

Technical Guidance for Pennsylvania Environmental Health Indicators Map

**Division of
Environmental
Health Epidemiology**

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Version 1



pennsylvania
DEPARTMENT OF HEALTH

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Glossary

ACS: American Community Survey
BWM: Bureau of Waste Management (PA)
DEHE: Division of Environmental Health Epidemiology (PA)
EJSCREEN: Environmental Justice Screening and Mapping Tool
EPA: Environmental Protection Agency (US)
EPHT: Environmental Public Health Tracking
HSCA: Hazardous Sites Cleanup Act (PA)
NATA: National Air Toxics Assessment
NCDMs: Nationally Consistent Data and Measures
NPL: National Priority List
PA DEP: Pennsylvania Department of Environmental Protection
PA DOH: Pennsylvania Department of Health
PASDA: Pennsylvania Spatial Data Access
PennDOT: Pennsylvania Department of Transportation
PHC4: Pennsylvania Health Care Cost Containment Council
PWS: Public Water System
RP: Responsible Party
USDA: United States Department of Agriculture
USGS: United States Geological Survey

Executive Summary

The Division of Environmental Health Epidemiology (DEHE) at the Pennsylvania Department of Health (DOH) has developed an environmental health indicators map to display environmental, sociodemographic and public health data for Pennsylvania. With funding from the Centers for Disease Control and Prevention's (CDC) Environmental Health Capacity-building (EHC) program, DEHE strives to make environmental health-related data publicly accessible. As a living geodatabase (i.e., to be updated over time), the map will be used by DEHE and others to make better public health decisions and design evidence-based interventions.

Environmental Justice (EJ) concerns are a guiding force behind the map. Map components, referred to as environmental health indicators, were selected based on the multi-dimensional question of where manufacturing, extraction, waste, transportation, and other infrastructure is located, who resides in those areas, and how healthy those residents are. DEHE consulted U.S. Environmental Protection Agency's (EPA) EJSCREEN and Washington State's Environmental Health Disparities map, both of which rank census tracts or block groups based on a broad range of environmental health-related aggregate measures. The current map does not rank areas but instead incorporates both the locations of point sources and boundaries that are relevant for environmental exposures as well as county/census-tract level aggregate measures of sociodemographic characteristics and health outcomes.

Our final list of environmental health indicators are grouped into 13 categories. The first 3 categories listed below are comprised of aggregate-level indicators, and the last 10 categories listed below are comprised of a mix of point source and boundary of interest indicators.

- EJSCREEN: Environmental exposure metrics from EPA's EJSCREEN
- Environmental Public Health Tracking (EPHT): Health outcome (i.e., hospitalization) measures aligning with CDC's EPHT program
- American Community Survey (ACS): Sociodemographic characteristics from the U.S. Census Bureau's ACS linked to EJ concerns, vulnerability to environmental exposure and poor health
- Natural Environmental Pollution Sources
- Air Pollution Sources
- Hazardous Sites
- Waste Operations
- Oil and Natural Gas Sites
- Mining Sites
- Water Resources
- Transportation Infrastructure
- Environmental Justice Boundaries
- Governmental Boundaries

The guidance that follows includes a brief overview of how to use the map, a summary/description of each indicator, the data source and which years the data correspond to, the geographic unit of analysis (if applicable), how often the data will be updated, and additional details about data processing and references to learn more. DEHE's environmental health map is an ongoing project. We welcome your feedback at dehe@pa.gov.

Acknowledgments

DEHE would like to thank the EHC coordination team, including members from the Office of Environmental Justice (OEJ) at the Pennsylvania Department of Environmental Protection (DEP), Women for a Healthy Environment (WHE), Bureau of Community Health Systems (BCHS) at DOH, and the Office of Operational Excellence at DOH. Without their support and input, this map would not have been possible. We would also like to thank the Environmental Justice Advisory Board (EJAB) members who provided feedback to us about essential map components and ways to use the map and Joel Rogers, from GeoDecisions, who provided invaluable guidance on the ArcGIS Online platform. Finally, we recognize our senior leadership who continues to bolster environmental health work in the Commonwealth.

Using the Environmental Health Indicators Map

This map is intended to be used by the public, including policymakers, industry representatives, university partners, non-profit and community advocates. The primary objective is to make environmental health-related data more easily accessible. Many of the environmental health indicators are available through other websites but none of these websites communicate with one another. Our innovation is presenting the data in one place using ArcGIS Online.

The following capabilities are available in the ArcGIS Online Web App:



Turn off/on layers: click on the indicator list icon to toggle layers on/off by clicking the square to the left of each desired indicator listed in the display window.

Note: Transparency was added to the aggregate layers so users can see more than one layer at a time (e.g., one aggregate layer and multiple point sources of interest).



Zoom in/out: click on the zoom slider icon to zoom in or out on the map for a desired scale. *Note: Some layers appear only when the map is zoomed in beyond a specified map scale (e.g., FEMA Flood Hazard Areas); this is called scale-dependent drawing.*



Search: click within the search bar icon to search within the map for a specified place or address. Once an address is entered, the map will zoom in on that location providing the ability to view points, boundaries or units of interest within varying distances of the address.



Home: click on the home icon to zoom the map to the default map extent of Pennsylvania and adjoining states; this extent is the same as the extent of the map when first opened.



My Location: click on the my location icon to allow the network to detect the user's physical location and zoom the map to it.



Identify attributes and show data: click on points or geographic units (e.g., landfills, counties, census tracts) to identify the point, boundary or unit of interest and view a table of relevant attributes of the selected indicator layer.



Attribute Table: click on the up arrow at the bottom of the map to display tabular information about the features of each selected indicator layer (e.g., facility name, county name). Minimize the attribute table by clicking on the down arrow above the table.

Note: Additional capabilities (e.g., Filter by map extent, Zoom to, Clear selection) for viewing indicator features are available within the attribute table.



Swipe: click on the swipe icon to easily compare the content of two different layers by dragging the tool left or right to reveal the indicator layer beneath the layer being swiped.



Measurement: click on the measurement icon to measure the area of a polygon, length of a line, distance between two points, or find the coordinates of a point with the map.



Near Me: click on the near me icon to find indicator features within a buffer (ranging from 0 miles to 20 miles) of a defined address or place, or of "My Location". View more detailed

information about the features, including the number of features for each indicator within the buffer and the distance to each feature within the buffer from the defined location.



Basemap Gallery: click on the basemap gallery to choose from a variety of alternative basemaps (e.g., topographic, imagery, terrain) for desired background.



Overview Map: click on the overview map icon to display the current map extent within the context of the larger region. The overview will change as the map extent changes.



Coordinate bar: allows users to view the coordinates of the cursor location on the map.



Scale Bar: allows users to view the scale of the current zoom level of the map.

Note: This map is one of several geospatial data projects happening within the Commonwealth. Other projects are the Pennsylvania Department of Human Services' (DHS) [Health Equity Analysis Tool](#) (HEAT) and DEP's OEJ [EJ Policy Revision](#). HEAT is intended to identify areas with scope for significant equity improvement. It is a more complex, statistical mapping application to be used chiefly by health care organizations (i.e., hospitals, insurers, etc.), and prioritizes breadth of topic areas over depth in any one topic. It does include some environmental health data drawn from EPA's EJSCREEN but environmental health is not a primary focus. DEP's EJ Policy Revision is in the early stages. It will include a map, also using data from EPA's EJSCREEN, but this is not currently available. DEHE views these maps as complementary to the environmental health map.

Additionally, indicators for this map were chosen based on a combination of existing research pointing to their association with potential health risk to residents living in close proximity, concerns raised by the public and data availability. We gathered initial feedback from the Environmental Justice Advisory Board's (EJAB) mapping subcommittee, consisting of a dozen or so stakeholders who are engaged in environmental health work (particularly among EJ communities) at the grassroots and/or state levels. The map is not intended to show causation but to bring together multiple data sources in one location to speak to what is present in individuals' environments, how infrastructure and people are distributed (unequally) around the state.

Environmental Health Indicators

Category 1: EJSCREEN (Aggregate)

Data Indicator: Air Toxics Cancer Risk

Summary/Description: This indicator provides the estimated lifetime inhalation cancer risk from analyzed carcinogens in ambient outdoor air. Data are derived from EPA's National Air Toxics Assessment (NATA). The percentile value is also included to easily compare areas across the state.

Data Source: Environmental Protection Agency's (EPA) EJSCREEN 1.0 via <https://gaftp.epa.gov/EJSCREEN/>

Year(s): 2014

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Ad hoc, contingent on NATA data releases

Additional Details: EJSCREEN data with corresponding state percentiles are available for download as an ArcGIS file geodatabase. Note that EJSCREEN displays air toxics cancer risk data at the block group level by assigning all block groups within a census tract the same value. For more information on EJSCREEN data, including EPA's methodology for calculating air toxics cancer risk, visit <https://www.epa.gov/ejscreen/technical-information-about-ejscreen>. Frequently asked questions are also answered here: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>.

Data Indicator: Respiratory Hazard Risk

Summary/Description: This indicator provides the air toxics respiratory hazard index, which is the ratio of exposure concentration to health-based reference concentration. Data are derived from EPA's National Air Toxics Assessment (NATA). The percentile value is also included to easily compare areas across the state.

Data Source: EPA's EJSCREEN 1.0 via <https://gaftp.epa.gov/EJSCREEN/>

Year(s): 2014

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Ad hoc, contingent on NATA data releases

Additional Details: EJSCREEN data with corresponding state percentiles are available for download as an ArcGIS file geodatabase. Note that EJSCREEN displays respiratory hazard risk data at the block group level by assigning all block groups within a census tract the same value. For more information on EJSCREEN data, including EPA's methodology for calculating respiratory hazard risk, visit <https://www.epa.gov/ejscreen/technical-information-about-ejscreen>. Frequently asked questions are also answered here: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>.

Data Indicator: Particulate Matter (PM) 2.5

Summary/Description: This indicator provides the level of particulate matter of diameter 2.5 microns or less (PM_{2.5}) in air, measured in microns per meter cubed (µg/m³). The percentile value is also included to easily compare areas across the state.

Data Source: EPA's EJSCREEN 1.0 via <https://gaftp.epa.gov/EJSCREEN/>

Year(s): 2016

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, contingent on EPA data releases; EPA's stated goal is to update EJSCREEN data annually

Additional Details: EJSCREEN data with corresponding state percentiles are available for download as an ArcGIS file geodatabase. Note that EJSCREEN displays PM_{2.5} data at the block group level by assigning all block groups within a census tract the same PM_{2.5} value. For more information on EJSCREEN data, including EPA's methodology for calculating PM_{2.5}, visit <https://www.epa.gov/ejscreen/technical-information-about-ejscreen>. Frequently asked questions are also answered here: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>.

Data Indicator: Ozone

Summary/Description: This indicator provides the ozone concentration in air, measured in parts per billion (ppb). Data are derived from the summer (May to September) seasonal average of daily maximum 8-hour ozone concentrations. The percentile value is also included to easily compare areas across the state.

Data Source: EPA's EJSCREEN 1.0 via <https://gaftp.epa.gov/EJSCREEN/>

Year(s): 2016

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, contingent on EPA data releases; EPA's stated goal is to update EJSCREEN data annually

Additional Details: EJSCREEN data with corresponding state percentiles are available for download as an ArcGIS file geodatabase. Note that EJSCREEN displays ozone data at the block group level by assigning all block groups within a census tract the same ozone value. For more information on EJSCREEN data, including EPA's methodology for calculating ozone, visit <https://www.epa.gov/ejscreen/technical-information-about-ejscreen>. Frequently asked questions are also answered here: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>.

Data Indicator: Diesel Particulate Matter (PM)

Summary/Description: This indicator provides the level of diesel particulate matter in air, measured in microns per meter cubed (µg/m³). Data are derived from EPA's National Air

Toxics Assessment (NATA). The percentile value is also included to easily compare areas across the state.

Data Source: EPA's EJSCREEN 1.0 via <https://gaftp.epa.gov/EJSCREEN/>

Year(s): 2014

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Ad hoc, contingent on NATA data releases

Additional Details: EJSCREEN data with corresponding state percentiles are available for download as an ArcGIS file geodatabase. Note that EJSCREEN displays diesel particulate matter data at the block group level by assigning all block groups within a census tract the same value. For more information on EJSCREEN data, including EPA's methodology for calculating diesel particulate matter, visit <https://www.epa.gov/ejscreen/technical-information-about-ejscreen>. Frequently asked questions are also answered here: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>.

Data Indicator: Traffic Proximity and Volume

Summary/Description: This indicator provides the amount of vehicular traffic nearby and distance from roads, measured as the count of vehicles (average annual daily traffic) at major roads within 500 meters of a block centroid divided by distance in meters. The final indicator presents the population-weighted average of blocks in each block group. The percentile value is also included to easily compare areas across the state.

Data Source: EPA's EJSCREEN 1.0 via <https://gaftp.epa.gov/EJSCREEN/>

Year(s): 2017

Geographic Unit of Analysis: Block group

Proposed Update Schedule: Annually, contingent on EPA data releases; EPA's stated goal is to update EJSCREEN data annually

Additional Details: EJSCREEN data with corresponding state percentiles are available for download as an ArcGIS file geodatabase. For more information on EJSCREEN data, including EPA's methodology for calculating traffic proximity, visit <https://www.epa.gov/ejscreen/technical-information-about-ejscreen>. Frequently asked questions are also answered here: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>.

Data Indicator: Wastewater Discharge

Summary/Description: This indicator provides the amount of toxic concentrations in waterways nearby and distance from waterways, measured by the toxicity-weighted stream concentrations at stream segments within 500 meters of a block centroid divided by distance in kilometers. The final indicator presents the population-weighted average of blocks in each block group. The percentile value is also included to easily compare areas across the state.

Data Source: EPA's EJSCREEN 1.0 via <https://gaftp.epa.gov/EJSCREEN/>

Year(s): 2017

Geographic Unit of Analysis: Block group

Proposed Update Schedule: Annually, contingent on EPA data releases; EPA's stated goal is to update EJSCREEN data annually

Additional Details: EJSCREEN data with corresponding state percentiles are available for download as an ArcGIS file geodatabase. For more information on EJSCREEN data, including EPA's methodology for calculating wastewater discharge, visit <https://www.epa.gov/ejscreen/technical-information-about-ejscreen>. Frequently asked questions are also answered here: <https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen>.

Category 2: Environmental Public Health Tracking (EPHT) (Aggregate)

Data Indicator: Asthma Hospitalizations

Summary/Description: This indicator provides the crude and age-adjusted hospitalization admission rates for asthma for adults ages 15 and older per 10,000 population.

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4) via restricted data request

Year(s): 2019

Geographic Unit of Analysis: County

Proposed Update Schedule: Annually

Additional Details: In-patient hospitalization data are not available in geospatial formats. The asthma hospitalization indicator was joined with county geographic information to create the final map. The 2000 U.S. population was used as the standard population for age adjustment; data were categorized into fifteen 5-year age groups. For more information on PHC4 data offerings, please visit <https://www.phc4.org/services/datarequests/data.htm>. Also, more information about the CDC's EPHT program and state-by-state data can be accessed from <https://www.cdc.gov/nceh/tracking/>. The EPHT program publishes a set of nationally consistent data and measures (NCDMs) in guidance documents to facilitate state comparisons. Asthma is defined using ICD-10-CM: J45 as the primary diagnosis.

Data Indicator: COPD Hospitalizations

Summary/Description: This indicator provides the crude and age-adjusted hospitalization admission rates for chronic obstructive pulmonary disease (COPD) for adults ages 15 and older per 10,000 population.

Data Source: PHC4 via restricted data request

Year(s): 2019

Geographic Unit of Analysis: County

Proposed Update Schedule: Annually

Additional Details: In-patient hospitalization data are not available in geospatial formats. The COPD hospitalization indicator was joined with county geographic information to create the final map. The 2000 U.S. population was used as the standard population for age adjustment. For more information on PHC4 data offerings, visit <https://www.phc4.org/services/datarequests/data.htm>. Also, more information about the CDC's EPHT program and state-by-state data can be accessed from <https://www.cdc.gov/nceh/tracking/>. The EPHT program publishes a set of NCDMs to facilitate state comparisons. COPD is defined using ICD-10-CM: J40-J44 as the primary diagnosis.

Data Indicator: Heart Attack Hospitalizations

Summary/Description: This indicator provides the crude and age-adjusted hospitalization admission rates for heart attack, also called acute myocardial infarction, for adults ages 15 and older per 10,000 population.

Data Source: PHC4 via restricted data request

Year(s): 2019

Geographic Unit of Analysis: County

Proposed Update Schedule: Annually

Additional Details: In-patient hospitalization data are not available in geospatial formats. The heart attack hospitalization indicator was joined with county geographic information to create the final map. The 2000 U.S. population was used as the standard population for age adjustment. For more information on PHC4 data offerings, visit <https://www.phc4.org/services/datarequests/data.htm>. Also, more information about the CDC's EPHT program and state-by-state data can be accessed from <https://www.cdc.gov/nceh/tracking/>. The EPHT program publishes a set of NCDMs in guidance documents to facilitate state comparisons. Acute myocardial infarction is defined using ICD-10-CM: I21-I22 as the primary diagnosis.

Data Indicator: Heat Stress Hospitalizations

Summary/Description: This indicator provides the crude and age-adjusted hospitalization admission rates for heat stress for adults ages 15 and older per 100,000 population.

Data Source: PHC4 via restricted data request

Year(s): 2019 (May through September only)

Geographic Unit of Analysis: County

Proposed Update Schedule: Annually

Additional Details: In-patient hospitalization data are not available in geospatial formats. The heat stress hospitalization indicator was joined with county geographic information to create the final map. The 2000 U.S. population was used as the standard population for age adjustment. For more information on PHC4 data offerings, visit <https://www.phc4.org/services/datarequests/data.htm>. Also, more information about the CDC's EPHT program and state-by-state data can be accessed from

<https://www.cdc.gov/nceh/tracking/>. The EPHT program publishes a set of NCDMs in guidance documents to facilitate state comparisons. Heat stress is defined using ICD-10-CM: T67, X30, or X32 (excluding W92) as any diagnosis (primary or other).

Category 3: American Community Survey (ACS) (Aggregate)

Data Indicator: Low Income

Summary/Description: This indicator provides the population with income less than 200% of the federal poverty level and can be displayed as a number or a percent of the total population. The population of families with income less than 200% of the federal poverty level is also available.

Data Source: American Community Survey (ACS) (Tables C17002 and B17026) via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The low-income indicator was joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: People of Color (POC)

Summary/Description: This indicator provides the population of all races/ethnicities combined except for non-Hispanic white only and can be displayed as a number or a percent. The population of separate race/ethnic groups is also included, i.e., non-Hispanic white only, non-Hispanic black only, Hispanic any race, and non-Hispanic Asian only.

Data Source: ACS Table B03002 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The POC indicator and race/ethnic breakdowns were joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: Children Less Than 5 Years Old

Summary/Description: This indicator provides the vulnerable age group population of children under age 5 and can be displayed as a number or a percent of the total population.

Data Source: ACS Table B01001 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The ACS data for children less than 5 years were joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: Adults 65 Years Old and Over

Summary/Description: This indicator provides the vulnerable age group population of adults 65 years old and over and can be displayed as a number or a percent of the total population.

Data Source: ACS Table B01001 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The ACS data for adults 65 years old and over were joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: Women of Childbearing Age (Ages 15-44)

Summary/Description: This indicator provides the vulnerable sex group population of women of childbearing age (ages 15-44) and can be displayed as a number or a percent of the total population.

Data Source: ACS Table B01001 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The ACS data for women of childbearing age (ages 15-44) were joined with census tract geographic information to create the final map. Provisional data from 2020 support the exclusion of women 10-14 years old and 45 years and older in the women of childbearing age indicator as these age groups accounted for about 0.3% of total births in 2019 and 2020 (Hamilton, Martin, & Osterman, 2021). For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: Low Educational Attainment (Less Than College Education)

Summary/Description: This indicator provides the population aged 25 years and older who have a high school diploma (or equivalent) or less education and can be displayed as a number or a percent of the total population aged 25 years and older. The population of

separate education groups is also included, i.e., less than high school, high school diploma (or equivalent), some college, and bachelor's degree or higher.

Data Source: ACS Table B15003 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The low-education indicator was joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: Linguistically Isolated Households

Summary/Description: This indicator provides the population who resides in a limited English household and can be displayed as a number or a percent of the total population. Limited English households are those households in which no member 14 years old and over (1) speaks only English or (2) speaks a non-English language and speaks English "very well."

Data Source: ACS Table C16002 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The low-education indicator was joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>. Also, visit <https://www.census.gov/topics/population/language-use/about/faqs.html> for more details on the Census Bureau's language data.

Data Indicator: Unemployment Rate

Summary/Description: This indicator provides the unemployment rate for the population aged 16 and over, which represents the unemployed population as a percent of the total labor force population. The labor force participation rate (labor force population as a percent of the total civilian non-institutionalized population) for the population aged 16 and over is also included.

Data Source: ACS Table S2301 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The unemployment indicator was joined with census tract geographic information to create the final map. For

more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: Homeownership (Renters)

Summary/Description: This indicator provides the population who reside in owner-occupied houses versus renter-occupied households and can be displayed as a number or a percent of the total population.

Data Source: ACS Table B25008 via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The homeownership indicator was joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Data Indicator: Old Housing (Lead Paint Proxy)

Summary/Description: This indicator provides the number of houses built before 1960 and can be displayed as a number or a percent of total households. The number of houses built before 1980 is also included.

Data Source: ACS (Table B25034) via <https://data.census.gov/cedsci/>

Year(s): 2015-2019

Geographic Unit of Analysis: Census tract

Proposed Update Schedule: Annually, following the release of 5-year ACS data

Additional Details: ACS data are not available in geospatial formats. The lead paint indicator was joined with census tract geographic information to create the final map. For more information on ACS data and the data release schedule at Census Bureau, visit <https://www.census.gov/programs-surveys/acs/>.

Category 4: Natural Environmental Pollution Source Indicators (Boundary)

Data Indicator: Radon

Summary/Description: This indicator provides the median indoor radon concentration by geologic unit, in picocuries per liter (pCi/L), using the categories 0.7-1.9 (shown in green), 2.0-3.9 (in orange), and 4.0-57.9 (in red). United States Geological Survey (USGS), in partnership with the Pennsylvania Department of Environmental Protection (PA DEP) and PA DOH, analyzed 548,507 indoor radon measurements to create the map (Gross, 2013). EPA recommends considering mitigation for radon concentrations between 2.0 and 3.9 pCi/L. EPA recommends taking action to mitigate radon if concentrations are at or above 4.0 pCi/L.

Data Source: USGS Distribution of Indoor Radon Concentrations in Pennsylvania, 1990–2007 at <https://pubs.usgs.gov/sir/2013/5143/>

Year(s): 1990-2007

Proposed Update Schedule: PA DOH is in the process of summarizing the most up-to-date radon testing data from PA DEP.

Additional Details: For more information about the USGS PA radon project, visit <https://pubs.usgs.gov/sir/2013/5143/>.

Category 5: Air Pollution Source Indicators (Point Source)

Data Indicator: Air Emission Plants

Summary/Description: This indicator provides the location of any air emission plant that reports data to PA DEP's Air Emissions Inventory. Facilities are stationary sources of air emissions such as factories and paper mills. Gas wells and compressor stations are excluded. For each facility, emission levels (in tons/year) are shown for five of the six National Ambient Air Quality Standards (NAAQS), including carbon monoxide, lead, nitrogen oxides (NO_x), particulate matter (PM_{2.5} and PM₁₀), and sulfur oxides (SO_x); note that ozone is not typically generated by facilities but rather formed when heat and sunlight cause chemical reactions between NO_x and volatile organic compounds (VOCs). Emission levels are also shown for the top ten air pollutants in PA reported to the EPA's Toxic Release Inventory; these pollutants were sulfuric acid, hydrochloric acid, ammonia, styrene, methanol, toluene, glycol ethers, xylenes, zinc, and hexane in 2019.

Data Source: PA DEP's Air Emission Report at http://cedatareporting.pa.gov/reports/powerbi/Public/DEP/AQ/PBI/Air_Emissions_Report

Year(s): 2015-2019 (pollutants are shown for each facility based on the most recent year that facility submitted data to the inventory; therefore, all pollutants were measured in the same year)

Proposed Update Schedule: Annually, following March 1st deadline for facilities to submit their emission inventories

Additional Details: For more information on PA DEP's Air Emission Inventory and reporting requirements, visit <https://www.dep.pa.gov/Business/Air/BAQ/BusinessTopics/Emission/Pages/default.aspx>.

Category 6: Hazardous Site Indicators (Point Source)

Data Indicator: Superfund / National Priority List (NPL) Sites

Summary/Description: This indicator provides the location of NPL sites, also referred to as Superfund Sites, where known releases of hazardous substances, pollutants, or contaminants have occurred or are threatened. The NPL is intended to guide EPA in

determining which sites warrant further investigation and ultimately remediation. Thus, EPA primarily leads the remediation of NPL sites. The status of NPL sites is also included, where sites are delineated as current NPL sites (yellow square), deleted NPL sites (green square), or proposed NPL sites (red square).

Data Source: EPA via REST Service (Feature Service by whumbert_EPA) [https://services.arcgis.com/cJ9YHowT8TU7DUyn/arcgis/rest/services/Superfund_National_Priorities_List_\(NPL\)_Sites_with_Status_Information/FeatureServer](https://services.arcgis.com/cJ9YHowT8TU7DUyn/arcgis/rest/services/Superfund_National_Priorities_List_(NPL)_Sites_with_Status_Information/FeatureServer)

Year(s): 2021

Proposed Update Schedule: Automatically via ArcGIS REST Services Directory

Additional Details: These sites are governed under the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), which allows EPA to clean up contaminated sites. CERCLA also forces the parties responsible for the contamination to either perform cleanups or reimburse the government for EPA-led cleanup work. When there is no viable responsible party the Superfund Trust gives EPA the funds and authority to clean up contaminated sites (EPA, 2020). This feature service contains all Superfund Sites across the United States, but it is displayed in the EHI Map with an extent filter to only show the Superfund Sites that are within PA. For more information on EPA's Superfund program, visit <https://www.epa.gov/superfund>.

Data Indicator: Formerly Used Defense (FUD) Sites

Summary/Description: This indicator provides the location of Formerly Used Defense (FUD) Sites, where the U.S. Department of Defense (DOD) is responsible for the environmental restoration/cleanup of properties that were formerly owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of DOD prior to October 1986.

Data Source: PA DEP's Office of Waste, Air, Radiation and Remediation, Bureau of Environmental Cleanup and Brownfields, Division of Site Remediation

Year(s): Fiscal Year 2020

Proposed Update Schedule: Annually

Additional Details: For more information about the FUD Sites, visit <https://www.usace.army.mil/missions/environmental/formerly-used-defense-sites/> or <https://www.dep.pa.gov/Business/Land/SiteRemediation/Multi-Site-Remediation-Agreements/Pages/Federal-Facilities-Restoration.aspx>.

Data Indicator: Responsible Party (RP) / NPL State Deferral Sites

Summary/Description: This indicator provides the location of Responsible Party (RP) Sites, also referred to as National Priority List (NPL) State Deferral Sites, where cleanup activities for hazardous substances that have been released are being conducted by the responsible party under the enforcement authority of the PA DEP. RP Sites are NPL-caliber sites where

the state uses its own authority to compel and oversee the RP cleanup activities or implements a response using its own resources and receives cost recovery.

Data Source: PA DEP's Office of Waste, Air, Radiation and Remediation, Bureau of Environmental Cleanup and Brownfields, Division of Site Remediation

Year(s): Fiscal Year 2020

Proposed Update Schedule: Annually

Additional Details: Potential RPs fall into four categories: 1) current owners and operators of a facility; 2) past owners and operators of a facility at the time hazardous wastes were disposed; 3) generators and parties that arranged for the disposal or transport of the hazardous substances; and 4) transporters of hazardous waste that selected the site where the hazardous substances were brought (EPA, 2021). These same "potential RPs" also apply to NPL sites. These sites are governed under the provisions of the Hazardous Sites Cleanup Act (HSCA). For more information about PA DEP's remediation efforts, visit <https://www.dep.pa.gov/Business/Land/SiteRemediation/Hazardous-Sites-Cleanup-Program/Pages/default.aspx> or <https://storymaps.arcgis.com/stories/3a1fd90f6a07489dadadd0b324e0af0d>.

Data Indicator: Hazardous Sites Cleanup Act (HSCA) Sites

Summary/Description: This indicator provides the location of HSCA sites, where PA DEP is conducting and funding investigations, cleanups, and monitoring activities due to the release of hazardous substances. These sites do not have a responsible party (RP), either because the RP has not been found or they are not financially viable to conduct remediation efforts.

Data Source: PA DEP's Office of Waste, Air, Radiation and Remediation, Bureau of Environmental Cleanup and Brownfields, Division of Site Remediation

Year(s): Fiscal Year 2020

Proposed Update Schedule: Annually

Additional Details: HSCA was enacted in PA on October 18, 1988. The PA DEP primarily leads remediation activities at these sites and those activities are governed by the provisions of the HSCA. The rules governing the clean-up of HSCA sites differ from those governing the federally run NPL sites. For more information about the Hazardous Sites Cleanup Program, visit <https://www.dep.pa.gov/Business/Land/SiteRemediation/Hazardous-Sites-Cleanup-Program/> or <https://storymaps.arcgis.com/stories/3a1fd90f6a07489dadadd0b324e0af0d>.

Category 7: Waste Operation Indicators (Point Source)

Data Indicator: Waste Composting Facilities

Summary/Description: This indicator provides the location of waste composting facilities that use land for processing municipal and/or residual waste by composting, which is a

process that biologically decomposes organic waste under controlled anaerobic or aerobic conditions to yield a humus-like product.

Data Source: PA DEP via Pennsylvania Spatial Data Access (PASDA) at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation;>

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, waste composting facilities, was drawn from two major waste type feature layers (municipal waste operations and residual waste operations). For more information about waste programs managed by PA DEP's Bureau of Waste Management (BWM), visit <https://www.dep.pa.gov/Business/Land/Waste/Pages/default.aspx>.

Data Indicator: Waste Impoundments

Summary/Description: This indicator provides the location of waste impoundments that are designed to hold an accumulation of liquid residual waste. Waste impoundments are typically natural topographic depressions, man-made excavations, or diked areas formed primarily of earthen materials and lined with man-made materials.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation;>

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, waste impoundments, was drawn from one major waste type feature layer (residual waste operations). For more information about PA DEP BWM's waste programs, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Waste Incinerators and Resource Recovery Facilities

Summary/Description: This indicator provides the location of waste incinerators and resource recovery facilities. Waste incinerators are facilities typically used to thermally break down municipal and/or residual waste using controlled combustion in an enclosed device. Less often, waste incinerators may burn or thermally combust *captive hazardous waste* in an enclosed device using a controlled flame. Resource recovery facilities are facilities that 1) provide for the extraction and utilization of materials or energy from municipal waste via mechanical means or combustion, or 2) reduce the volume or bulk of residual waste for reuse.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation;>

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, waste incinerators and resource recovery facilities, was drawn from three major waste type feature layers (municipal waste operations, residual waste operations, and captive hazardous waste operations). As of 2021, there is one waste incinerator in this layer that receives hazardous waste. For more information about PA DEP BWM's waste programs, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Permitted Landfills

Summary/Description: This indicator provides the location of landfills, which are permitted facilities that use land for the disposal of municipal and/or residual waste.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation>;

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, landfills, was drawn from two major waste type feature layers (municipal waste operations and residual waste operations). For more information about PA DEP BWM's waste programs, visit <https://www.dep.pa.gov/Business/Land/Waste/Pages/default.aspx>.

Data Indicator: Historically Abandoned Landfills

Summary/Description: This indicator provides the location of abandoned landfills, which are facilities that were historically abandoned or closed prior to regulatory landfill requirements. Locations of the abandoned landfills were determined from historic records such as microfiche, index card, topographic map, and staff personal files, and then compiled into site lists.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation>;

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, abandoned landfills, was drawn from one major waste type feature layer (municipal waste operations). For more information about PA DEP BWM's waste programs, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Waste Processing Facilities

Summary/Description: This indicator provides the location of waste processing facilities that reduce the volume or bulk of municipal and/or residual waste by changing the

chemical, physical, or biological properties of the waste to make it easier to dispose of, recover a resource from, or transfer the processed waste material.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation>;

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, waste processing facilities, was drawn from two major waste type feature layers (municipal waste operations and residual waste operations). For more information about PA DEP BWM's waste programs, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Waste Transfer Stations

Summary/Description: This indicator provides the location of waste transfer stations that receive and process, or temporarily store, municipal and/or residual waste at a location other than the generation site.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation>;

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, waste transfer stations, was drawn from two major waste type feature layers (municipal waste operations and residual waste operations). For more information about PA DEP BWM's waste programs, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Hazardous Waste Disposal Facilities

Summary/Description: This indicator provides the location of hazardous waste disposal facilities permitted by PA DEP to 1) dispose of hazardous waste generated onsite and/or 2) accept hazardous waste generated off-site for disposal, and dispose of the hazardous waste by incineration, or by intentionally placing the waste in or on land or water in specially designed and constructed containment units where the waste will remain after closure of the facility.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation>;

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, hazardous waste disposal facilities, was drawn from two major waste type feature layers (commercial hazardous waste operations and

captive hazardous waste operations). For more information about PA DEP BWM's waste programs, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Hazardous Waste Generators

Summary/Description: This indicator provides the location of hazardous waste generators, which are facilities where hazardous waste is first produced. This hazardous waste may be accumulated on-site at these facilities for a prescribed limited amount of time (usually between 90 and 270 days). If longer than that, a special storage permit from PA DEP is required.

Data Source: PA DEP via PASDA at

<https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation;>

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, hazardous waste generators, was drawn from two major waste type feature layers (commercial hazardous waste operations and captive hazardous waste operations). For more information about waste programs managed by PA DEP's BWM, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Hazardous Waste Recycling Facilities

Summary/Description: This indicator provides the location of hazardous waste recycling facilities permitted by PA DEP to 1) treat hazardous waste generated onsite and/or 2) accept and treat hazardous waste generated off-site, to make the waste suitable for upcoming recovery of a usable product or material.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation;>

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, hazardous waste recycling facilities, was drawn from two major waste type feature layers (commercial hazardous waste operations and captive hazardous waste operations). For more information about waste programs managed by PA DEP's BWM, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Hazardous Waste Storage Facilities

Summary/Description: This indicator provides the location of hazardous waste storage facilities permitted by PA DEP to 1) hold hazardous waste generated onsite for a temporary period (not to exceed one year) and/or 2) accept hazardous waste generated off-site and hold the waste for a temporary period (not to exceed one year). At the end of that period

the hazardous waste is treated or disposed of at the same facility, or treated, disposed, or stored elsewhere.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation;>

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, hazardous waste storage facilities, was drawn from two major waste type feature layers (commercial hazardous waste operations and captive hazardous waste operations). For more information about waste programs managed by PA DEP's BWM, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Data Indicator: Hazardous Waste Treatment Facilities

Summary/Description: This indicator provides the location of hazardous waste treatment facilities permitted by PA DEP to change the physical, chemical, or biological character or composition of hazardous waste that is generated on- or off-site. The purpose of the treatment is to neutralize the waste, or to render the waste non-hazardous, safer for transport, suitable for recovery, suitable for storage, or reduced in volume.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=Waste+Operation;>

this data can also be downloaded from PA DEP's GIS Open Data Portal

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: The sub-facility type, hazardous waste storage facilities, was drawn from two major waste type feature layers (commercial hazardous waste operations and captive hazardous waste operations). For more information about waste programs managed by PA DEP's BWM, visit <https://www.dep.pa.gov/Business/Land/Waste/>.

Category 8: Oil and Natural Gas Site Indicators (Point Source/Boundary)

Data Indicator: Underground Natural Gas Storage Fields

Summary/Description: This indicator provides the location of underground natural gas storage fields, both active and inactive, based on data from the Energy Information Administration (EIA).

Data Source: EIA REST Service at

https://services7.arcgis.com/FGr1D95XCGALKXqM/ArcGIS/rest/services/Natural_Gas_Underground_Storage/FeatureServer/0

Year(s): 2020

Proposed Update Schedule: Automatically via REST Service

Additional Details: For more information on underground natural gas storage, please visit <https://www.eia.gov/naturalgas/storage/basics/>.

Data Indicator: Natural Gas Interstate and Intrastate Pipelines

Summary/Description: This indicator provides the location of major natural gas transmission pipelines, including interstate, intrastate, and gathering pipelines, based on data from EIA.

Data Source: EIA REST Service at

[https://services7.arcgis.com/FGr1D95XCGALKXqM/ArcGIS/rest/services/NaturalGas InterIntrastate Pipelines US EIA/FeatureServer/0](https://services7.arcgis.com/FGr1D95XCGALKXqM/ArcGIS/rest/services/NaturalGas%20InterIntrastate%20Pipelines%20US%20EIA/FeatureServer/0)

Year(s): 2020

Proposed Update Schedule: Automatically via REST Service

Additional Details: The underlying data are based on a variety of sources with varying scales and levels of accuracy, therefore affecting accuracy in this layer. For more information on natural gas pipelines, visit <https://www.eia.gov/energyexplained/natural-gas/natural-gas-pipelines.php>.

Data Indicator: Petroleum Product Pipelines

Summary/Description: This indicator provides the location of major petroleum products pipelines, based on data from EIA. These pipelines carry refined petroleum products, including gasoline, jet fuel, home heating oil, and diesel fuel.

Data Source: EIA REST Service at

[https://services7.arcgis.com/FGr1D95XCGALKXqM/ArcGIS/rest/services/PetroleumProduct Pipelines US EIA/FeatureServer/0](https://services7.arcgis.com/FGr1D95XCGALKXqM/ArcGIS/rest/services/PetroleumProduct%20Pipelines%20US%20EIA/FeatureServer/0)

Year(s): 2020

Proposed Update Schedule: Automatically via REST Service

Additional Details: The underlying data are based on a variety of sources with varying scales and levels of accuracy, therefore affecting accuracy in this layer. For more information on oil and petroleum products, visit <https://www.eia.gov/energyexplained/oil-and-petroleum-products/use-of-oil.php>.

Data Indicator: Natural Gas Compressor Stations

Summary/Description: This indicator provides the location of compressor stations that report data to the PA DEP's Air Emissions Inventory. For each facility, emission levels (in tons/year) are shown for five of the six National Ambient Air Quality Standards (NAAQS), including carbon monoxide, lead, nitrogen oxides (NO_x), particulate matter (PM_{2.5} and PM₁₀), and sulfur oxides (SO_x); note that ozone is not typically generated by facilities but rather formed when heat and sunlight cause chemical reactions between NO_x and volatile organic compounds (VOCs). Emission levels are also shown for the top ten air pollutants in PA reported to the EPA's Toxic Release Inventory; these pollutants were sulfuric acid,

hydrochloric acid, ammonia, styrene, methanol, toluene, glycol ethers, xylenes, zinc, and hexane, n- in 2019.

Data Source: PA DEP's Air Emission Report at http://cedatareporting.pa.gov/reports/powerbi/Public/DEP/AQ/PBI/Air_Emissions_Report

Year(s): 2015-2019 (pollutants are shown for each facility based on the most recent year that facility submitted data to the inventory; therefore, all pollutants were measured in the same year)

Proposed Update Schedule: Annually, following March 1st deadline for facilities to submit their emission inventories

Additional Details: For more information on PA DEP's Air Emission Inventory and reporting requirements, visit <https://www.dep.pa.gov/Business/Air/BAQ/BusinessTopics/Emission/Pages/default.aspx>. For more information on compressor stations, visit <https://extension.psu.edu/understanding-natural-gas-compressor-stations>.

Data Indicator: Unconventional Oil and Gas Wells

Summary/Description: This indicator provides the location of unconventional oil and gas wells. Unconventional wells extract oil and natural gas from unconventional, or non-traditional, geologic formations, i.e., a geological shale formation that can be accessed primarily by leveraging technological advancements in oil and gas extraction, including directional drilling (both vertical and horizontal well bores) and a stimulation process by high volume, high pressure hydraulic fracturing. The status of each well, differentiating active from other types of wells (e.g., regulatory inactive, abandoned, plugged, etc.) can be viewed in the attribute table.

Data Source: PA DEP's GIS Open Data Portal at <https://newdata-padep-1.opendata.arcgis.com/maps/oil-gas-unconventional-well-locations>

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: For more information on PA DEP's Oil and Gas definitions, visit <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/Act13/Pages/Act-13-FAQ.aspx>. Additional information about PA DEP's Office of Oil and Gas Management and program reporting and mapping can be found at the following websites: <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/>; <https://www.dep.pa.gov/DataandTools/Reports/Oil%20and%20Gas%20Reports/pages/default.aspx>; <https://gis.dep.pa.gov/PaOilAndGasMapping/>.

Data Indicator: Conventional Oil and Gas Wells

Summary/Description: This indicator provides the location of conventional oil and gas wells. Conventional wells extract oil and natural gas from conventional, or traditional, geologic formations, i.e., any formation that does not meet the statutory definition of an unconventional formation. Conventional wells are typically drilled using a vertical well bore,

and while often using a stimulation process by hydraulic fracturing, they do not require the volume of fluids typically required for unconventional wells. The status of each well, differentiating active from other types of wells (e.g., regulatory inactive, abandoned, plugged, etc.) can be viewed in the attribute table.

Data Source: PA DEP's GIS Open Data Portal at <https://newdata-padep-1.opendata.arcgis.com/maps/oil-gas-conventional-well-locations>

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: For more information on PA DEP's Oil and Gas definitions, visit <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/Act13/Pages/Act-13-FAQ.aspx>. Additional information about PA DEP's Office of Oil and Gas Management and program reporting and mapping can be found at the following websites: <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/>; <https://www.dep.pa.gov/DataandTools/Reports/Oil%20and%20Gas%20Reports/pages/default.aspx>; <https://gis.dep.pa.gov/PaOilAndGasMapping/>.

Category 9: Mining Site Indicators (Point Source/Boundary)

Data Indicator: Industrial Mineral (Non-Coal) Mining Operations

Summary/Description: This indicator provides the location of industrial mineral (non-coal) mining operations, both surface and underground mine sites. Surface mining of industrial minerals entails the removal of material above the industrial minerals. Types of surface mining for industrial minerals include, but are not limited to, strip, auger, quarry, dredging, and leaching mines. Underground mining of industrial minerals entails the deep mining of industrial minerals by means of shafts, tunnels, adits or other mining openings.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=278>

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: Data points for the following sub-facility types were removed from the initial layer file to eliminate duplication, as they are all sub-facilities of a main mining operation: discharge points, mineral preparation plants, mining stormwater general permit, National Pollutant Discharge Elimination System (NPDES) discharge point, and post-mining treatment sites. Each mining site is represented by one point. For more information about non-coal mining, visit <https://www.dep.pa.gov/Business/Land/Mining/>.

Data Indicator: Coal Mining Operations

Summary/Description: This indicator provides the location of coal mining operations, both coal surface and underground mine sites. Surface mining of coal entails the removal of material which lies above the coal seam. Types of surface coal mining include, but are not

limited to, strip, auger, quarry, dredging, and leaching mines. Underground mining of coal entails the deep mining of coal. Types of underground coal mining include, but are not limited to, portal, tunnel, slope, and drift mines.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=271>

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: Data points for the following sub-facility types were removed from the initial layer file to eliminate duplication, as they are all sub-facilities of a main mining operation: anthracite river dredges, coal-above ground storage tanks, discharge points, government-financed construction contracts, mineral preparation plants, mining stormwater general permit, NPDES discharge point, post-mining treatment sites, refuse disposal facilities, and refuse reprocessing sites. Each mining site is represented by one point. For more information about coal mining in PA, visit <https://www.dep.pa.gov/Business/Land/Mining/>.

Data Indicator: Abandoned Anthracite Mine Discharges

Summary/Description: This indicator provides the location of large discharges from abandoned mines in the anthracite region of eastern PA. This dataset was originally developed by the USGS and includes historic water quality data to showcase the water quality of these anthracite discharges. The Eastern Pennsylvania Coalition for Abandoned Mine Reclamation (EPCAMR) updated this dataset to include additional abandoned mine discharges identified in watershed assessment reports and additional attributes, such as elevation and dissolved oxygen. The water quality indicators that are included in this data set are Flow Rate (cfs), Temperature (°C), Specific Conductivity (uS/cm), pH, Sulfate (mg/L), Iron (mg/L), Alkalinity (mg/L), Total Acidity (mg/L), pH Range, Dissolved Oxygen (mg/L), Iron (kg/year), and Acid (kg/year).

Data Source: EPCAMR and USGS via PASDA at

<https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=3048>

Year(s): 2018

Proposed Update Schedule: Ad hoc, when updated.

Additional Details: EPCAMR has mapped abandoned anthracite mine discharges and performed water quality monitoring from 2004 to the present in the anthracite region of eastern PA, building upon work originally performed by the USGS. For more information on the water quality of large discharges from mines in the anthracite region of eastern PA and/or for cleanup and reuse of mining-impacted land and water in the anthracite region of PA, visit <https://pubs.usgs.gov/wri/1995/4243/report.pdf>, <http://epcamr.org/home/current-initiatives/technical-assistance/watershed-assessment/anthracite-remediation-strategy-with-srbc/> or <https://www.nrc.gov/docs/ML1430/ML14308A225.pdf>.

Data Indicator: Abandoned Mine Land Inventory Sites

Summary/Description: This indicator provides the boundaries of abandoned mine land (AML) inventory sites. These sites denote the boundaries of AML problem areas containing public health, safety and public welfare problems created by past coal mining.

Data Source: PA DEP via PASDA at

<https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=460>

Year(s): 2021

Proposed Update Schedule: Annually.

Additional Details: For more information about AML programs managed by PA DEP's Bureau of Abandoned Mine Reclamation, visit <https://www.dep.pa.gov/Business/Land/Mining/AbandonedMineReclamation/AMLProgramInformation/>.

Category 10: Water Resource Indicators (Boundary/Point Source)

Data Indicator: Public Water Supplier Service Areas with Water Quality Metrics

Summary/Description: This indicator provides the boundaries of the public water suppliers' (PWS) service areas in PA. Water quality metrics from the PA DEP Bureau of Safe Drinking Water are also included, specifically the mean and maximum annual concentrations of arsenic (EPA Analyte Code 1005; µg/L), nitrate (1040; mg/L), total Haloacetic acids (HAA5: 2456; µg/L), total trihalomethanes (TTHM: 2950; µg/L), trichloroethylene (TCE: 2984; µg/L), tetrachloroethylene (PCE: 2987; µg/L), di(2-ethylhexyl) phthalate (DEHP: 2039; µg/L), atrazine (2050; µg/L), combined uranium (4006; µg/L), combined radium (4010; pCi/L).

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=1090>

Year(s): 2021 (Water quality metrics: 2019)

Proposed Update Schedule: Annually

Additional Details: Not all analytes are required to be tested each year at PWS. Water quality metrics were manually joined to the PWS in ArcGIS. For more information about PA DEP's work on safe drinking water, visit <https://www.dep.pa.gov/Business/Water/BureauSafeDrinkingWater/>.

Data Indicator: Sewage Treatment Plant Discharges

Summary/Description: This indicator provides the location of sewage treatment plant discharges to waterways, which are relative to the location of the sewage treatment plants.

Data Source: PA DEP via PASDA at <https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=289>

Year(s): 2021

Proposed Update Schedule: Annually

Additional Details: Data points for the following sub-facility types were removed from the initial layer to reflect the intended purpose of the layer: instream discharges, spray irrigation fields, groundwater recharges, on-lot septics, and unidentified facility types. This layer is part of the PA DEP Water Resources data set. A Water Resource is a PA DEP primary facility type related to the Water Use Planning Program, which is led by the Office of Water Resources Planning. For more information about PA DEP's Water programs, visit <https://www.dep.pa.gov/Business/Water/>.

Data Indicator: FEMA Flood Hazard Areas

Summary/Description: This indicator provides the boundaries of current flood hazard areas identified on Flood Insurance Rate Maps (FIRMs) produced by the Federal Emergency Management Agency (FEMA). Special Flood Hazard Areas have regulations that include the mandatory purchase of flood insurance.

Data Source: FEMA, ESRI via ArcGIS Living Atlas of the World

https://services.arcgis.com/P3ePLMYs2RVChkJx/arcgis/rest/services/USA_Flood_Hazard_Reduced_Set_gdb/FeatureServer

Year(s): 2021

Proposed Update Schedule: Automatically via REST Service.

Additional Details: The National Flood Insurance Program (NFIP) is managed by the FEMA and is delivered to the public by a network of approximately 60 insurance companies and the NFIP Direct. The NFIP works with communities required to adopt and enforce floodplain management regulations to mitigate flooding effects. Flood insurance is available to anyone living in one of the 23,000 participating NFIP communities. Homes and businesses in high-risk flood areas with mortgages from government-backed lenders are required to have flood insurance. For more information on FEMA's National Flood Insurance Program and related maps, visit <https://www.fema.gov/flood-insurance>.

Data Indicator: PA Small Watersheds (Subwatersheds)

Summary/Description: This indicator provides the boundaries of the 1,454 watersheds, displayed at the Hydrologic Unit Code 12 (HUC-12) level of detail, that are either wholly or partially within PA. These watershed boundaries are compiled from U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) and U.S. Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Watershed Boundary Dataset (WBD) sources. Watersheds, also called drainage basins or water catchment areas, define land areas that separate waters flowing into different larger water bodies, such as rivers, lakes, seas, or oceans.

Data Source: USGS and USDA's NRCS via REST Service

<https://hydro.nationalmap.gov/arcgis/rest/services/wbd/MapServer/6>

Year(s): 2020

Proposed Update Schedule: Automatically via REST Service

Additional Details: This feature service contains Hydrologic Unit (HU) polygon boundaries for the United States, Puerto Rico, and the U.S. Virgin Islands, but it is displayed in the EHI Map with an extent filter to only show subwatersheds that are either wholly or partially within PA. For more information about the WBD and watersheds generally, visit <https://www.usgs.gov/core-science-systems/ngp/national-hydrography/watershed-boundary-dataset>, <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/water/watersheds/>, and <https://oceanservice.noaa.gov/facts/watershed.html>.

Data Indicator: PA Large Watersheds (Subbasins)

Summary/Description: This indicator provides the boundaries of the 56 watersheds, displayed at the Hydrologic Unit Code 8 (HUC-8) level of detail, that are either wholly or partially within PA. These watershed boundaries are compiled from U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) and U.S. Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Watershed Boundary Dataset (WBD) sources. Watersheds, also called drainage basins or water catchment areas, define land areas that separate waters flowing into different larger water bodies, such as rivers, lakes, seas, or oceans.

Data Source: USGS and USDA's NRCS via REST Service

<https://hydro.nationalmap.gov/arcgis/rest/services/wbd/MapServer/4>

Year(s): 2020

Proposed Update Schedule: Automatically via REST Service

Additional Details: This feature service contains Hydrologic Unit (HU) polygon boundaries for the United States, Puerto Rico, and the U.S. Virgin Islands, but it is displayed in the EHI Map with an extent filter to only show subbasins that are either wholly or partially within PA. For more information about the WBD and watersheds generally, visit <https://www.usgs.gov/core-science-systems/ngp/national-hydrography/watershed-boundary-dataset>, <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/water/watersheds/>, and <https://oceanservice.noaa.gov/facts/watershed.html>.

Category 11: Transportation Infrastructure Indicators

Data Indicator: PA Rail Lines with Rail Freight Density

Summary/Description: This indicator provides the location of rail lines within PA. Additionally, each individual section of rail line has been color coded into four classes based on rail freight density in million tons per year.

Data Source: Pennsylvania Department of Transportation (PennDOT) via PASDA at <https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=48>

Year(s): 2020

Proposed Update Schedule: Ad hoc, when updated

Additional Details: PA ranks first in the country in the number of operating railroads (65) and also ranks near the top in total track mileage (more than 5,600 miles). For more information about rail freight in PA and programs administered by the PennDOT Bureau of Rail, Freight, Ports, and Waterways, visit <https://www.penndot.gov/Doing-Business/RailFreightAndPorts/Pages/default.aspx>.

Category 12: Environmental Justice Boundary Indicators

Data Indicator: Environmental Justice (EJ) Areas

Summary/Description: This indicator provides the boundaries of current EJ areas in PA as defined by the Office of EJ within DEP. EJ areas are census tracts where 20 percent or more of individuals live at or below the federal poverty line and/or 30 percent or more of the population identifies as a non-white race/ethnic group.

Data Source: American Community Survey and DEP via PASDA at <https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=313>

Year(s): 2011-2015

Proposed Update Schedule: The Office of EJ within DEP is set to revise the state's EJ policy and corresponding definition of what constitutes an EJ area by the Spring/Summer of 2022. Data for this indicator will be updated following the formalization of the new EJ policy.

Additional Details: For more information on the Office of EJ's policy and outreach work, visit <https://www.dep.pa.gov/PublicParticipation/OfficeofEnvironmentalJustice/>.

Data Indicator: Historic Home Owners' Loan Corporation (HOLC) Redlining Areas

Summary/Description: This indicator provides the boundaries of historic redlined (grade 'D') neighborhoods in select cities in PA, including Altoona, Bethlehem, Chester, Erie, Harrisburg, Johnstown, Lancaster, New Castle, Philadelphia, Pittsburgh, Wilkes-Barre, and York. The Home Owners' Loan Corporation (HOLC), established by Congress in 1933 to refinance mortgages in default and prevent foreclosures, created a neighborhood ranking system to indicate the level of security for real-estate investments as a part of a residential security mapping project in 1935. Grade 'D' neighborhoods (in red) were regarded as "hazardous" and most risky for mortgage lending, and tended to be predominantly black, while Grade 'A' neighborhoods (in green) were deemed "best" and minimal risk and therefore further encouraged predominantly wealthy white homeowners to move in. Grade 'B' (blue) and Grade 'C' (yellow) neighborhoods were regarded as "desirable" and "declining", respectively (Nelson et al., 2021).

Data Source: University of Richmond's Digital Scholarship Lab, ESRI via ArcGIS Living Atlas of the World (Feature Service by UR_DSL_urichmond)

<https://www.arcgis.com/home/item.html?id=075648999ba940ff94edcb122e3d0b82>

Year(s): 2020

Proposed Update Schedule: None needed unless original data source expands project to map additional cities within PA.

Additional Details: This feature service contains the boundaries of historic neighborhood grades for select cities across the United States, but it is displayed in the EHI Map with an extent filter to only show the historic neighborhood grades for cities that are within PA. For more information on the Mapping Inequality project at the University of Richmond, visit <https://dsl.richmond.edu/panorama/redlining>.

Category 13: Governmental Boundary Indicators

Data Indicator: PA Municipalities

Summary/Description: This indicator provides the boundaries of the 2,572 municipalities within PA as delineated for the PennDOT Type 10 general highway maps. This layer contains all classifications of municipalities, including first- and second-class townships, boroughs, cities and towns.

Data Source: PennDOT via PASDA at

<https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=41>

Year(s): 2021

Proposed Update Schedule: As needed (name changes and boundary line tweaks may occur in the future)

Additional Details: PennDOT's Type 10 general highway maps show all roads open to the public and designates the roads as expressways, toll roads, multi-lane highways, traffic routes, state-maintained roads and bridges and local roads. Municipal boundary lines including state, county, township, city, borough, and town are displayed. Visit <https://www.penndot.gov/ProjectAndPrograms/Planning/Maps/Pages/County-Type-10.aspx> for more information on PennDOT's Type 10 maps.

Data Indicator: PA Census Tracts 2020

Summary/Description: These indicators provide the boundaries of all 3,446 census tracts for the 2020 Census in PA. Census tracts are small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants prior to each decennial census as part of the Census Bureau's Participant Statistical Areas Program. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of statistical data. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people.

Data Source: US Census Bureau via PASDA at

<https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=3118>

Year(s): 2020

Proposed Update Schedule: N/A

Additional Details: PASDA's census tract boundaries originate from selected geographic and cartographic information from the U.S. Census Bureau's Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) Database (MTDB). For more information about census tracts and other statistical subdivisions, visit <https://www.census.gov/programs-surveys/geography/about/glossary.html>.

Data Indicator: PA Census Tracts 2010

Summary/Description: These indicators provide the boundaries of all 3,218 census tracts for the 2010 Census in PA. Census tracts are small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants prior to each decennial census as part of the Census Bureau's Participant Statistical Areas Program. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of statistical data. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people.

Data Source: US Census Bureau via PASDA at

<https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=3110>

Year(s): 2010

Proposed Update Schedule: N/A

Additional Details: PASDA's census tract boundaries originate from selected geographic and cartographic information from the U.S. Census Bureau's Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) Database (MTDB). The ACS and EJSCREEN indicators above rely on the 2010 Census census tracts. For more information about census tracts and other statistical subdivisions, visit <https://www.census.gov/programs-surveys/geography/about/glossary.html>.

Data Indicator: PA Counties

Summary/Description: This indicator provides the boundaries of the 67 counties in PA.

Data Source: PennDOT via PASDA at <https://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=24>

Year(s): 2021

Proposed Update Schedule: As needed (name changes and boundary line tweaks may occur in future)

Additional Details: Visit <https://www.penndot.gov/ProjectAndPrograms/Planning/Maps/Pages/County-Type-10.aspx> for more information on PennDOT's Type 10 maps.

Additional Technical Guidance

Data Suppression: For indicators where case counts are smaller than 5, the data has been suppressed. DEHE has followed the lead of PA DOH's Enterprise Data Dissemination Informatics Exchange (EDDIE) and imposed stricter data suppression rules than some of the source data, i.e., U.S. Census Bureau.

Projection: The map was created using the Projected Coordinate System, World Geodetic System 1984 Web Mercator Auxiliary Sphere. All layers not in this coordinate system were reprojected to ensure capability.

Citations

- EPA. (2020, October 9). *What is Superfund*. <https://www.epa.gov/superfund/what-superfund>
- EPA. (2021, June 8). *Superfund liability*. <https://www.epa.gov/enforcement/superfund-liability>
- Gross, E. L. (2013). *Distribution of indoor radon concentrations in Pennsylvania, 1990-2007* (Report No. 2013-5143 in Scientific Investigations). U.S. Geological Survey. <http://pubs.usgs.gov/sir/2013/5143/>
- Hamilton, B. E., Martin, J. A., Osterman, J. K. (2021). *Births: Provision data for 2020* (Report Number 012). National Vital Statistics System. <https://www.cdc.gov/nchs/data/vsrr/vsrr012-508.pdf>
- Nelson, R. K., Winling, L., Marciano, R., Connolly, N., et al. (2021). "Mapping inequality." American panorama, ed. Robert K. Nelson, Edward L. Ayers, <https://dsl.richmond.edu/panorama/redlining> [accessed 1 September 2021].
- Wood, C. R. (1996). *Water quality of large discharges from mines in the Anthracite region of Eastern Pennsylvania* (Report Number 95-4243 in Water-Resources Investigations). U.S. Geological Survey. <https://pubs.usgs.gov/wri/1995/4243/report.pdf>

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