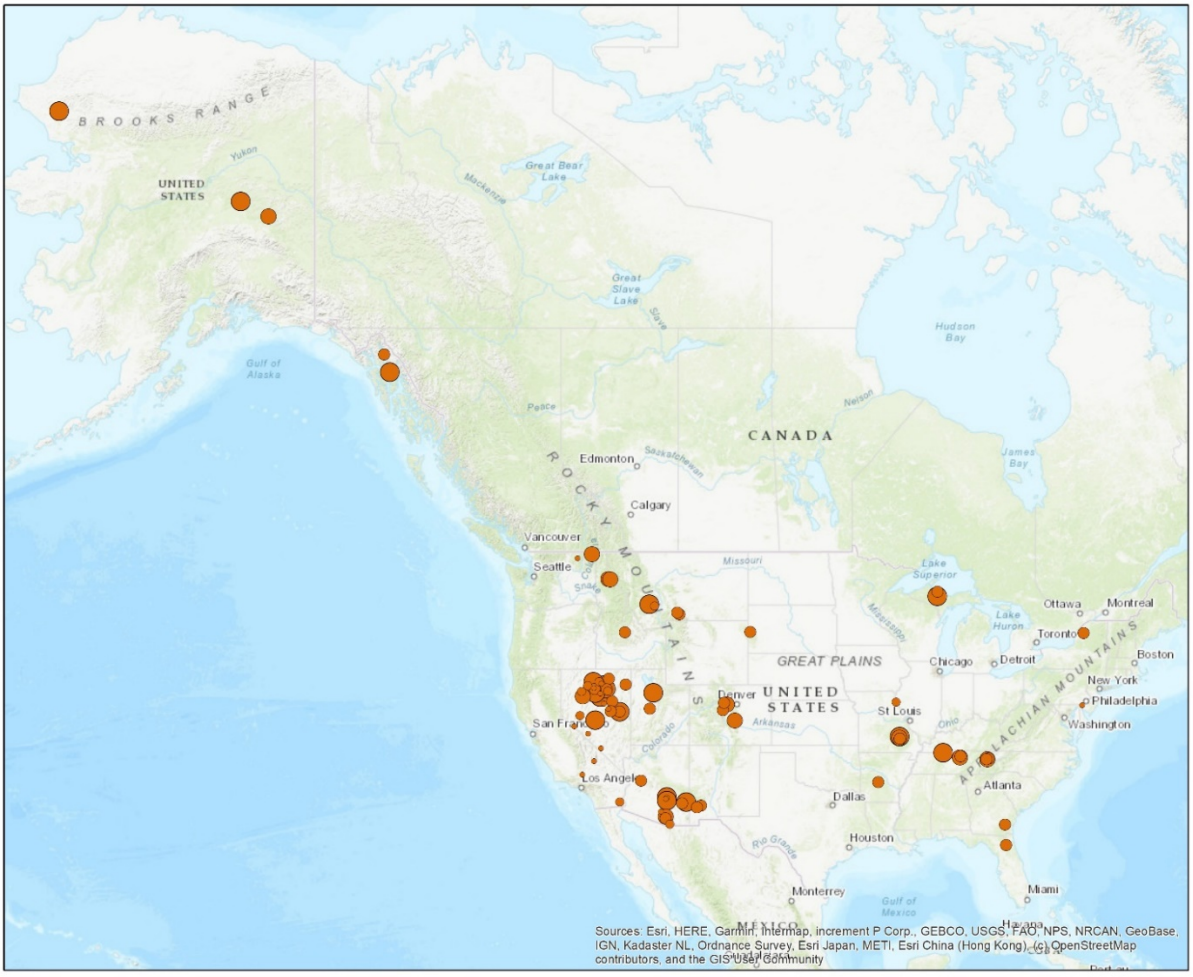
Additional Resources

- TRI's P2 program "Spotlights" feature pollution prevention activities by the fabricated metals and other sectors in reducing organic solvents and metal waste.
- TRI's P2 Industry Profile Dashboard can help you learn more about releases, other waste management trends, and pollution prevention opportunities in this sector.

Metal Mining

This section examines how TRI chemical wastes are managed in the metal mining sector (defined as facilities reporting their primary NAICS code as 2122).

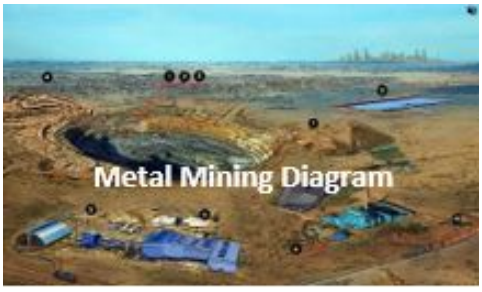
This map shows the locations of the metal mining facilities that reported to TRI for 2019, sized by their relative releases. Click on a facility for details on its TRI reporting. Mines are shown on this map based on their longitude/latitude, which may be miles from the city identified on the mine's TRI reporting forms. Mines can qualify their location relative to the city by noting the distance in the street address data field of their TRI reporting forms.



Metal Mines Reporting to TRI, 2019

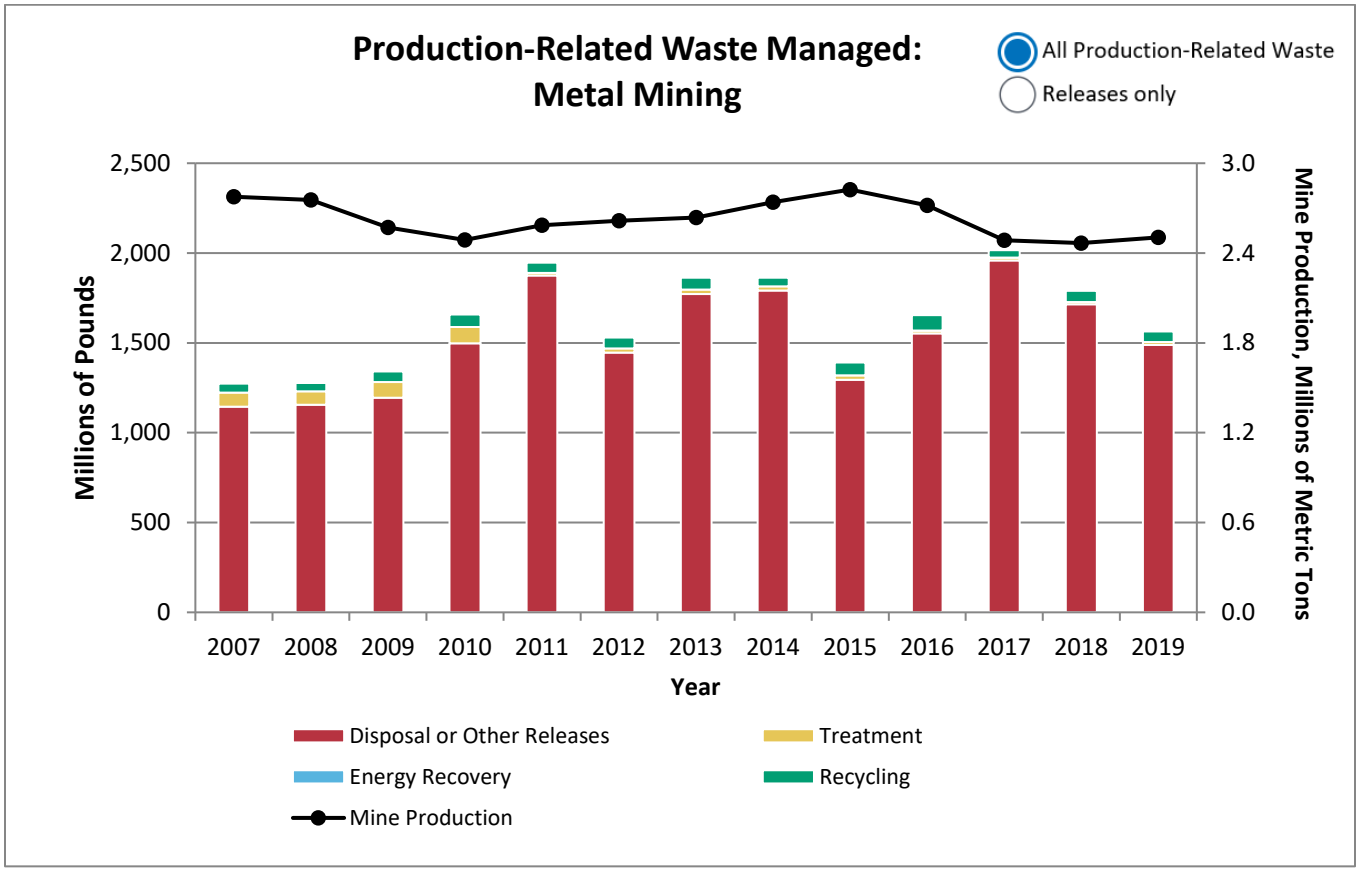
View Larger Map

For 2019, 82 metal mining facilities reported to TRI. They tend to be in western states where most of the copper, silver, and gold mining occurs; however, zinc and lead mining tend to occur in Missouri and Tennessee. Metals generated from U.S. mining operations are used in a wide range of products, including automobiles, electric and industrial equipment, jewelry, and decorative objects. The extraction and processing of these minerals generate large amounts of on-site land disposals, primarily of metal-bearing rock (called ore) and waste rock containing TRI-covered metals. To learn more about metal mining operations and their TRI reporting, explore the interactive metal mining diagram. Metal mining operations are subject to federal and state regulations.



Metal Mining Waste Management Trend

The following graph shows the annual quantities of TRI chemical waste managed by the metal mining industry from 2007 to 2019, mainly in the form of on-site land disposal. The nature of metal mining operations limits the feasibility of other methods of waste management. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- While metal mining production (as reported in the United States Geological Survey) remained relatively steady, the quantity of waste managed fluctuated.
- Besides production volume, one factor commonly cited by facilities as a contributor to the changes in quantities of waste managed is the chemical composition of the extracted ore, which can vary substantially from year to year. In some cases, small changes in the ore's composition can impact whether TRI chemicals in ore qualify for a

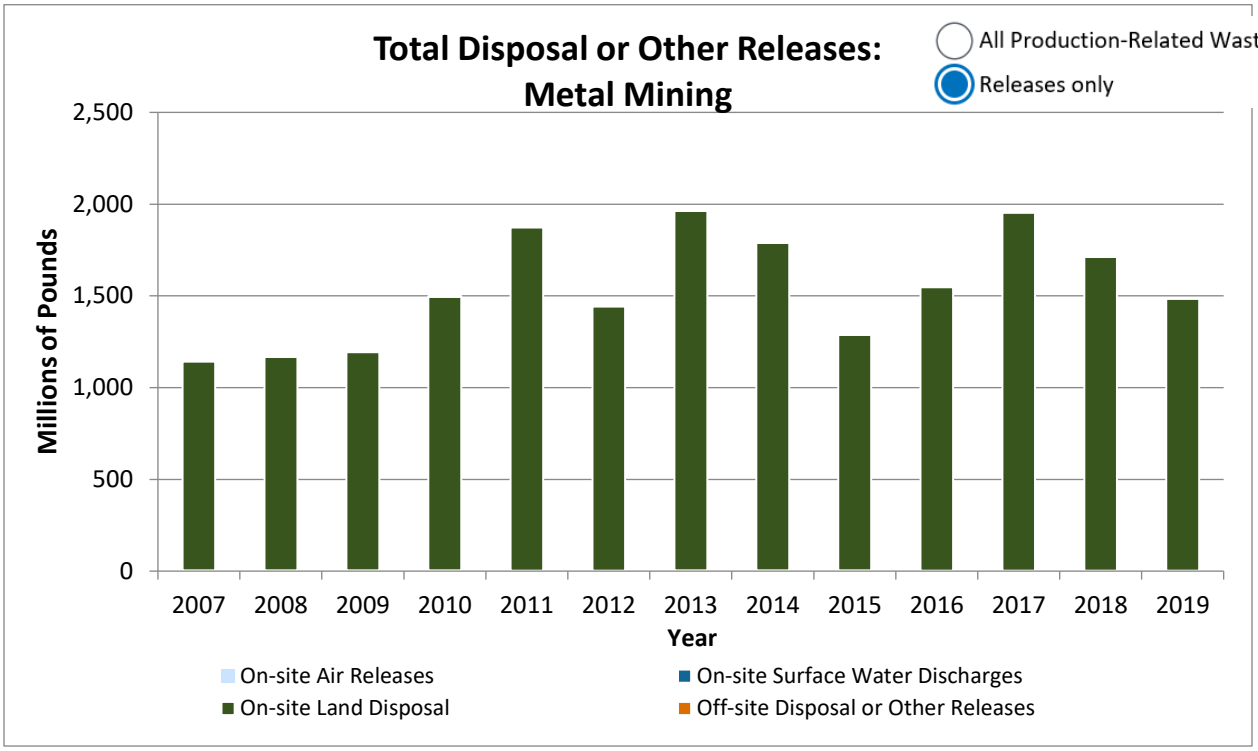
concentration-based TRI reporting exemption in one year but not in the next year or vice versa.

From 2018 to 2019:

- The quantity of TRI chemical waste managed by this sector decreased by 227 million pounds (-13%) between 2018 and 2019.
- During 2019, 95% of the metal mining sector's production-related waste generated was disposed of or otherwise released. Most of this waste consisted of metals, which were primarily disposed of to land on site at the mine.

Metal Mining Releases Trend

The following graph shows the annual quantities of TRI chemicals released by the metal mining industry, primarily through on-site land disposal.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- More than 99% of the metal mining sector's releases of TRI chemicals were on site and to land. The quantity of on-site land disposal by metal mines has fluctuated in recent years.
- Several mines have reported that changes in production volume and changes in the chemical composition of the deposit being mined are the primary causes of fluctuations in the amount of chemicals reported as disposed of on site at the mine.
- Metal mining facilities typically handle large volumes of material, and even a small change in the chemical composition of the deposit being mined can lead to big changes in the amount of TRI chemicals reported.

- The quantity of TRI chemicals released is not an indicator of health risks posed by the chemicals, as described in the Introduction. For more information, see the TRI document, *Factors to Consider When Using Toxics Release Inventory Data*.

In 2019:

- The metal mining sector reported the largest quantity of total disposal or other releases, accounting for 44% of total TRI releases and 63% of on-site land disposal for all industries.

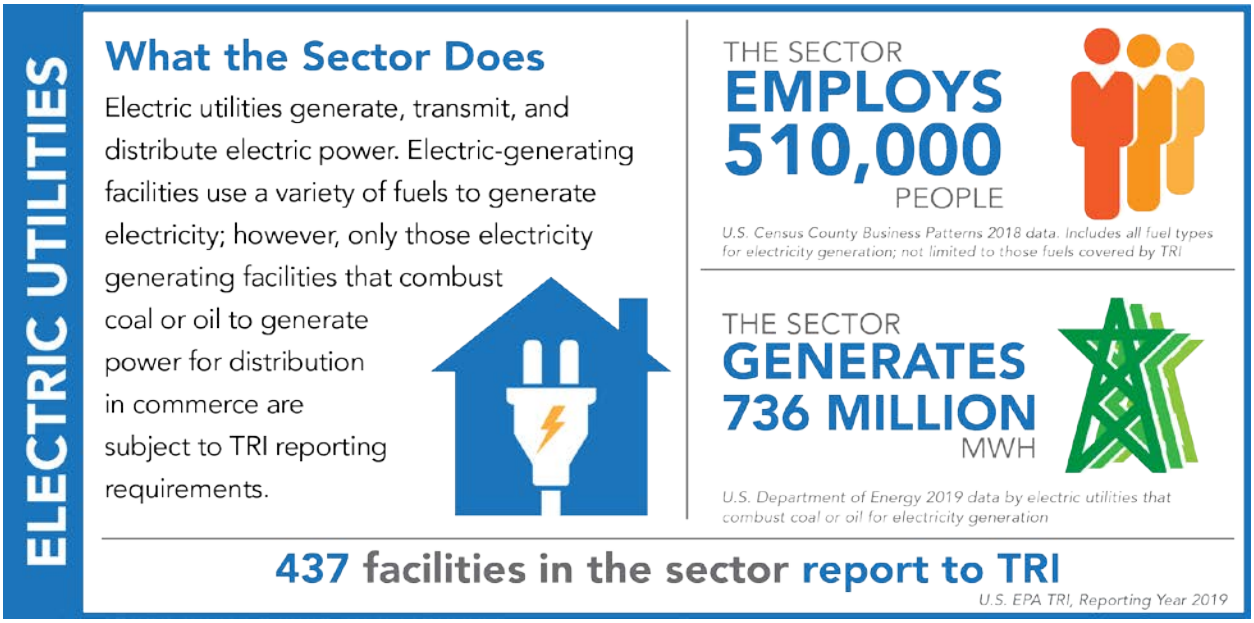
Source Reduction in the Metal Mining Sector:

One metal mining facility reported initiating source reduction activities for TRI chemicals in 2019, replacing a component used in grinding with one containing less nickel and chromium. Unlike manufacturing, the nature of mining—the necessary movement and disposal of large volumes of rock containing TRI chemicals to access the target ore—does not lend itself to source reduction. TRI's P2 Industry Profile Dashboard can help you learn more about releases, other waste management trends, and pollution prevention opportunities in this sector.

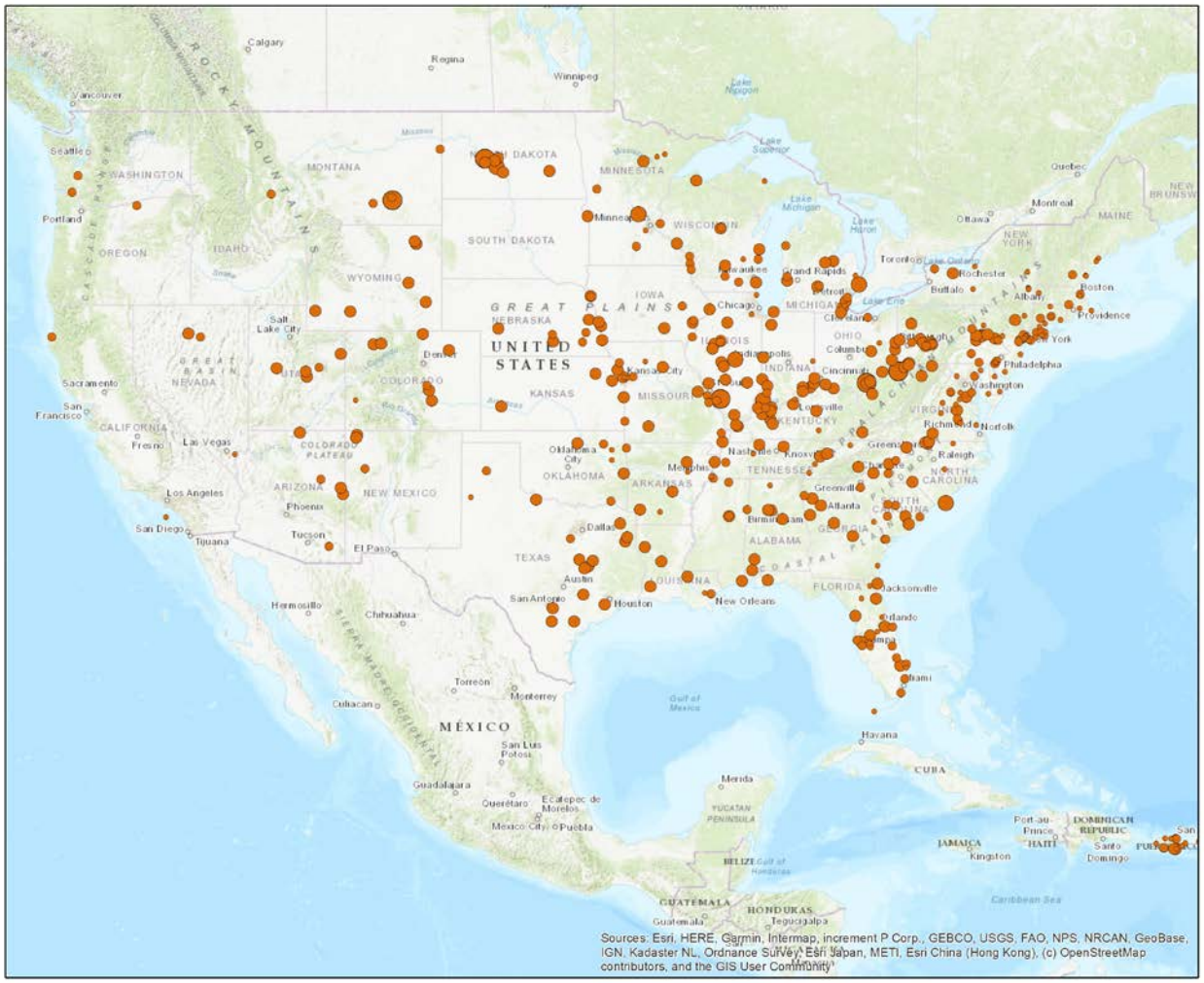
EPA's Smart Sectors Program is partnering with the mining sector to develop sensible approaches to better protect the environment and public health.

Electric Utilities

This section examines how TRI chemical wastes are managed in the electric utilities sector (defined as facilities reporting their primary NAICS code as 2211).



This map shows the locations of the electric utilities that reported to TRI for 2019, sized by their relative releases. Click on a facility for details on its TRI reporting.



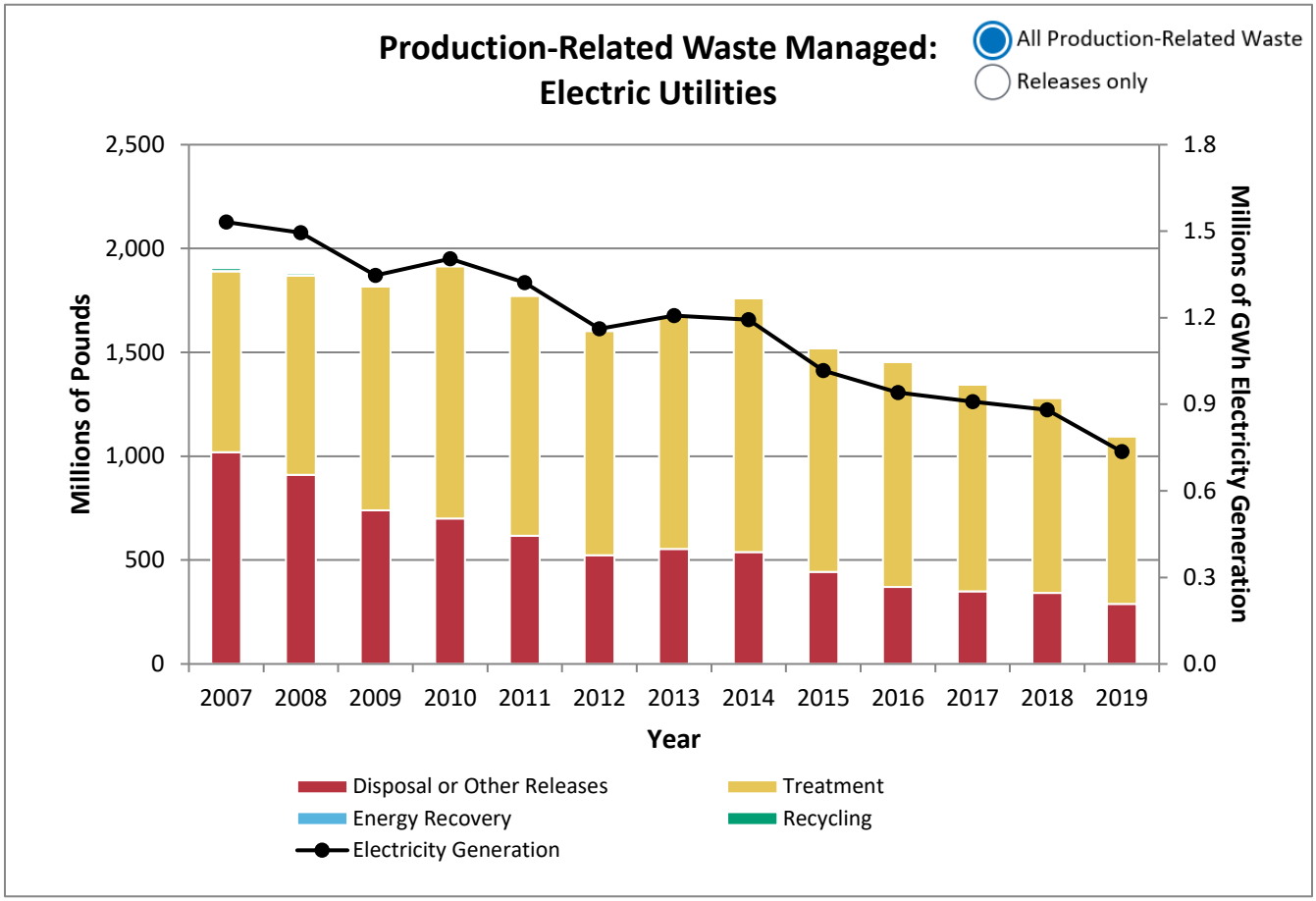
Electric Utilities Reporting to TRI, 2019

View Larger Map

For 2019, 437 electricity generating facilities reported to TRI. Facilities in the sector use different fuels to generate electricity. Only those facilities that combust coal or oil to generate electricity for distribution in commerce are subject to the TRI reporting requirements.

Electric Utilities Waste Management Trend

The following graph shows the annual quantities of TRI chemical waste that electric utility facilities managed, primarily through treatment or release. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Quantities of production-related waste managed decreased by 804 million pounds (-42%) since 2007, driven by reduced releases.
- Net electricity generation by electric utilities from coal and oil fuels decreased by 52% (as reported by the U.S. Department of Energy's Energy Information Administration). The recent production decrease (beginning in 2014) was driven by the industry's

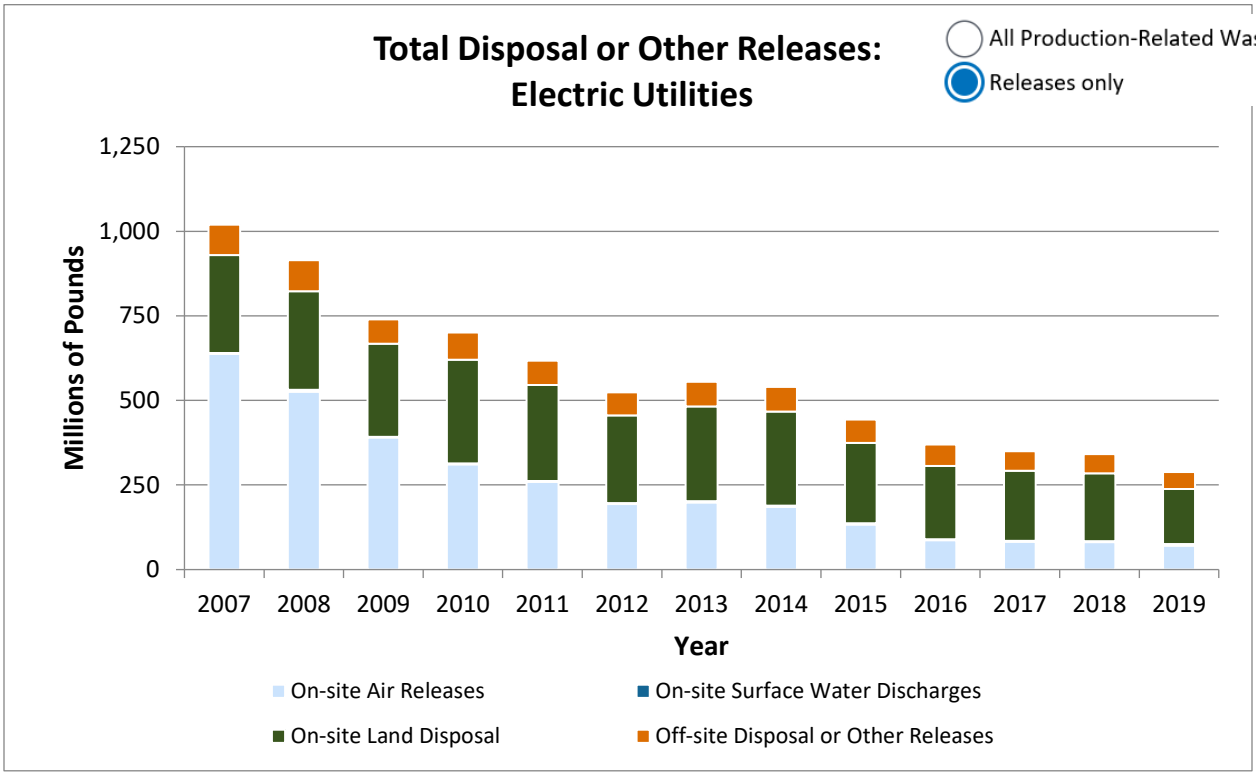
transition to natural gas. Note that only facilities that combust coal or oil to generate electricity are covered under TRI reporting requirements.

In 2019:

- Nearly three-quarters of the sector's production-related waste generated was treated, while approximately one-quarter was released to the environment.
    - This contrasts with 2007, when over half of the waste from this sector was released. This trend is due in part to increased installation of air pollution control devices that destroy TRI-reportable chemicals, reducing the quantities of chemicals that would otherwise be released into the air.
- 52 fewer facilities in the sector reported to TRI in 2019 than had reported in 2018, an 11% drop. Based on data from the U.S. Department of Energy's Energy Information Administration, most of these facilities were either no longer operating in 2019 or were no longer combusting coal or oil to generate electricity.
- Data from the Energy Information Administration indicate that the mix of energy sources for U.S. electricity generation has changed over time, especially in recent years. Natural gas and renewable energy sources account for an increasing share of U.S. electricity generation, while coal-fired electricity generation has declined. Use of oil for electric power generation continues to contribute a small percentage of total U.S. electricity generation.

Electric Utilities Releases Trend

The following graph shows the annual quantities of TRI chemicals released by electric utilities.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2007 to 2019:

- Releases from the electric utilities sector decreased by 731 million pounds (-72%). This decrease was driven by a 567 million pound (-89%) decrease in on-site air releases. On-site land disposal and off-site disposal also decreased, but to a lesser extent.

From 2018 to 2019:

- Releases by electric utilities decreased by 53 million pounds (-16%). This decrease was driven by reductions in on-site land disposal of barium compounds and reduced air releases of sulfuric and hydrochloric acid.

Source Reduction in the Electric Utilities Sector:

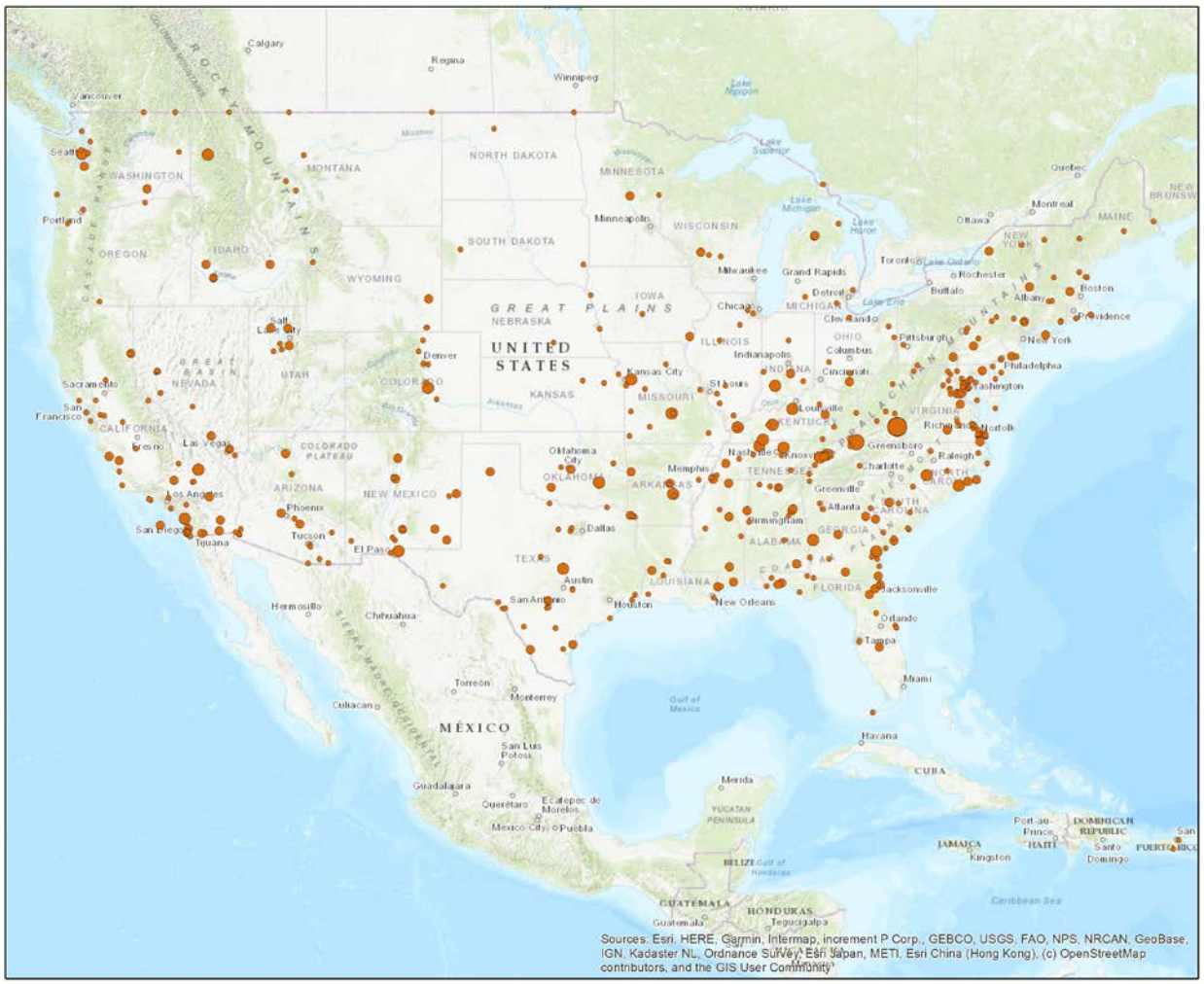
In the electric utilities sector, 6 facilities (1% of the electric utility facilities reporting to TRI) initiated source reduction activities in 2019 to reduce their use of TRI chemicals and generation of wastes that contain TRI chemicals. Examples include reducing fuel use by increasing the heat rate capacity, and experiementing with renewable biomass fuels. TRI's P2 Industry Profile Dashboard can help you learn more about releases, other waste management trends, and pollution prevention opportunities in this sector.

EPA's Smart Sectors Program is partnering with this sector to develop sensible approaches to industrial operations that better protect the environment and public health.

Federal Facilities

The 1993 Executive Order 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements," established the requirement that all federal facilities, including facilities operated by the EPA, the Department of Defense, and the Department of the Treasury, are subject to the TRI reporting requirements, regardless of the type of operations at the facility (as described by their NAICS code). This executive order has been reaffirmed by subsequent administrations.

This map shows the locations of 441 federal facilities that reported to TRI in 2019, sized by their relative releases. Click on a facility for details on its TRI reporting.

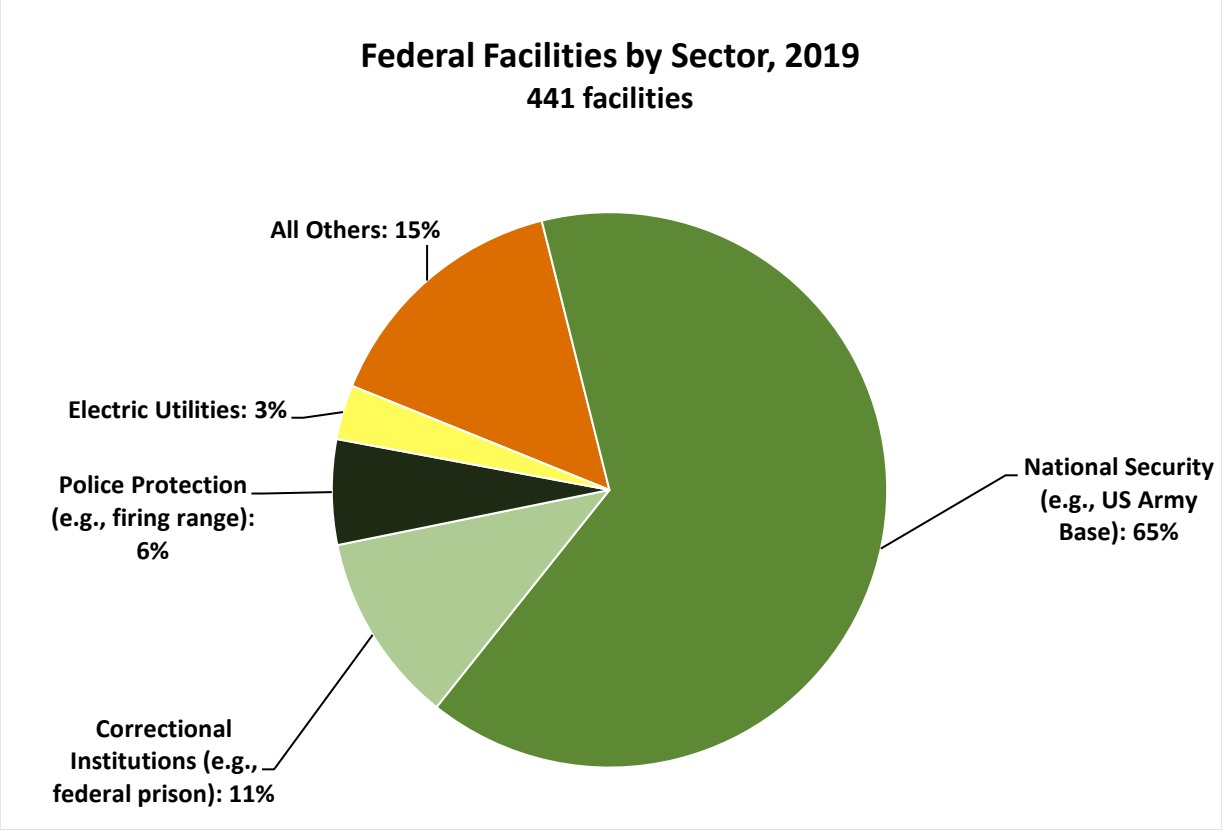


Federal Facilities Reporting to TRI, 2019

View Larger Map

Federal Facilities by Industry

The following chart shows the number of federal facilities reporting to TRI by sector for 2019.

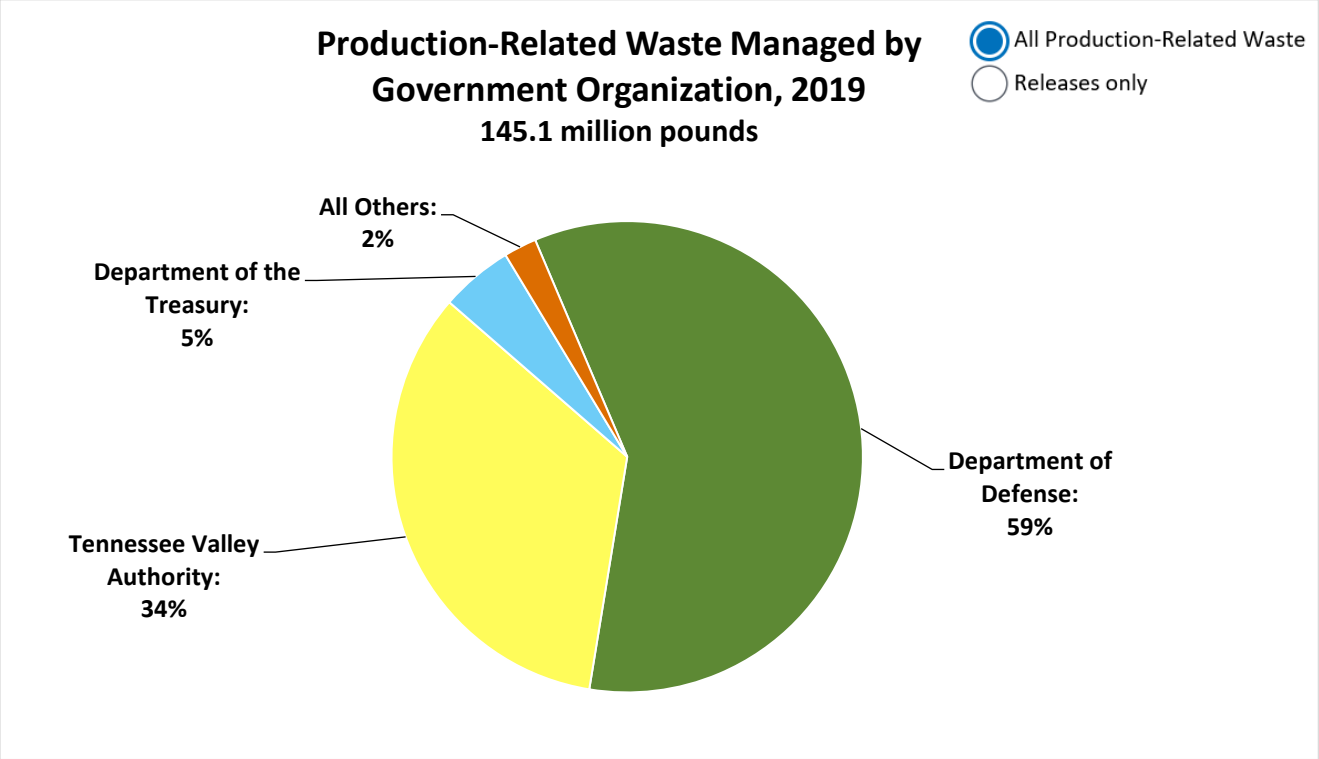


For 2019, 441 federal facilities in 38 different types of operations (based on their 6-digit NAICS codes) reported to TRI. Almost two-thirds of these facilities were in the National Security sector, which includes Department of Defense facilities such as Army and Air Force bases. Since all federal facilities are subject to TRI reporting requirements regardless of industry sector, for some sectors, the TRI database only includes data from federal facilities. Most federal facilities are in such sectors, including Military Bases; Correctional Institutions; and Police Protection, such as training sites for Border Patrol stations.

As with non-federal facilities, the type of activities at federal facilities determine the types and quantities of chemical waste managed and reported to TRI. Some of the activities occurring at federal facilities that are captured by TRI reporting are similar to those at non-federal facilities, such as electric utilities. In other cases, federal facilities may report waste managed from specialized activities that do not usually happen at non-federal facilities. For example, all of the federal facilities included under Police Protection and Correctional Institutions only reported lead and lead compounds, likely due to the use of lead ammunition on their firing ranges.

Waste Management by Federal Facilities

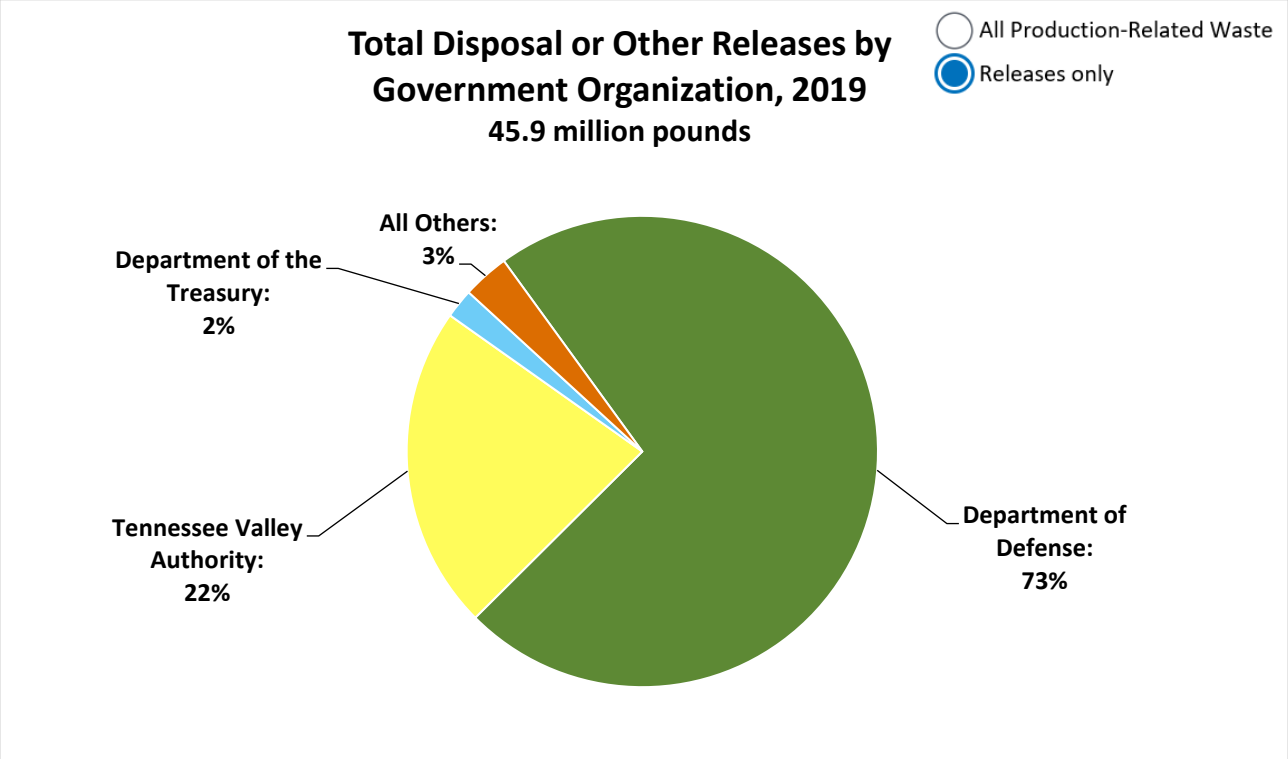
The following pie chart shows the percentages of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by federal government organizations in 2019. For more details on quantities released, toggle to the "Releases only" graph.



- The types of waste reported by federal facilities vary by the type of operation.
    - The Tennessee Valley Authority is a government-owned electric utility that provides power to southeastern states. Over 80% of its reported waste was hydrochloric and sulfuric acid aerosols, which were mostly treated on site.
    - The Department of the Treasury facilities reporting to TRI are mints for manufacturing currency and, accordingly, they report metals (e.g., copper and nickel) to TRI. Almost all of their metal waste was recycled off site.

Federal Facilities Releases Trend

The following graph shows the percentages of TRI chemicals released by federal government organizations in 2019.



- Most of the Department of Defense's releases were on-site releases of nitrate compounds to water and on-site land disposal of metals and metal compounds.
- The chemicals released by the Tennessee Valley Authority are similar to the chemicals released by other electric utilities that report to TRI. On-site land disposal of barium compounds and air releases of sulfuric acid make up a large portion of releases from the Tennessee Valley Authority and other electric utilities.

Source Reduction at Federal Facilities:

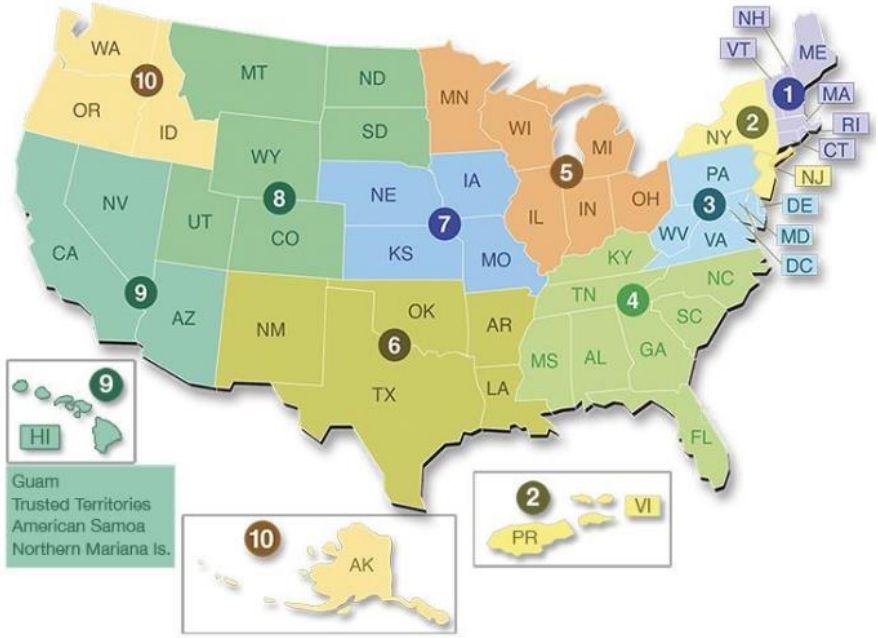
Federal facilities' operations are diverse and few focus on manufacturing processes. Due to this variety of functions, operations at some federal facilities are better suited to source reduction strategies than others. For the 2019 reporting year, 21 federal facilities (5%) reported implementing source reduction activities.

Federal facilities have often reported difficulties when trying to reduce their use of lead because it is contained in ammunition used at National Security and Park Service facilities. For 2019,

several federal facilities reported using “green” ammuntion in accordance with National Park Service policy to use non-lead ammunition where feasible. To find more examples of federal facilities’ source reduction activities and the source reduction barriers they face, visit TRI’s P2 Search Tool and select industry sectors such as National Security, Correctional Institutions or Police Protection from the dropdown menu under “search criteria.”

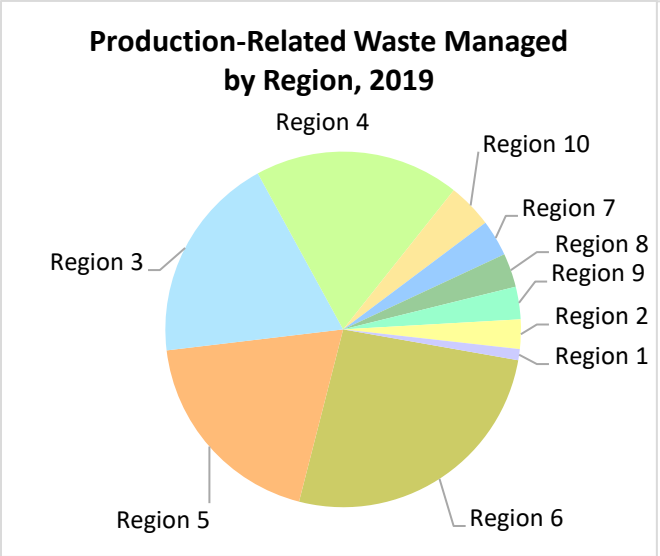
EPA Regional Profiles

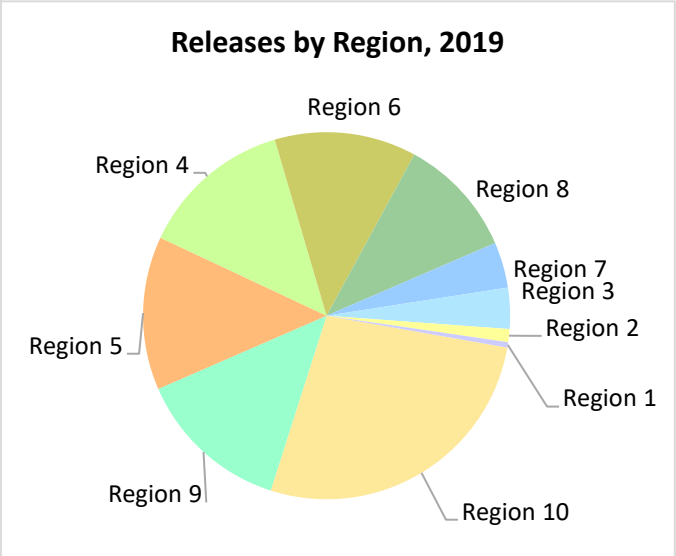
This section of the National Analysis looks at releases and other production-related waste management activities of Toxics Release Inventory (TRI) chemicals at the EPA regional level during 2019. EPA has 10 regional offices, each of which is responsible for multiple states and in some cases, territories and tribes.



EPA regions vary significantly in many important characteristics, including size, population, and the types of facilities located in each region. These factors result in significant differences between national and regional trends in TRI chemical waste management. For example, certain activities such as metal mining are geographically concentrated and generate large quantities of TRI chemical waste. As a result, release trends in regions with many metal mines often do not mirror national release trends.

The charts below show: 1) production-related TRI chemical waste managed, which includes management through recycling, combustion for energy recovery, treatment, and disposal or other release; and 2) the portion of production-related waste that is released, by EPA region.





The relative amounts of production-related waste managed compared to releases in each region is largely explained by the types of industry located in each region. For example:

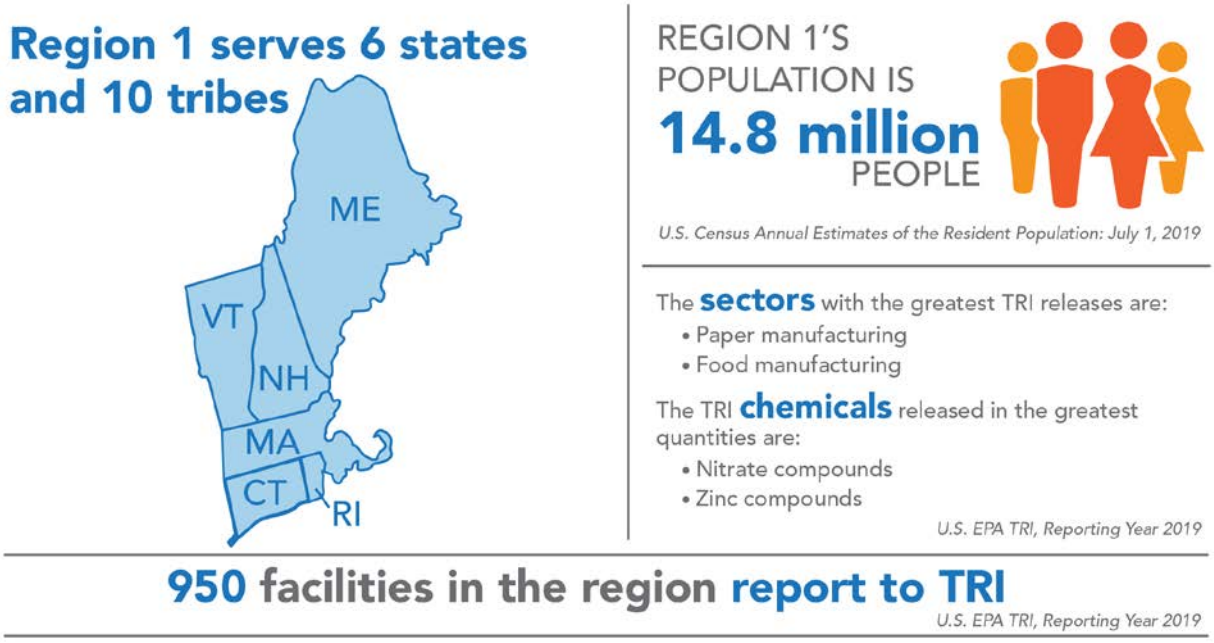
- In **Regions 8, 9 and 10**, metal mines accounted for more releases than any other sector. Metal mines tend to have high releases due to the large quantities of metals disposed of on site to land. For quantities of waste managed through treatment, energy recovery and recycling, metal mines rank lower than almost all other sectors, resulting in lower production-related waste managed in regions with substantial metal mining operations.
- **Region 6** had the largest quantity of production-related waste managed, driven by facilities in the chemical manufacturing sector treating chemicals on site, such as ethylene, toluene, and propylene.
- Quantities of production-related waste managed in **Regions 3, 4 and 5** were largely from the chemical manufacturing sector. Each of these regions include one chemical manufacturing facility that reported high quantities of chemicals recycled on site. For example, in Region 3, one facility reported 3.6 billion pounds of cumene recycled, and in Regions 4 and 5, one facility in each region reported recycling over one billion pounds of dichloromethane (methylene chloride). The recycling quantities at these individual facilities are major contributors to the large quantities of TRI production-related waste managed in these regions.

TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the Introduction. For more information see *Factors to Consider When Using Toxics Release Inventory Data*.

Regional Profile for EPA Region 1

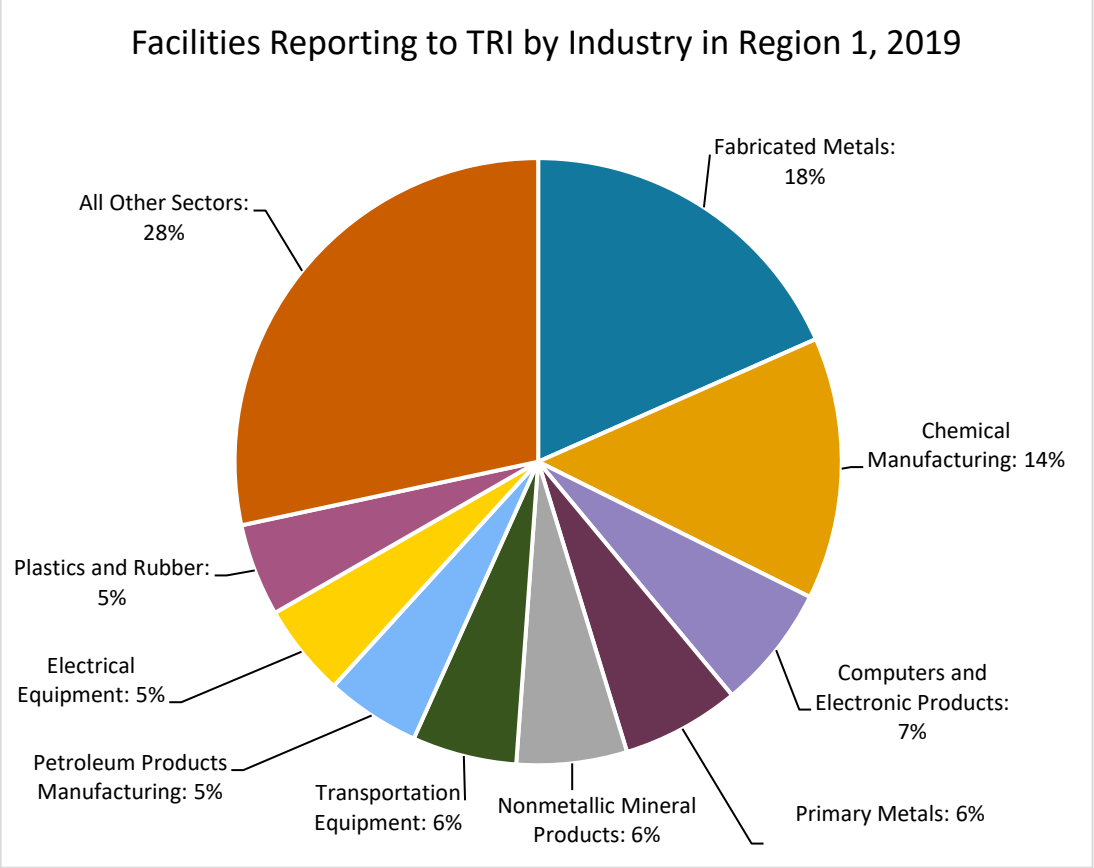
This section examines TRI reporting in EPA Region 1. Region 1 includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, and 10 tribes.



Region 1 covers 4% of the U.S. population and includes 4% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Although Region 1 includes 10 tribes, no facilities located on tribal lands in the region reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 1.



In 2019:

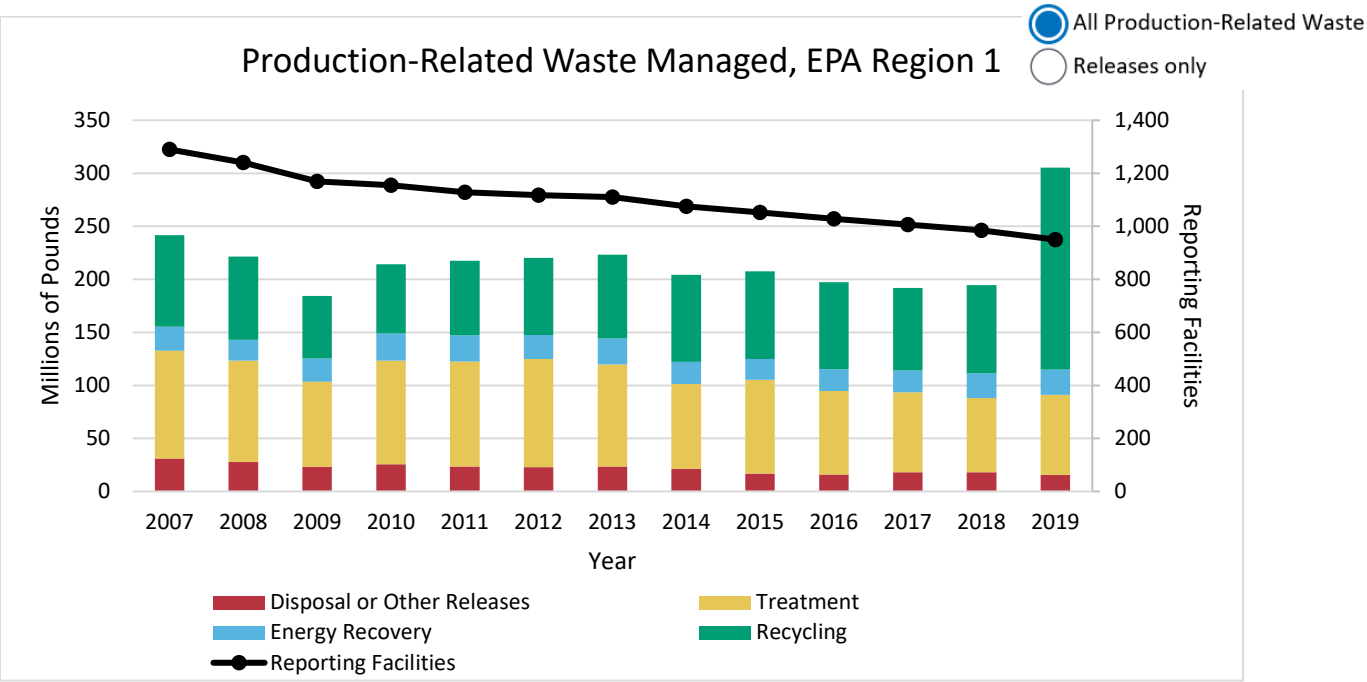
- 950 facilities in Region 1 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the fabricated metals (i.e., manufacture of metal products) or chemical manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 1 were the paper manufacturing, food manufacturing, fabricated metals, and chemical manufacturing sectors. Note that relatively few facilities in the paper manufacturing and food manufacturing sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.

- Nationwide, the metal mining, chemical manufacturing, primary metals (including iron and steel manufacturing, and foundries), and electric utilities sectors reported the largest quantities of releases.

For information on the Region 1 facilities with the largest releases, see the Region 1 TRI factsheet.

Region 1 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 1. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

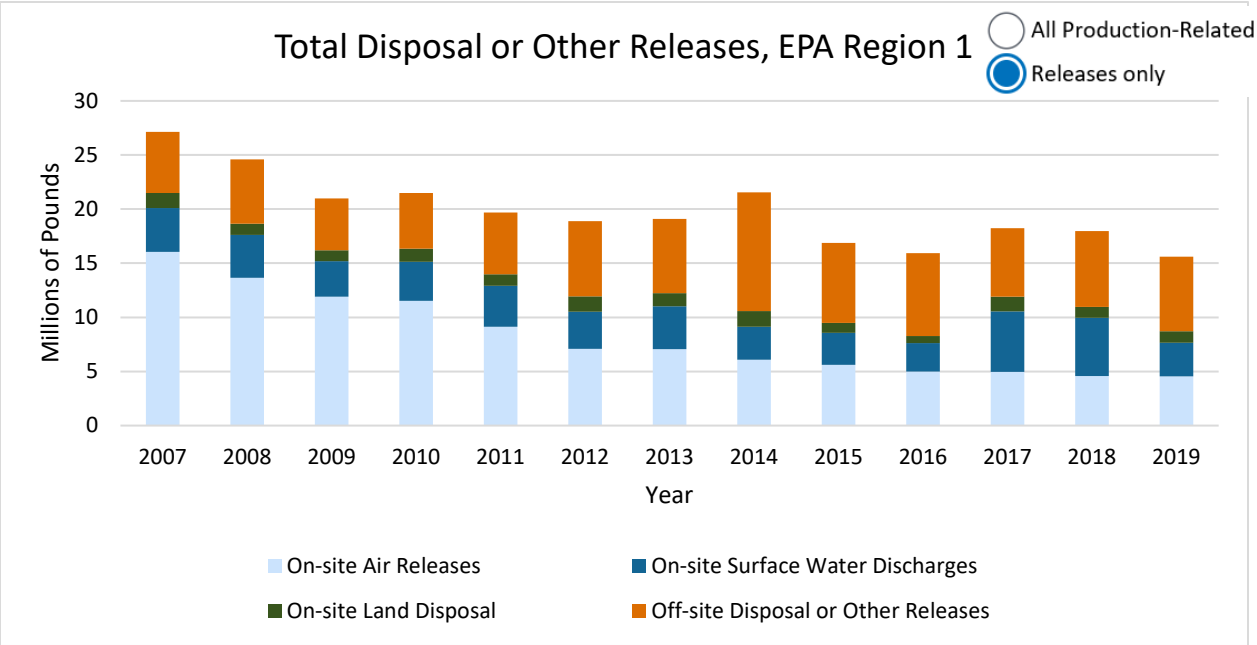
In 2019:

- Facilities in Region 1 managed 309 million pounds of production-related waste, 95% of which was recycled, combusted for energy recovery, or treated. Only 5% was disposed of or otherwise released into the environment in Region 1, compared to 11% nationally.
- Since 2018, quantities of production-related waste managed in the region increased by 56%, driven by a large increase in recycling, which more than doubled from 2018 to 2019.
    - The increase for 2019 is due to increased recycling of methanol by a single chemical manufacturing facility in Connecticut. [Click to view facility details in the TRI P2 Search Tool].

From 2007 to 2019:

- Production-related waste managed increased by 63.9 million pounds (26%), driven by the 2019 increase in recycling.
    - Nationally, quantities of production-related waste managed increased by 23% since 2007, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 1.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 1 reported releasing 16.2 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
    - To air: methanol and ammonia;
    - To water: nitrate compounds;
    - To land: zinc compounds and manganese compounds; and
    - Transferred off site for disposal: zinc compounds and nitrate compounds
- Since 2018, releases in Region 1 decreased by 2.3 million pounds (-13%). On-site releases to air and water and off-site transfers for disposal decreased while releases to land increased. Nationally, releases decreased by 9%.
- Contributions by state to TRI releases in Region 1 were: Maine (58%), Massachusetts (19%), Connecticut (15%), Rhode Island (2%), New Hampshire (2%), and Vermont (2%).

Regional Highlight

Since 2007, releases in Region 1 have decreased by 42%, driven by reductions in releases to air reported by electric utilities.

- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 1 were: Connecticut (66%), Massachusetts (32%), Maine (1%), Rhode Island (<1%), New Hampshire (<1%), and Vermont (<1%).
    - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

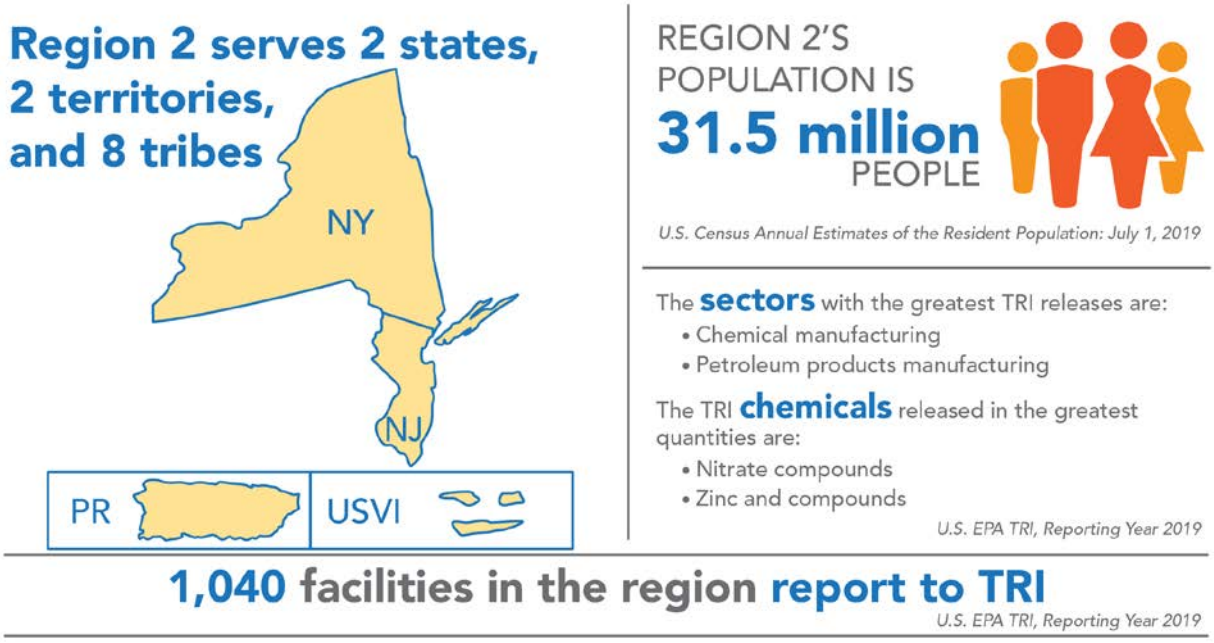
- Releases in Region 1 decreased by 11.5 million pounds (-42%), driven by reduced air releases from electric utilities. Nationally, releases decreased by 19%.
- Quantities of chemicals released to air, water and land decreased, while quantities of chemicals transferred off site for disposal increased.

Source Reduction

In 2019, 9% of facilities in Region 1 (82 facilities) reported implementing new source reduction activities. Source reduction reporting rates were among the highest in the computer/electronic products sector, in which 22% of facilities reported source reduction activities. For example, one circuit board manufacturer reduced its use of formaldehyde by optimizing the process control module that analyzes bath conditions and monitors the chemistry needed to maintain proper conditions. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 2

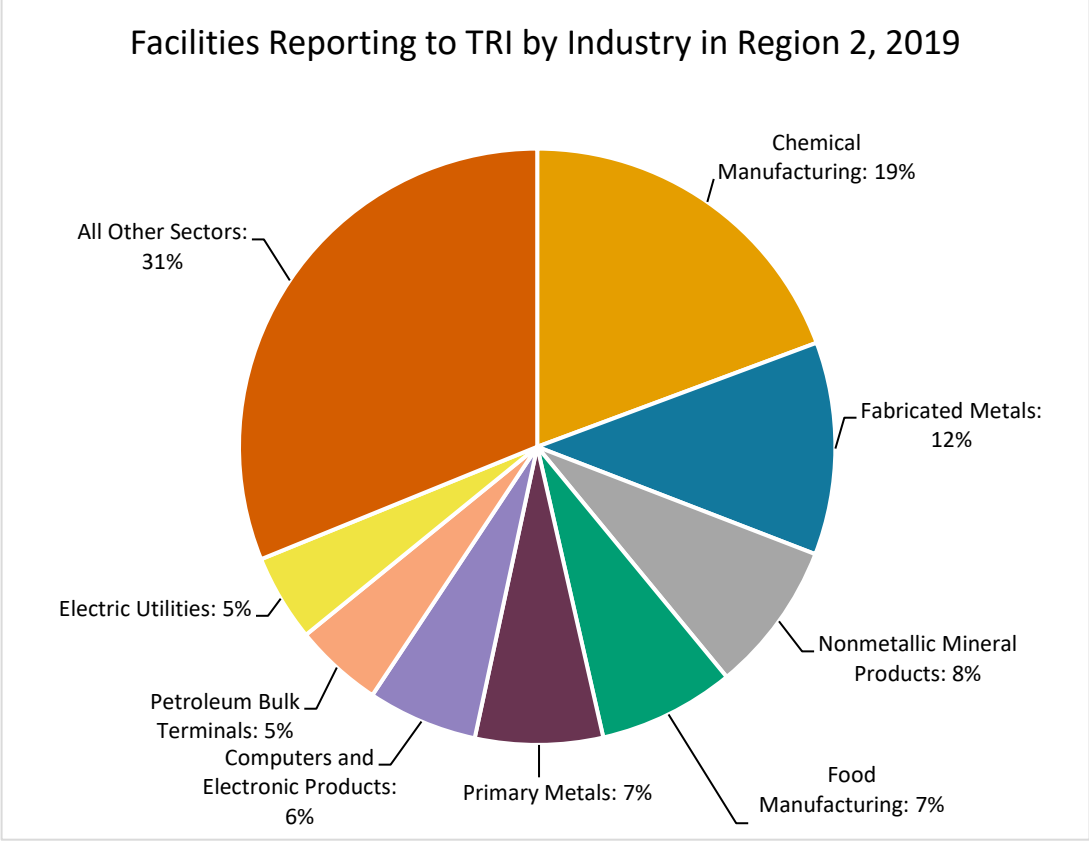
This section examines TRI reporting in EPA Region 2. Region 2 includes New Jersey, New York, Puerto Rico, US Virgin Islands, and 8 tribes.



Region 2 covers 10% of the U.S. population and includes 5% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Although Region 2 includes 8 tribes, no facilities located on tribal lands in the region reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 2.



In 2019:

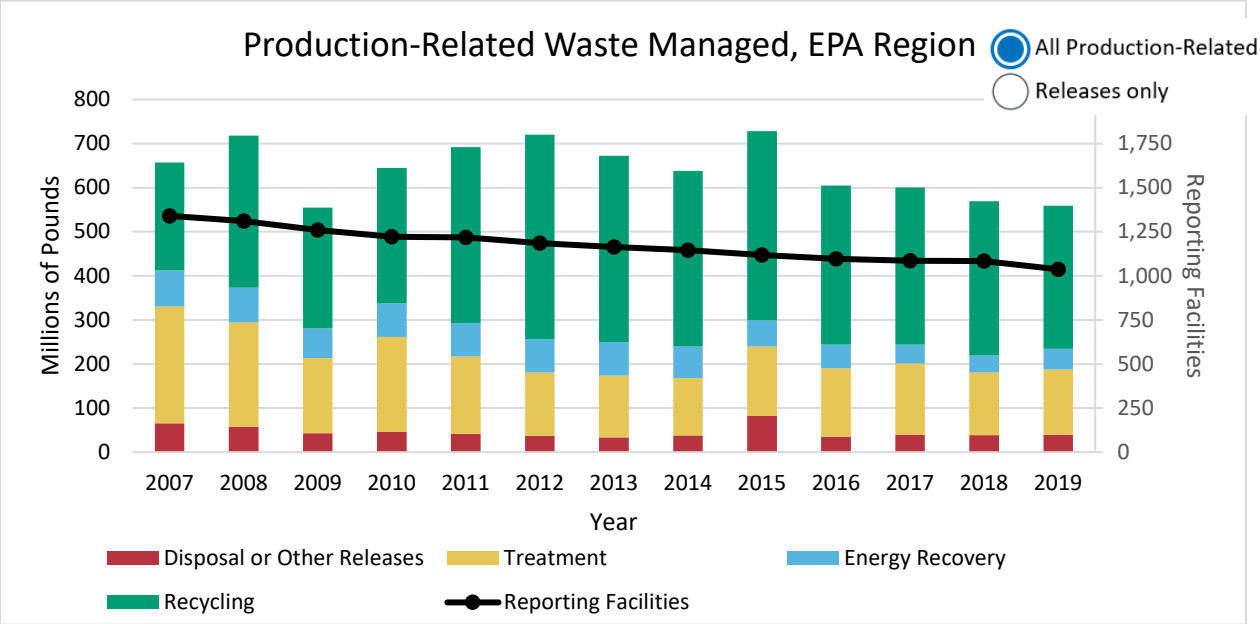
- 1,040 facilities in Region 2 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the chemical manufacturing or fabricated metals (i.e., manufacture of metal products) sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 2 were the chemical manufacturing, petroleum products manufacturing, hazardous waste management, primary metals (including iron and steel manufacturing, and foundries), and electric utilities sectors. Note that relatively few facilities in the petroleum products and hazardous waste management sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.

- Nationwide, the metal mining, chemical manufacturing, primary metals, and electric utilities sectors reported the largest releases.

For information on the Region 2 facilities with the largest releases, see the TRI Region 2 TRI factsheet.

Region 2 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 2. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented. Total production-related waste managed reported for 2019 in Region 2 was higher than shown here due to large treatment quantities of hydrogen sulfide, which was not TRI-reportable until 2012.

In 2019:

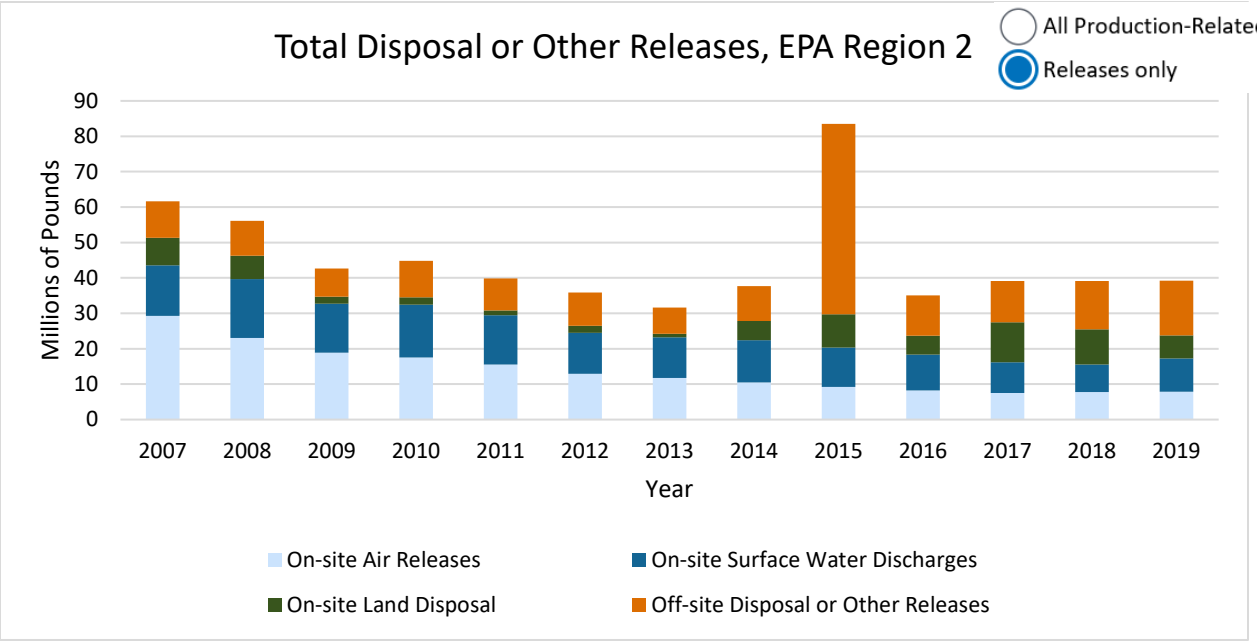
- Facilities in Region 2 managed 821 million pounds of production-related waste, 95% of which was recycled, combusted for energy recovery, or treated. Only 5% was disposed of or otherwise released into the environment in Region 2, compared to 11% nationally. The 821 million pounds of production-related waste includes all chemicals reported for 2019, while for comparability over time, the trend chart excludes chemicals that were added to the TRI list after 2007. For Region 2, the difference for 2019 is primarily due to the quantity of hydrogen sulfide treated which is included in the 821 million pound total for 2019 but is excluded from the trend chart. TRI reporting of hydrogen sulfide began in 2012.
- The chart above shows a 2% decrease in production-related waste managed since 2018. This excludes chemicals that were added to the TRI chemical list after 2007. Including

those chemicals, quantities of production-related waste managed in Region 2 increased by 64 million pounds (9%) since 2018, driven by increased treatment of hydrogen sulfide.

From 2007 to 2019:

- Production-related waste managed decreased by 97.8 million pounds (-15%). Quantities of waste treated, combusted for energy recovery, and disposed of or otherwise released decreased, while quantities recycled increased. Nationally, quantities of production-related waste managed increased by 23%.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 2.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 2 reported releasing 39.3 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - To air: ammonia and sulfuric acid;
  - To water: nitrate compounds;
  - To land: asbestos; and
  - Transferred off site for disposal: zinc compounds and nitrate compounds.
- Since 2018, releases decreased slightly (by less than 1%). Water releases and off-site transfers for disposal increased, while air releases and land releases decreased. Nationally, releases decreased by 9%.
- Contributions by state or territory to TRI releases in Region 2 were: New York (48%), New Jersey (36%), Puerto Rico (15%), and U.S. Virgin Islands (<1%).

Regional Highlight

Variability in TRI chemical releases in Region 2 is due to changes in releases reported by hazardous waste management facilities, where release quantities can vary widely year to year.

- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state or territory to the RSEI Score for Region 2 were: New Jersey (56%), New York (35%), Puerto Rico (9%), and U.S. Virgin Islands (<1%).
    - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

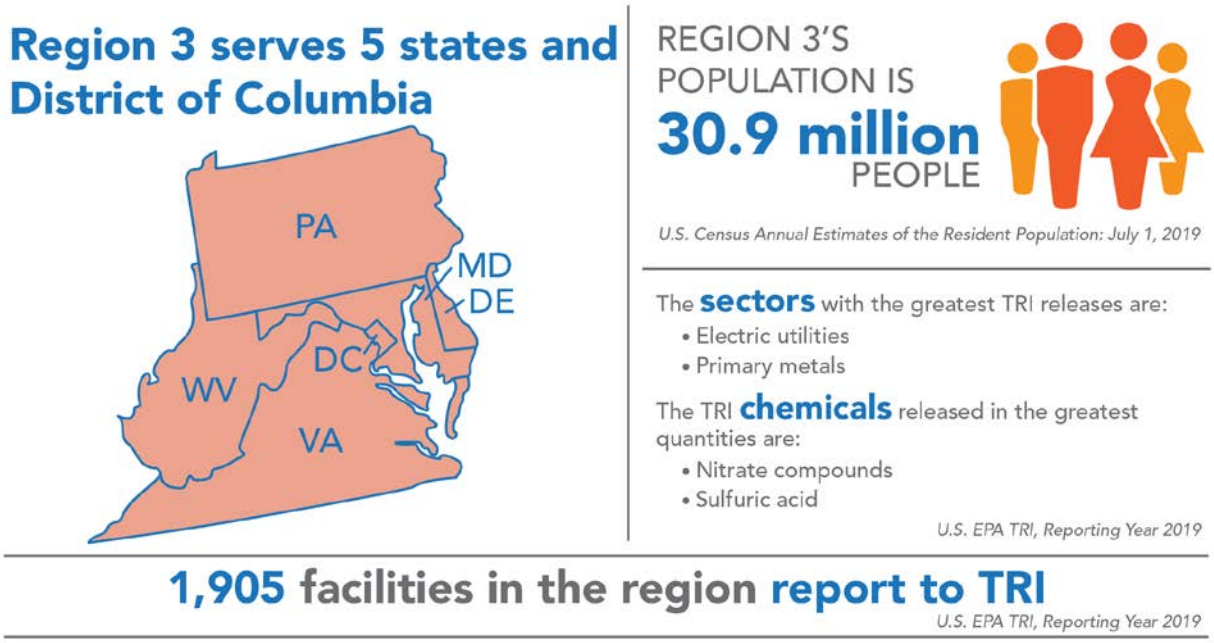
- Releases in Region 2 decreased by 22.4 million pounds (-36%), driven by reduced releases from electric utilities. Nationally, releases decreased by 19%.
- Quantities of chemicals released to air, water, and land decreased, while off-site transfers for disposal increased.
- The increased releases for 2015 shown in the graph were caused by off-site transfers for disposal of several chemicals from a hazardous waste management facility in Kearny, New Jersey. [Click to view facility details in the TRI P2 Search Tool].

Source Reduction

In 2019, 9% of facilities in Region 2 (95 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the miscellaneous manufacturing sector, where 14% of facilities reported source reduction activities. As one example of source reduction in Region 2, a facility began monitoring operations to improve material yields and reduce waste. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 3

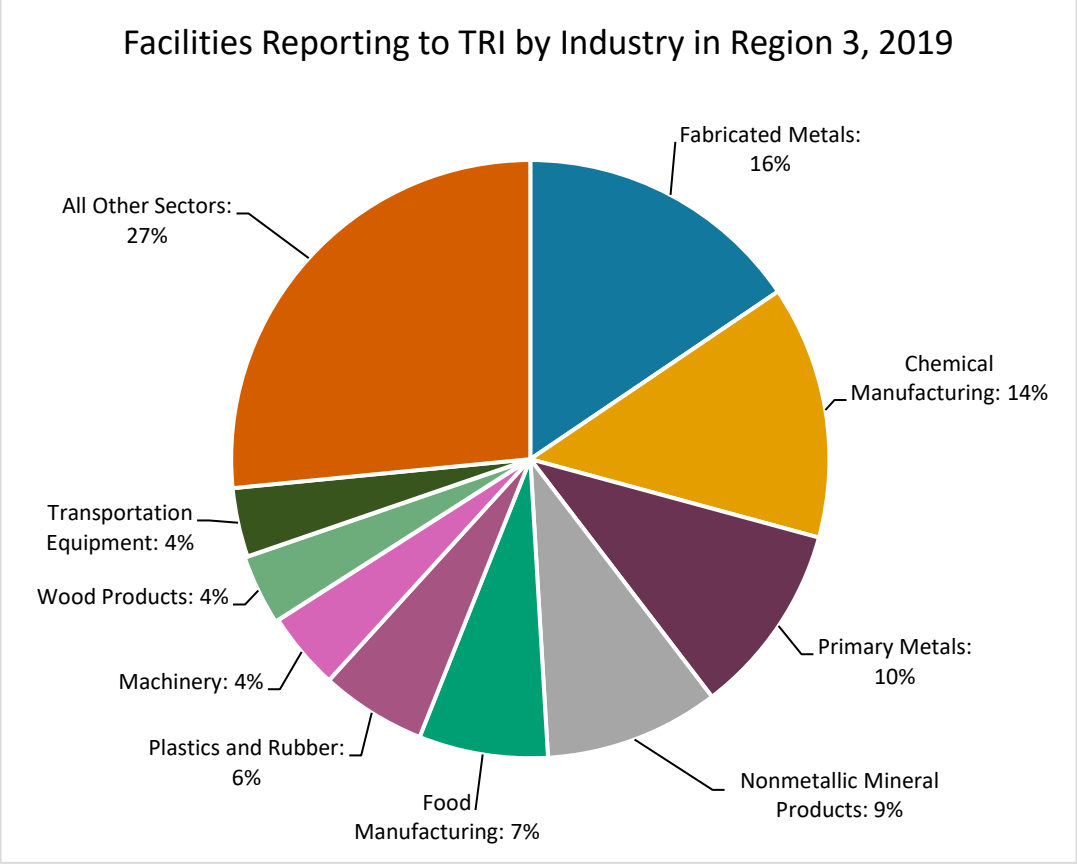
This section examines TRI reporting in EPA Region 3. Region 3 includes Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia.



Region 3 covers 9% of the U.S. population and includes 9% of all facilities that report to TRI. For state-specific TRI data, see the Where You Live section.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 3.



Note: Percentages do not sum to 100% due to rounding

In 2019:

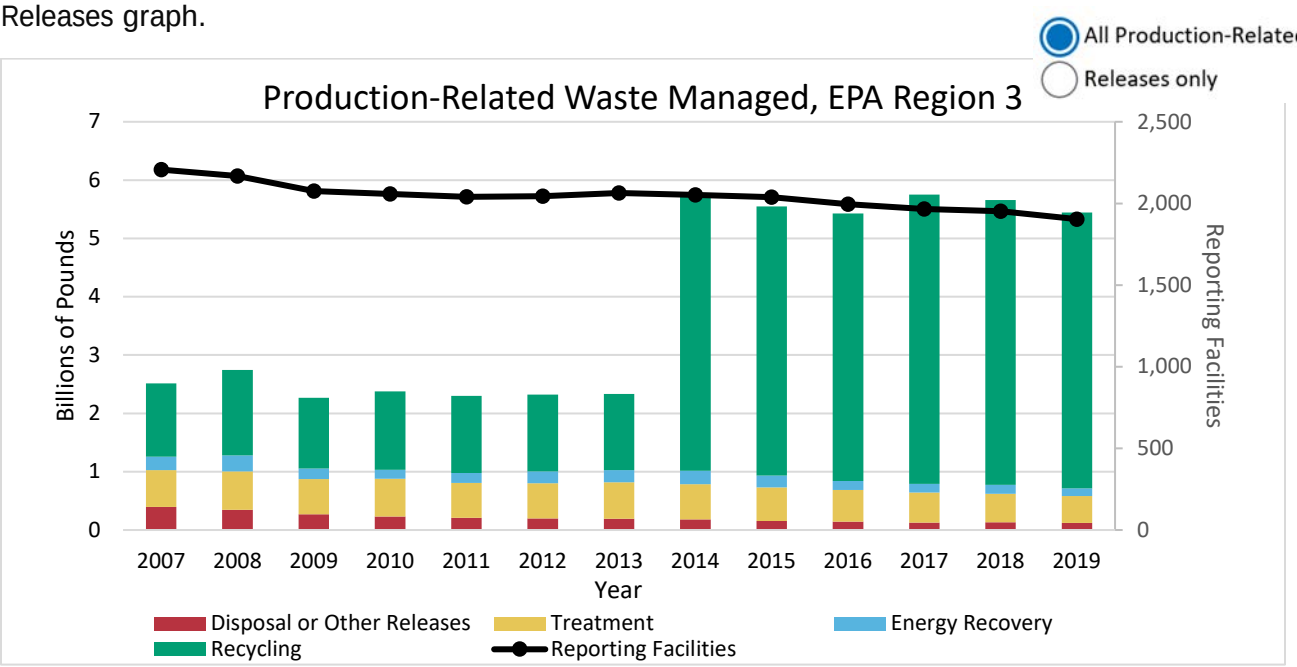
- 1,905 facilities in Region 3 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the fabricated metals (i.e., manufacture of metal products) or chemical manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 3 were the electric utilities, primary metals (including iron and steel manufacturing, and foundries), and petroleum products manufacturing. Note that relatively few facilities in the electric utilities and petroleum products sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.

- Nationwide, the metal mining, chemical manufacturing, primary metals, and electric utilities sectors reported the largest releases.

For information on the facilities with the largest releases in the region, see the Region 3 TRI factsheet.

Region 3 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 3. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

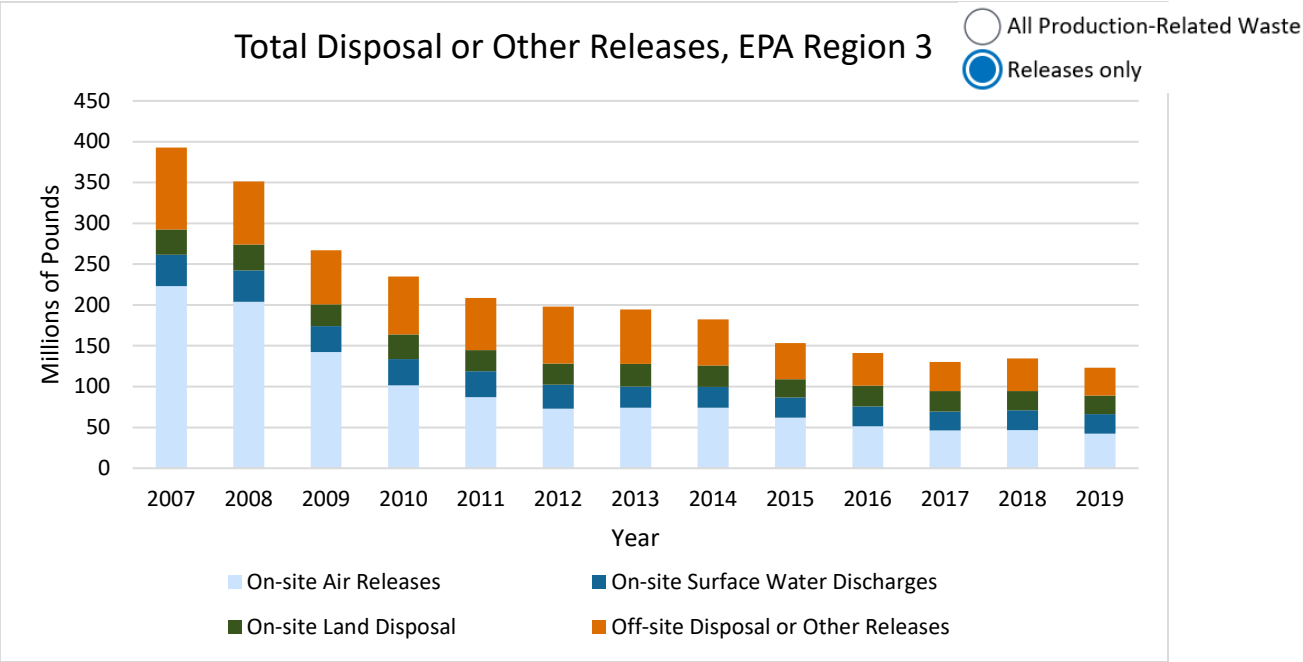
In 2019:

- Facilities in Region 3 managed 5.8 billion pounds of production-related waste, 81% of which was recycled, compared to 53% nationally.
- Since 2018, production-related waste managed in the region decreased by 324 million pounds (-5%), driven by reductions in the quantities of waste recycled and treated.

From 2007 to 2019:

- Total production-related waste managed increased by 2.9 billion pounds (117%), driven by one facility which reported that it recycled over 3 billion pounds of cumene each year from 2014 to 2019. [Click to view facility details in the TRI P2 Search Tool].
    - Excluding this facility, production-related waste managed in the region decreased by 699 million pounds (-28%).
    - Nationally, quantities of production-related waste managed increased by 23% since 2007, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 3.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 3 reported releasing 124 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - To air: sulfuric acid;
  - To water: nitrate compounds;
  - To land: lead compounds and manganese compounds; and
  - Transferred off site for disposal: zinc compounds and manganese compounds.
- Since 2018, releases decreased by 11.4 million pounds (-8%), primarily driven by air releases and off-site transfers for disposal, though releases to land and water also decreased slightly. Nationally, releases decreased by 9%.
- Contributions by state to TRI releases in Region 3 were : Pennsylvania (41%), Virginia (28%), West Virginia (22%), Delaware (5%), and Maryland (4%).

Regional Highlight

The decrease in chemical releases for 2019 in Region 3 was driven by a reduction in releases to air and off-site transfers for disposal from the electric utilities sector.

- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 3 were: Pennsylvania (62%), Virginia (14%), West Virginia (9%), Delaware (8%), and Maryland (1%).
    - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

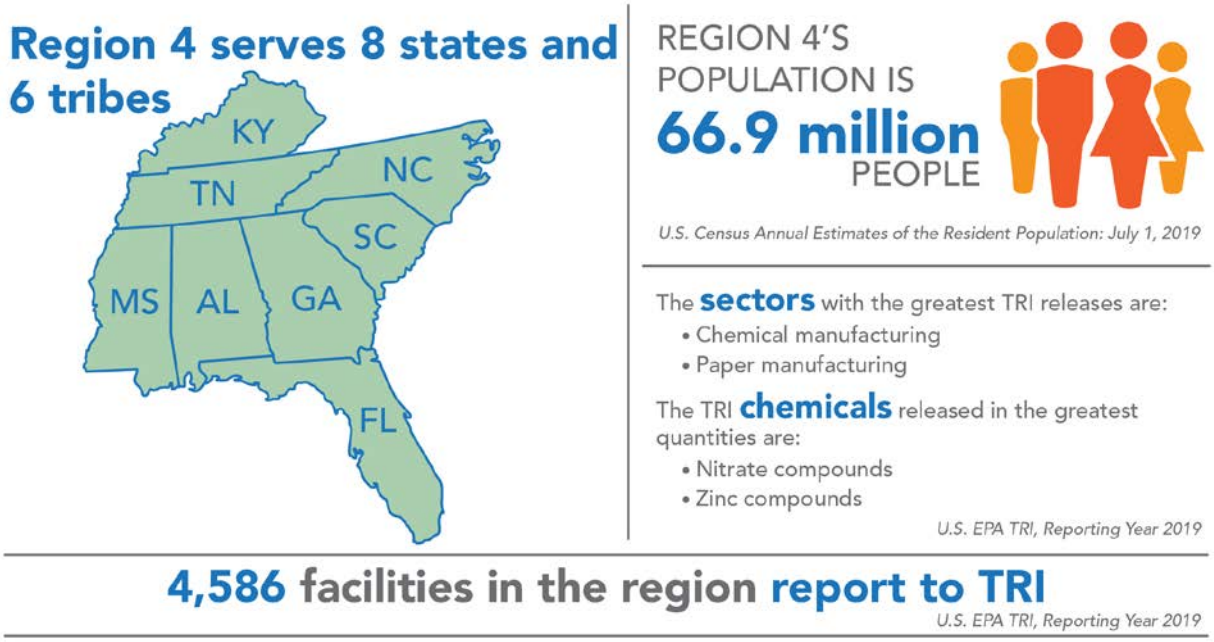
- Releases in Region 3 decreased by 270 million pounds (-69%), compared to a 19% decrease nationally.
- Quantities of chemicals released to air, water, and land, and transfers off-site for disposal all decreased, with a 181-million-pound reduction in air releases driving the overall decrease.

Source Reduction

In 2019, 7% of facilities in Region 3 (130 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the plastics/rubber manufacturing sector, where 14% of facilities reported source reduction activities. For example, a foam products manufacturer implemented spill prevention solutions to reduce the loss of nitrate compounds through spills or leaks. The facility also began electronically tracking maintenance activities to improve scheduling and recordkeeping procedures. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 4

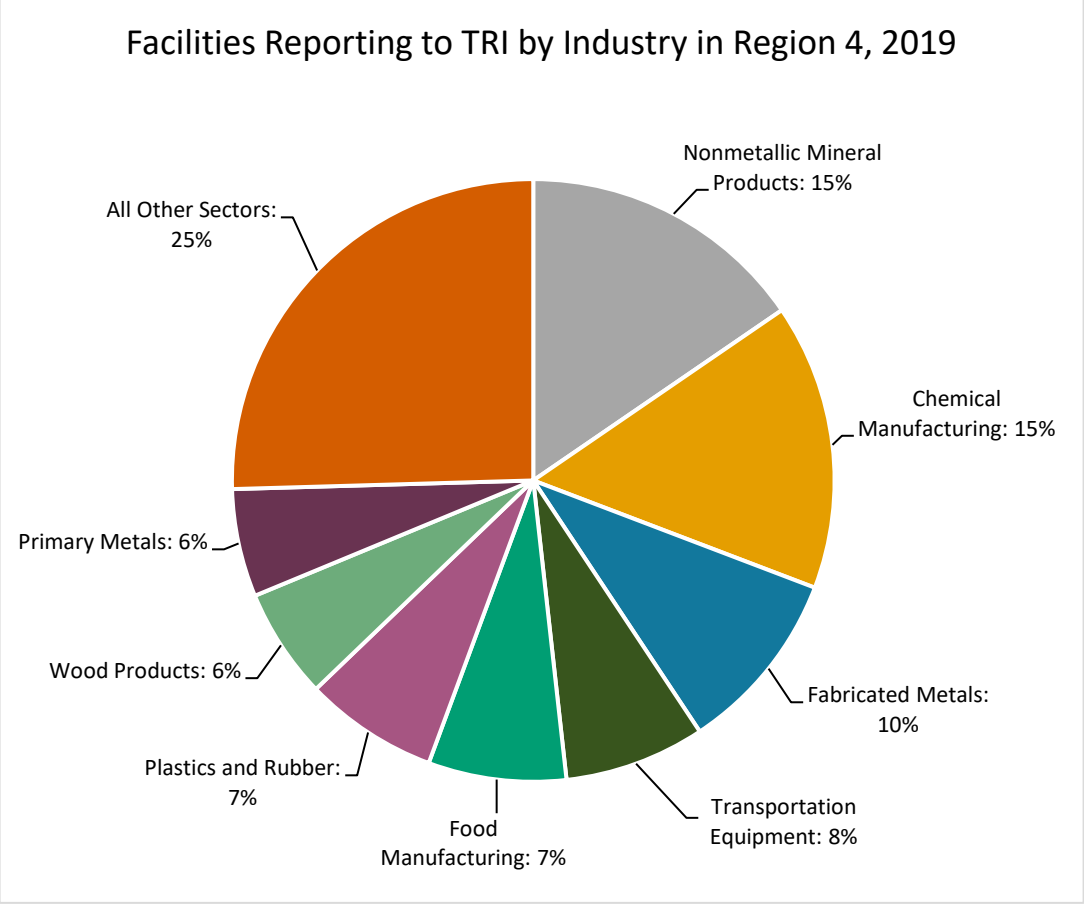
This section examines TRI reporting in EPA Region 4. Region 4 includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, and 6 tribes.



Region 4 covers 20% of the U.S. population and includes 21% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. One facility located on tribal land in Region 4 reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 4.



Note: Percentages do not sum to 100% due to rounding

In 2019:

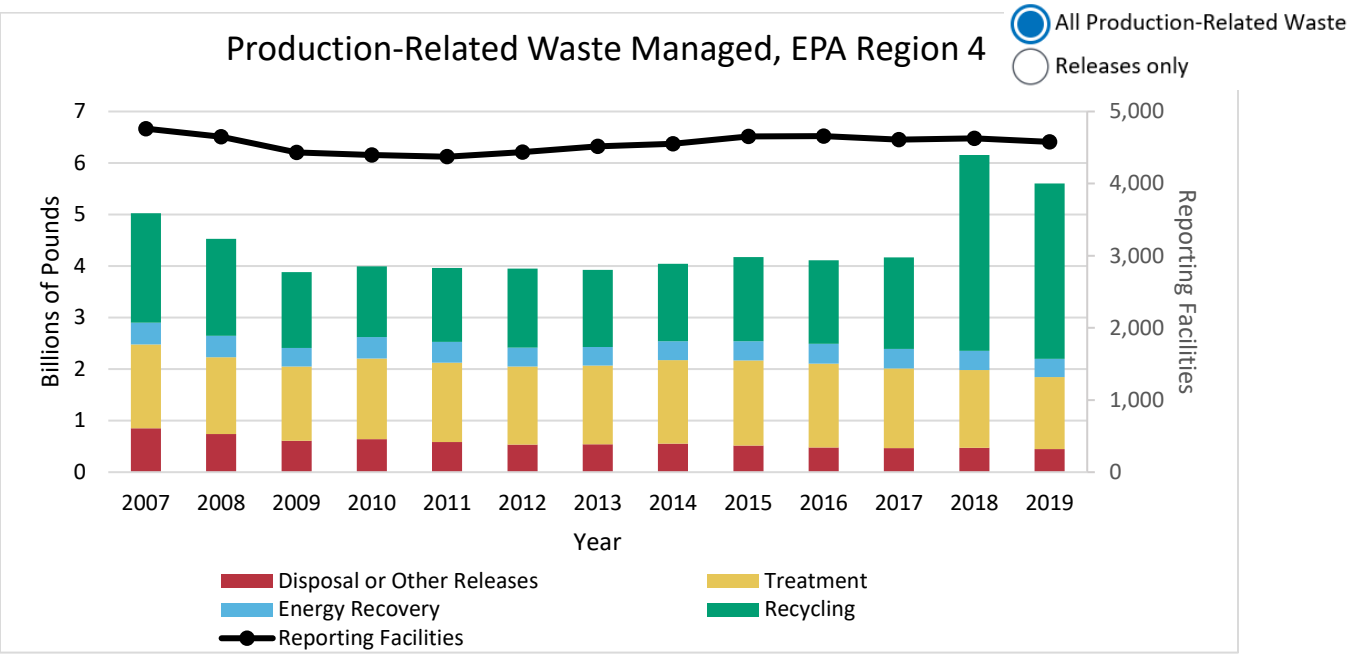
- 4,586 facilities in Region 4 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the nonmetallic mineral products (including cement and concrete manufacturing) or chemical manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 4 were the chemical manufacturing, paper manufacturing, electric utilities, and primary metals (including iron and steel mills and foundries) sectors. Note that relatively few facilities in the paper manufacturing and electric utilities sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above. Nationwide, the metal mining, chemical

manufacturing, primary metals, electric utilities, and paper manufacturing sectors reported the largest releases.

For information on the Region 4 facilities with the largest releases, see the Region 4 TRI factsheet.

Region 4 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 4. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 4 managed 5.72 billion pounds of production-related waste, 92% of which was recycled, combusted for energy recovery, or treated. Only 8% was disposed of or otherwise released into the environment in Region 4, compared to 11% nationally.
- Since 2018, quantities of production-related waste managed in the region decreased by 9%, with reductions in every waste management method (i.e., recycling, energy recovery, treatment, and releases).

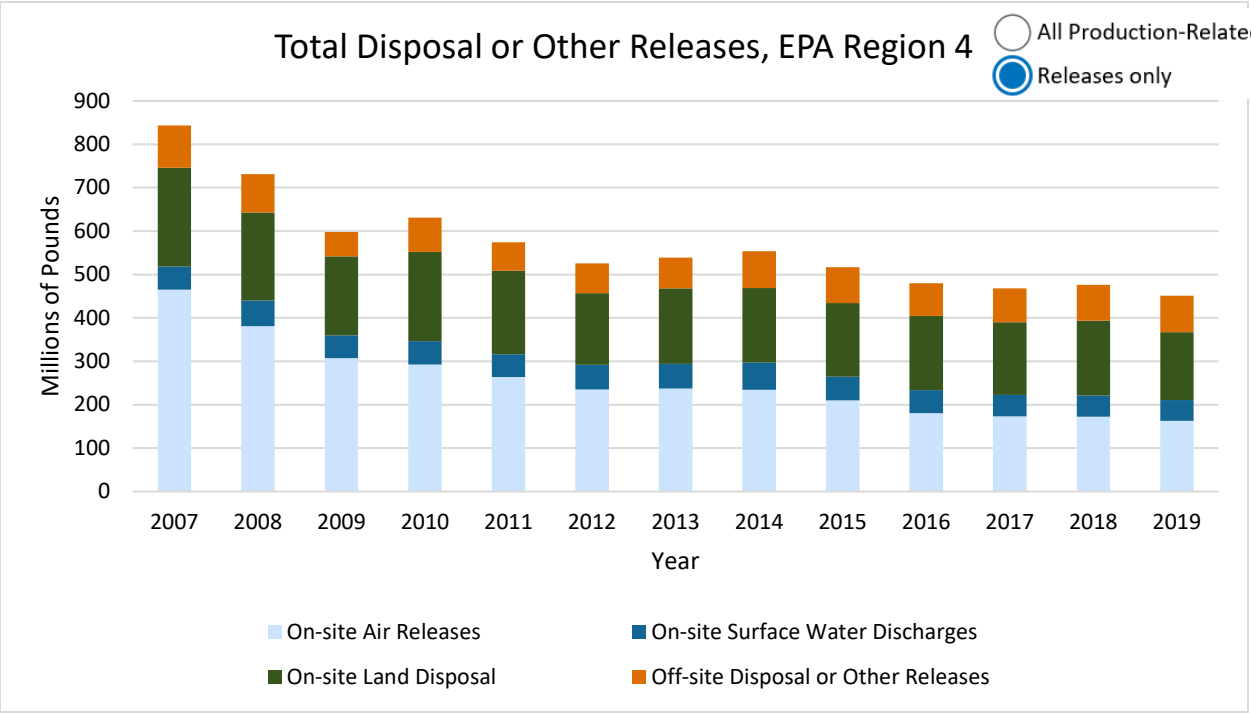
From 2007 to 2019:

- Production-related waste managed increased by 576 million pounds (11%), driven by one facility that reported recycling over 1.5 billion pounds of dichloromethane (methylene chloride) during 2018 and 2019. [Click to view facility details in the TRI P2

Search Tool]. Excluding this facility, production-related waste managed in the region decreased by 1.1 billion pounds (-22%), and quantities of waste managed by every method (i.e., recycling, treatment, energy recovery, and disposal and releases) decreased.

- Nationally, quantities of production-related waste managed increased by 23%, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 4.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 4 reported releasing 462 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - To air: methanol and ammonia;
  - To water: nitrate compounds;
  - To land: manganese compounds and zinc compounds; and
  - Transferred off site for disposal: zinc compounds and manganese compounds.
- Since 2018, releases decreased by 25.4 million pounds (-5%), driven by decreased releases to land and air. Nationally, releases decreased by 9%.
- Contributions by state to TRI releases in Region 4 were: Tennessee (18%), Alabama (17%), North Carolina (12%), Mississippi (12%), Florida (12%), Georgia (11%), Kentucky (10%), and South Carolina (8%).

Regional Highlight

On-site releases to air in Region 4 decreased by 65% since 2007. The largest decrease in was reported by electric utilities, which continued to report decreased releases to air from 2018 to 2019.

- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 4 were: Tennessee (24%), Florida (18%), Alabama (14%), Georgia (13%), North Carolina (12%), Kentucky (10%), South Carolina (8%), and Mississippi (2%).
    - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

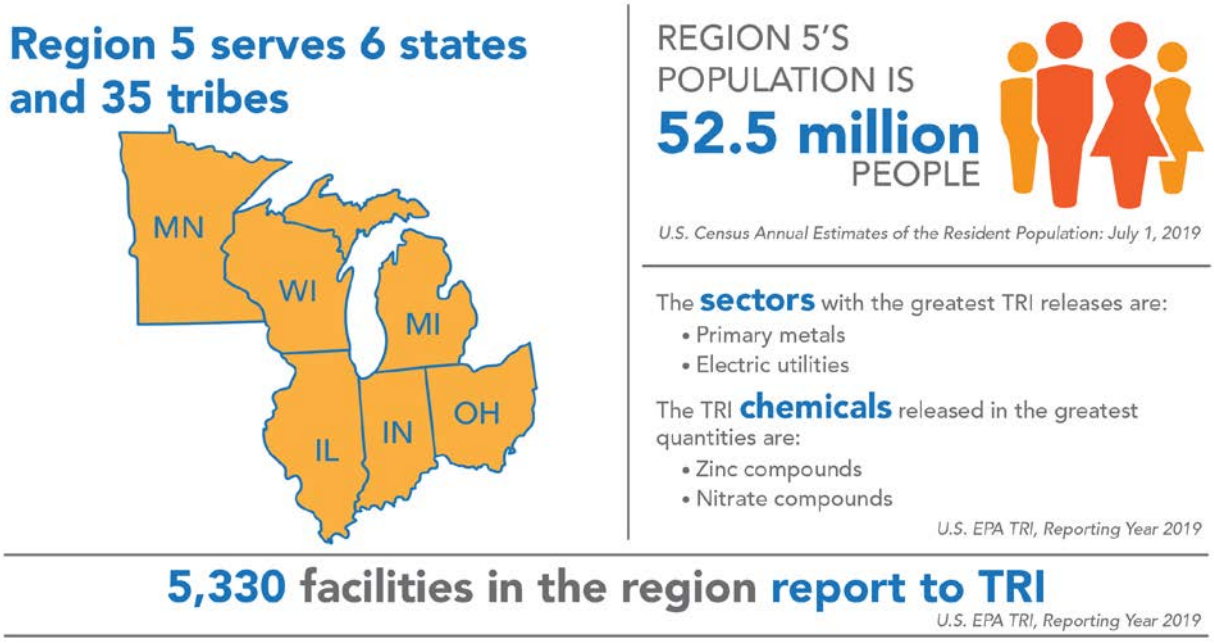
- Releases in Region 4 decreased by 392 million pounds (-47%), compared to a 19% decrease nationally.
- Quantities of chemicals released to air, water, and land, and transferred off-site for disposal all decreased, with the largest reduction in releases to air.

Source Reduction

In 2019, 6% of facilities in Region 4 (257 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the computers/electronic products manufacturing sector, in which 19% of facilities reported source reduction activities. As one example of source reduction in Region 4, an electronic assembly facility reported that current mass production units are no longer manufactured using lead solder and that lead waste is contained in a limited number of service parts. Production of these service parts has decreased in the last year. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 5

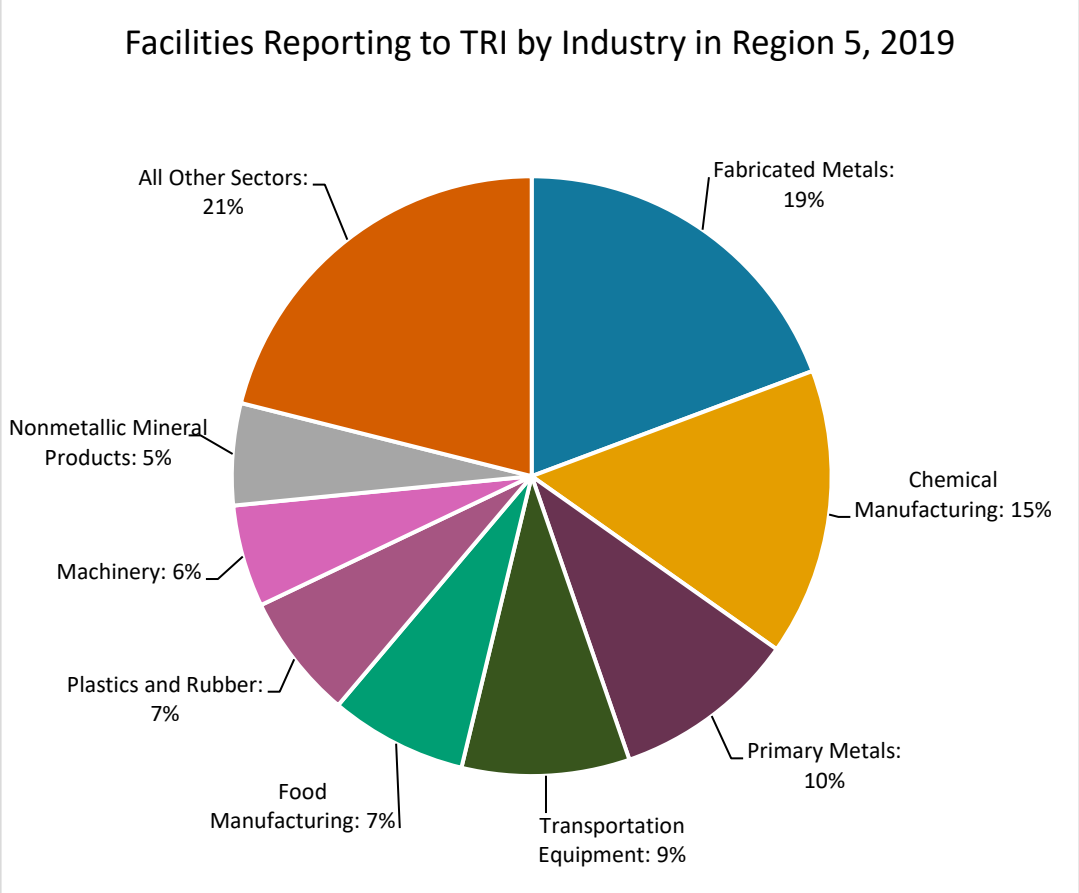
This section examines TRI reporting in EPA Region 5. Region 5 includes Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin, and 35 tribes.



Region 5 covers 16% of the U.S. population and includes 25% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Five facilities located on the land of two different tribes in Region 5 reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 5.



Note: Percentages do not sum to 100% due to rounding

In 2019:

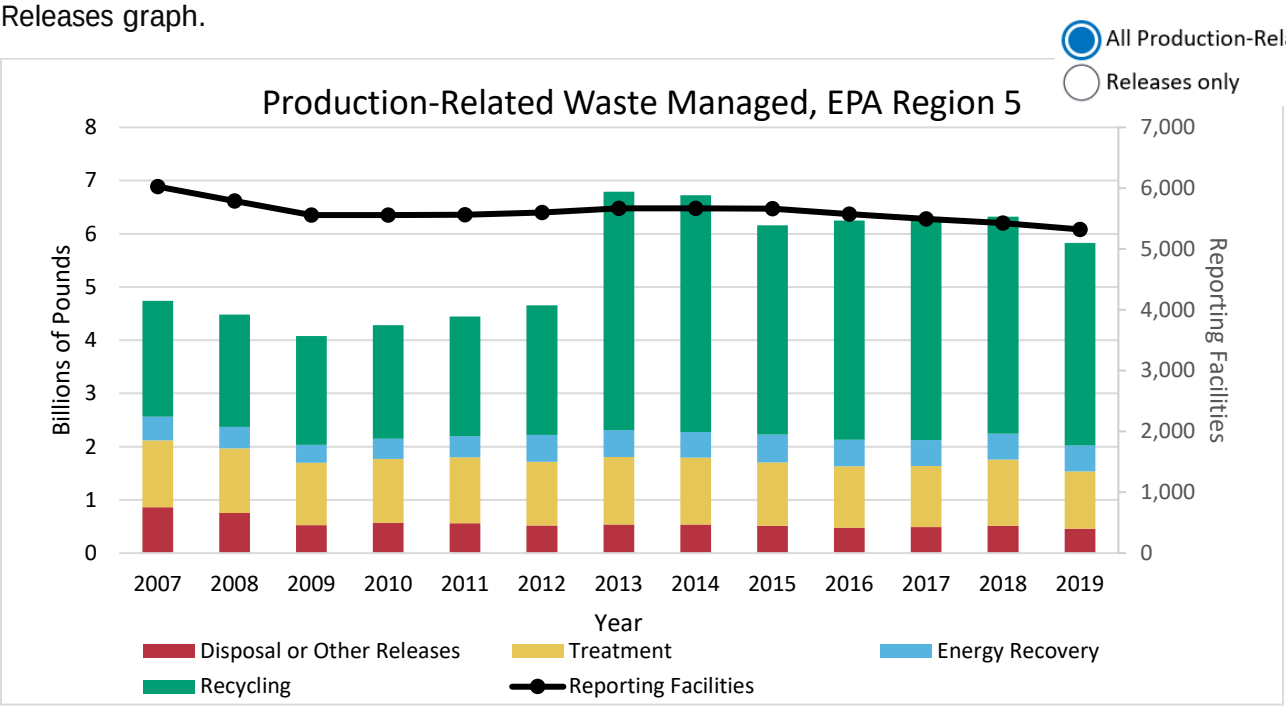
- 5,330 facilities in Region 5 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the fabricated metals (i.e., manufacture of metal products) or chemical manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 5 were the primary metals (including iron and steel manufacturing, and foundries), electric utilities, chemical manufacturing, and hazardous waste management sectors. Note that relatively few facilities in the electric utilities and hazardous waste management sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.

- Nationwide, the metal mining, chemical manufacturing, primary metals, and electric utilities sectors reported the largest releases.

For information on the Region 5 facilities with the largest releases, see the Region 5 TRI factsheet.

Region 5 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 5. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

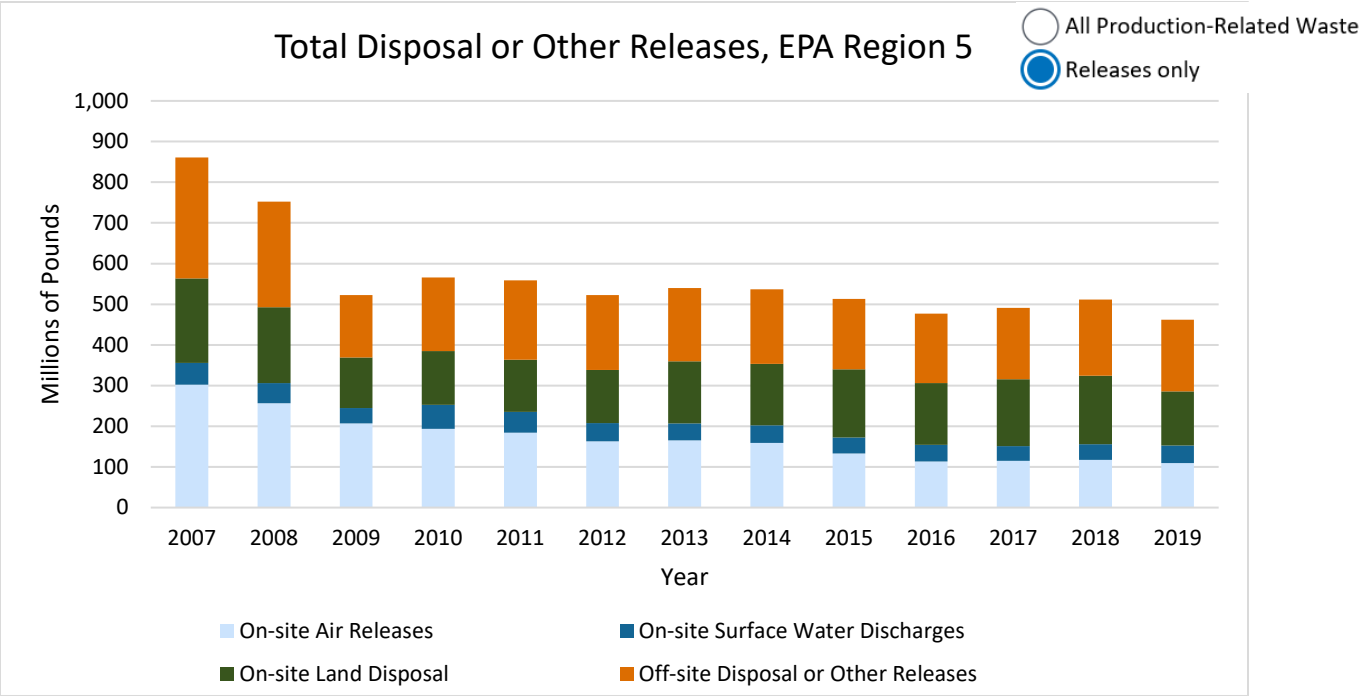
- Facilities in Region 5 managed 5.87 billion pounds of production-related waste, 65% of which was managed through recycling, compared to 53% nationally.
- Since 2018, quantities of production-related waste managed in the region decreased by 8%.

From 2007 to 2019:

- Total production-related waste managed increased by 1.1 billion pounds (23%), driven by one plastics manufacturing facility that reported recycling more than a billion pounds of dichloromethane (methylene chloride) annually from 2013 to 2019 [Click to view facility details in the TRI P2 Search Tool]. Excluding this facility, production-related waste managed in the region decreased by 387 million pounds (-8%).

- Nationally, quantities of production-related waste managed increased by 23% since 2007, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 5.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 5 reported releasing 464 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - To air: sulfuric acid, ammonia, and *n*-hexane;
  - To water: nitrate compounds;
  - To land: barium compounds, manganese compounds, and zinc compounds; and
  - Transferred off site for disposal: zinc compounds and manganese compounds.
- Since 2018, releases decreased by 49.2 million pounds (-10%). Decreases occurred across many sectors, with the largest decreases in the hazardous waste management and electric utilities sectors. Releases decreased to all media except water, which increased. Nationally, releases decreased by 9%.

Regional Highlight

Releases in Region 5 have decreased by almost 400 million pounds since 2007. Releases from the electric utilities, primary metals and hazardous waste sectors decreased the most, together decreasing by 374 million pounds.

- Contributions by state to TRI releases in Region 5 were: Indiana (27%), Ohio (23%), Illinois (22%), Michigan (16%), Wisconsin (7%), and Minnesota (5%).
- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 5 were: Ohio (33%), Illinois (30%), Indiana (16%), Michigan (12%), Wisconsin (5%), and Minnesota (4%).
    - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

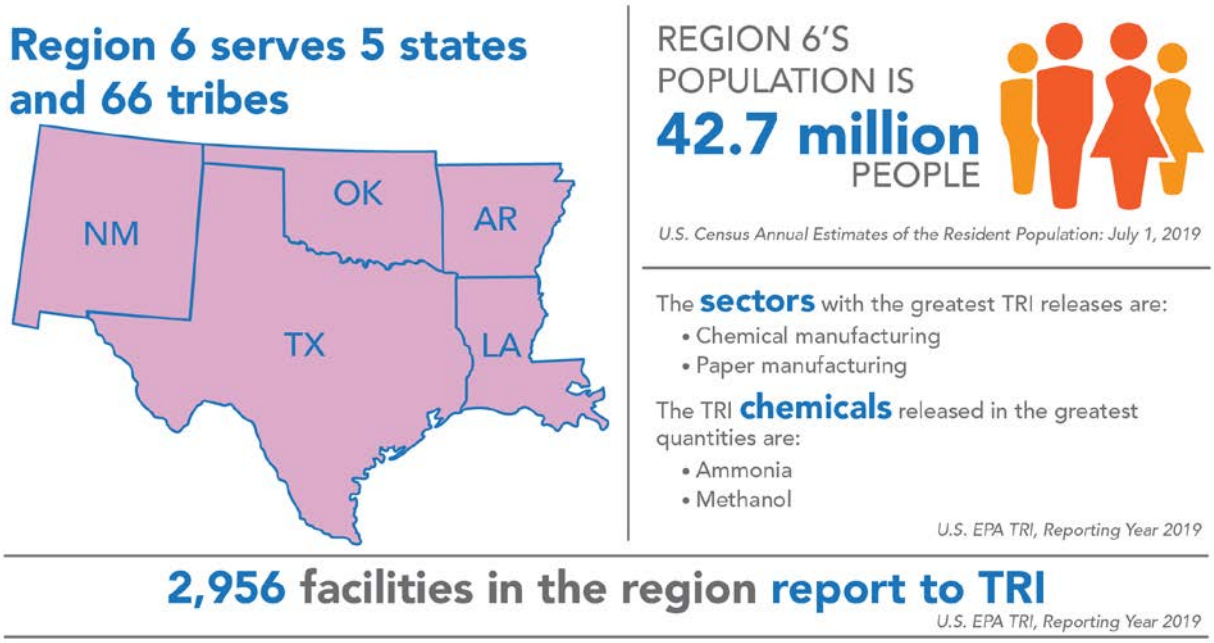
- Releases in Region 5 decreased by 399 million pounds (-46%), driven by reduced releases from electric utilities and the primary metals sector. Nationally, releases decreased by 19%.
- Releases to air, water, land, and transferred off site for disposal all decreased.

Source Reduction

In 2019, 7% of facilities in Region 5 (373 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the computers/electronic products manufacturing sector, in which 23% of facilities reported source reduction activities. For example, a circuit board manufacturer reduced its copper usage by installing a new copper etcher that is more efficient than the previous equipment. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 6

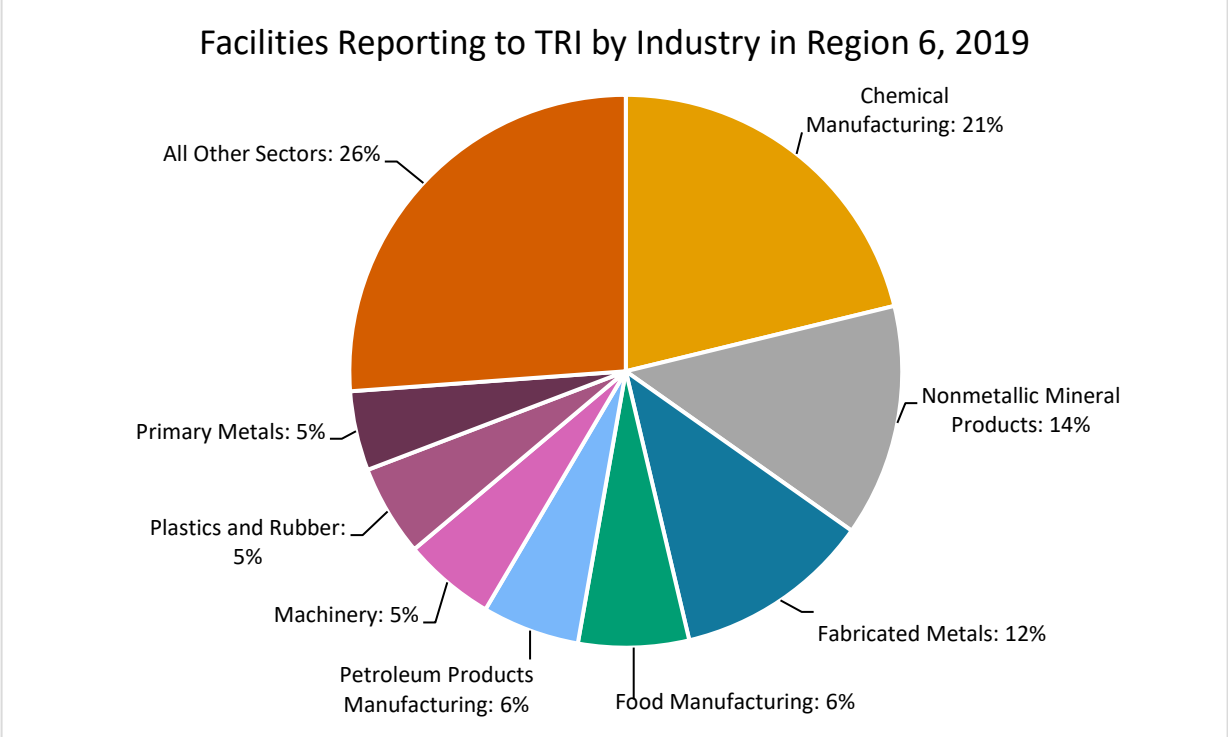
This section examines TRI reporting in EPA Region 6. Region 6 includes Arkansas, Louisiana, New Mexico, Oklahoma, Texas, and 66 Tribes.



Region 6 covers 13% of the U.S. population and includes 14% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Three facilities located on the land of two different tribes in Region 6 reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 6.



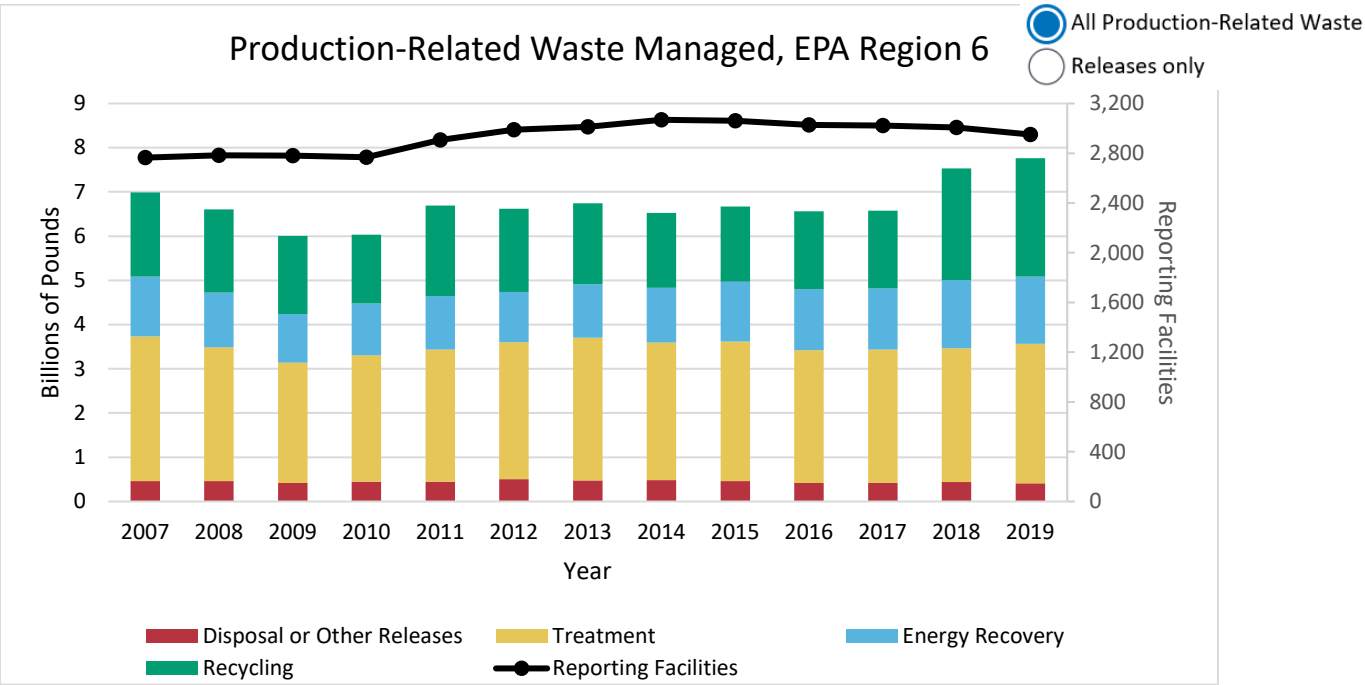
In 2019:

- 2,956 facilities in Region 6 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the chemical manufacturing or nonmetallic mineral products (including concrete manufacturing) sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 6 were the chemical manufacturing, paper manufacturing, petroleum products manufacturing, and electric utilities sectors. Note that relatively few facilities in the paper manufacturing and electric utilities sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.
    - Nationwide, the metal mining, chemical manufacturing, primary metals (including iron and steel manufacturing, and foundries), and electric utilities sectors reported the largest releases.

For information on Region 6 facilities with the largest releases, see the Region 6 TRI factsheet.

Region 6 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 6. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 6 managed 8.05 billion pounds of production-related waste, 41% of which was treated and 34% of which was recycled. Nationally, 26% of production-related waste was managed through treatment and 53% was recycled. The 8.05 billion pounds of production-related waste includes all chemicals reported for 2019, while for comparability over time, the trend chart excludes chemicals that were added to the TRI list after 2007.
- Since 2018, quantities of production-related waste managed in the region increased by 3%.

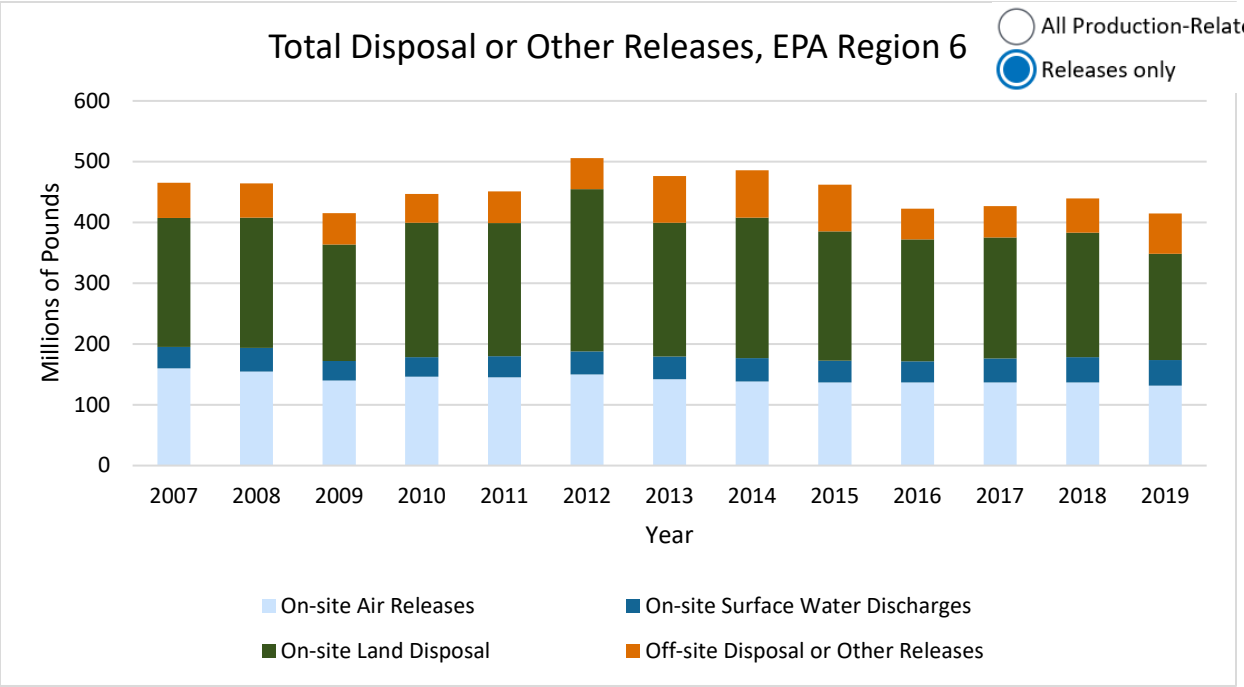
From 2007 to 2019:

- Production-related waste managed increased by 770 million pounds (11%), largely driven by one facility which reported 477 million pounds of recycling for 2019, compared

to 6 million pounds recycled in 2007. Excluding this facility, quantities of production-related waste managed in the region increased by 303 million pounds (4%) since 2007.

- Nationally, quantities of production-related waste managed increased by 23% since 2007, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 6.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 6 reported releasing 429 million pounds of TRI chemicals. The 429 million pounds of releases includes all chemicals reported for 2019, while for comparability over time, the trend chart excludes chemicals that were added to the TRI list after 2007.
- The chemicals released in the largest quantities by medium were:
  - To air: ammonia and methanol;
  - To water: nitrate compounds;
  - To land: ammonia, barium compounds, and formaldehyde; and
  - Transferred off site for disposal: manganese compounds and methanol.
- Since 2018, releases decreased by 25.9 million pounds (-6%). Releases to air and land decreased, while water discharges and off-site transfers for disposal increased. Nationally, releases decreased by 9%.
- Contributions by state to TRI releases in Region 6 were: Texas (45%), Louisiana (32%), Arkansas (12%), Oklahoma (7%), and New Mexico (4%).

Regional Highlight

Releases to air decreased by 5.4 million pounds from 2018 to 2019, driven by reductions in the chemical manufacturing, electric utilities, and petroleum product manufacturing sectors.

- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 6 were: Texas (75%), Louisiana (16%), Arkansas (6%), Oklahoma (4%), and New Mexico (<1%).
    - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

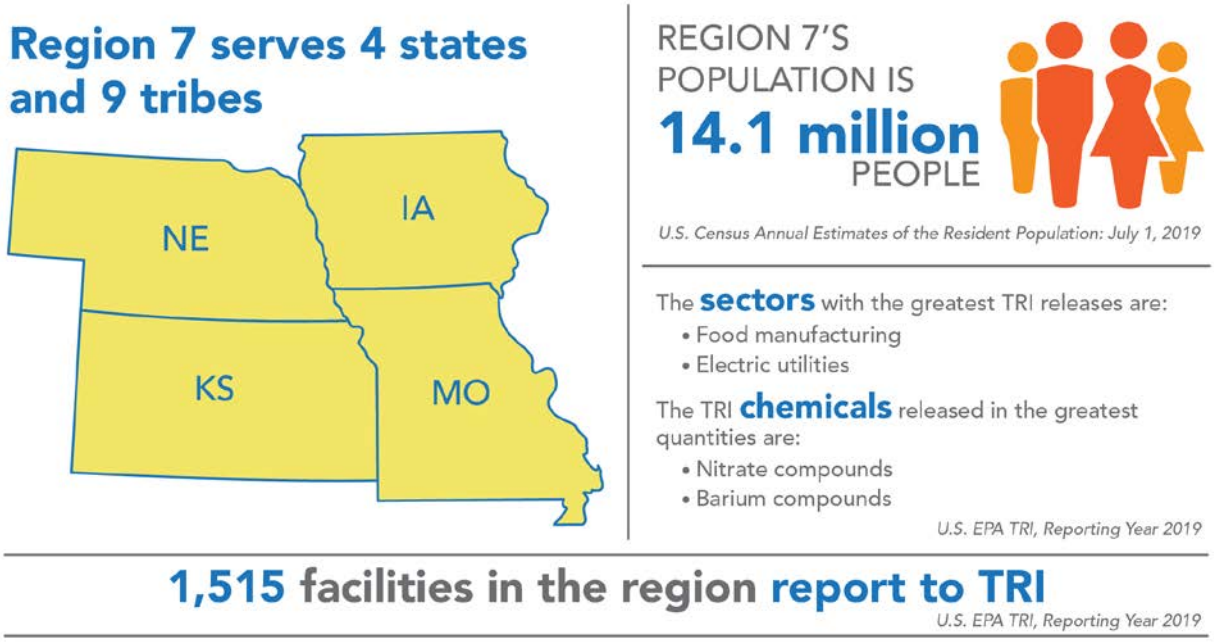
- Releases in Region 6 decreased by 50.7 million pounds (-11%), compared to a 19% decrease nationally.
- Quantities of chemicals released to air and land decreased, while releases to water and off-site transfers for disposal increased.

Source Reduction

In 2019, 5% of facilities in Region 6 (153 facilities) reported implementing new source reduction activities. As one example of source reduction in Region 6, a motor vehicle parts manufacturer updated the zinc rinse system with automated equipment, which reduced zinc waste by improving the overall effectiveness of the system. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 7

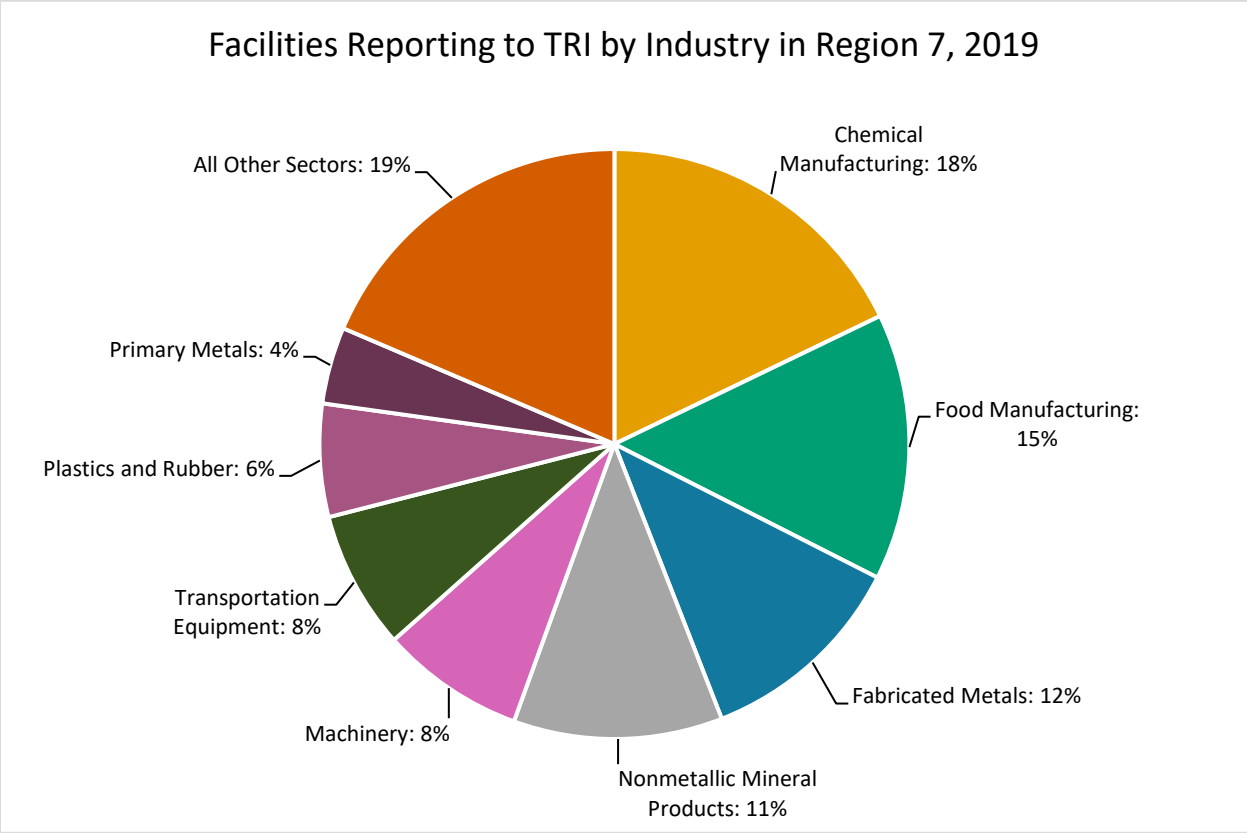
This section examines TRI reporting in EPA Region 7. Region 7 includes Iowa, Kansas, Missouri, Nebraska, and 9 tribes.



Region 7 covers 4% of the U.S. population and includes 7% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Although Region 7 includes 9 tribes, no facilities located on tribal lands in the region reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 7.



Note: Percentages do not sum to 100% due to rounding.

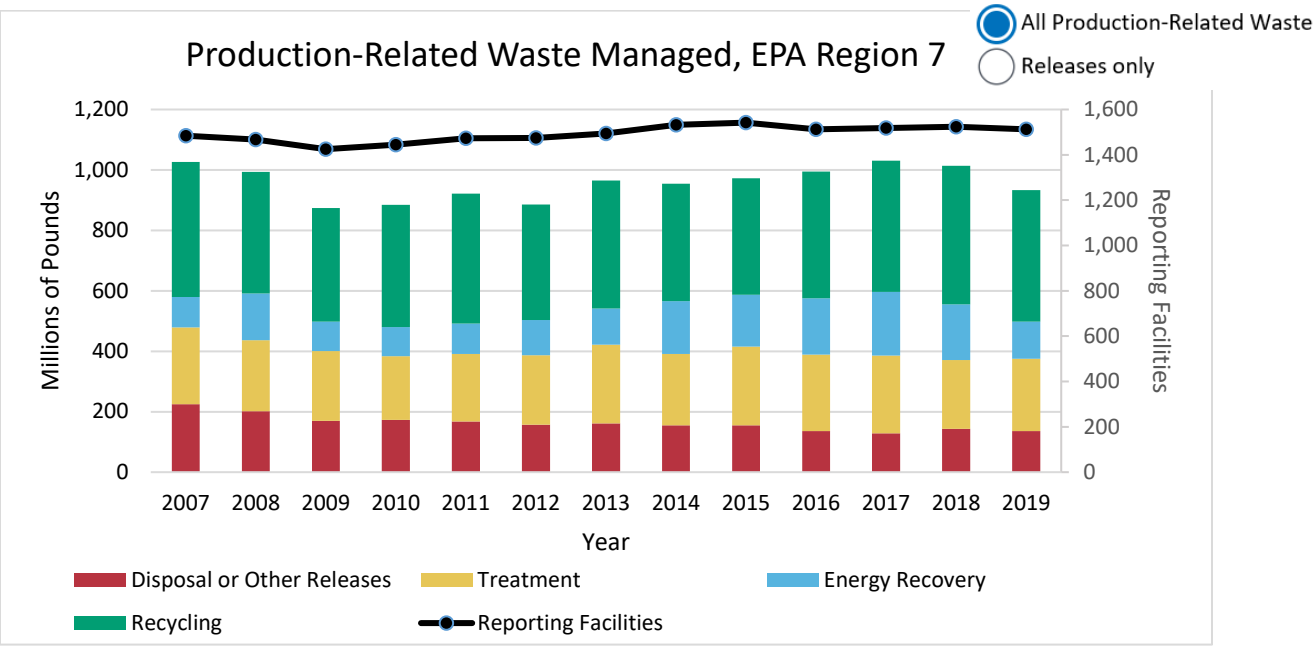
In 2019:

- 1,515 facilities in Region 7 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the chemical manufacturing or food manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 7 were the food manufacturing, electric utilities, chemical manufacturing, and metal mining sectors. Note that relatively few facilities in the electric utilities and metal mining sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above. Nationwide, the metal mining, chemical manufacturing, primary metals (including iron and steel manufacturing, and foundries), and electric utilities sectors reported the largest releases.

For information on the Region 7 facilities with the largest releases, see the Region 7 TRI factsheet.

Region 7 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 7. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

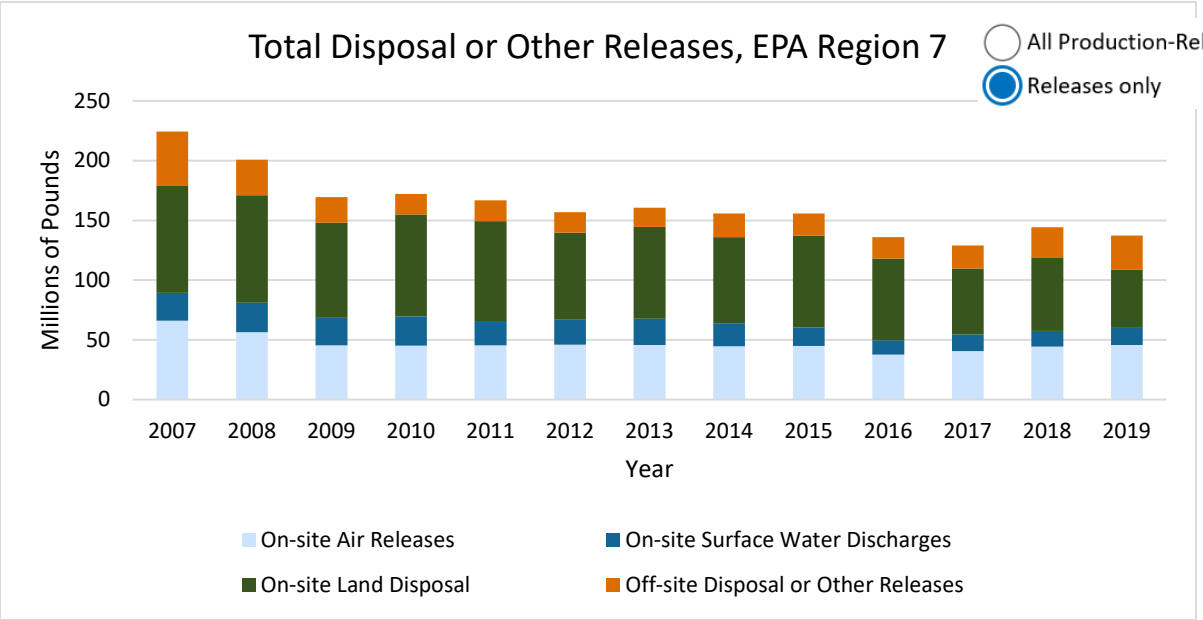
- Facilities in Region 7 managed 1.01 billion pounds of production-related waste, 89% of which was recycled, combusted for energy recovery, or treated. 11% was disposed of or otherwise released into the environment, which is consistent with the proportion of production-related waste released into the environment nationally. The 1.01 billion pounds of production-related waste includes all chemicals reported for 2019, while for comparability over time, the trend chart excludes chemicals that were added to the TRI list after 2007.
- Since 2018, quantities of production-related waste managed in the region decreased by 8%, which was driven by reduced waste combusted for energy recovery.

From 2007 to 2019:

- Production-related waste managed decreased by 92.6 million pounds (-9%). Quantities of waste recycled, treated, and disposed of or otherwise released all decreased, while

quantities of waste combusted for energy recovery increased. Nationally, quantities of production-related waste managed increased by 23%, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 7.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 7 reported releasing 138 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - To air: ammonia and n-hexane;
  - To water: nitrate compounds;
  - To land: lead compounds and barium compounds; and
  - Transferred off site for disposal: nitrate compounds.
- Since 2018, releases decreased by 7.0 million pounds (5%). Releases increased to all media except land. Nationally, releases decreased by 9%.
- Contributions by state to TRI releases in Region 7 were: Missouri (40%), Iowa (29%), Kansas (18%), and Nebraska (13%).
- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 7 were: Missouri (34%), Kansas (33%), Iowa (27%), and Nebraska (6%).
  - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI

Regional Highlight

Releases in Region 7 decreased from 2018 to 2019 primarily due to reduced releases from the electric utilities and metal mining sectors.

does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

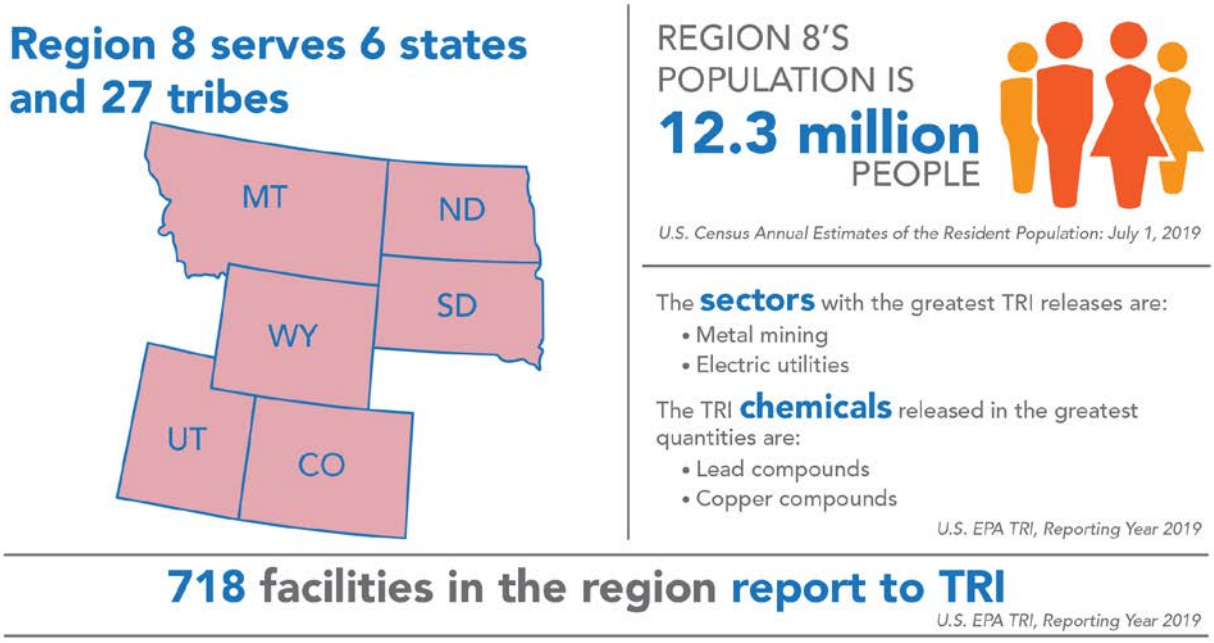
- Releases in Region 7 decreased by 86.9 million pounds (-39%). This decrease was driven by a reduction in releases from the primary metals and metal mining sectors. Nationally, releases decreased by 19%.
- Quantities of chemicals released to air, water, and land, and transferred off site for disposal all decreased.

Source Reduction

In 2019, 4% of facilities in Region 7 (65 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the electrical equipment sector, where 16% of facilities reported source reduction activities. For example, a carbon fiber manufacturer reduced its styrene usage by moving to smaller bath sizes which reduced the amount of resin used and limited losses during production. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 8

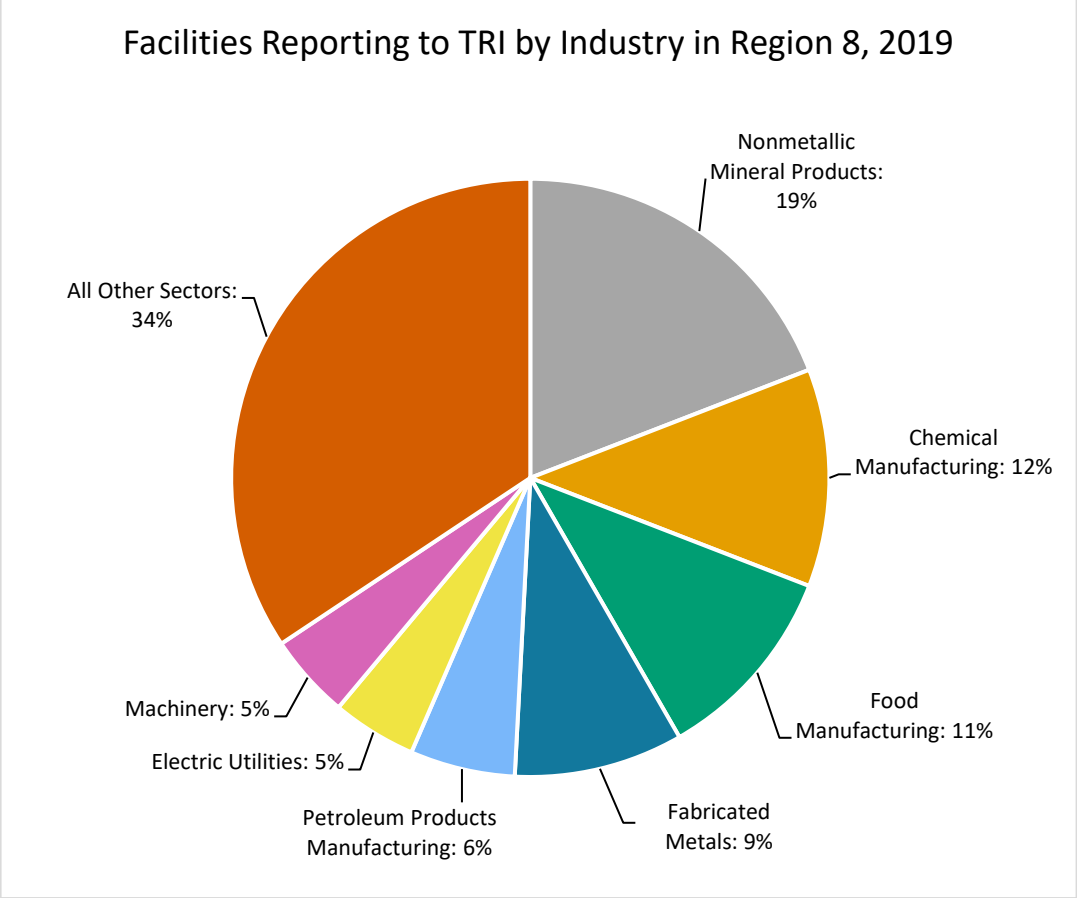
This section examines TRI reporting in EPA Region 8. Region 8 includes Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 tribes.



Region 8 covers 4% of the U.S. population and includes 3% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Two facilities located on the land of two different tribes in Region 8 reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 8.



Note: Percentages do not sum to 100% due to rounding.

In 2019:

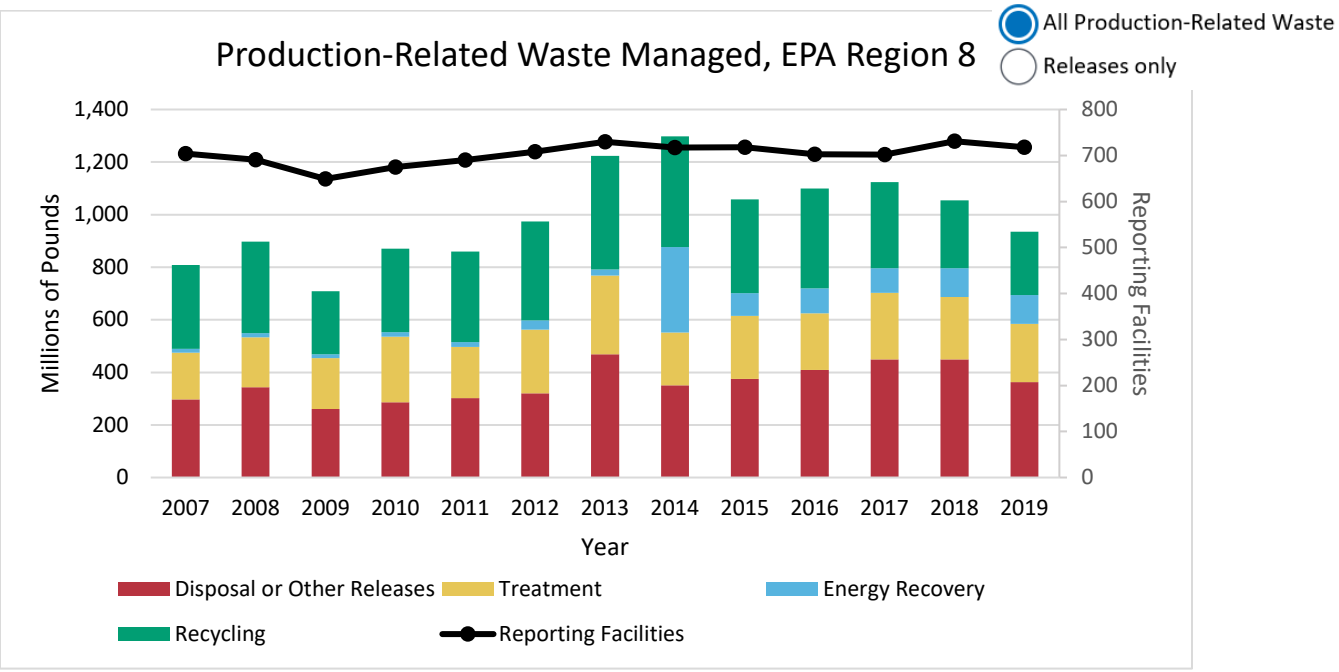
- 718 facilities in Region 8 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the nonmetallic mineral products (including concrete manufacturing), chemical manufacturing, or food manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sector that reported the largest TRI releases in Region 8 was the metal mining sector, which accounted for 53% of releases reported in the region. After metal mining, the electric utilities, primary metals (including smelters), and chemical manufacturing sectors reported the largest releases. Note that relatively few facilities in the metal mining and primary metals sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.

- Nationwide, the metal mining, chemical manufacturing, primary metals, and electric utilities sectors reported the largest releases.
- Metal mining facilities typically handle large volumes of material. In this sector, even a small change in the chemical composition of the mineral deposit being mined can lead to large changes in the amount of TRI-listed chemicals reported. Therefore, releases in Region 8, where 11 metal mines reported to TRI for 2019, may differ from national trends. For more information on the metal mining sector, see the metal mining sector profile.

For information on the Region 8 facilities with the largest releases, see the Region 8 TRI factsheet.

Region 8 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 8. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

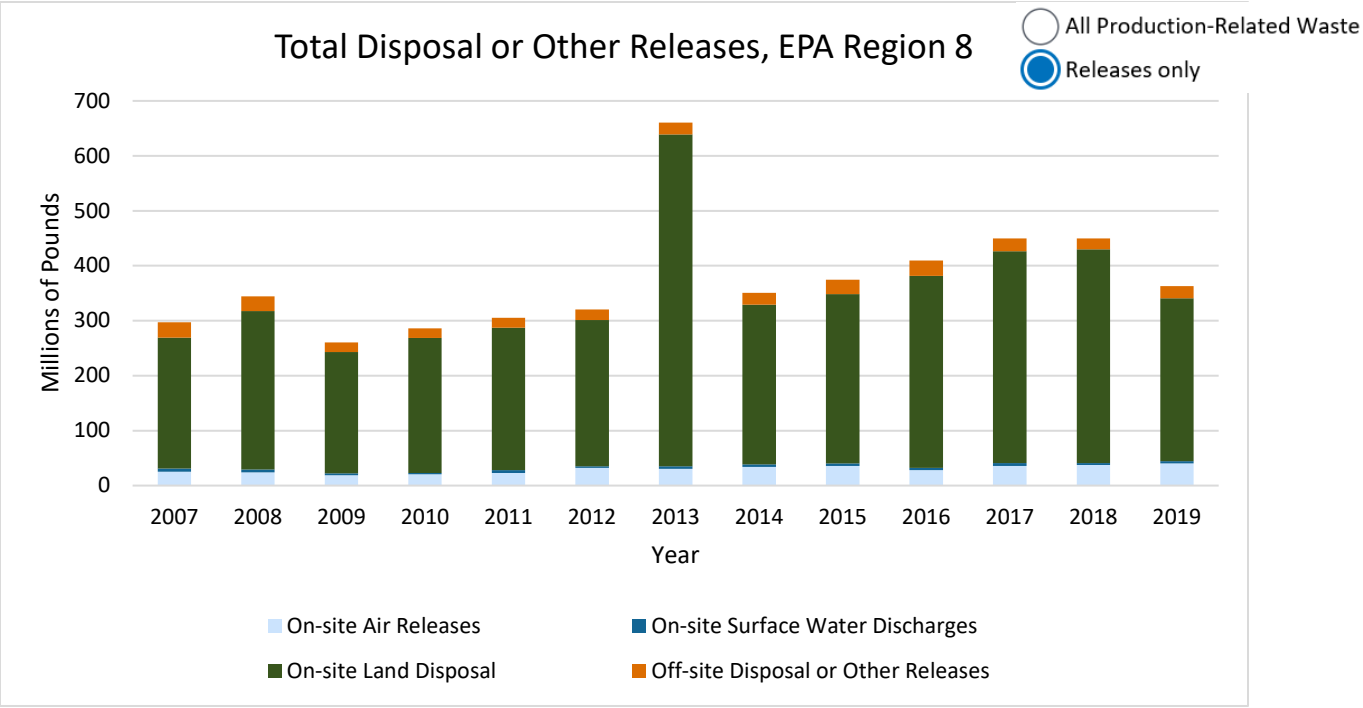
In 2019:

- Facilities in Region 8 managed 945 million pounds of production-related waste, 38% of which was disposed of or otherwise released, compared to 11% nationally. Metal mines drive the quantity of production-related waste released in Region 8. For 2019, metal mines in the region disposed of 95% of their waste on site to land.
- Since 2018, quantities of production-related waste managed in the region decreased by 11%, driven by reduced disposal or other releases from metal mines.

From 2007 to 2019:

- Production-related waste managed increased by 126 million pounds (16%). Quantities of waste combusted for energy recovery, treated, and disposed of or otherwise released increased, while quantities recycled decreased.
    - Nationally, quantities of production-related waste managed increased by 23%, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 8.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 8 reported releasing 363 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - To air: ammonia
  - To water: nitrate compounds
  - To land: lead compounds and copper compounds; and
  - Transferred off site for disposal: barium compounds
- Since 2018, releases decreased by 86.7 million pounds (-19%), driven by reduced releases to land. Nationally, releases decreased by 9%.
- Contributions by state to TRI releases in Region 8 were: Utah (55%), Montana (17%), North Dakota (13%), Colorado (8%), Wyoming (5%), and South Dakota (2%).
- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 8 were: Utah (80%), Colorado (14%), Montana (3%), North Dakota (2%), South Dakota (<1%), and Wyoming (<1%).

Regional Highlight

For 2019, 53% of total disposal or other releases reported in Region 8 were from the metal mining sector, down from 64% in 2018. The decrease in releases was driven by one copper mine in Utah [view facility details].

- The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities which drive the high release quantities for Utah. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

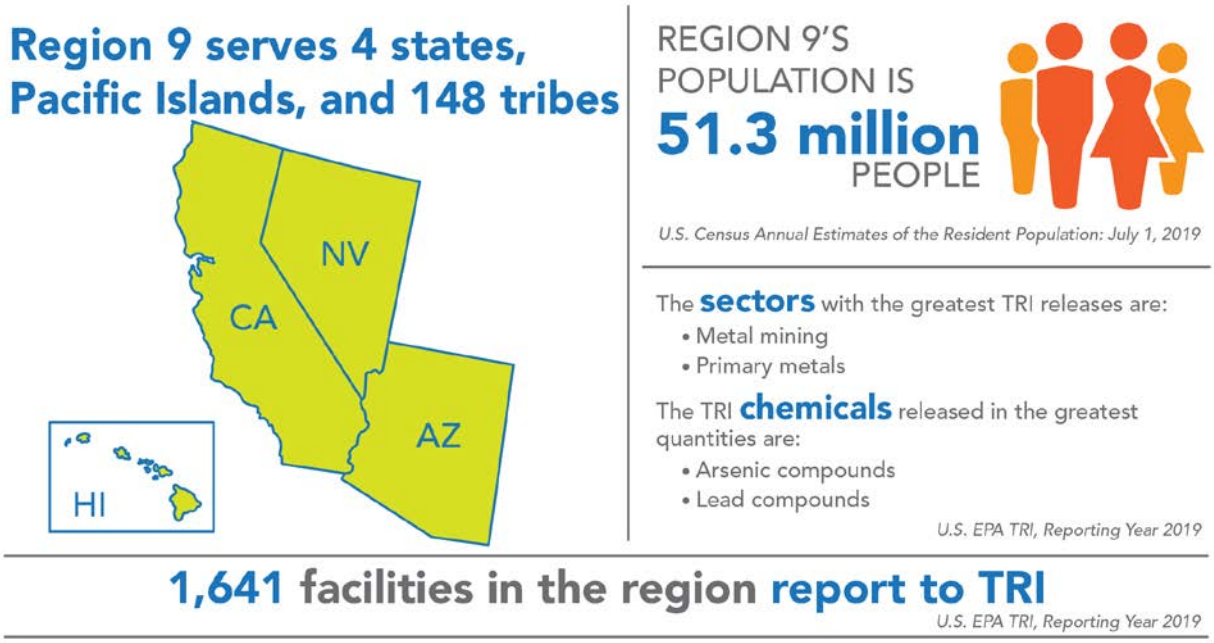
- Releases in Region 8 increased by 66.1 million pounds (22%), driven by increased land disposal by the metal mining and primary metals sectors. Nationally, releases of TRI chemicals decreased by 19%.
- Quantities of chemicals released to water and transferred off site for disposal decreased, and releases to air and land increased.

Source Reduction

In 2019, 5% of facilities in Region 8 (35 facilities) reported implementing new source reduction activities. For example, a wood cabinet manufacturer replaced its primer coat with a conversion varnish that uses less xylene per gallon, reducing the facility's overall xylene use. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 9

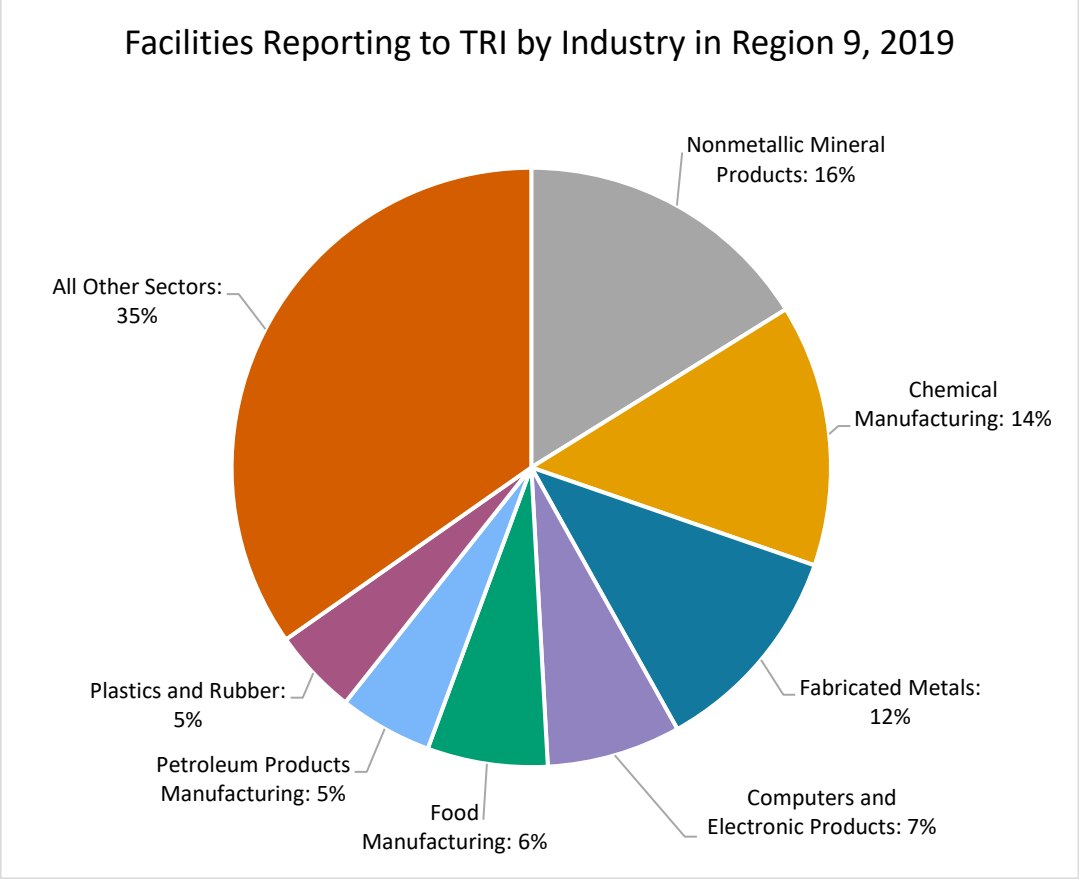
This section examines TRI reporting in EPA Region 9. Region 9 includes Arizona, California, Hawaii, Nevada, the Pacific Islands (American Samoa, Guam, and the Northern Mariana Islands), and 148 Tribes.



Region 9 covers 15% of the U.S. population and includes 8% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Thirteen facilities located on the land of six different tribes in Region 9 reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 9.



In 2019:

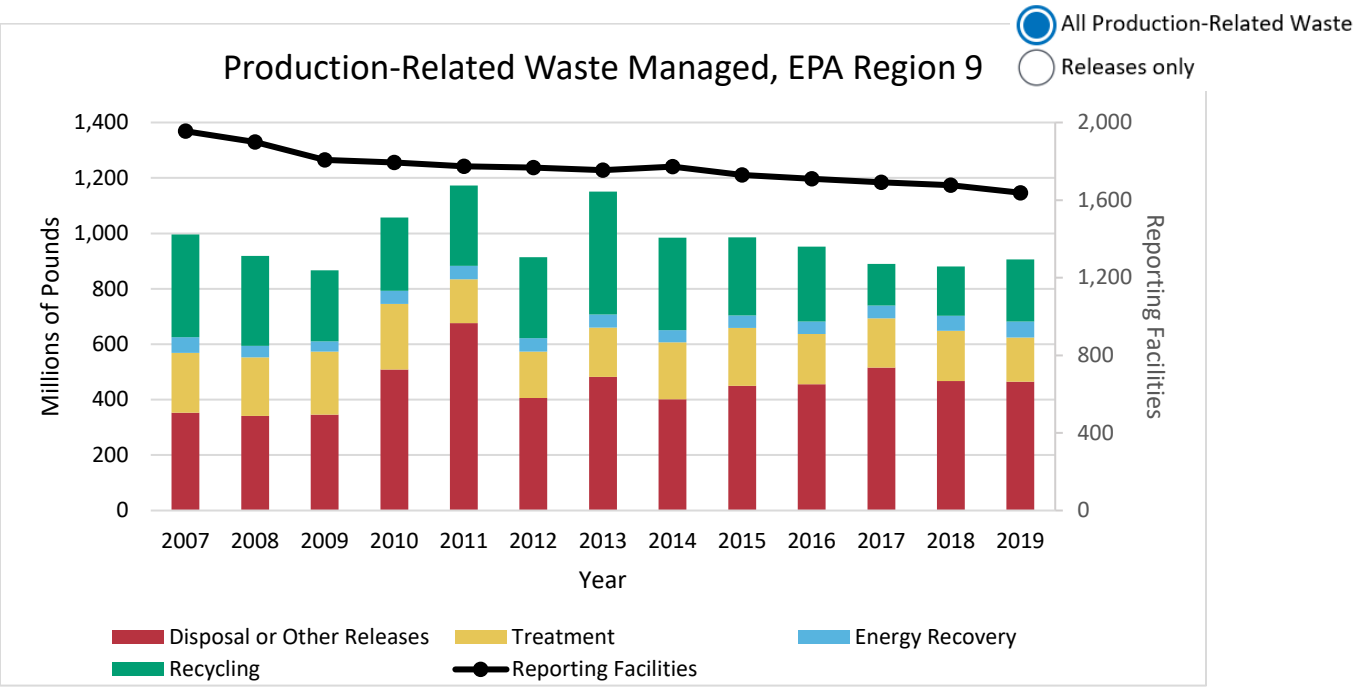
- 1,641 facilities in Region 9 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the nonmetallic mineral products (including concrete and cement manufacturing) or chemical manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the most TRI releases in Region 9 were from the metal mining sector, which accounted for 78% of the region's releases for 2019. After metal mining, the primary metals (including smelting), hazardous waste management, and petroleum products manufacturing sectors reported the largest releases. Note that relatively few facilities in the metal mining, primary metals, and hazardous waste management sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.
    - Nationwide, the metal mining, chemical manufacturing, electric utilities, and primary metals sectors reported the largest releases.

- Metal mining facilities typically handle large volumes of material. In this sector, even a small change in the chemical composition of the mineral deposit being mined can lead to large changes in the amount of TRI-listed chemicals reported. Therefore, releases in Region 9, where 42 metal mines reported to TRI for 2019, may not follow national trends. For more information on the metal mining sector, see the metal mining sector profile.

For information on the Region 9 facilities with the largest releases, see the TRI Region 9 factsheet.

Region 9 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 9. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

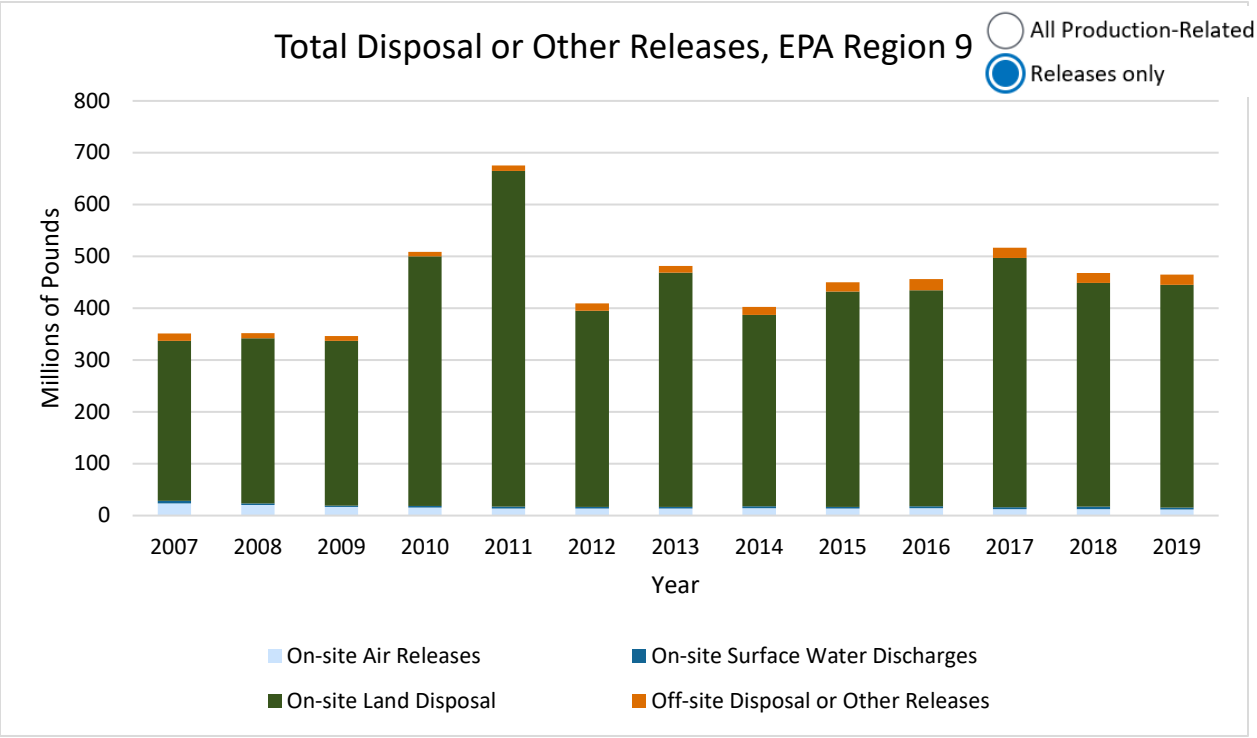
In 2019:

- Facilities in Region 9 managed 908 million pounds of production-related waste, 51% of which was disposed of or otherwise released, compared to 11% nationally. Metal mines drive the quantity of production-related waste released in Region 9. For 2019, metal mines in the region disposed of 90% of their waste on site to land.
- Since 2018, quantities of production-related waste managed in Region 9 increased by 3%, driven by increased production-related waste managed in the electrical equipment and metal mining sectors.

From 2007 to 2019:

- Total production-related waste managed decreased by 89.8 million pounds (-9%), driven by decreased recycling in the primary metals sector. In contrast, nationally, quantities of production-related waste managed increased by 23%, driven by increased recycling.

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 9.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 9 released 465 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - To air: ammonia and sulfuric acid;
  - To water: nitrate compounds;
  - To land: arsenic compounds and lead compounds; and
  - Transferred off site for disposal: nitrate compounds and manganese compounds
- Since 2018, releases stayed about the same, while nationally, releases decreased by 9%.
- Contributions by state to TRI releases in Region 9 were: Nevada (72%), Arizona (18%), California (8%), Hawaii (<1%), and the Pacific Islands (<1%).
- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI

Regional Highlight

42 metal mines in Region 9 reported to TRI for 2019, more than in any other region, accounting for 78% of the region's releases. Most of the mining releases were reported by gold mines in Nevada.

Score for Region 9 were: California (43%), Nevada (40%), Arizona (15%), Hawaii (<1%), and the Pacific Islands (<1%).

  - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

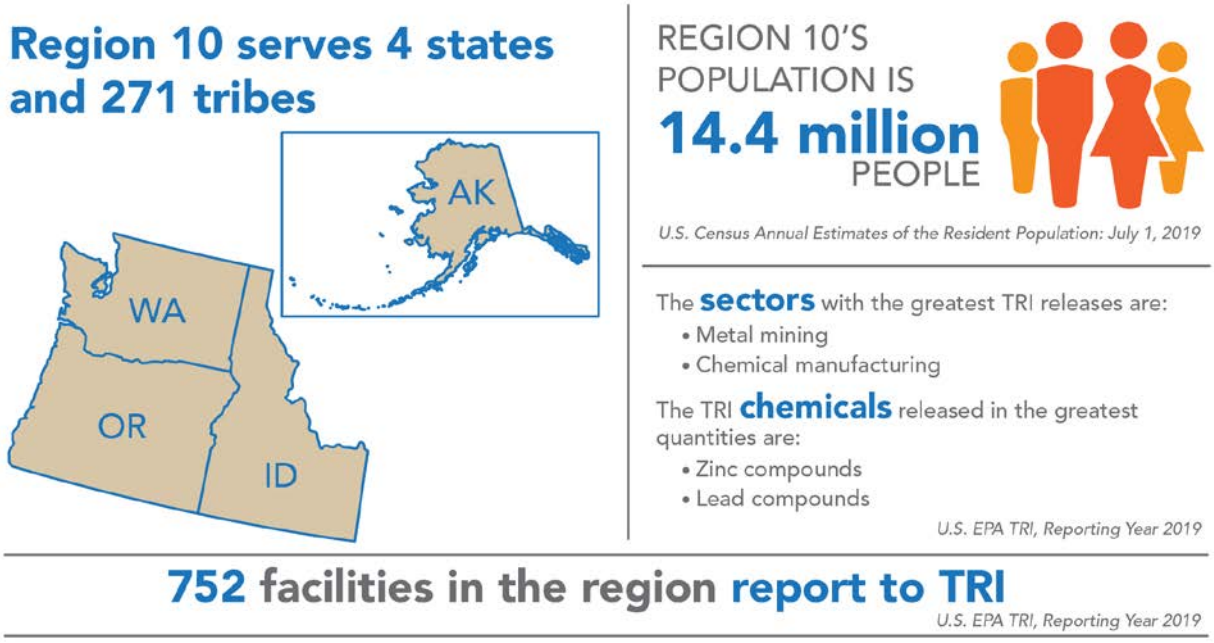
- Releases in Region 9 increased by 114 million pounds (32%), driven by increased releases from the metal mining sector, in which releases often vary substantially from year to year. In comparison, nationally, total releases of TRI chemicals decreased by 19%.
  - Excluding the metal mining sector, releases in Region 9 increased by 5 million pounds (5%).
- Quantities of chemicals released to air and water decreased, while land disposal and off-site transfers for disposal increased.

Source Reduction

In 2019, 6% of facilities in Region 9 (105 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the electrical equipment sector, in which 22% of facilities reported at least one source reduction activity. For example, an electrical equipment manufacturer replaced a wave solder machine with a new selective solder machine that helped reduce the amount of lead used in the process. [Click to view facility details in the TRI P2 Search Tool].

Regional Profile for EPA Region 10

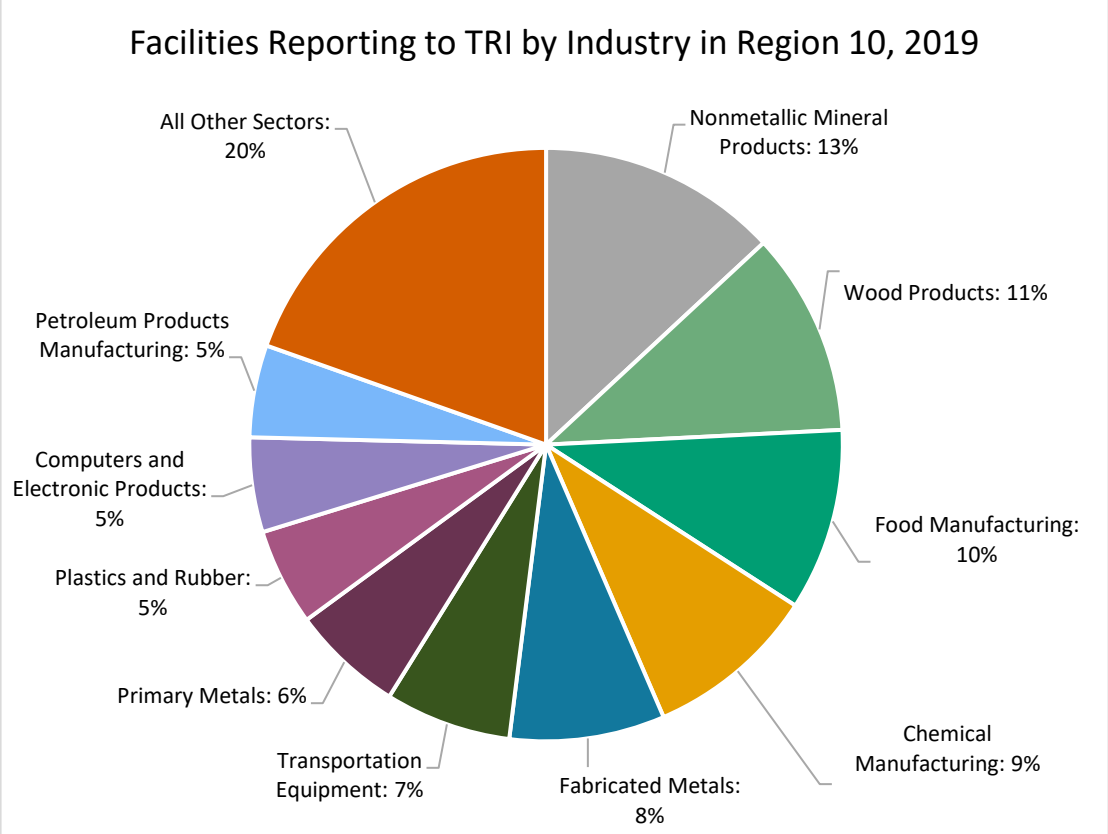
This section examines TRI reporting in EPA Region 10. Region 10 includes Alaska, Idaho, Oregon, Washington, and 271 tribes.



Region 10 covers 4% of the U.S. population and includes 4% of all facilities that report to TRI. For state- and tribe-specific TRI data, see the Where You Live section and the Tribal Communities section. Sixteen facilities located on the land of five different tribes in Region 10 reported to TRI for 2019.

Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 10.



Note: Percentages do not sum to 100% due to rounding.

In 2019:

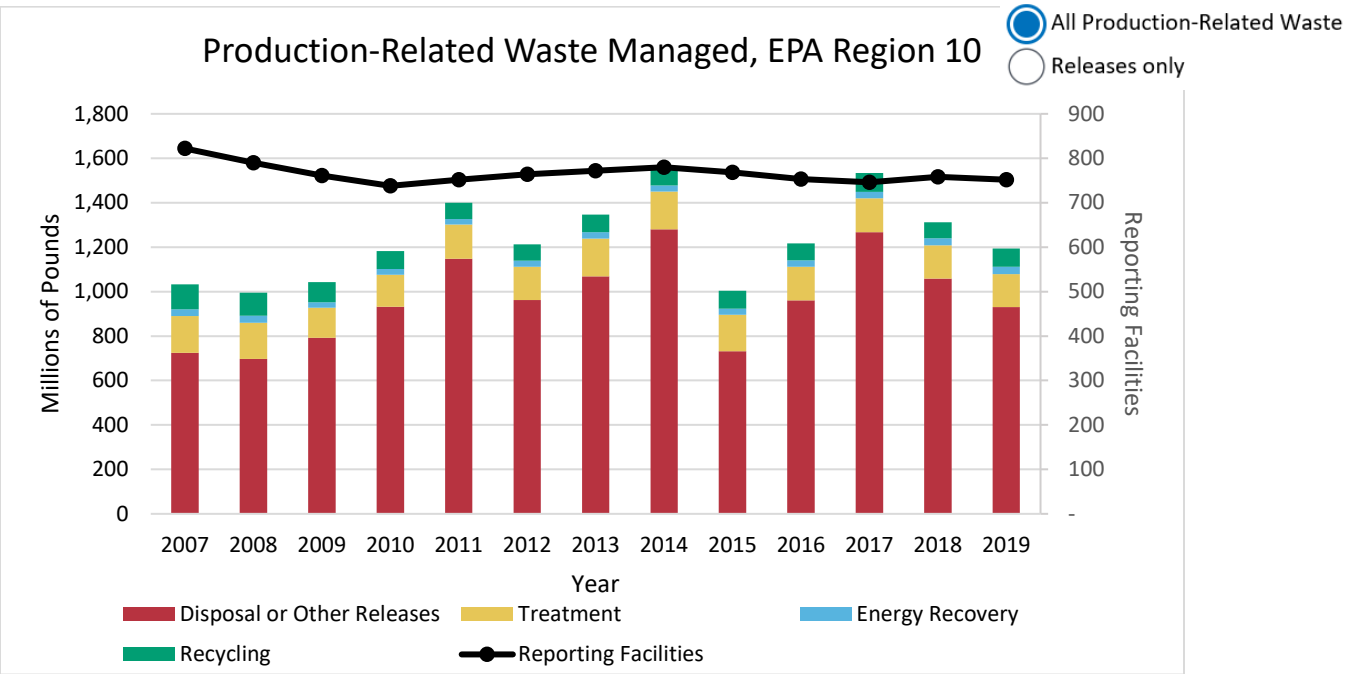
- 752 facilities in Region 10 reported to TRI, similar to reporting for 2018. These facilities were most commonly in the nonmetallic mineral products (including concrete manufacturing) or wood product manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the most TRI releases in Region 10 were from the metal mining sector, which accounted for 93% of the region's releases for 2019. After metal mining, the chemical manufacturing, food manufacturing, and paper manufacturing sectors reported the largest releases. Note that relatively few facilities in the metal mining sector or paper manufacturing sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.

- Nationwide, the metal mining, chemical manufacturing, electric utilities, and primary metals (including iron and steel manufacturing, and foundries) sectors reported the largest releases.
- Metal mining facilities typically handle large volumes of material. In this sector, even a small change in the chemical composition of the mineral deposit being mined can lead to big changes in the amount of TRI-listed chemicals reported. Therefore, releases in Region 10, where 10 metal mines reported to TRI for 2019, may not follow national trends. For more information on the metal mining sector, see the metal mining sector profile.

For information on the Region 10 facilities with the largest releases, see the Region 10 TRI factsheet.

Region 10 Waste Management Trend

The following graph shows the annual quantities of TRI chemicals in production-related waste managed by facilities located in Region 10. For more details on quantities released, toggle to the Releases graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

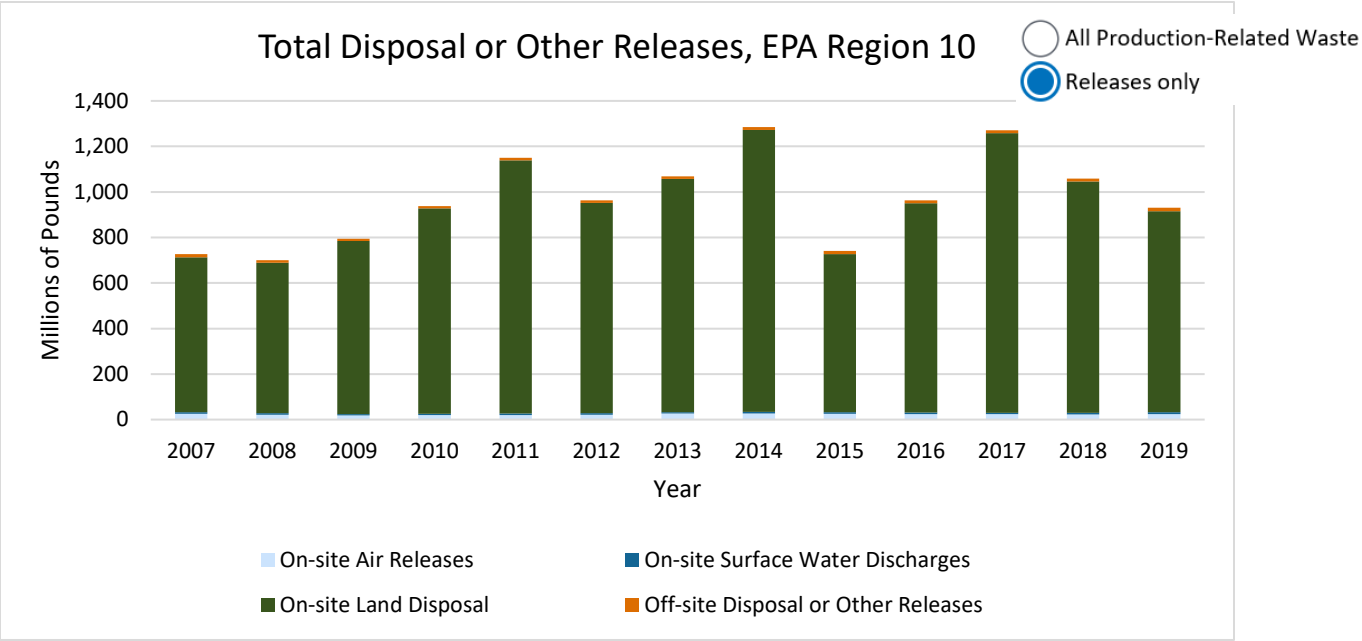
In 2019:

- Facilities in Region 10 managed 1.25 billion pounds of production-related waste, 74% of which was disposed of or otherwise released, compared to 11% nationally. Metal mines drive the quantity of production-related waste released in Region 10. For 2019, metal mines in the region disposed of more than 99% of their waste on site to land. The 1.25 billion pounds of production-related waste includes all chemicals reported for 2019, while for comparability over time, the trend chart excludes chemicals that were added to the TRI list after 2007.
- Since 2018, quantities of production-related waste managed in the region decreased by 9%, driven by decreased releases from metal mines. Excluding metal mines, production-related waste managed in Region 10 decreased by 9 million pounds (-3%).

From 2007 to 2019:

- Total production-related waste managed increased by 161 million pounds (16%), driven by increased releases reported by metal mines. Nationally, quantities of production-related waste managed increased by 23%, driven by increased recycling.
    - Excluding metal mines, production-related waste managed in the region decreased by 78.4 million pounds (-19%).

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 10.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2019:

- Facilities in Region 10 reported releasing 932 million pounds of TRI chemicals.
- The chemicals released in the largest quantities by medium were:
  - ammonia and methanol to air;
  - nitrate compounds to water;
  - zinc compounds and lead compounds to land; and
  - nitrate compounds and ethylene glycol transferred off site for disposal.
- Since 2018, releases decreased by 128 million pounds (-12%), compared to a 9% decrease nationally. The decrease in Region 10 releases was driven by the metal mining sector.
  - Excluding metal mining, releases decreased by 855,000 pounds (-1%) since 2018.
- Contributions by state to TRI releases in Region 10 were: Alaska (91%), Idaho (4%), Washington (3%), and Oregon (2%).

Regional Highlight

TRI chemical releases in Region 10 are dominated by one metal mine. For 2019, the Red Dog mine in Alaska reported 83% of the region's releases [View facility details].

- To consider the potential health risk from chronic exposure to these releases, EPA provides a risk-screening score from the RSEI model. Contributions by state to the RSEI Score for Region 10 were: Oregon (84%), Washington (15%), Idaho (<1%), and Alaska (<1%).
    - The RSEI model accounts for factors such as chemical properties and population density in addition to the pounds of TRI chemicals released. Additionally, RSEI does not model land disposal quantities, which drive the high release quantities for Alaska. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

From 2007 to 2019:

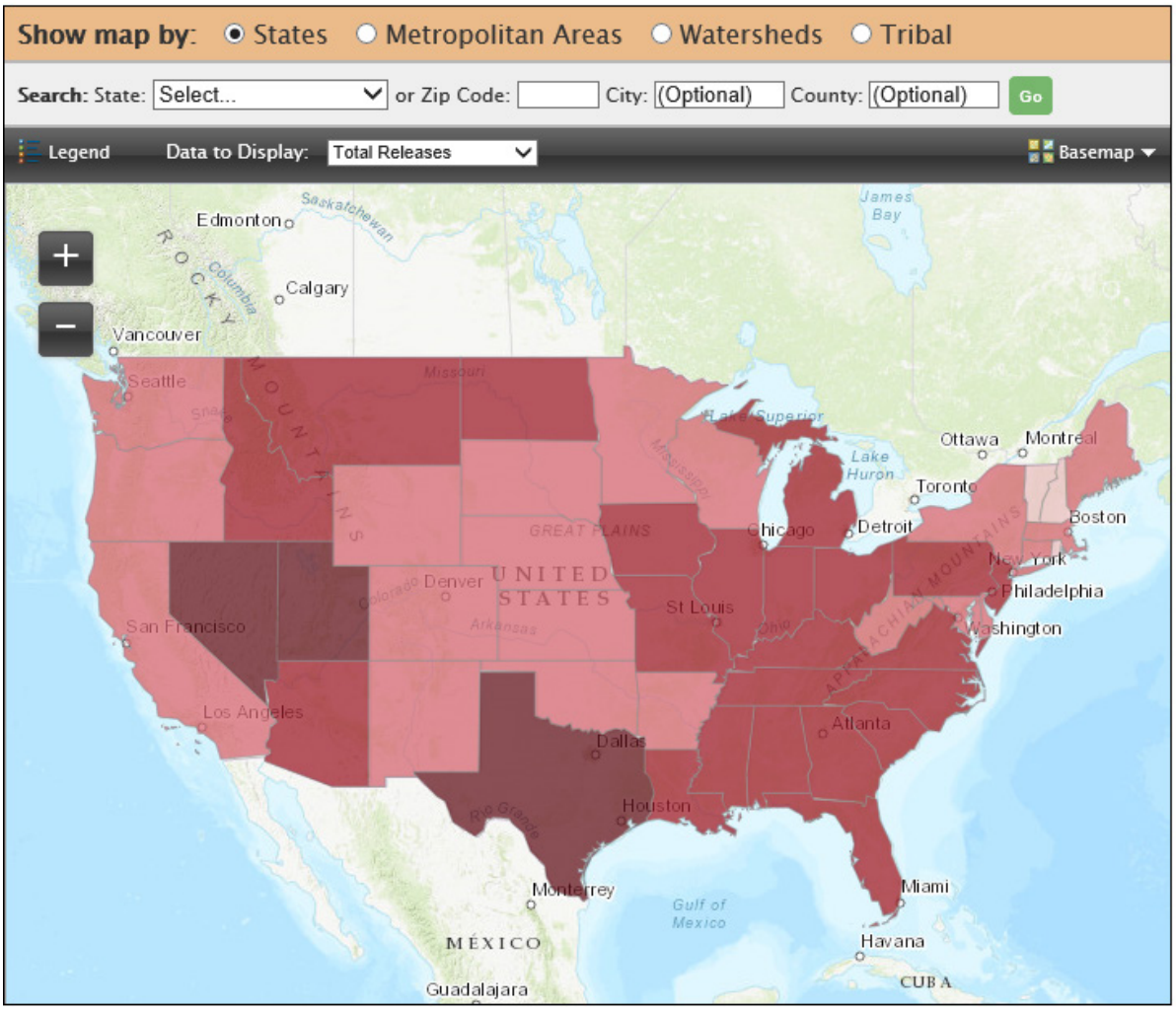
- Releases in Region 10 increased by 204 million pounds (28%), compared to a national decrease of 19%. The increase in Region 10 releases was driven by the metal mining sector, and if the sector is excluded, releases decrease by 35.3 million pounds (-35%).
- Quantities of chemicals released to every medium except air increased.

Source Reduction

In 2019, 4% of facilities in Region 10 (30 facilities) reported implementing new source reduction activities. As one example of source reduction in Region 10, a plastics plumbing fixture manufacturer began using a production line which uses a polymeric thermoset resin that does not contain styrene. This decreased the facility's styrene usage, waste generated, and air emissions. [Click to view facility details in the TRI P2 Search Tool].

Where You Live

Use the geographical selections bar above the map to show the disposal and other releases of Toxics Release Inventory (TRI) chemicals that occurred throughout the United States during 2019.



Click on any one of the locations on the map to see detailed information.

View Larger Map

In addition to viewing maps based on release quantities, you can also view maps based on risk-screening scores, which are estimates of potential human health risk generated by EPA's Risk-Screening Environmental Indicators (RSEI) model. These unitless scores represent relative human health risk from chronic exposures to TRI chemical releases and allow one to compare potential for risk across locations. For more on RSEI, see the Hazard and Potential Risk of TRI Chemicals section.

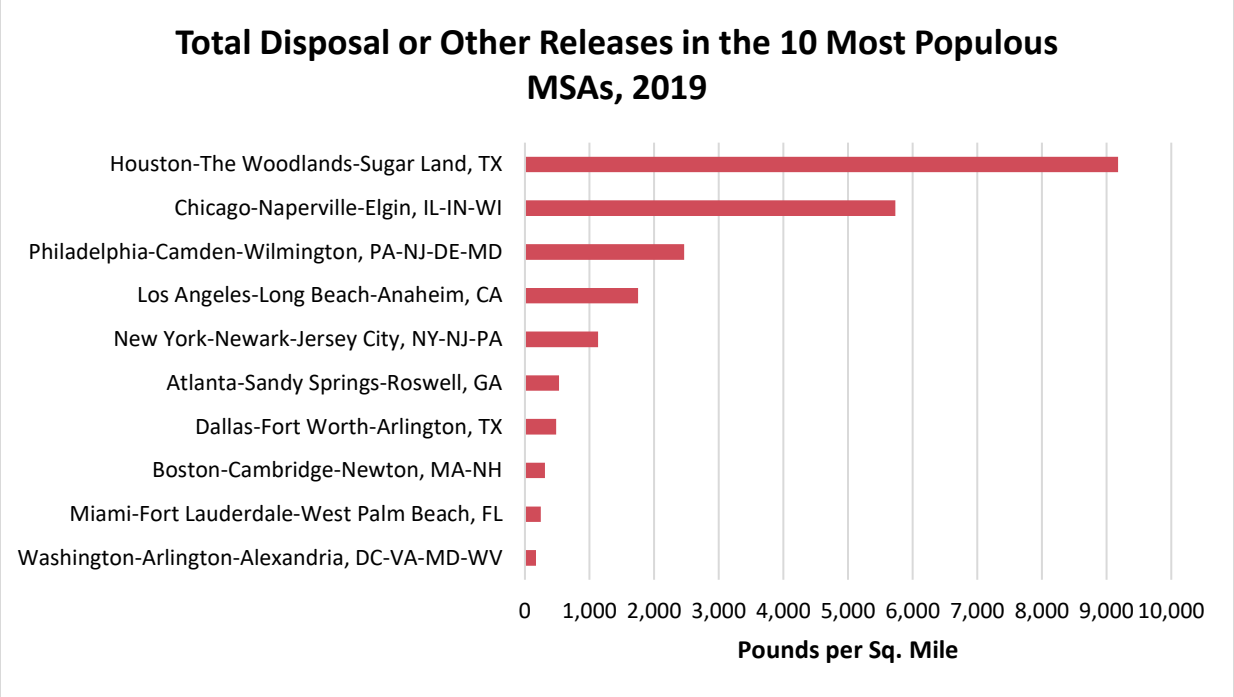
TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the Introduction. For more information see *Factors to Consider When Using Toxics Release Inventory Data*.

States and Metropolitan Areas

For TRI purposes, “states” includes all U.S. territories. For 2019, facilities located in all 56 states and territories reported to the TRI Program. Texas, Ohio, and California had the most facilities that reported to TRI, and together accounted for 20% of the total number of facilities that reported for 2019.

More than 80% of the United States’ population and many of the industrial and federal facilities that report to the TRI Program are located in urban areas. “Metropolitan statistical areas” and “micropolitan statistical areas” in the United States are defined by the Office of Management and Budget (OMB) and consist of one or more socially and economically integrated adjacent counties, cities, or towns.

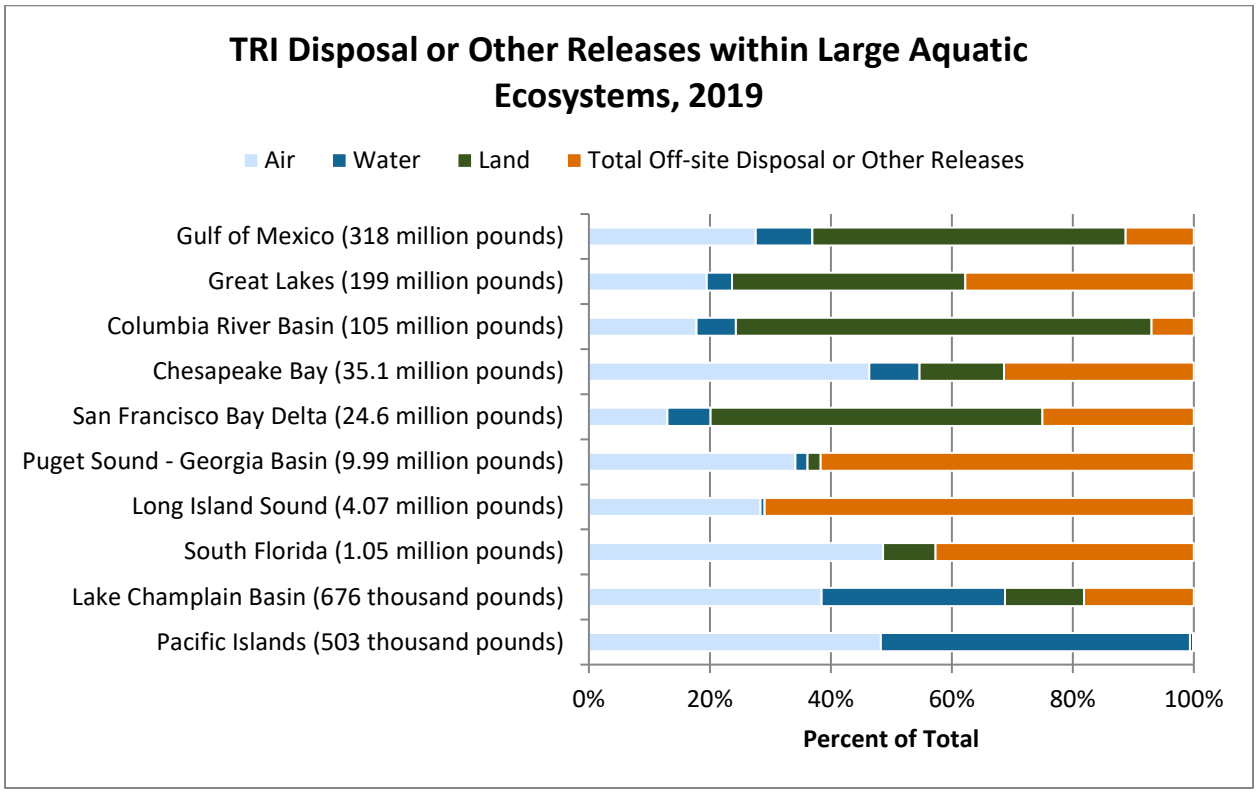


Watersheds

A watershed is the land area that drains to a common waterway. Rivers, lakes, estuaries, wetlands, streams, and oceans are catch basins for the land adjacent to them. Ground water aquifers are replenished by water flowing through the land area above them.

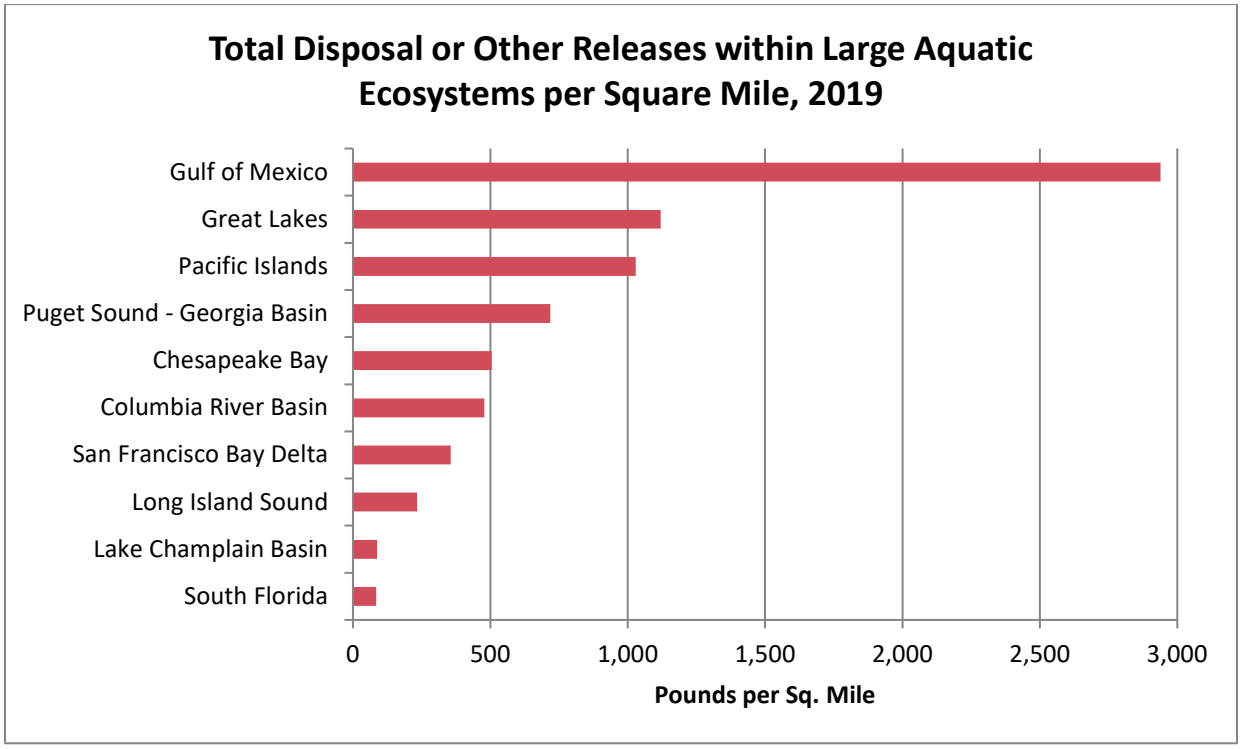
Large aquatic ecosystems (LAEs) comprise multiple small watersheds and water resources within a large geographic area. Currently, EPA defines 10 LAEs. More than 6,000 TRI facilities are located in these LAEs.

The chart below shows the portion of TRI chemical releases within each LAE that were released to air, water, or land, or transferred for disposal off site. Discharges of chemicals to water, as well as releases to air, releases to land, and land disposal, can all affect living resources within an aquatic ecosystem. For example, some chemicals can persist in the environment and accumulate in the tissues of fish and other wildlife. A few chemicals can become more concentrated as predators farther up the food chain eat these organisms, which may ultimately cause health problems for wildlife and humans.



The chart below shows TRI chemical releases per square mile for each LAE. Releases per square mile are greatest in the Gulf of Mexico watershed in the southeastern US, where many

chemical manufacturing facilities are located. Almost half of the TRI releases from chemical manufacturing facilities in the US are from facilities located in the Gulf of Mexico watershed.



Tribal Communities

Under EPA policy, the Agency works with federally recognized tribes on a government-to-government basis to protect the land, air, and water in Indian country and Alaska Native villages and to support tribal assumption of program authority. Facilities located in Indian country that meet TRI reporting requirements must indicate the appropriate three-digit Bureau of Indian Affairs (BIA) tribal code on annual TRI reporting forms. These codes tell the EPA on which tribal land the facility is located.

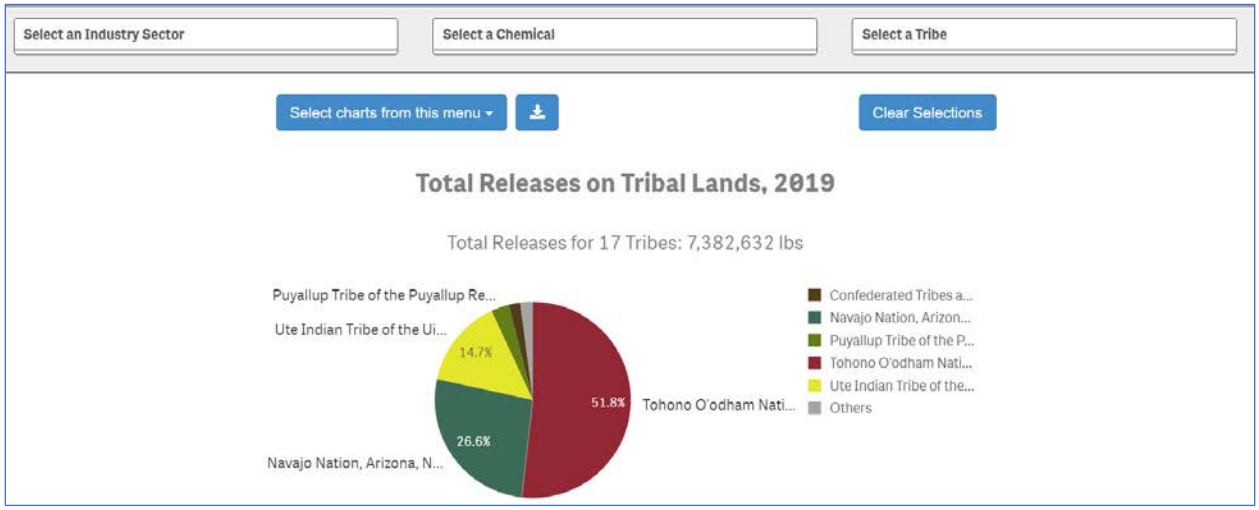
In 2019, there were 40 facilities located in the Indian country of 17 different federally recognized tribes that reported to TRI. These facilities collectively managed nearly 25 million pounds of production-related waste, 7.4 million pounds of which was disposed of or otherwise released. Of the releases reported, 99.7% were released on site; 92% of these were on-site disposal to land from electric utilities and metal mining facilities. These facilities primarily released metal compounds such as lead, barium, and copper. Lead and copper are often present in the mineral ore disposed of by metal mines, and barium is present in coal and oil combusted at electric utilities.

The table below provides more details about various types of releases and other waste management reported by facilities on federally recognized tribal lands.

Quick Facts for 2019: Facilities on Tribal Lands

Measure	*Value*
Number of Facilities that Reported to TRI	**40**
Number of Tribes with TRI Facilities on Their Lands	17
Production-Related Waste Managed	**24.59 million lb**
Recycling	9.00 million lb
Energy Recovery	0.13 million lb
Treatment	8.08 million lb
Disposal or Other Releases	7.38 million lb
Total Disposal or Other Releases	**7.38 million lb**
On-site	**7.36 million lb**
Air	0.62 million lb
Water	1.10 thousand lb
Land	6.74 million lb
Off-site	**0.02 million lb**

The Tribal Communities Dashboard makes it easy to explore information about releases of TRI chemicals from facilities on or near tribal lands. An example of the type of TRI information in the Tribal Communities Dashboard is shown in the interactive chart below. Use the buttons in the top row to filter the data by industry sector, chemical, and/or tribe. Change the data displayed in the pie chart below using the blue dropdown button on the left.



The interactive table below lists the federally recognized tribes that had at least one TRI-reporting facility on their lands, along with the total releases reported by facilities, the number of facilities, and the number of chemicals reported. Click on a column header to change how the table is sorted.

Total Disposal or Other Releases on Tribal Lands by Tribe, 2019

Tribes in 2019, Sorted by Releases and Number of Facilities

This table is interactive - click the column headers to change the sorting of the table.

Tribe	Total Releases (lbs)	Number of Facilities	Fact Sheet
Totals	**7,382,632**	**40**	
Tohono O'odham Nation of Arizona	3,824,068	1	Link
Navajo Nation, Arizona, New Mexico & Utah	1,965,189	2	Link
Ute Indian Tribe of the Uintah & Ouray Reservation, Utah	1,083,652	1	Link
Puyallup Tribe of the Puyallup Reservation	217,710	9	Link
Confederated Tribes and Bands of the Yakama Nation	140,259	3	Link
Coeur D'Alene Tribe	115,158	2	Link
Eastern Band of Cherokee Indians	29,083	1	Link
Saginaw Chippewa Indian Tribe of Michigan	3,488	1	Link
Arapaho Tribe of the Wind River Reservation, Wyoming	1,611	1	Link
Oneida Tribe of Indians of Wisconsin	1,086	4	Link
Colorado River Indian Tribes of the Colorado River Indian Reservation, Arizona and California	607	1	Link
Gila River Indian Community of the Gila River Indian Reservation, Arizona	378	8	Link
Salt River Pima-Maricopa Indian Community of the Salt River Reservation, Arizona	306	1	Link
Choctaw Nation of Oklahoma	25	2	Link
Tulalip Tribes of Washington	10	1	Link
Suquamish Indian Tribe of the Port Madison Reservation	2	1	Link
Rincon Band of Luiseno Mission Indians of the Rincon Reservation, California	0	1	Link

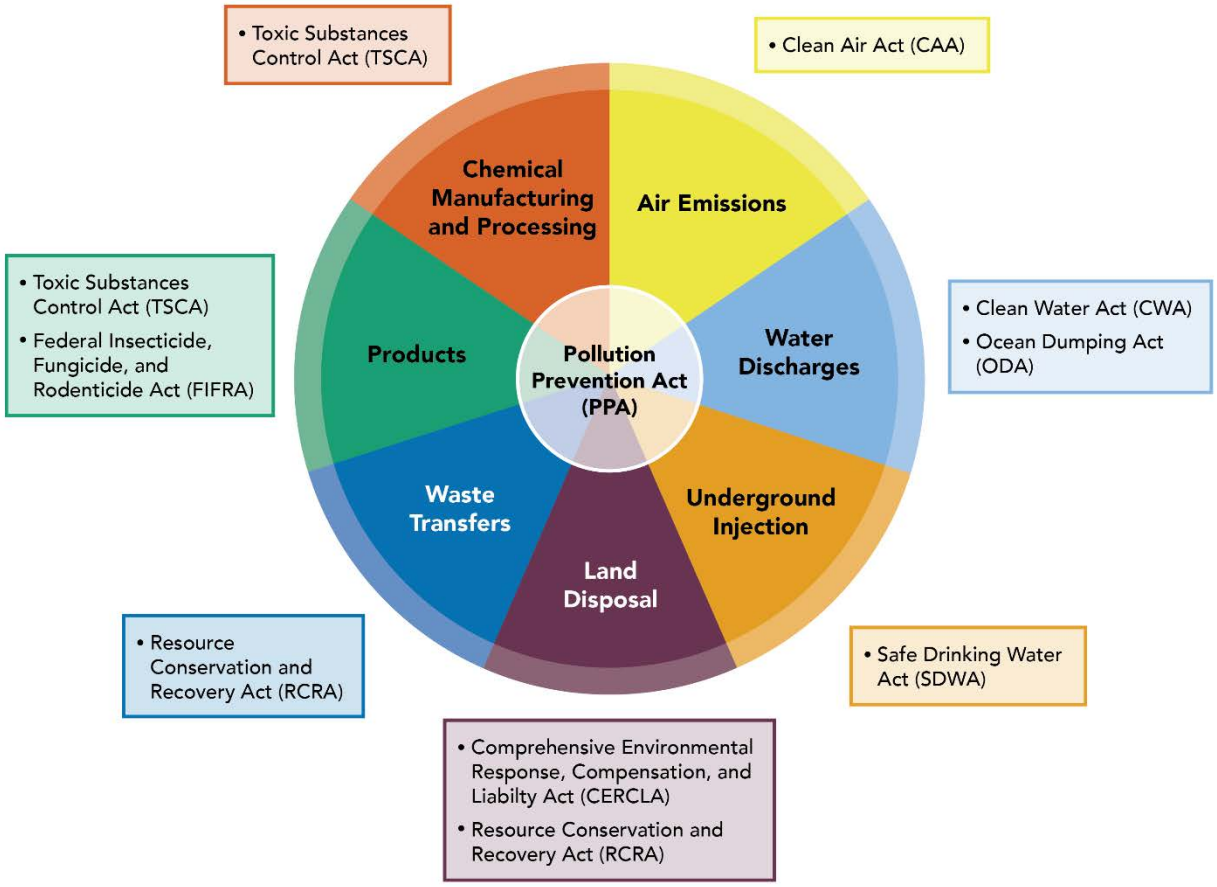
Additional resources for tribes are available on the TRI for Tribal Communities webpage, including more detailed analyses of TRI data, links to other online tools, and contact information for EPA's Tribal Program Managers.

TRI and Beyond

This section presents how the Toxics Release Inventory (TRI) relates to other EPA environmental and chemical management programs and laws, and how the TRI serves as a model for pollutant release and transfer inventories internationally.

The TRI is a powerful resource that provides the public with information about how TRI chemical wastes are managed by facilities in the United States. Beyond the TRI, there are many other programs at EPA that also collect, through regulations established under laws, various types of information about TRI chemicals and other chemicals. The next figure is an overview of some of the laws that EPA implements, and the industrial activities or processes EPA regulates under these laws.

While many programs at EPA focus on one medium, i.e., land, air or water, TRI is unique in that it covers all media, including the release of chemicals to air, water, and land, and waste transfers. In addition, facilities that are subject to the TRI reporting requirements are required to submit TRI reports annually. As a result, TRI data are especially valuable, as they are timely and can be used with data from other datasets to provide a more complete picture of national trends in chemical use, chemical management, environmental release and other waste management practices, and environmental performance.



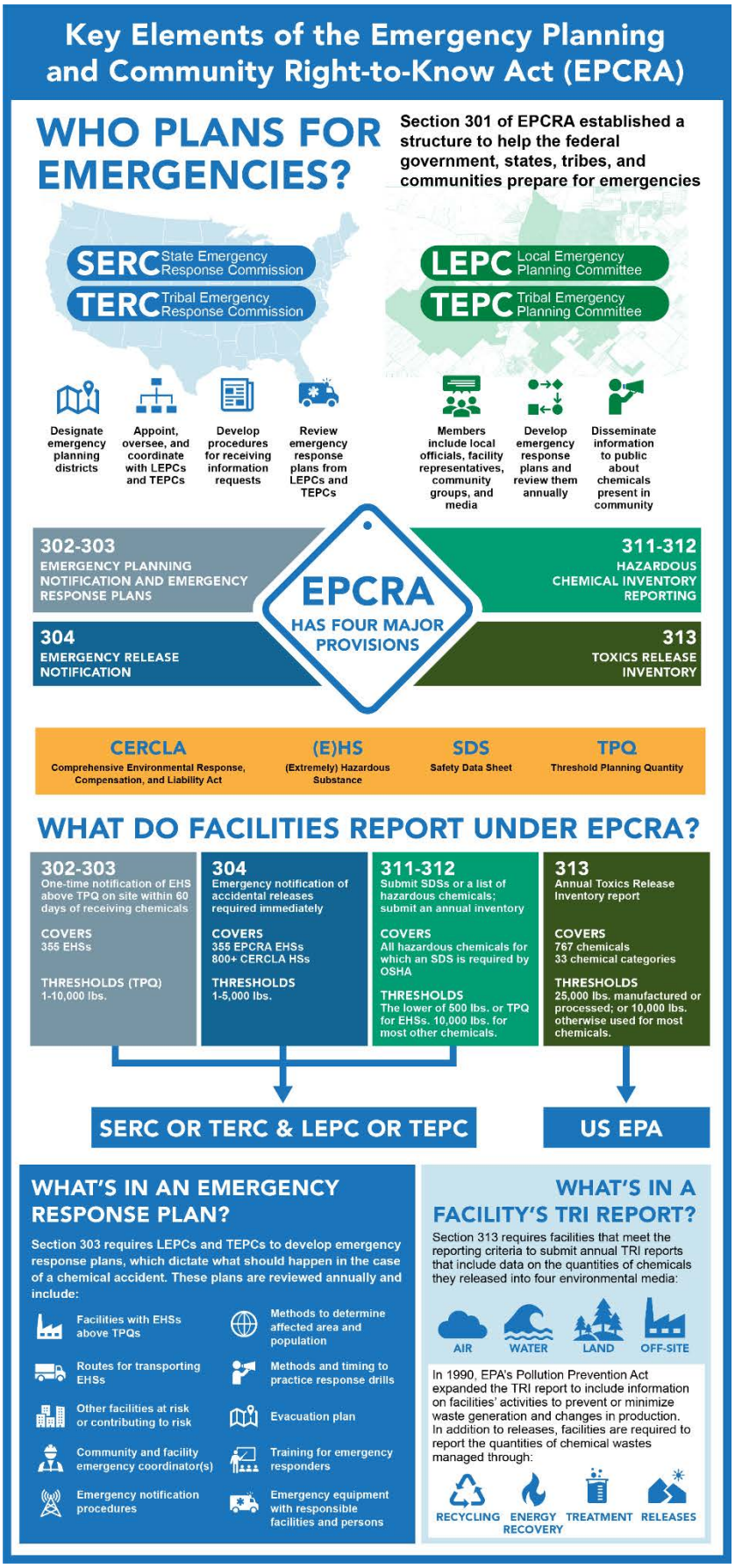
Note: The Emergency Planning and Community Right-to-Know Act (EPCRA) establishes requirements for emergency planning, preparedness, and reporting on hazardous and toxic chemicals involving air releases, water releases, land disposal, waste transfers, and the quantities of chemicals on site, the type and location of storage of those chemicals, and their use.

Offices throughout EPA use TRI data to support their respective missions to protect human health and the environment. These uses include technical analysis for regulation, informing program priorities and projects, providing information to internal and external stakeholders, and many other applications.

More on EPCRA

The TRI was established by the Emergency Planning and Community Right-to-Know Act (EPCRA) in 1986. The creation of EPCRA was in response to what is widely considered to be the worst industrial chemical disaster in history. Beginning on December 2, 1984, methyl isocyanate gas was accidentally released from a chemical plant in Bhopal, India. Thousands of people died that night and many more were injured. Thousands more died later as a result of their exposure, and survivors of the accident continue to suffer with permanent disabilities. Approximately six months later, a similar incident occurred at a facility in West Virginia. These two events raised concern about local preparedness for chemical emergencies and the availability of information on toxic chemicals.

EPCRA establishes requirements for federal, state and local governments, Indian tribes, and industry regarding **emergency planning** and **"Community Right-to-Know" reporting** on hazardous and toxic chemicals. These requirements are specified in EPCRA's four major provisions as shown in the figure below. Information collected under EPCRA helps states and communities develop a broad perspective of chemical hazards for the entire community, as well as for individual facilities. The TRI (also known as EPCRA section 313) contributes to this broader perspective by making information about the management of chemical waste generated at facilities available to the public, further supporting informed decision-making by companies, government agencies, non-governmental organizations, communities, and others.

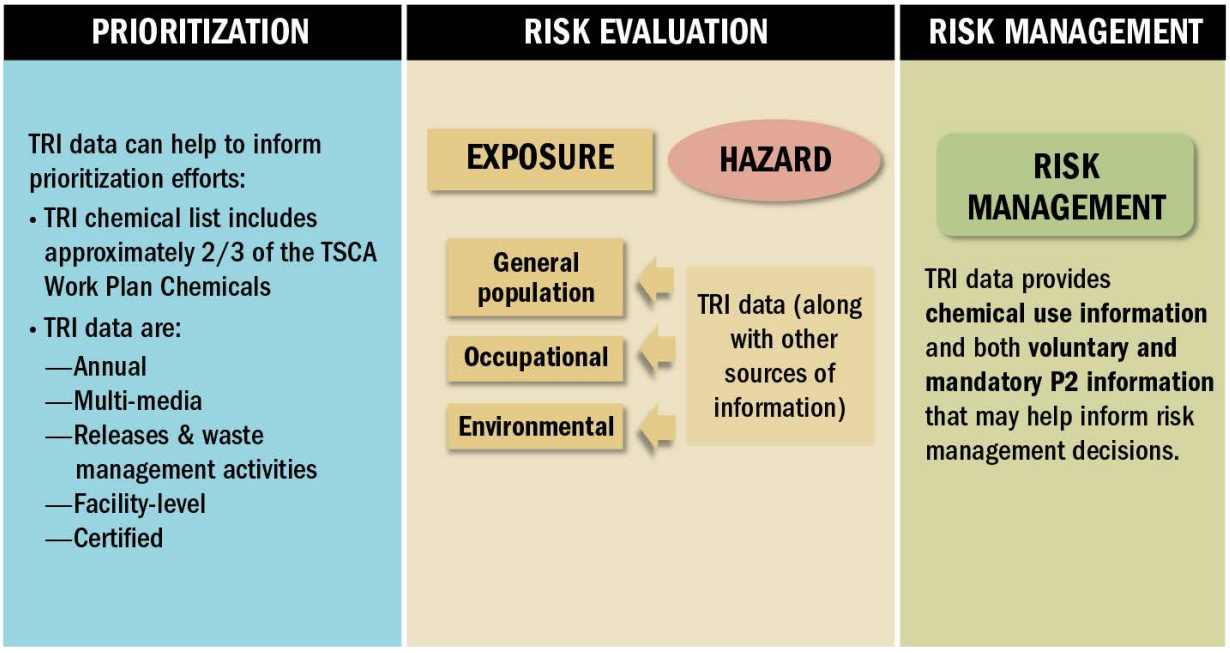

Key Elements of the Emergency Planning and Community Right-to-Know Act (EPCRA)
WHO PLANS FOR EMERGENCIES?
Section 301 of EPCRA established a structure to help the federal government, states, tribes, and communities prepare for emergencies
SERC State Emergency Response Commission
TERC Tribal Emergency Response Commission
LEPC Local Emergency Planning Committee
TEPC Tribal Emergency Planning Committee
Designate emergency planning districts
Appoint, oversee, and coordinate with LEPCs and TEPCs
Develop procedures for receiving information requests
Review emergency response plans from LEPCs and TEPCs
Members include local officials, facility representatives, community groups, and media
Develop emergency response plans and review them annually
Disseminate information to public about chemicals present in community
302-303 EMERGENCY PLANNING NOTIFICATION AND EMERGENCY RESPONSE PLANS
311-312 HAZARDOUS CHEMICAL INVENTORY REPORTING
EPCRA HAS FOUR MAJOR PROVISIONS
304 EMERGENCY RELEASE NOTIFICATION
313 TOXICS RELEASE INVENTORY
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
(E)HS (Extremely) Hazardous Substance
SDS Safety Data Sheet
TPQ Threshold Planning Quantity
WHAT DO FACILITIES REPORT UNDER EPCRA?
302-303
One-time notification of EHS above TPQ on site within 60 days of receiving chemicals
COVERS
355 EHSs
THRESHOLDS (TPQ)
1-10,000 lbs.
304
Emergency notification of accidental releases required immediately
COVERS
355 EPCRA EHSs
800+ CERCLA HSs
THRESHOLDS
1-5,000 lbs.
311-312
Submit SDSs or a list of hazardous chemicals; submit an annual inventory
COVERS
All hazardous chemicals for which an SDS is required by OSHA
THRESHOLDS
The lower of 500 lbs. or TPQ for EHSs. 10,000 lbs. for most other chemicals.
313
Annual Toxics Release Inventory report
COVERS
767 chemicals
33 chemical categories
THRESHOLDS
25,000 lbs. manufactured or processed; or 10,000 lbs. otherwise used for most chemicals.
SERC OR TERC & LEPC OR TEPC
US EPA
WHAT'S IN AN EMERGENCY RESPONSE PLAN?
Section 303 requires LEPCs and TEPCs to develop emergency response plans, which dictate what should happen in the case of a chemical accident. These plans are reviewed annually and include:
Facilities with EHSs above TPQs
Routes for transporting EHSs
Other facilities at risk or contributing to risk
Community and facility emergency coordinator(s)
Emergency notification procedures
Methods to determine affected area and population
Methods and timing to practice response drills
Evacuation plan
Training for emergency responders
Emergency equipment with responsible facilities and persons
WHAT'S IN A FACILITY'S TRI REPORT?
Section 313 requires facilities that meet the reporting criteria to submit annual TRI reports that include data on the quantities of chemicals they released into four environmental media:
AIR
WATER
LAND
OFF-SITE
In 1990, EPA's Pollution Prevention Act expanded the TRI report to include information on facilities' activities to prevent or minimize waste generation and changes in production. In addition to releases, facilities are required to report the quantities of chemical wastes managed through:
RECYCLING
ENERGY RECOVERY
TREATMENT
RELEASES

TSCA and TRI

This section highlights how TRI information contributes to data used in Toxics Substances Control Act (TSCA) risk evaluations. TRI data serve as a source of environmental information for TSCA throughout the three-stage chemical evaluation process. TSCA, as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act, is the nation's primary chemicals management law. TSCA requires EPA to evaluate existing chemicals in commerce and new chemicals intended for use in commerce for safety. The Agency is required to conduct a transparent, risk-based process. EPA selects existing chemicals for further evaluation from the 2014 Update to the TSCA Work Plan, which helps to focus and direct EPA's activities.

The three stages of EPA's process for evaluating the safety of existing chemicals are prioritization, risk evaluation, and risk management. EPA first **prioritizes** toxic chemicals in commerce through a screening-level review, **evaluates** those chemicals to determine if they present unreasonable risks, and then **manages** the unreasonable risks of those chemicals to protect human health and the environment. During both the prioritization and risk evaluation stages of the process, TRI serves as a source of information as illustrated in the figure below. TRI data may also be used in the risk management stage of the process.

TRI Data Use in TSCA Chemical Evaluations



Prioritization. Approximately two-thirds of the chemicals identified in the 2014 update of the TSCA Work Plan are also included on the TRI list of chemicals. TRI data can inform EPA's prioritization of chemicals for risk evaluation because the data are collected annually and

include the location of facilities and the quantities of TRI chemicals they released to air, water and land, and transferred to off-site locations. In addition, trend analyses of TRI data can help identify changes over time in the geographic location and quantities of releases, and the types of industrial sectors managing these chemicals.

Risk evaluation. A TSCA risk evaluation of a chemical is a comprehensive evaluation of the risks the chemical poses to human health and the environment. EPA evaluates how the chemical will be used, which may include manufacturing and import, processing, use, distribution in commerce, and disposal over the chemical's life cycle. During risk evaluation, EPA is required to assess exposures to the chemical in the workplace, to the general population and to environmental (e.g. ecological) receptors. This includes assessment of potentially exposed or susceptible populations that may be sensitive to the potential hazards posed by the chemical under review. TRI and other data are used to support these assessments under TSCA.

Risk Management. If EPA determines that a chemical poses an unreasonable risk of injury to health or the environment under its methods of use, EPA will impose regulatory actions or other risk management options to effectively manage the identified risk. These regulatory actions and options may include labeling with warnings and instructions for use, recordkeeping or notice requirements, restrictions on certain uses or activities to reduce human exposure or environmental releases, or a ban of the chemical entirely. EPA may use TRI data, such as on chemical use and pollution prevention practices, to help inform these risk management decisions.

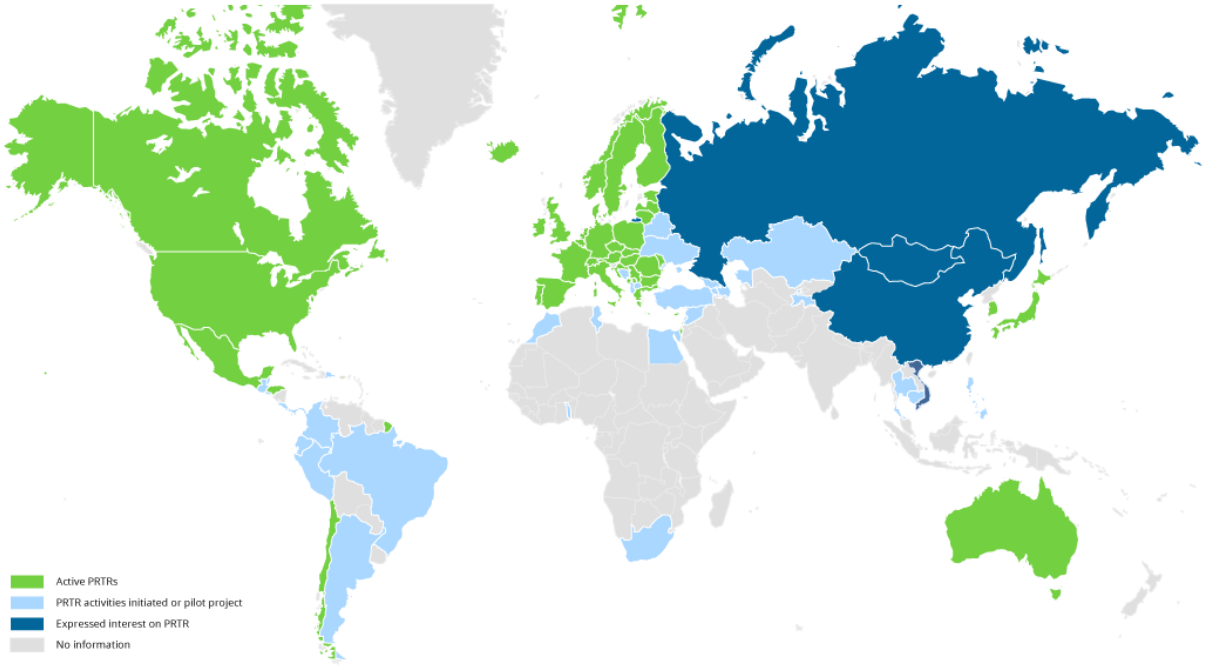
High-priority Substances for TSCA Risk Evaluation

In 2017, EPA published the scope documents for the initial ten chemicals undergoing risk evaluation under the amended TSCA in which nine of the ten chemicals are TRI-reportable chemicals (except for C.I. Pigment Violet 29).

In 2019, EPA announced the next 20 chemicals to undergo risk evaluation. Finalizing this list of high-priority chemicals for risk evaluation establishes the TSCA prioritization queue which requires ongoing review and selection of priority chemicals as evaluations are completed. This marks a major milestone for EPA in its efforts to ensure the safety of existing chemicals in the marketplace through its updated chemical management program. In August 2020, EPA published the final scope documents for these 20 chemical substances, of which 13 are TRI-reportable chemicals.

TRI Around the World

In 1986, with the enactment of the Emergency Planning and Community Right-to-Know Act (EPCRA), the TRI was established as the first national Pollutant Release and Transfer Register (PRTR) in the world. Since then, environmental agencies in other countries have implemented their own right-to-know PRTR programs modeled after the TRI program. Currently, at least 50 countries have fully established PRTRs or have implemented pilot programs, as shown in the map below. More countries are expected to develop PRTRs in the future, particularly in Asia, South America, and Africa.



Source: United Nations Economic Commission for Europe PRTR Global Map

As global PRTR implementation continues to grow, the TRI Program will continue to work with international organizations to:

- Assist in the development of new PRTR programs,
- Promote data standards and core data elements for greater PRTR comparability and harmonization, resulting in better global scale analysis capabilities, and
- Showcase PRTR data utility for assessing progress towards sustainability.

As an example, the TRI Program is currently working with the Organization for Economic Co-operation and Development (OECD) EXIT on a project to use global PRTR data to assess progress toward the Sustainable Development Goals established in the United Nation's 2030 Agenda for Sustainable Development EXIT, as described in the Project Spotlight below. For

information on international PRTR activities, projects and partners, see TRI's International webpage.

International Project Spotlight: Using PRTR Data to Assess Progress toward the U.N. Sustainable Development Goals

Background. The TRI Program is collaborating on an OECD project to use global PRTR data to assess progress toward the United Nations' (U.N.) Sustainable Development Goals (SDGs). These goals are designed to "shift the world on to a sustainable and resilient path" by setting targets that encompass the economic, environmental, and social dimensions of sustainability. As stakeholders act toward achieving the SDGs, the U.N. will measure progress toward the Goals using existing data where possible. One such existing data source for some of the SDGs may be found in countries' PRTR data.

SDG Target 12.4

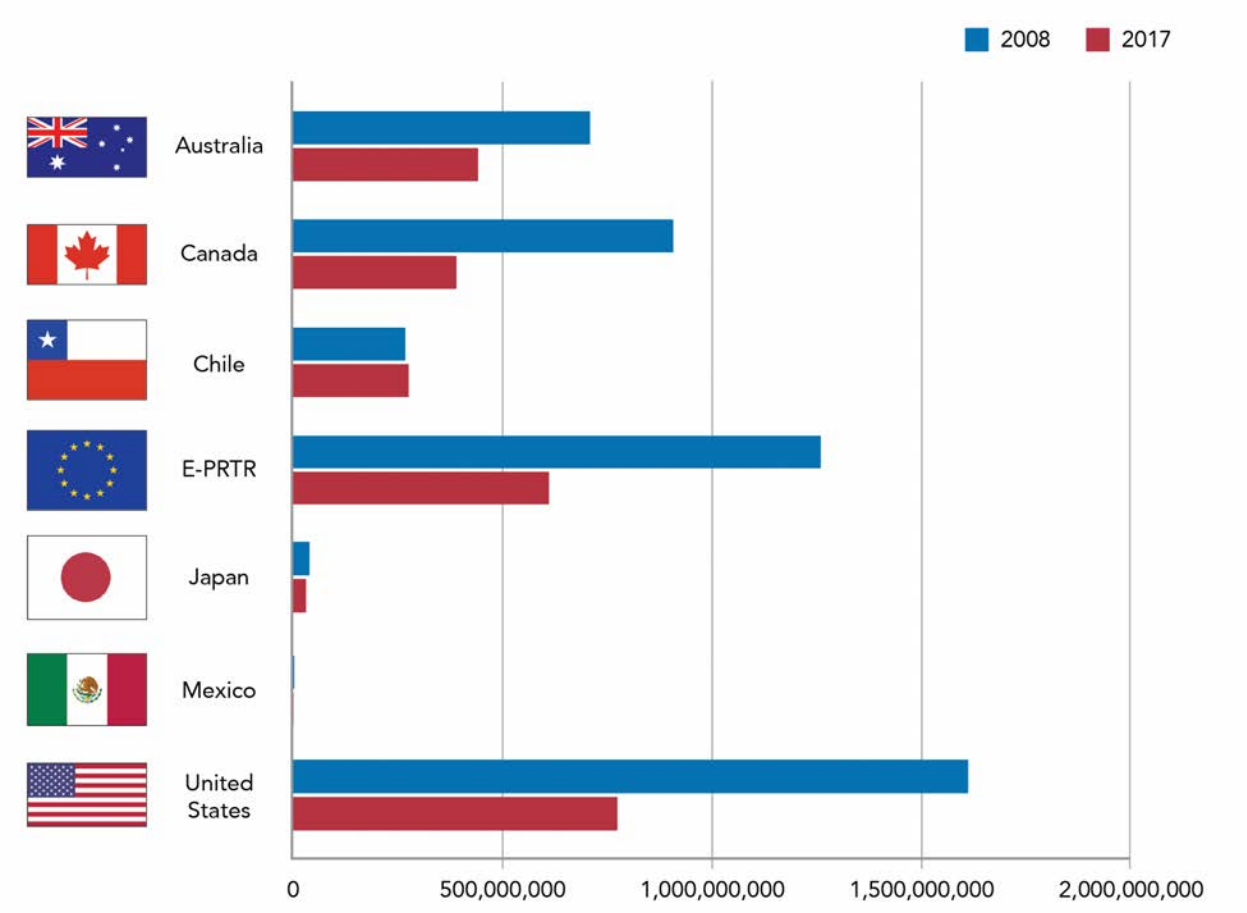
By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

Project Focus. The U.N. SDG Target 12.4 EXIT was identified as the target most directly relevant to PRTR data and is the focus of this initial phase of the project. This target focuses on reducing chemical releases to the environment.

Project Status. Global analyses of PRTR data are currently underway based on aggregated data for multiple chemicals from multiple countries in order to provide insight into progress toward achieving SDG Target 12.4. The figure below shows the trend for air and water releases of 14 pollutants from manufacturing facilities as reported to the 7 PRTRs analyzed in the project.

Next steps. As the project progresses and the methods and metrics are reviewed and refined, the findings may be included in the next update of the U.N. Sustainable Development Goals Report EXIT.

Change in releases of 14 pollutants, 2008 to 2017 (kg)



PRTRs included in the analyses: Australia – National Pollutant Inventory (NPI), Canada – National Pollutant Release Inventory (NPRI), Chile – Registro de Emisiones y Transferencia de Contaminantes (RETC), European Union – European Pollutant Release and Transfer Register (E-PRTR), Japan Pollutant Release and Transfer Register (PRTR), Mexico – Registro de Emisiones y Transferencia de Contaminantes (RETC), United States – Toxics Release Inventory (TRI).
Chemicals included in the analyses: 1,2-Dichloroethane, Benzene, Cadmium, Chromium, Di-(2-ethylhexyl) phthalate, Dichloromethane, Ethylbenzene, Mercury, Nickel, Particulate matter, Styrene, Sulfur oxides, Tetrachloroethylene, Trichloroethylene.

Read more about the TRI Around the World.