Using the Great Lakes Environmental and Economic Data Visualization Tool

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Introduction

In 2015, the Great Lakes Regional Pollution Prevention Roundtable (GLRPPR) began a project to analyze public data sets to determine the impact of manufacturing on the economy and environment of the six states in U.S. EPA Region 5. The project's goal was to use the analyzed results to assist pollution prevention technical assistance programs (P2 TAPs) with targeting their assistance efforts. The project resulted in a report, a series of fact sheets, and a data visualization tool. Publications associated with the project are available at http://go.illinois.edu/glrppr-data-pubs. The data tool is available at http://guides.library.illinois.edu/tools-for-taps/data/glrppr-data-tool and on the Illinois Sustainable Technology Center web site (http://www.istc.illinois.edu).

Data Sets

The tool uses data from U.S. EPA's Toxics Release Inventory and Greenhouse Gas Emissions Inventory, as well as the Census Bureau's County Business Patterns data set.

Census Data

Download County Business Patterns data directly from the Census Bureau web site. Below are links to the 2015 data sets used to create the Economic Data by State and County dashboard:

- State level data for Region 5 States by Employment Size Class
- County-level data by state and employment size class
  - Illinois
  - Indiana
  - Michigan
  - Minnesota
  - Ohio
  - Wisconsin

Toxics Release Inventory and Greenhouse Gas Reporting Program Data

To download the data sets underlying each of the data dashboards, click on the **Download Data in CSV** link in the tool. Use the links below to download more recent data from the Toxics Release Inventory and the Greenhouse Gas Reporting Program.

- Toxics Release Inventory Emissions and Release Data -- Basic Data FIles
- TRI Search via Envirofacts
- Greenhouse Gas Reporting Program Data Search (Envirofacts)

Tool Components

Primary Filter

- This filter appears at the top of and controls all dashboards *except* **Economic Data by State and County**. Using this filter will limit the displays in all dashboards to *only* facilities that match these criteria.

- **State**, **County**, **City**, **3-digit NAICS**, **4-digis NAICS**, and **6-digit NAICS** are drop down lists for selecting multiple criteria for filtering results. These filters also related to each other. For example, after selecting a state, the county and city lists will only show those within the state.
- **Zip Code**, **Facility Name**, and **FRS ID** use Wildcard Match. There is no drop down list for these filter boxes. Type a search term or part of a search term in order to return results. For example, searching for "cater" in the **Facility Name** box will return any facility with that text anywhere in the name.
- Any selections made in the primary filter apply to all sections of the emissions and P2 dashboards. To remove a filter, mouse over the appropriate filter box and click the funnel icon with the x beside it (see image above).
- Note that unselecting **All** without selecting another option will clear data from all of the charts.

Download Data in CSV

- After clicking this link, the browser will open a new window (or tab) and start to prepare the download. That window will be blank. When the download completes, the file will be available in the default download folder for the browser. You can continue to work in the dashboard while the file downloads.
- Note that the downloaded file includes **all** of the data underlying the dashboard on which the link appears, even if you have made selections using the primary filter.
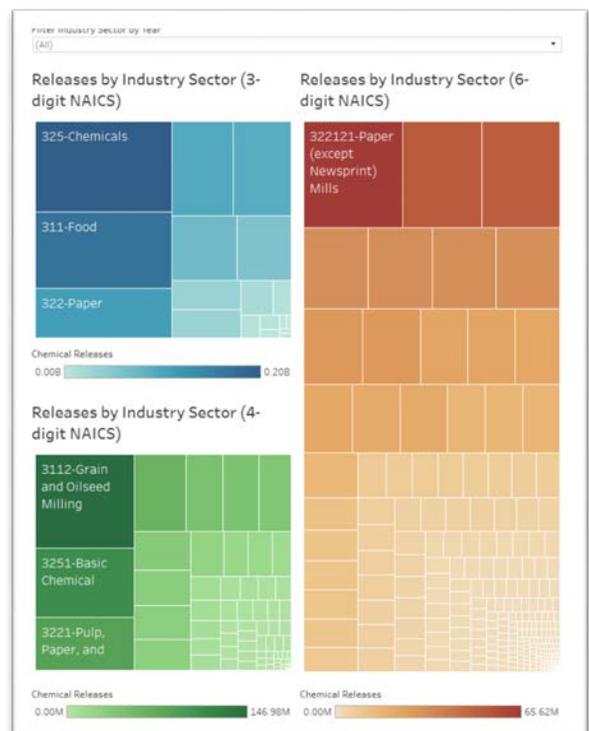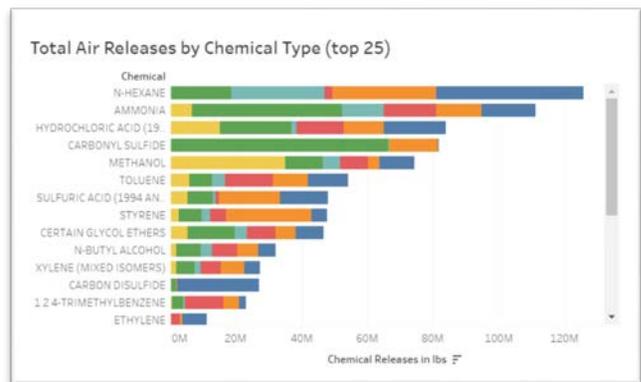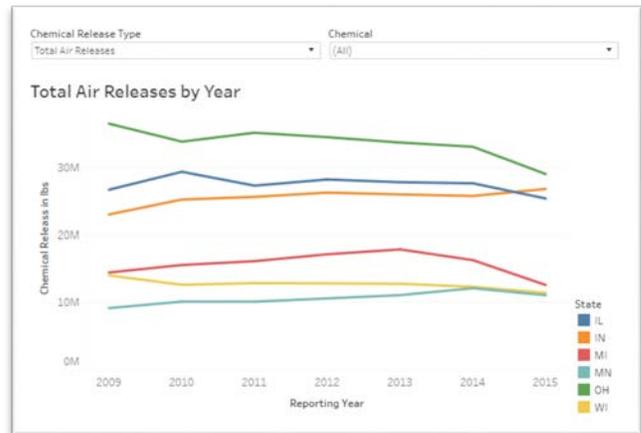
Dashboards

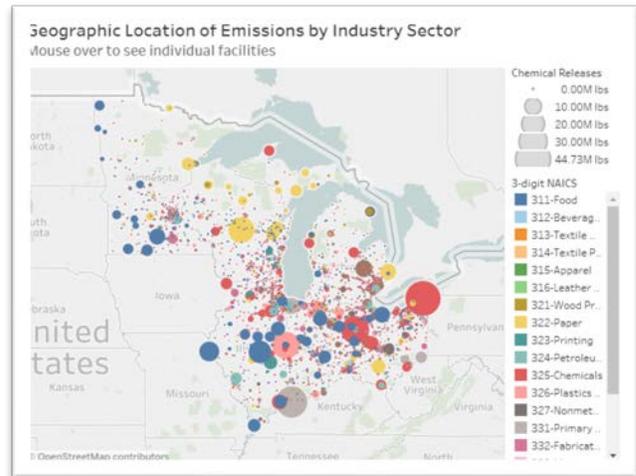### TRI Chemical Release Dashboard

Filters

- **Primary Filter** settings apply to this dashboard.
- The **Chemical Release Type** filter includes:
  - Overall Releases
  - Total Air Releases
  - Total Land Releases
  - Total On Site Releases
  - Total Off Site Releases
  - Total Uninjected Well Releases
  - Total Water Releases
- The **Chemical** filter limits results to specific chemicals. The filter box also allows searching by partial chemical name. For example, searching for "hexane" returns all chemicals with that string in the name.
- When applied, these filters effect the line, bar, and treemap charts described below.

Charts and tables

- The line chart displays overall releases by year for each state in the region. The title of the graph will changed based on your selection in the **Chemical Release Type** filter.
- The bar chart displays overall releases of the 25 most frequently emitted chemicals. The title of the graph changes based on the selection in the **Chemical Release Type** filter.
    - The chart sorts by the overall release amount. Using the **Primary Filter** will change the quantities, but not the order of the chemicals. For example, when selecting "Adams" from the **County** filter list, n-hexane is still listed fifth, even though it is by far the highest emitted chemical on the chart.
    - Clicking on the chemical name in the chart will filter the treemaps in the section below, as well as the line chart in the section above.
    - Clicking on a specific color within a bar on the chart will filter the treemaps to show releases for that chemical in the selected state. It will also filter the line chart above.
- Three treemap charts display releases by industry sector at the three, four, and six digit NAICS level.
    - The three treemaps are related to each other and will filter each other when a specific block is selected. For example, clicking the "325-Chemicals" box in the 3-digit NAICS treemap changes the remaining two maps so they display only the 4- and 6-digit NAICS codes associated with that industrial sector.
    - Remember that filtering by industry sector using the **Primary Filter** at the top of the dashboard means that only those sectors will be displayed in the treemaps.
    - The **Year** filter above the treemaps only applies to those charts. The remaining charts on the dashboard include a trend line graph in the tooltip.
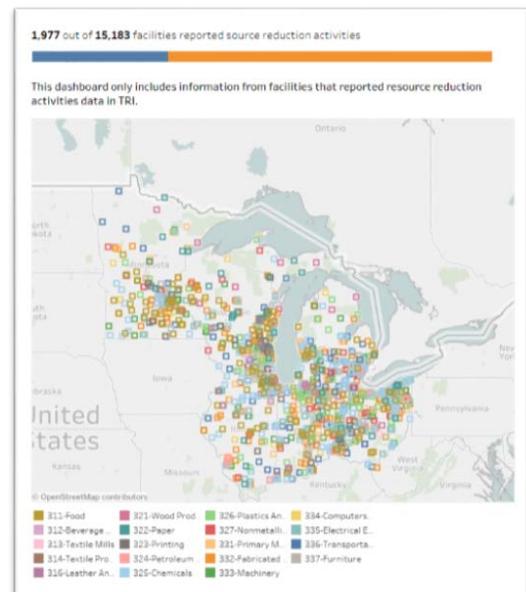
- The map displays all reporting facilities. Color represents industry sector by 3-digit NAICS code. Size of the circle corresponds to the amount of emissions released by the facility.
    - Mousing over any part of the map will activate the map control panel. Click on the magnifying glass icon to search by city name or zip code. The search box will provide a list of choices. Click on a selection to zoom into a particular location.
    - The home icon resets the map.
    - The right arrow has several options including pan, select by different shapes, and zoom to areas by selection.
    - Click a dot to view more information about a specific facility. The tooltip includes a "more details" link, which opens a new window with the facility's entry in EPA's ECHO database. The ECHO record includes enforcement and compliance information, as well as facility releases.
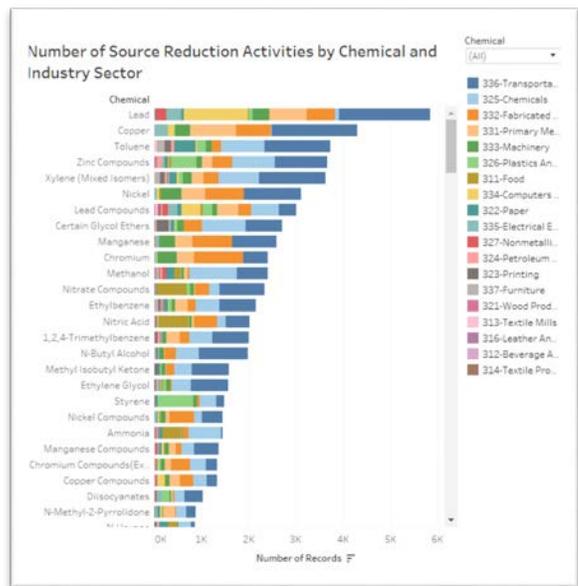- The table at the bottom of the dashboard includes six columns with basic information for each facility.

TRI Pollution Prevention Dashboard

- **Primary Filter** settings apply to this dashboard.
- The bar at the top of the dashboard shows the proportion of facilities reporting P2 data compared to all TRI reporting facilities. About 13% of reporting facilities in the region included P2 data when reporting to TRI in 2015.
- The map shows the location of the facilities reporting P2 data. The color represents the industry sector to which they belong. The sizes of the marks do not correlate with the amount of reductions the facility reported.
    - Mousing over any part of the map will activate the map control panel. Click on the magnifying glass icon to search by city name or zip code. The search box will provide a list of choices. Click on a selection to zoom into a particular location.
    - The home icon resets the map.
    - The right arrow has several options including pan, select by different shapes, and zoom to areas by selection.
    - Click the square to view more information about a specific facility. The tooltip includes a "more details" link, which opens a new window with the facility's entry in EPA's ECHO database. The ECHO record includes enforcement and compliance information, as well as facility releases.
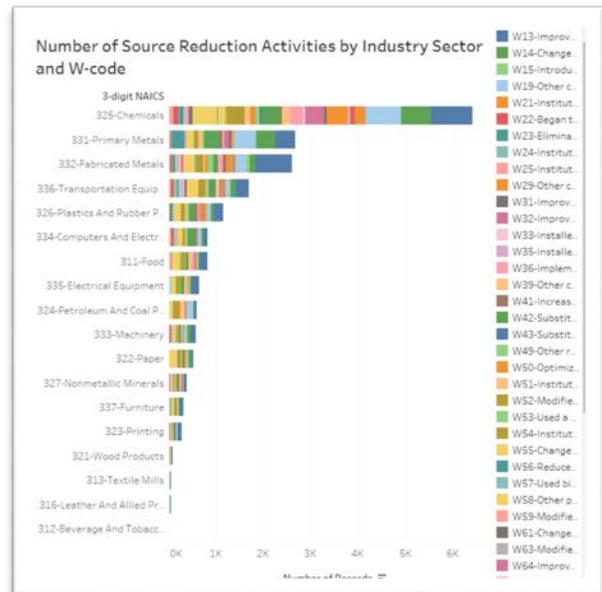
- The bar charts and the treemaps interact with each other.
  - The first bar chart on the dashboard shows the number of reported source reduction activities for specific chemicals. The colors on each bar represent a 3-digit NAICS code.
  - The elements in this bar chart are used as filters. Choosing one element from the bar chart will change the second bar chart and the treemaps. For instance, selecting the dark blue segment of the bar associated with lead will filter the following charts to show only the activities associated with lead in the Transportation Equipment sector. The treemaps will then display the four and six digit NAICS codes associated with NAICS 336 (Transportation Equipment).
    - Selecting a specific chemical name (either from the **Chemical** filter or on the axis of the bar graph) will filter the following charts so that they only display records for facilities that reported reductions of that chemical.
  - The second bar chart shows the number of reported source reduction activities by industry sector. The colors represent the reported pollution prevention activity (W) code. When hovering over the element in this chart, the industry sector treemaps will display the corresponding details for sectors that have implemented this activity.
- The industry sector treemaps also interact with each other. When clicking a block in the 6-digit NAICS code, the 4-digit NAICS code will only show the related block.
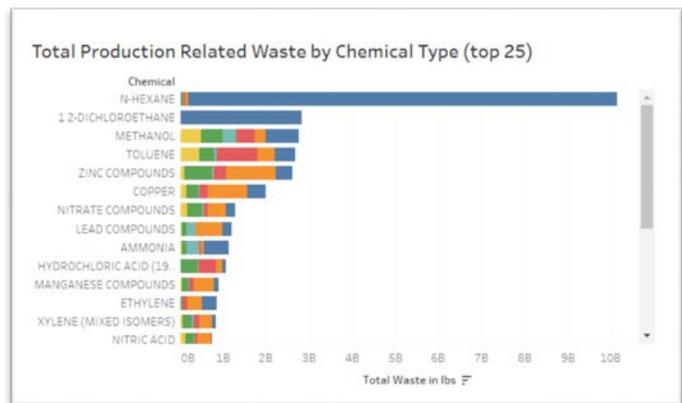 - The bar charts filter the table at the bottom of the dashboard. The treemaps do not.
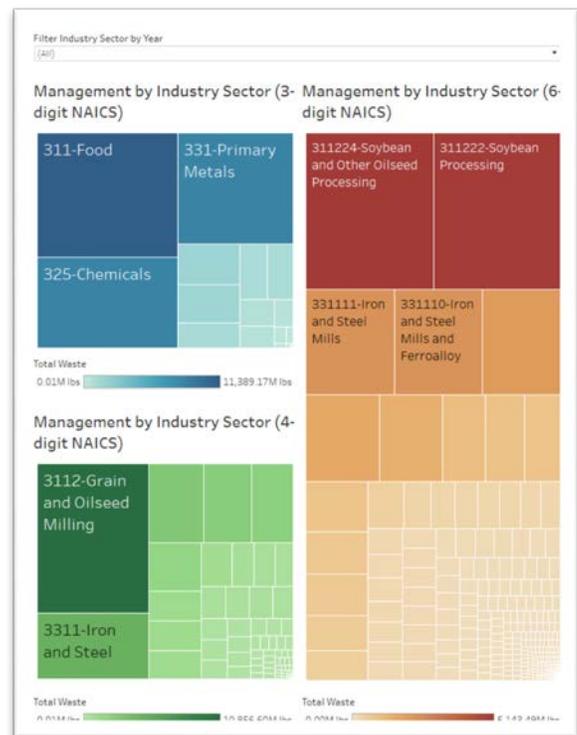
TRI Waste Management Dashboard

Filters

- **Primary Filter** settings apply to this dashboard.
- The **Waste Management Method** filter includes:
  - Total Production Related Waste
  - Waste Burned for Energy Recovery Onsite
  - Waste Burned for Energy Recovery Offsite
  - Waste Recycled Offsite
  - Waste Recycled Onsite
  - Waste Released
  - Waste Treated Offsite
  - Waste Treated Onsite
- The **Chemical** filter limits by specific chemicals. The filter box also allows searching by partial chemical name. For example, searching for "hexane" returns all chemicals with that string in the name.
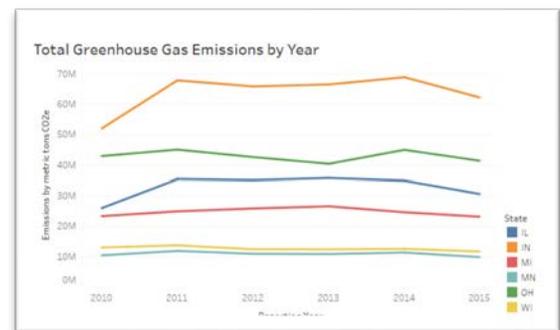- When applied, these filters effect the line, bar, and treemap charts described below..

Charts and tables

- The line chart displays waste managed by year for each state in the region. The title of the graph will changed based on your selection in the **Waste Management Method** filter.
- The bar chart displays overall releases of the 25 most frequently emitted chemicals. The bar chart sorts by the overall release amount.
  - The chart sorts by the overall release amount. Using the **Primary Filter** will change the quantities, but not the order of the chemicals. For example, when selecting "Adams" from the **County** filter list, n-hexane is still listed fifth, even though it is by far the highest emitted chemical on the chart.
  - Clicking on the chemical name in the chart will filter the treemaps in the section below, as well as the line chart in the section above.
  - Clicking on a specific color within a bar on the chart will filter the treemaps to show releases for that chemical in the selected state. It will also filter the line chart.

- The three treemaps display releases by industry sector at the 3-, 4-, and 6-digit NAICS level.
  - The three treemaps are related to each other and will filter each other when a specific block is selected. For example, clicking the "325-Chemicals" box in the 3-digit NAICS treemap changes the remaining two maps so they display only the 4- and 6-digit NAICS codes associated with that industrial sector.
  - Remember that filtering by industry sector using the **Primary Filter** at the top of the dashboard means that only those sectors will be displayed in the treemaps.
  - The **Year** filter above the treemaps only applies to those charts. The remaining charts on the dashboard include a trend line graph in the tooltip.
- The map displays all reporting facilities. Color represents industry sector by 3-digit NAICS code. Size of the circle corresponds to the amount of emissions released by the facility.
  - Mousing over any part of the map will activate the map control panel. Click on the magnifying glass icon to search by city name or zip code. The search box will provide a list of choices. Click on a selection to zoom into a particular location.
  - The home icon resets the map.
  - The right arrow has several options including pan, select by different shapes, and zoom to areas by selection.
  - Click a dot to view more information about a specific facility. The tooltip includes a "more details" link, which opens a new window with the facility's entry in EPA's ECHO database. The ECHO record includes enforcement and compliance information, as well as facility releases.
- The table at the bottom of the dashboard includes six columns with basic information for each facility.

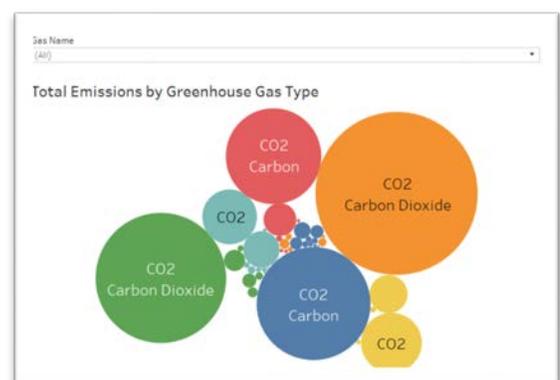## Greenhouse Gas Emissions Dashboard

- **Primary Filter** settings apply to this dashboard.

Line chart

- The line chart displays total greenhouse gas emissions for each state.

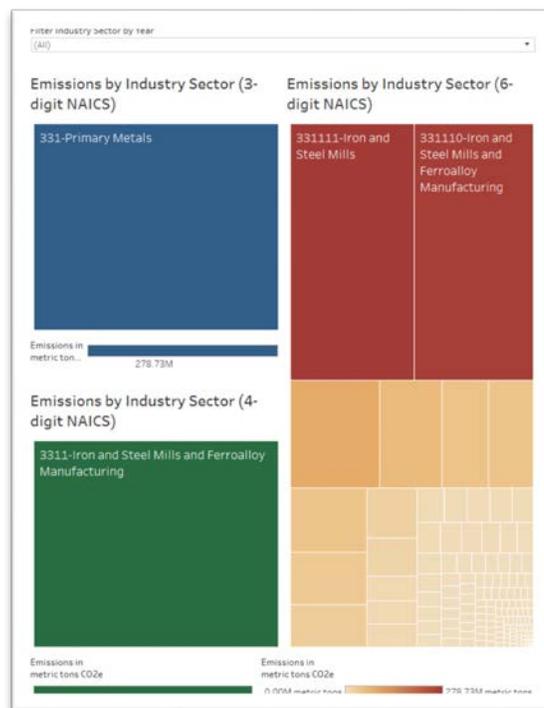### Packed bubble chart and associated filters

- The **Gas Name** filter only applies to the packed bubble chart and the treemaps below it.

- The packed bubble chart represents emissions for each gas by state. The colors of the bubbles represent the state. They correspond to the colors in the line chart at the top of the dashboard. The size of the bubbles corresponds to the relative size of the release.
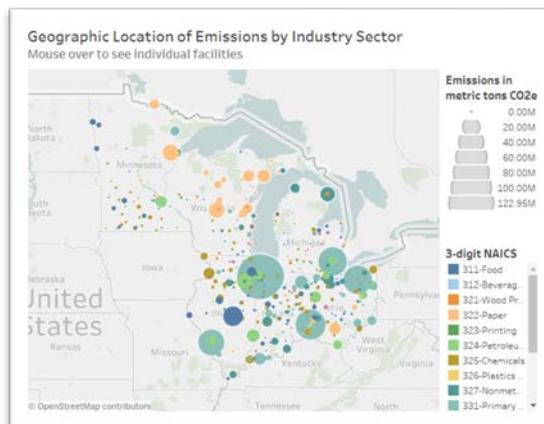- The tooltip for each bubble includes a trend line that shows the state's emissions of a specific gas over time.

Treemaps

- The three treemaps are related to each other and will filter each other when a specific block is selected. For example, clicking the "325-Chemicals" box in the 3-digit NAICS treemap changes the remaining two maps so they display only the 4- and 6- digit NAICS codes associated with that industrial sector.
- Remember that filtering by industry sector using the **Primary Filter** at the top of the dashboard means that only those sectors will be displayed in the treemaps.
- The **Year** filter above the treemaps only applies to those charts. The remaining charts on the dashboard include a trend line graph in the tooltip.

Industry sector map

- The map displays all reporting facilities. Color represents industry sector by 3-digit NAICS code. Size of the circle corresponds to the amount of emissions released by the facility.
    - Mousing over any part of the map will activate the map control panel. Click on the magnifying glass icon to search by city name or zip code. The search box will provide a list of choices. Click on a selection to zoom into a particular location.
    - The home icon resets the map.
    - The right arrow has several options including pan, select by different shapes, and zoom to areas by selection.
    - Click a dot to view more information about a specific facility. The tooltip includes a "more details" link, which opens a new window with the facility's entry in EPA's ECHO database. The ECHO record includes enforcement and compliance information, as well as facility releases.
- The table at the bottom of the dashboard includes six columns with basic information for each facility.

Economic Data by State and County

- This dashboard is intended to give users an overview of the economic impact of the manufacturing sector at the state and county level. It does not identify individual facilities, but does provide information about the number of companies, employees, and payroll size on a county and statewide level.
- **Primary Filter** settings do not apply to this dashboard because census data does not identify individual facilities.
- The **Economic Facet**, **Year**, and **Industry Sector** filters control both the treemaps and the map.
- Use the radio buttons to select the economic facet to visualize.
- Colors in the state treemap represent the six U.S. EPA Region 5 states. The size of each box represents the size of the economic facet relative to the whole region.
  - Mouse over a box to see more detail for each state.
- Click a box in the state treemap to filter the county treemap.
  - Mouse over a box to see more detail for each state.
- Click a box in the county treemap to highlight it on the map.
  - Mouse over a box to see more detail for each county.
- The map shows the economic impact of the selected manufacturing industry sector by county. Orange shades indicate a smaller impact while blue shades indicate a larger impact.
  - Mouse over a county to see more detail.