The U.S. Toxics Release Inventory (TRI)

Presentation Overview

- Toxics Release Inventory overview
  - Definitions
  - Regulatory coverage
- TRI's pollution prevention data
- TRI data uses
- Accessing TRI data

What is the TRI?

An information resource about toxic chemical waste management at facilities across the U.S.

800+

individual chemicals and chemical categories

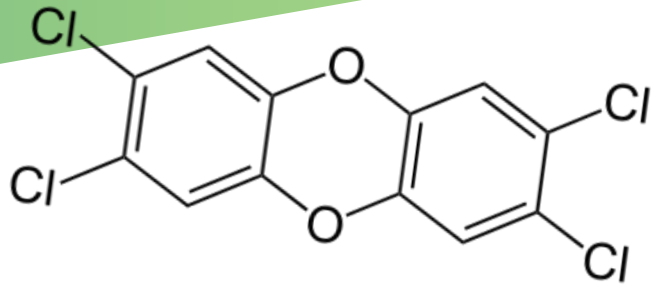
21,000+

industrial and federal facilities

since 1987

annual reporting directly from facilities

What Chemicals Are Covered?



- TRI covers an important subset of chemicals used in commerce
- In general, chemicals on the TRI list are those that cause:
  - Cancer or other chronic human health effects
  - Adverse acute human health effects
  - Significant adverse environmental effects

See the complete list at www.epa.gov/tri/tri-listed-chemicals

What Facilities Must Report?

- Covered industry sectors, including:

Manufacturing

Federal Facilities

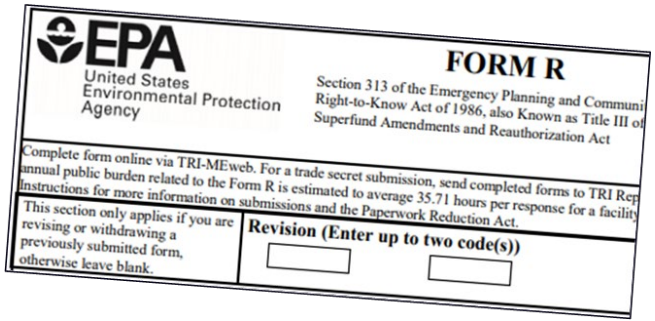
Coal/Oil Electricity Generation

Certain Mining Facilities

Hazardous Waste Management

- Minimum number of employees
- Manufacture~~s~~, process~~es~~, or otherwise use~~s~~ more than a certain amount of a TRI-listed toxic chemical per year

What information do facilities report to TRI?


EPA
United States Environmental Protection Agency

FORM R

Section 313 of the Emergency Planning and Communi
Right-to-Know Act of 1986, also Known as Title III of
Superfund Amendments and Reauthorization Act

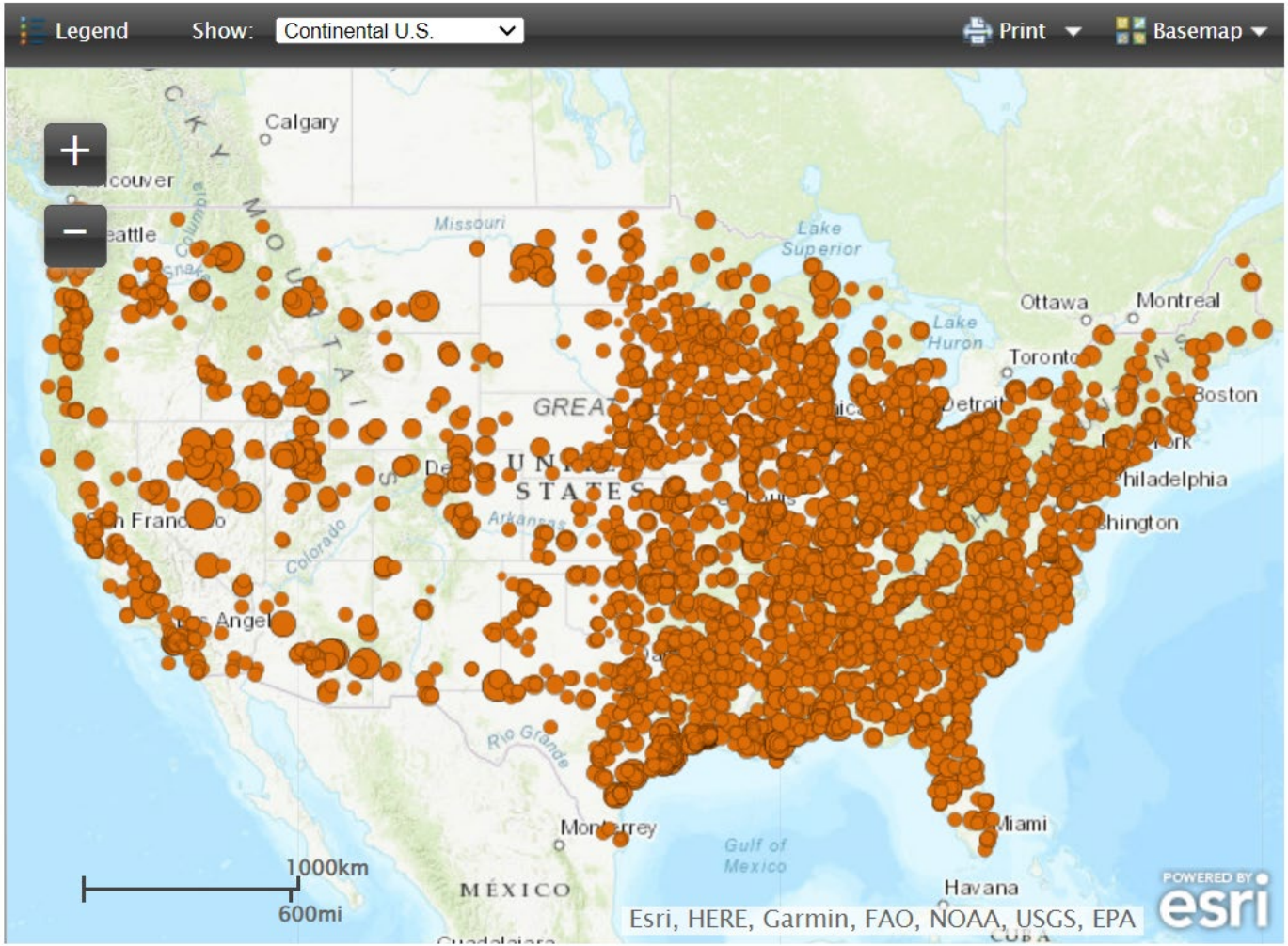
Complete form online via TRI-MEweb. For a trade secret submission, send completed forms to TRI Rep
annual public burden related to the Form R is estimated to average 35.71 hours per response for a facilit
instructions for more information on submissions and the Paperwork Reduction Act.

This section only applies if you are revising or withdrawing a previously submitted form, otherwise leave blank.

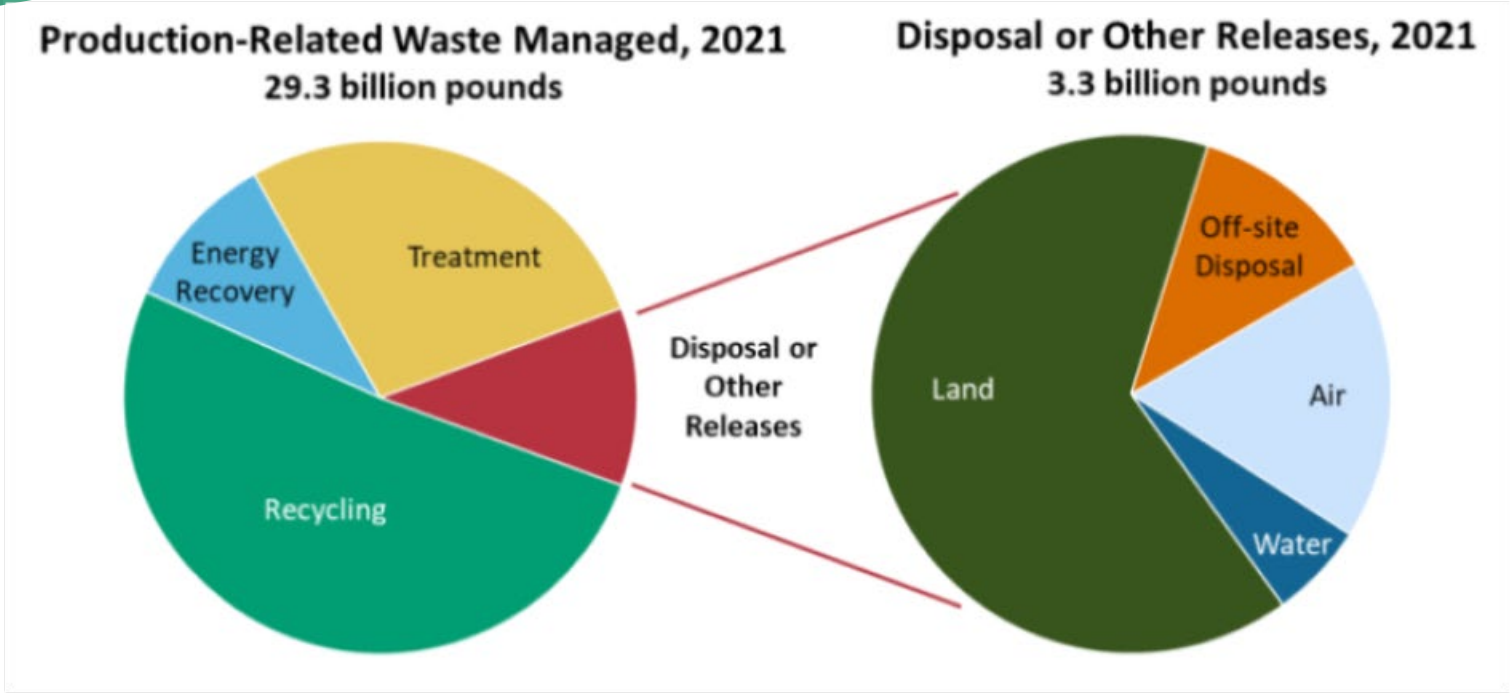
Revision (Enter up to two code(s))

- **On-site releases**
  - Air emissions
  - Surface water discharges
  - Disposal to land
- **Other on-site waste management**
  - Recycling
  - Energy recovery
  - Treatment
- **Transfers to off-site locations**
- **Newly implemented pollution prevention activities**

2021 TRI Reporting Facilities



2021 TRI Data – Waste Managed




Air release
2b
Air releases
3
Off-site transfer
2a
On-site recycling
1
4
Off-site transfer to POTW
6
Water release

What Pollution Prevention Data do Facilities Report?

Source reduction activities are practices that reduce, eliminate, or prevent pollution at its source. Source reduction is also referred to as Pollution Prevention (P2).

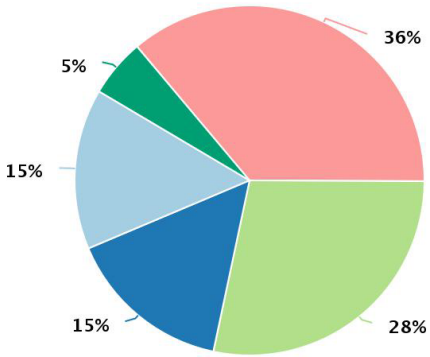
- Facilities are **required** to report all newly implemented source reduction activities involving TRI chemicals
  - Includes selection from 24 source reduction activity codes. Example: “S02: Substituted an organic solvent”
  - Codes are tracked across 5 categories
- Must also indicate the method(s) used to identify the activity (e.g., audit, vendor assistance)

Benefits of TRI P2 Data Collection

- Explore a shared knowledge base of source reduction practices
- Learn from peers along the value chain
- Increased opportunity to identify replicable practices
- Create a strong incentive for companies to reduce pollution and be good neighbors in their communities
- Measure facility/industry progress on reducing environmental releases and hazards

2021 TRI Data - Pollution Prevention

Source Reduction Activities Reported, 2021

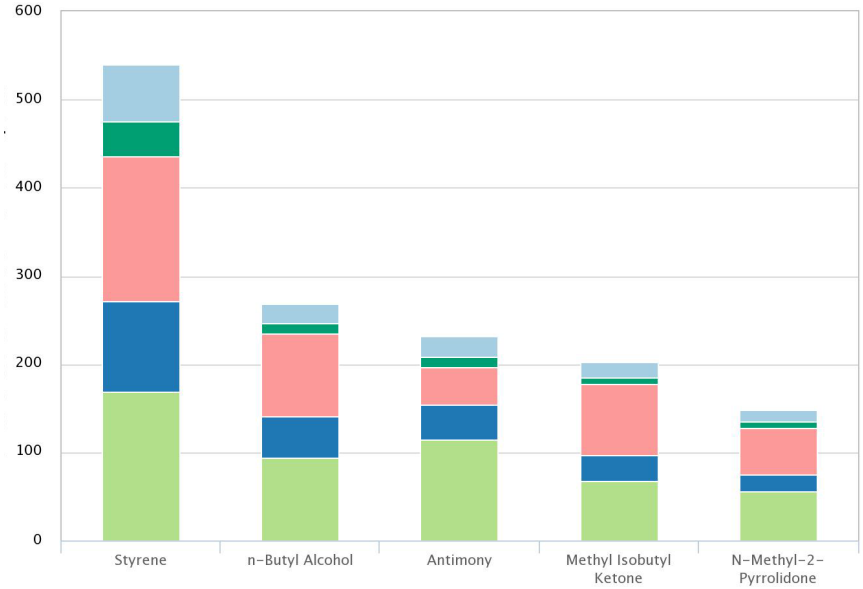


Process and Equipment Modifications
Operating Practices and Training
Inventory and Material Management
Material Substitutions and Modifications
Product Modifications

Source Reduction Activities by Chemical, 2017-2021

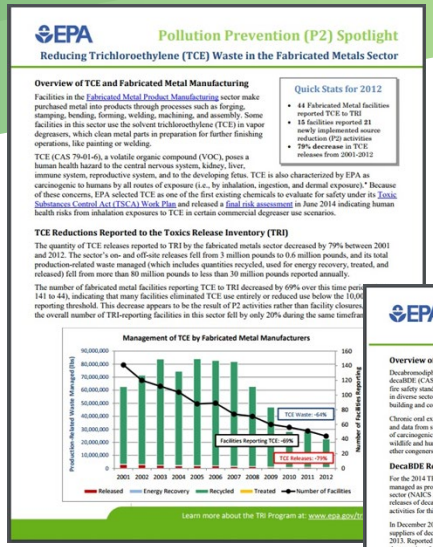
Click on legend items below to customize items displayed in the chart

Material Substitutions and Modifications
Product Modifications
Process and Equipment Modifications
Inventory and Material Management
Operating Practices and Training



How EPA uses TRI P2 data

- Promoting P2 success stories
  - Chemical- and industry-specific spotlights
  - Videos highlighting good work being done at TRI-reporting facilities
  - P2 Search Tool
- Tracking facility performance
- Facilitating tech transfer
- Identifying research/assistance needs


EPA Pollution Prevention (P2) Spotlight

Reducing Trichloroethylene (TCE) Waste in the Fabricated Metals Sector

Overview of TCE and Fabricated Metal Manufacturing

Facilities in the Fabricated Metal Product Manufacturing sector make purchased metal into products through processes such as forging, stamping, bending, forming, welding, machining, and assembly. Some facilities in this sector use the solvent trichloroethylene (TCE) in vapor degreasers, which clean metal parts in preparation for further finishing operations, like painting or welding.

TCE (CAS 79-01-6), a volatile organic compound (VOC), poses a human health hazard to the central nervous system, kidney, liver, immune system, reproductive system, and to the developing fetus. TCE is also characterized by EPA as carcinogenic to humans by all routes of exposure (i.e., by inhalation, ingestion, and dermal exposure).* Because of these concerns, EPA selected TCE as one of the first existing chemicals to evaluate for safety under its Toxic Substances Control Act (TSCA) Work Plan and released a final risk assessment in June 2014 indicating human health risks from inhalation exposures to TCE in certain commercial degreaser use scenarios.

Quick Stats for 2012

- 44 Fabricated Metal facilities reported TCE to TRI
- 16 facilities reported $1 newly implemented source reduction (P2) activities
- 79% decrease in TCE releases from 2001-2012

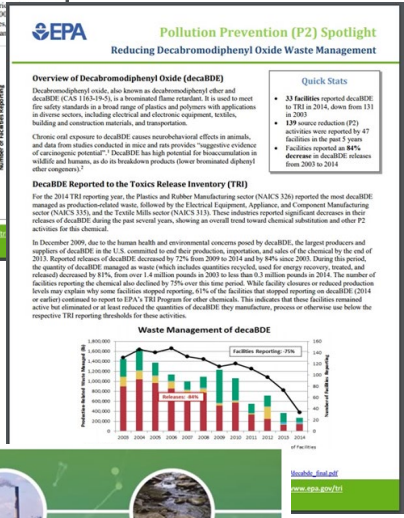
TCE Reductions Reported to the Toxics Release Inventory (TRI)

The quantity of TCE releases reported to TRI by the fabricated metals sector decreased by 79% between 2001 and 2012. The sector's on- and off-site releases fell from 3 million pounds to 0.6 million pounds, and its total production-related waste managed (which includes quantities recycled, used for energy recovery, treated, and released) fell from more than 80 million pounds to less than 30 million pounds reported annually.

The number of fabricated metal facilities reporting TCE to TRI decreased by 69% over this time peri... 141 to 44), indicating that many facilities eliminated TCE use entirely or reduced use below the 10,0... reporting threshold. This decrease appears to be the result of P2 activities rather than facility closures... the overall number of TRI-reporting facilities in this sector fell by only 20% during the same timefra...

Management of TCE by Fabricated Metal Manufacturers

Learn more about the TRI Program at: www.epa.gov/tri


EPA Pollution Prevention (P2) Spotlight

Reducing Decabromodiphenyl Oxide Waste Management

Overview of Decabromodiphenyl Oxide (decaBDE)

Decabromodiphenyl oxide, also known as decabromodiphenyl ether and decaBDE (CAS 1163-19-5), is a brominated flame retardant. It is used to meet fire safety standards in a broad range of plastics and polymers with applications in diverse sectors, including electrical and electronic equipment, textiles, building and construction materials, and transportation.

Chronic oral exposure to decaBDE causes neurobehavioral effects in animals, and data from studies conducted in mice and rats provides "suggestive evidence of carcinogenic potential".[1] DecaBDE has high potential for bioaccumulation in wildlife and humans, as do its breakdown products (lower brominated diphenyl ether congeners).[2]

Quick Stats

- 33 facilities reported decaBDE to TRI in 2014, down from 131 in 2003
- 139 source reduction (P2) activities were reported by 47 facilities in the past 5 years
- Facilities reported an 84% decrease in decaBDE releases from 2003 to 2014

DecaBDE Reported to the Toxics Release Inventory (TRI)

For the 2014 TRI reporting year, the Plastics and Rubber Manufacturing sector (NAICS 326) reported the most decaBDE managed as production-related waste, followed by the Electrical Equipment, Appliance, and Component Manufacturing sector (NAICS 335), and the Textile Mills sector (NAICS 313). These industries reported significant decreases in their releases of decaBDE during the past several years, showing an overall trend toward chemical substitution and other P2 activities for this chemical.

In December 2009, due to the human health and environmental concerns posed by decaBDE, the largest producers and suppliers of decaBDE in the U.S. committed to end their production, importation, and sales of the chemical by the end of 2013. Reported releases of decaBDE decreased by 72% from 2009 to 2014 and by 84% since 2003. During this period, the quantity of decaBDE managed as waste (which includes quantities recycled, used for energy recovery, treated, and released) decreased by 81%, from over 1.4 million pounds in 2003 to less than 0.3 million pounds in 2014. The number of facilities reporting the chemical also declined by 75% over this time period. While facility closures or reduced production levels may explain why some facilities stopped reporting, 61% of the facilities that stopped reporting on decaBDE (2014 or earlier) continued to report to EPA's TRI Program for other chemicals. This indicates that these facilities remained active but eliminated or at least reduced the quantities of decaBDE they manufacture, process or otherwise use below the respective TRI reporting thresholds for these activities.

Waste Management of decaBDE

decabdc_final.pdf

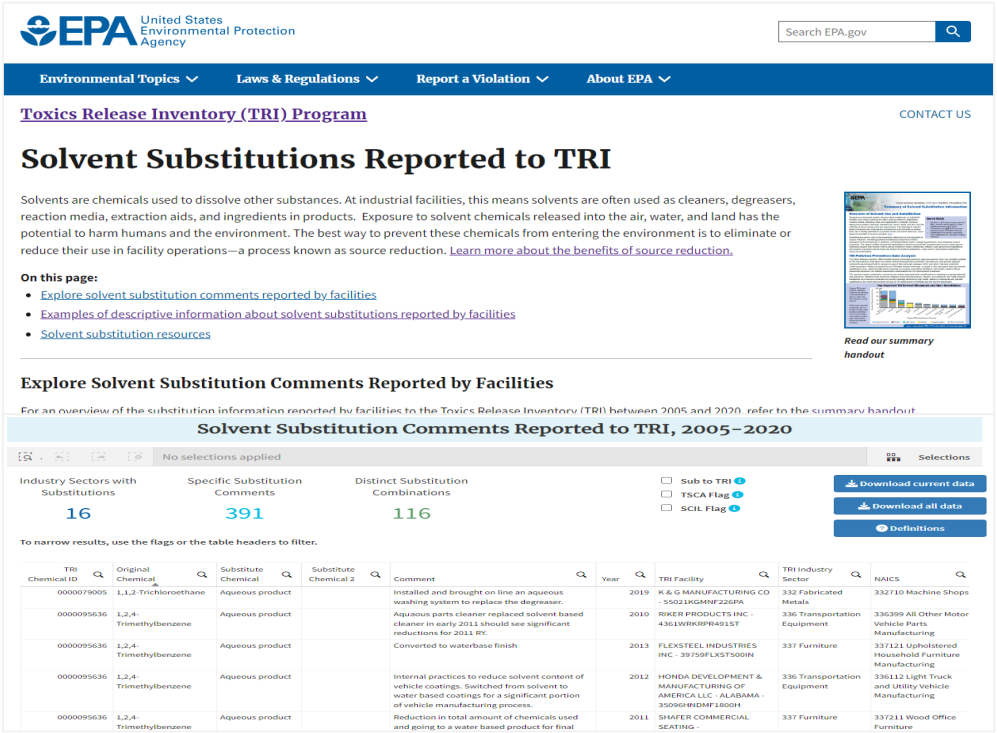
www.epa.gov/tri

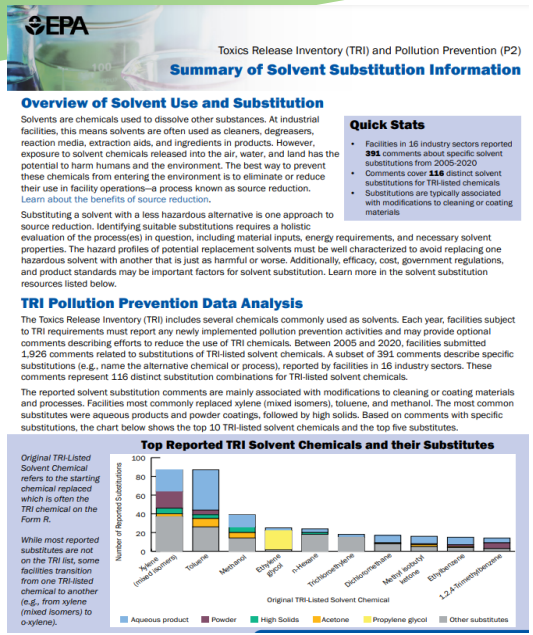
EPA Case Study: Solvent Substitutions

- TRI facilities reported **46,035 source reduction comments** from 2005 to 2020
- For many years, comments data had been underutilized and only explorable in downloadable formats or through limited keyword filtering options

- To make more readily-accessible relevant data and optimize usability of such data:
  - Created an inclusive and efficient methodology to automate analysis of solvents-related information and minimize manual processing
  - Used open-source R script to extract and process comments data based on filtering parameters and keyword matches
  - Identified **1,926 comments related to solvent substitutions** during this 15-year timespan

Greater Accessibility to Solvent Substitution Information Reported to TRI

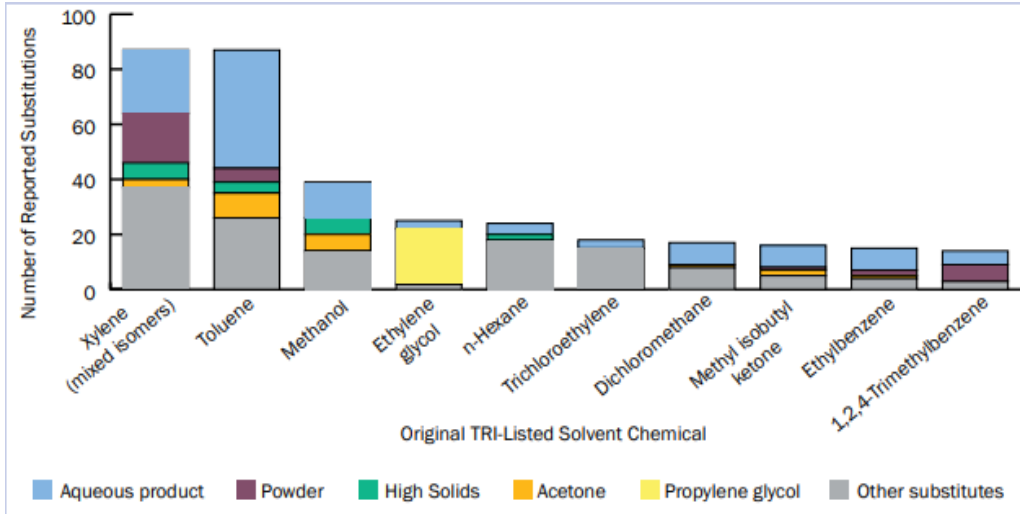




- Webpage
- Handout
- Interactive table
- Downloadable spreadsheet

Better Understanding of What Substitute Chemicals or Technologies Industry is Using

- **391 comments** describe specific substitutions (e.g., name the alternative chemical or process), reported by facilities in 16 industry sectors
  - Primary sectors: Chemicals, Metal Manufacturing and Fabrication, and Transportation Equipment
- **116 distinct substitution combinations** for TRI-listed solvent chemicals sectors
- Facilities most commonly **replaced xylene (mixed isomers), toluene, and methanol**
- The **most common substitutes were aqueous products and powder coatings, followed by high solids formulations**



More TRI Data Uses

Who uses the data?

*Includes federal, state, local, and tribal governments

For what purposes?

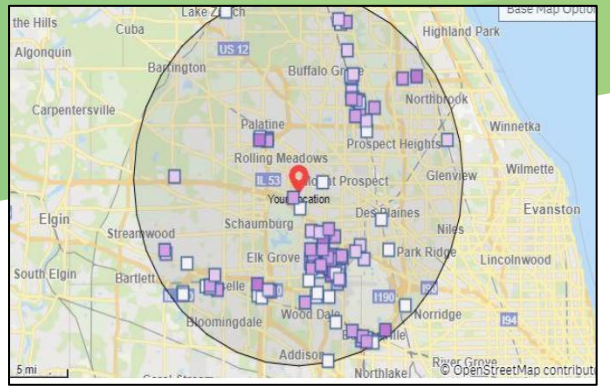
- Track environmental performance of facilities
- Estimate potential chemical risks
- Encourage pollution prevention

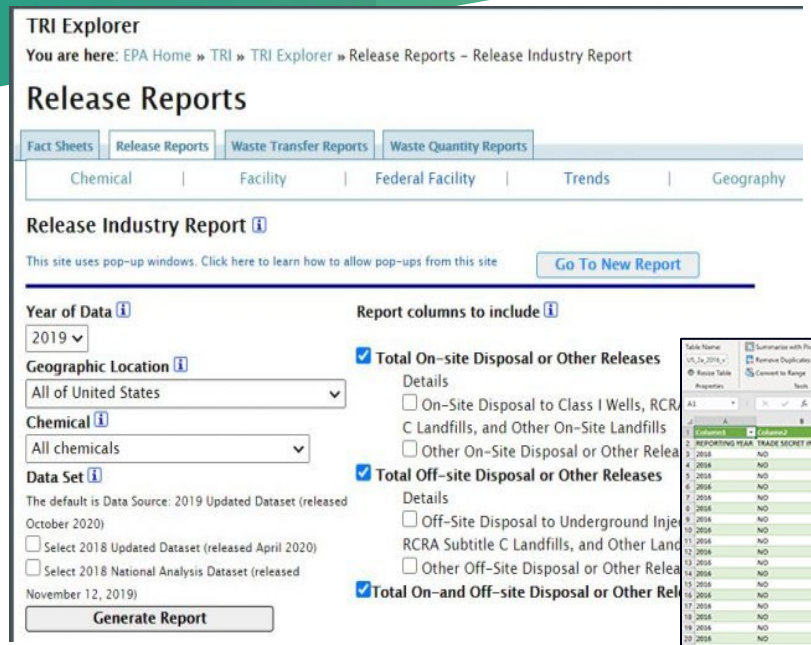
Leading to increased **awareness**, **understanding** of impact, and improved **decision making**.

www.epa.gov/toxics-release-inventory-tri-program/tri-data-uses

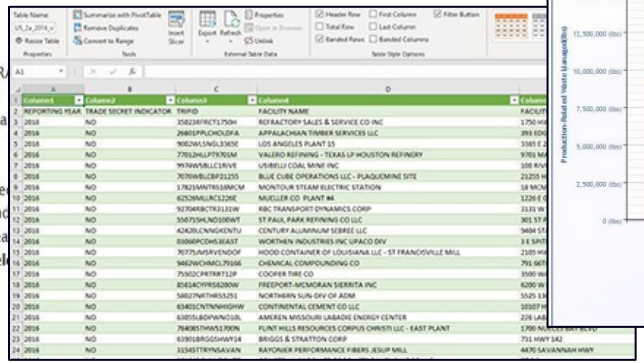
Accessing TRI Data

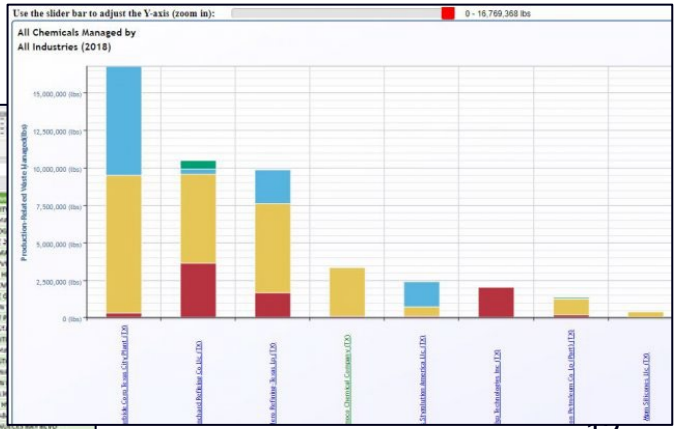
www.epa.gov/tri/tri-data-and-tools



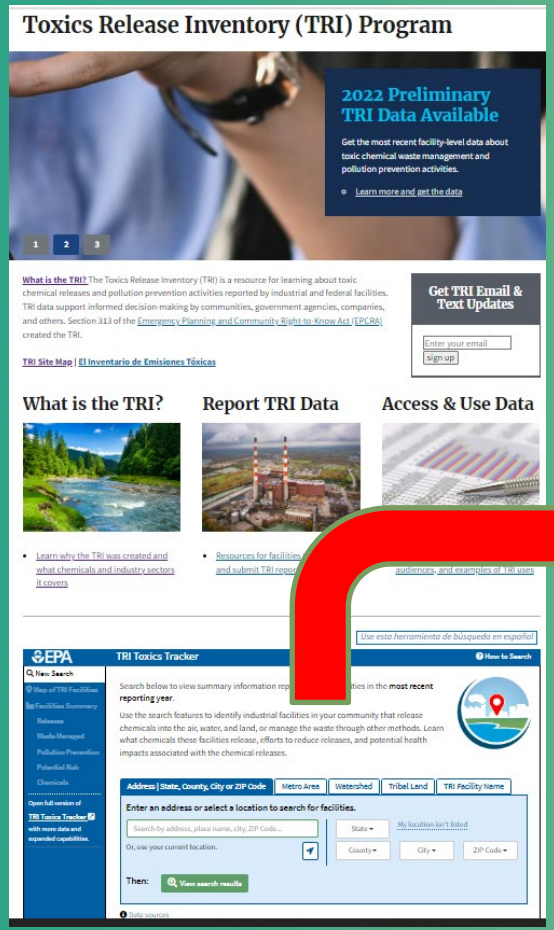


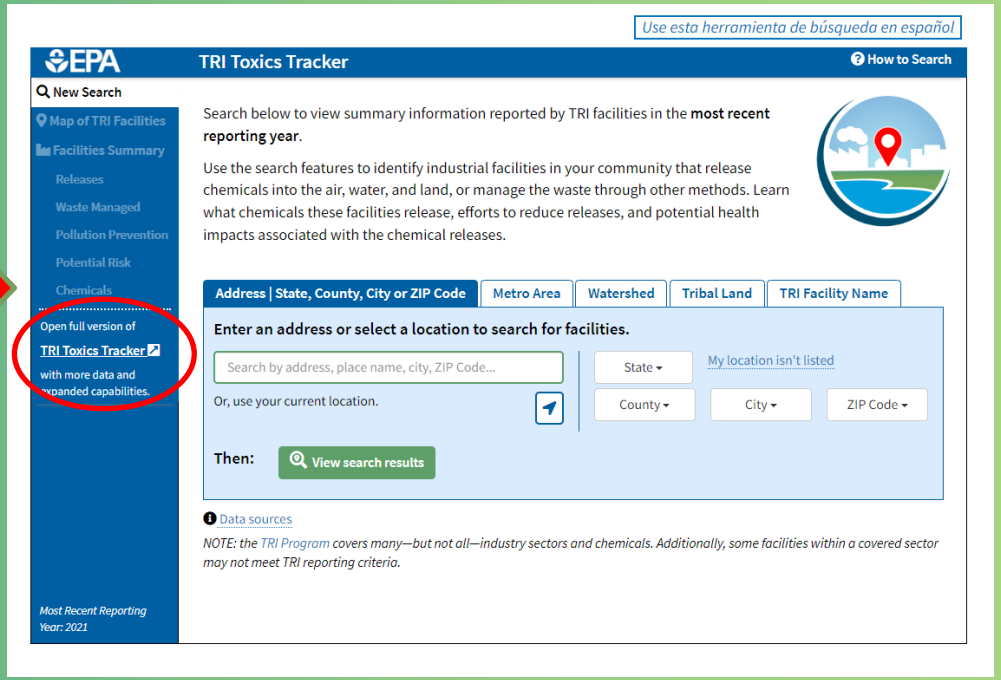
Tools vary by level of complexity, type of output, and amount of context added.



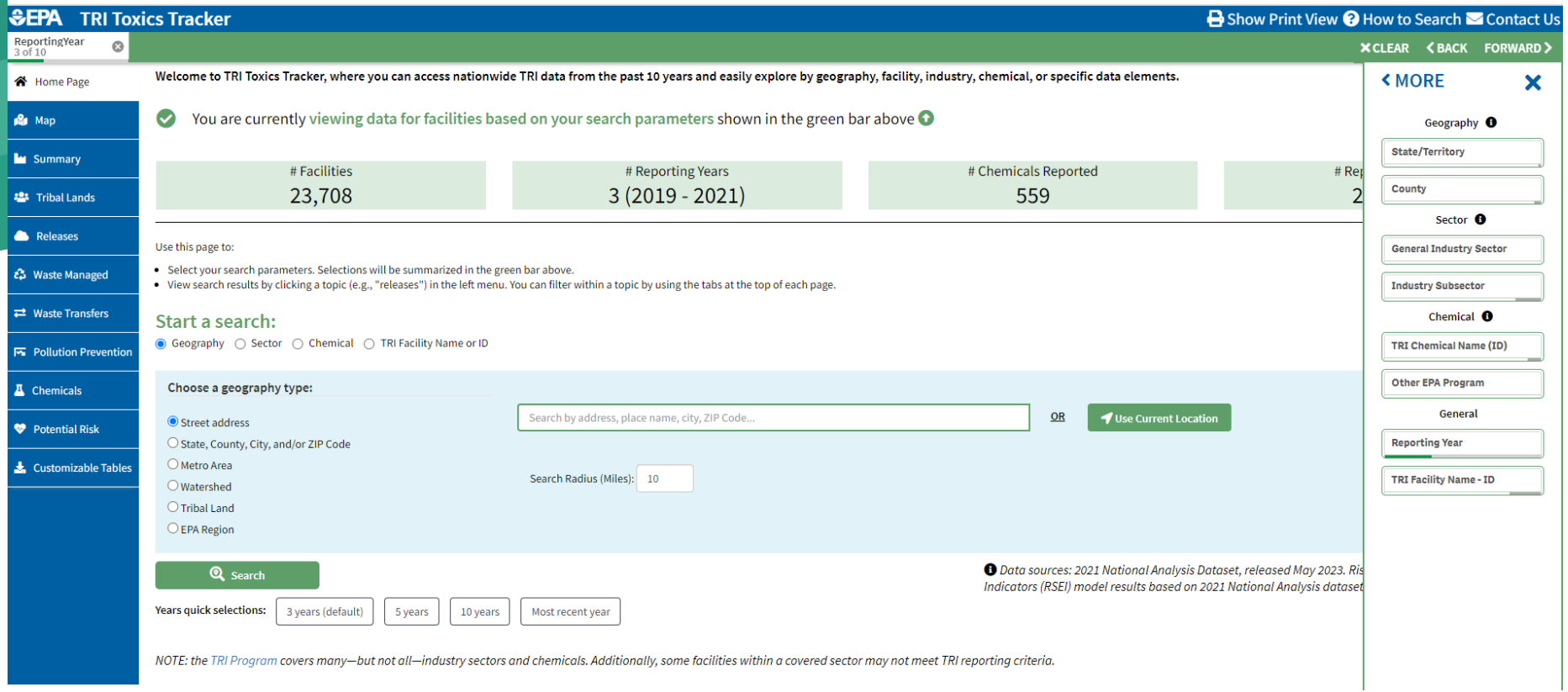


TRI Toxics Tracker via TRI Homepage





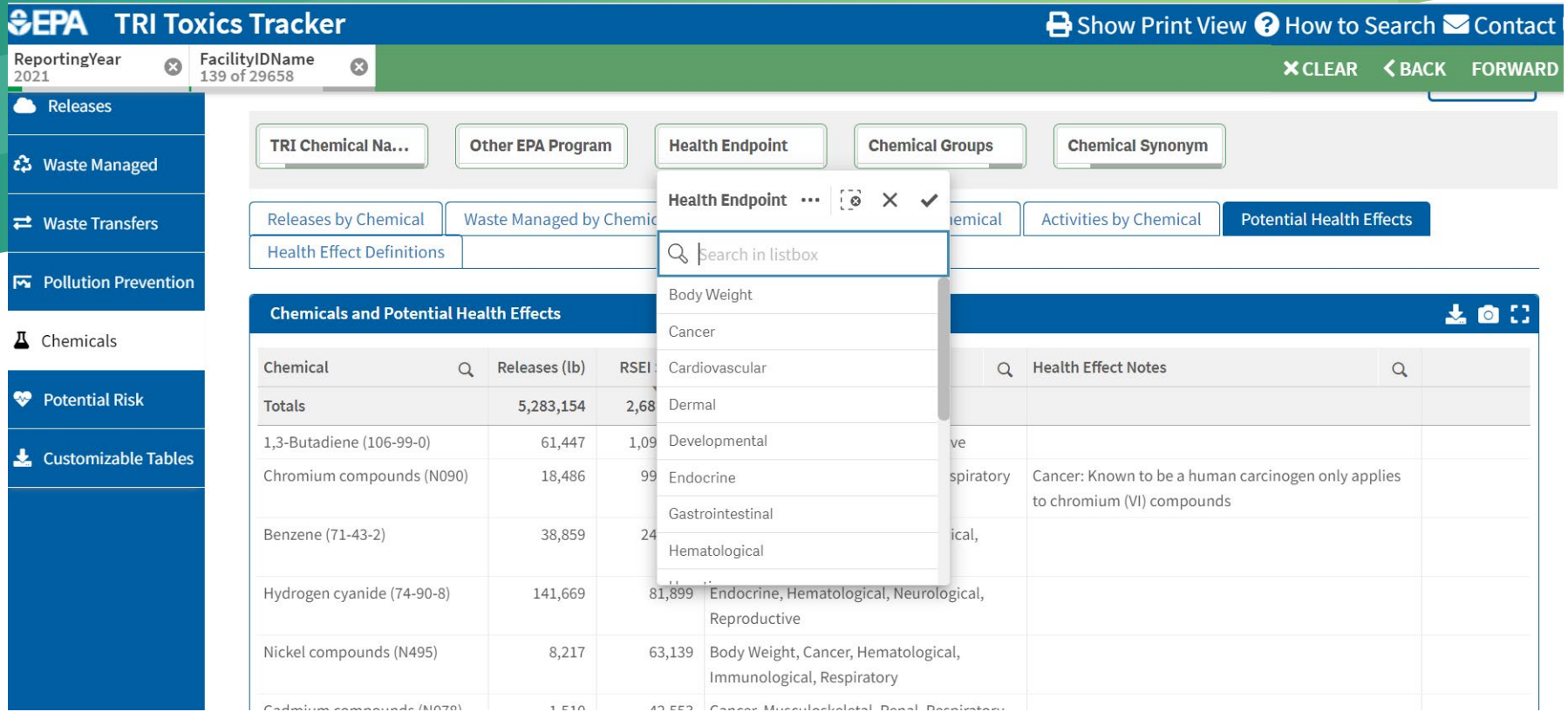
Full Version of TRI Toxics Tracker



Adding Context to TRI Data

- **Potential health effects associated with TRI chemicals are based on the Occupational Safety and Health Administration (OSHA) Carcinogen List and EPA's TRI-CHIP datasets.**
- *Demographic data layers provide characteristics of residents by census block groups, derived from EPA's EJScreen tool.*
- *Risk-Screening Environmental Indicators (RSEI) scores are relative unitless values to help understand potential impacts of TRI air and water releases, derived from EPA's RSEI model.*

Potential health effects associated with TRI chemicals



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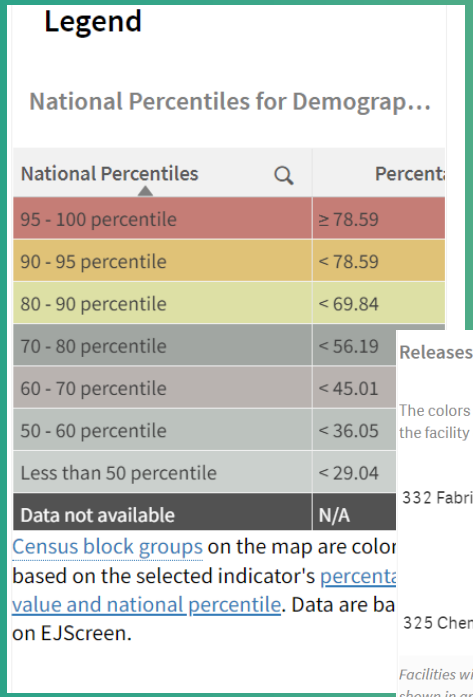
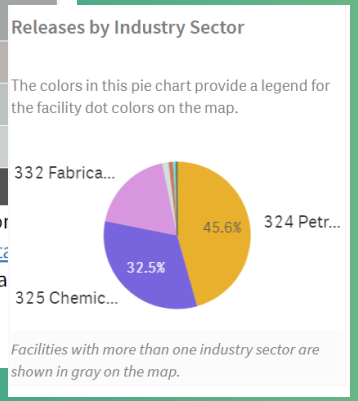
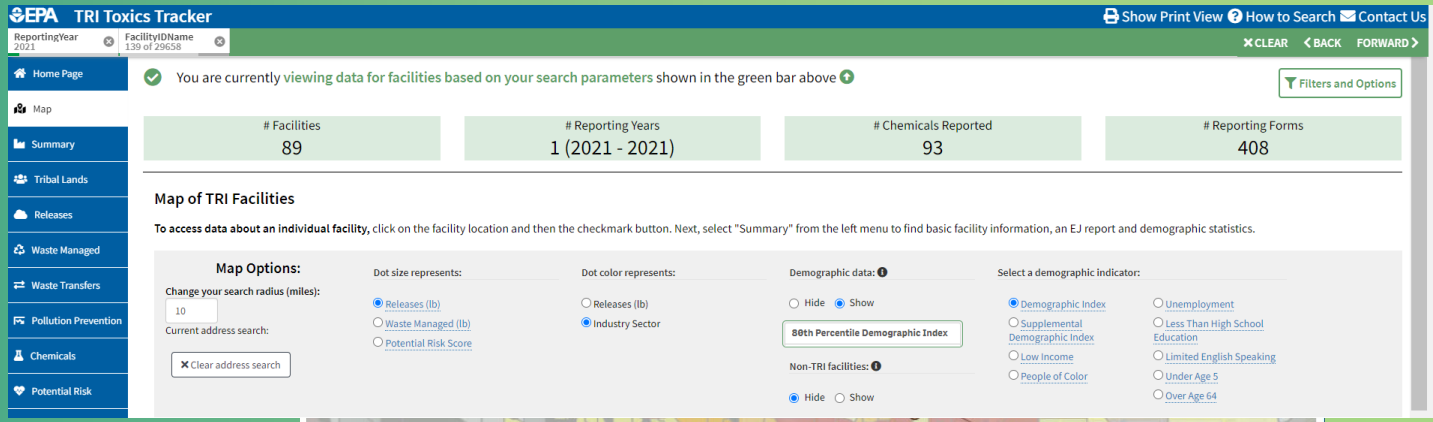
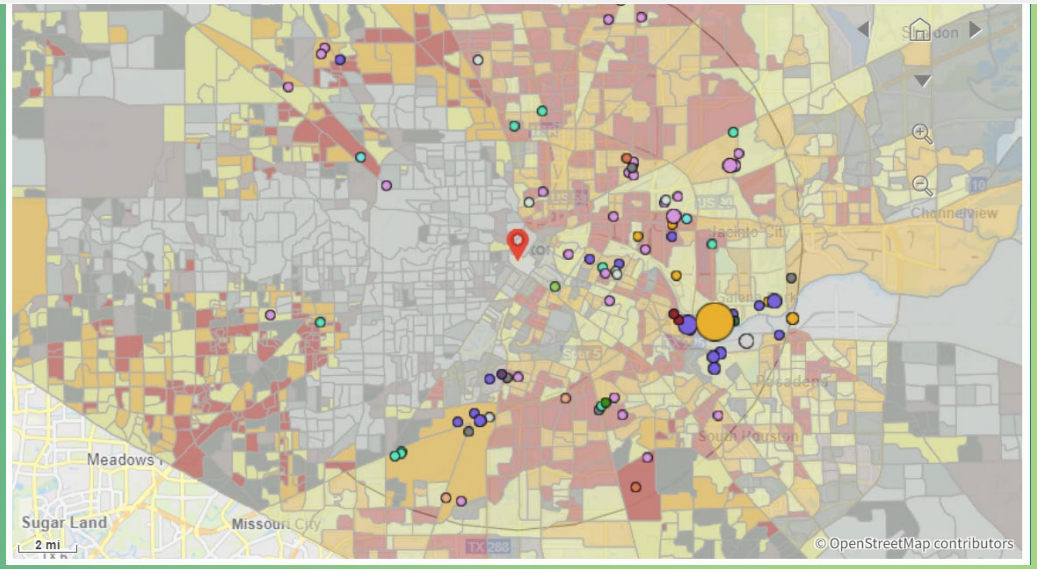
Mapping Demographic Data









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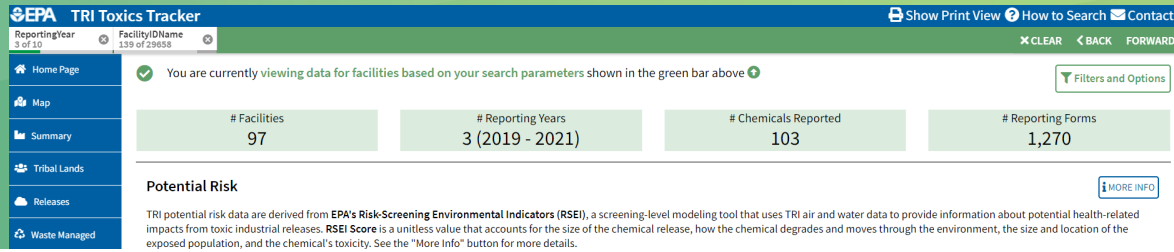
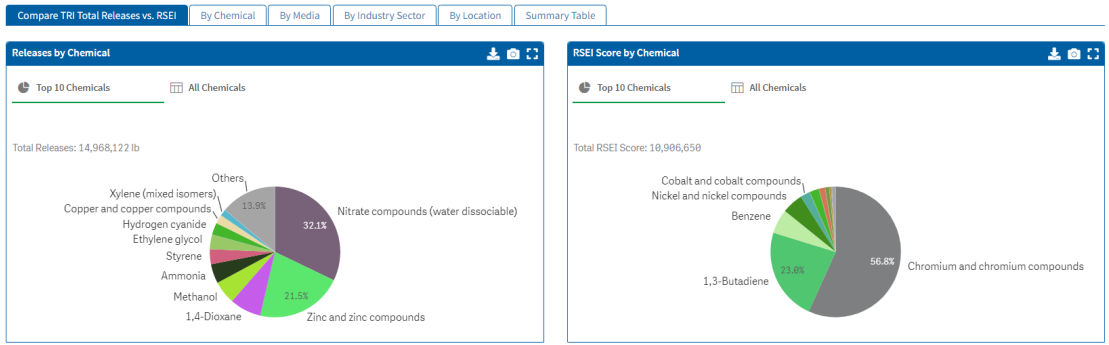
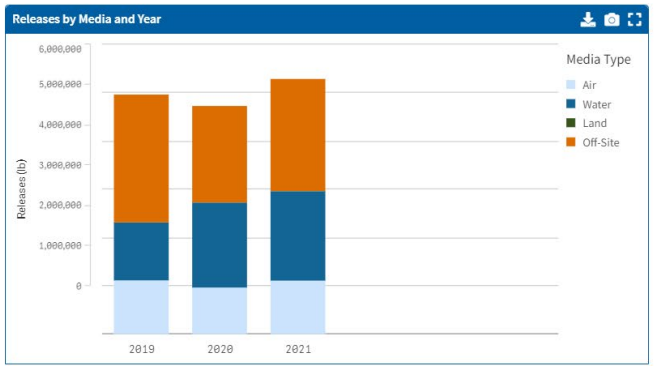
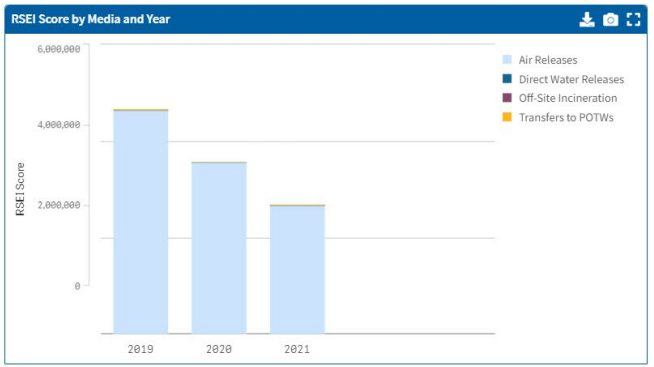
Potential impacts from TRI releases to air and water: RSEI scores









TRI Resources:

TRI Homepage - https://www.epa.gov/toxics-release-inventory-tri-program

TRI Toxics Tracker - https://edap.epa.gov/public/extensions/TRIToxicsTracker/TRIToxicsTracker.html#continue

TRI Data & Tools Page - https://www.epa.gov/toxics-release-inventory-tri-program/tri-data-and-tools

TRI Pollution Prevention - https://www.epa.gov/toxics-release-inventory-tri-program/pollution-prevention-p2-and-tri

Risk Screening Environmental Indicators Model - https://www.epa.gov/rsei

Factors to Consider when Using TRI Data - https://www.epa.gov/toxics-release-inventory-tri-program/factors-consider-when-using-toxics-release-inventory-data

Questions?

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