Secondary Data Sources: Available climate-health data in the Mountain West

Attachment B

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Prepared by:

Naomi Perlman

Nicholas Stoll, MPH

Katherine A. James, PhD, MSPH, MSCE

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Executive Summary

Purpose

The Mountain West Hub seeks to understand how rural and urban communities in the Mountain West are experiencing climate stressors (drought, air quality, heat, and wildfires), and what current and future actions they envision to build climate resilience and advance health equity. The Mountain West Hub currently is focused on two communities, the rural San Luis Valley (SLV) of Colorado and urban West Denver. To help guide our efforts and promote community-driven action, we aggregated a list of climate-health data sources that can be used to inform decision making throughout the Mountain West.

Methods

A top-down approach was used to identify publicly available data related to climate and human health. Starting at the national level, our implementation team reviewed federal agency websites for data dashboards, reports, and other data-driven information sources with state, regional, and local level data. Each source was thoroughly vetted to ensure that data was free to view and download. Please note that some sources require free registration or a data use agreement before downloading data. The same method was applied to identify sources specific to the state, region, and local levels. However, many state-level data sources were derived from previously listed national data. To avoid redundancy, these sources were not listed again.

Sources were then characterized as either containing health-only data, environment-/climate-only data, or both climate and health data. Agencies included, but were not limited to, the Center for Disease Control and Prevention (CDC), Environmental Protection Agency (EPA), Department of Health and Human Services, Bureau of Labor Statistics, National Institute of Health, National Oceanic and Atmospheric Administration (NOAA), and more.

Results Summary

A total of 89 sources were identified in our search. Most of these sources were identified at the national level (n = 50), while an additional 27 were identified specific to a state or Tribal Nation, and 12 localized to the West Denver or San Luis Valley communities. While only 18 sources included data on human health *and* environment or climate data, data specific to human health or to the environment/climate can still be used to investigate environmental-climate health.

Next Steps

Members of the Mountain-West Hub's Implementation Team have also aggregated notes and best practices for accessing secondary data sources. Our hope is that this may facilitate increased interest in using data sources for health promotion and climate resilience. Brief commentary has also been provided on the modes for which these resources have been generated, and opportunity potential for expanding climate-health data.

Secondary Data Sources

Summary Results

Our team found a notable selection of secondary data sources related to human health and the environment. Sources were mainly repositories or catalogs of information collected by the federal government. Data sources include information collected via surveys, medical examinations, laboratory testing, medical records, and environmental site monitoring. Many environmental and climate related data sources also include spatial data or modelled projections scenarios.

	Climate & Human Health Sources	Human Health Sources	Environmental/ Climate Sources
National	6	21	23
Colorado	7	0	1
Idaho	1	0	0
Montana	0	2	1
Utah	1	2	4
Wyoming	0	0	0
Tribal Nations	0	1	3
West Denver	3	0	0
San Luis Valley	0	6	3

Climate and Human Health Datasets

Sources in this section contain data on health outcomes and environmental exposures. Each annotation highlights key data topics available from each source, however, these topics are not exhaustive and may be updated over time.

National

National Environmental Public Health Tracking Network.

The National Environmental Public Health Tracking Network offers extensive data on various environmental health indicators across the United States. It provides datasets related to environmental exposures, behavioral risk factors, social determinants of health, and health outcomes. The platform integrates data from national, state, and local levels, allowing users to explore data at different granularity. Individuals can use the interactive map to visualize data, view charts and tables of selected data, or download information to analyze using the software of their choice

Available at https://ephtracking.cdc.gov/

Heat and Health Tracker.

The CDC's Heat & Health Tracker provides a snapshot of current heat burden by displaying average maximum daily temperatures by county and rate of emergency department visits associated with heat-related illness per 100,000 ED visits by region. Individuals can also explore historical, current, and projected heat trends across the country, or use the heat and health index tool to identify zip codes that are at higher risk of heat-related health outcomes.

Available at https://ephtracking.cdc.gov/Applications/heatTracker/

EJScreen.

EJScreen is a mapping and screening tool that includes 13 environmental indicators, 7 socioeconomic indicators, and supplemental indices that combine factors to estimate risk on a community level. Data is available for the entire United States, or users can look at smaller geographic units. EJScreen can generate reports for user-defined areas and can be customized to include whichever indicators and indices are needed.

Available at https://www.epa.gov/ejscreen

American Public Health Association Reports and Issue Briefs.

The American Public Health Association provides a collection of recent briefs and reports by category in one place. Topics include climate change, community drivers of health, environmental health, health equity, and school, health, and education. The reports summarize recent research, implementation, and future directions within each discipline.

Available at https://www.apha.org/publications/reports-and-issue-briefs

Wide-ranging Online Data for Epidemiologic Research (WONDER)

WONDER aggregates a vast swath of data from national agencies in one place. Topics include health outcomes, environmental factors, health system financing, surveillance data, and behavioral risk factors. For data housed within the WONDER platform, users can create custom queries, view statistics, and download data in multiple formats. Some datasets require redirection to alternative sites in order to be accessed.

Available at https://wonder.cdc.gov/

CDC Data Catalog

The CDC data catalog is a repository that houses datasets on chronic and communicable diseases, injury and violence, immunization rates, and some environmental indicators. The interface does not support direct data queries in the way that other CDC platforms

like WONDER do, but large datasets can be downloaded for more in-depth analysis purposes.

Available at https://data.cdc.gov/browse

Colorado

Colorado EnviroScreen.

Colorado EnviroScreen is an interactive environmental justice mapping tool. The tool enables users to identify disproportionately impacted communities based on the definition in Colorado's Environmental Justice Act (HB21-1266) so that communities can directly benefit from resource allocation, increased participation in legislative and permitting decisions, and priority setting for enforcement and compliance initiatives. This tool includes data on environmental exposures and effects, population climate vulnerability, sensitive populations, and population demographics.

Available at https://cdphe.colorado.gov/enviroscreen

CDPHE Open Data.

The CDPHE Open Data site contains geospatial data on health risk factors, demographics, disease burden, environmental factors, geographic boundaries and more. Individuals can search for desired data or browse by tags. Each dataset contains metadata that users can view before opening feature layers in a GIS environment. Feature layers can be downloaded to manipulate in GIS software, or they can be viewed directly in ArcGIS online.

Available at https://data-cdphe.opendata.arcgis.com/

Colorado Environmental Public Health Tracking.

This web-based surveillance system provides access to several datasets on health outcomes, environmental factors, and community-level data. Data can be viewed spatially and temporally directly on the site with the map and line chart widgets, or in a data table that includes confidence intervals for each metric. CDPHE also notes that users can request personalized datasets.

Available at https://coepht.colorado.gov/

Colorado Health Access Survey.

The Colorado Health Access Survey (CHAS) aggregates data from nearly 10,000 households surveyed in the state. The CHAS report includes information on healthcare, housing, and food access, mental health, perceptions of climate change, and COVID. Users can explore data from the report in an interactive data dashboard, in customized regional reports, or download Excel files to analyze themselves.

Available at https://www.coloradohealthinstitute.org/research/colorado-health-access-survey-2023

Health and Climate Index 2022

From the Colorado Health Institute, the 2022 Health and Climate Index analyzes the risks that Colorado counties face in four areas: exposure to climate-related hazards, health outcomes and access to care, social factors linked to climate vulnerability and plans and perceptions related to climate change and health. County-level risk estimates for various health and climate related outcomes can be viewed via an interactive map, and feature layers can be downloaded to use in GIS software.

Available at https://www.coloradohealthinstitute.org/research/colorado-health-access-survey-2023

Colorado Climate Change Vulnerability Study.

Published in 2015 by authors at the University of Colorado Boulder and Colorado State University, the Colorado Climate Change Vulnerability study offers a comprehensive overview of climate-related impacts across multiple sectors. The report delves into ecosystems, agriculture, water resources, energy, transportation, eco-tourism, and public health. For each sector, the authors discuss the effects of climate change, identify vulnerabilities, discuss preparedness strategies, and propose future research needs.

Available at https://wwa.colorado.edu/sites/default/files/2021-08/GordonOjima2015.pdf

Climate & Sustainability Perceptions Baseline Survey.

These baseline reports provide results from a questionnaire given to residents of various neighborhoods in and around Denver (Globeville/Elyria/Swansea, Montbello, Southwest Denver, and Valverde/Barnum). Questions cover demographic characteristics and perceptions of climate change specifically around rising temperatures, drought, and the responsibility of individuals versus the government.

Idaho

Get Healthy Idaho Population Data.

As part of an initiative by the Division of Public Health, Get Healthy Idaho aims to act as a data sharing resource within the department and beyond. The site includes population level datasets on environmental health, infectious diseases, adverse event surveillance, and risk assessments.

Available at https://www.gethealthy.dhw.idaho.gov/population-health-data

Montana

No additional data sources found.

Utah

Environmental Public Health Tracking.

This site aggregates surveillance data pertaining to human health, climate, home-based toxins, and more. Users can find data on topics such as heat stress and Lyme disease, access to green spaces, greenhouse gas emissions, proximity to air pollution producing sites, wildfires, and floods.

Available at https://ibis.utah.gov/epht-view/about/Welcome.html

Wyoming

No additional data sources found.

Tribal Nations

No additional data sources found.

West Denver

LoveMyAir.

The Love My Air program's goal is to provide Denver's diverse communities with visible, accessible, and actionable air quality information. The program has created a citywide AQ monitoring network to provide real-time AQ data utilizing low-cost cutting-edge air pollution sensor technology, redeveloped with solar, battery storage and data connectivity to make it useful for wide-scale deployment and replicable in any municipality.

Available at https://denver.lovemyair.com/dphe/Home/Map

Community Health Assessment for the City and County of Denver.

The Denver Department of Public Health and Environment (DDPHE) conducted a community health assessment to evaluate various determinants of health in Denver. The healthy environments bucket covers access to transportation, food, exposure to environmental exposures, and negative effects of climate change. Other factors assessed include housing availability, behavioral health, stress, and access to healthcare.

Available at https://dashboards.mysidewalk.com/denver-health-assessment/healthy-environments

Denver Neighborhood Equity Index Scores and Historic Redlining Grades.

DDPHE's health equity index considers historical redlining practices along with current predictors of health equity and displays them visually across neighborhoods. Equity indicators include quality and access of healthcare, education level, prevalence of poverty, access to healthy foods and green spaces, morbidity and mortality.

Available at https://www.denvergov.org/files/assets/public/v/1/public-health-and-environment/documents/equityindexandredlining_withexplanations_9.24.20-1.pdf

San Luis Valley

No additional data sources found.

Human Health Datasets

Sources in this section contain data on health outcomes only. Each annotation notes key information about the source including the data collection process, a non-exhaustive list of health-related variables, and the granularity of data collected.

National

Behavioral Risk Factor Surveillance System.

The Behavioral Risk Factor Surveillance System (BRFSS) is the nation's premier system of health-related telephone surveys that collect data about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services. Established in 1984 with 15 states, BRFSS now collects data in all 50 states as well as the District of Columbia and three U.S. territories. BRFSS completes more than 400,000 adult interviews each year, making it the largest continuously conducted health survey system in the world.

Available at https://www.cdc.gov/brfss/index.html

Pregnancy Risk Assessment Monitoring System (PRAMS).

PRAMS is a program developed by the CDC to track maternal behaviors before, during, and after pregnancy. After making an account, users can access PRAMS data on demographics, prenatal care, Medicaid/WIC utilization, breastfeeding, cigarette and alcohol use, physical abuse, health insurance coverage, contraceptive use, and more.

Available at https://www.cdc.gov/prams/index.htm

Youth Risk Behavior Surveillance System (YRBSS).

YRBSS is a CDC program that utilizes surveys to collect data on risky behavior in youths. Factors measured include tobacco, alcohol, and other drug use, physical activity, diet, sexual behaviors, unintentional injury, mental health, and obesity. Users can interact with data directly on the site or datasets can be downloaded for more in-depth analysis.

Available at https://www.cdc.gov/prams/index.htm

Chronic Disease Indicators (CDI).

Proprietary to the CDC, this tool contains data on risk factors and surveillance indicators for chronic diseases. Data is broken down by state or can be viewed on a national level. Indicators include maternal health, mental health, risky behaviors, social determinants of health, and existing chronic disease. Users can interact with information in the form of maps, graphs, comparison reports, or downloadable datasets.

Available at https://www.cdc.gov/cdi/index.html

National Vital Statistics System (NVSS).

The National Vital Statistics System (NVSS) is a CDC repository that contains measures of births, deaths, infant mortality, marriage, divorce, and life expectancy across the United States.

Available at https://www.cdc.gov/nchs/nvss/index.htm

National Health and Nutrition Examination Survey (NHANES).

The National Health and Nutrition Examination Survey (NHANES) is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations. The NHANES interview includes demographic, socioeconomic, dietary, and health-related questions. The examination component consists of medical, dental, and physiological measurements, as well as laboratory tests administered by highly trained medical personnel.

Available at https://www.cdc.gov/nchs/nhanes/index.htm

National Health Interview Survey (NHIS).

The National Health Interview Survey (NHIS) is a principal source of information on the health of the civilian, noninstitutionalized population of the United States. The main objective of the NHIS is to monitor the health of the United States population through the collection and analysis of data on a broad range of health topics. A major strength of this survey lies in the ability to categorize these health characteristics by many demographic and socioeconomic characteristics. Unlike NHANES, this survey does not include a medical examination or laboratory testing.

Available at https://www.cdc.gov/nchs/nhis/index.htm

National Inpatient Sample (NIS).

The National (Nationwide) Inpatient Sample (NIS) is a database that was developed for the Healthcare Cost and Utilization Project (HCUP). The NIS is the largest publicly available all-payer inpatient healthcare database designed to produce regional and national estimates of inpatient utilization, access, cost, quality, and outcomes. This is a

valuable tool to acquire estimates of rare diseases or uncommon treatments due to the large sample size of around 7 million hospital visits.

Available at https://hcup-us.ahrq.gov/nisoverview.jsp

Disability and Health Data System (DHDS).

The Disability and Health Data System (DHDS) is an online source of state-level data on adults with disabilities (cognitive, hearing, mobility, vision, self-care, independent living). Data on more than 30 health topics among adults with or without disabilities can be explored in DHDS, including smoking, obesity, heart disease, and diabetes. There is also data available on health risks and behaviors, prevention and screenings, and barriers and cost of healthcare.

Available at https://www.cdc.gov/ncbddd/disabilityandhealth/dhds/index.html

National Center for Health Statistics (NCHS).

The National Center for Health Statistics (NCHS) collects data from birth and death records, medical records, interview surveys, and through direct physical examinations and laboratory testing. Their data repository contains information on over 120 health topics that can be stratified by sex, age, and race/ethnicity. The NCHS has also developed a data linkage program that enables records from various CDC population level surveys to relate to administrative data from the National Death Index, Centers for Medicare and Medicaid, U.S. Renal Data System, Social Security Administration, Department of Housing and Urban Development, and Department of Veterans Affairs.

Available at https://www.cdc.gov/nchs/index.htm

National Notifiable Disease Surveillance System (NNDSS).

The National Notifiable Disease Surveillance System (NNDSS) is a nationwide collaboration that enables all levels of public health departments (local, state, territorial, federal, and international) to share health information to monitor, control, and prevent the occurrence and spread of state-reportable and nationally notifiable infectious and some noninfectious diseases and conditions. NNDSS is a multifaceted program that includes the surveillance system for collection, analysis, and sharing of health data, resources, and information about policies and standards at the local, state, and national levels. NNDSS provides weekly provisional and annual finalized information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE). Data include cases of nationally notifiable conditions, which are reported using uniform surveillance case definitions.

Available at https://www.cdc.gov/nndss/index.html

Minority Health Social Vulnerability Index (SVI).

The Social Vulnerability Index (SVI) combines various determinants of health to identify areas that need more support before, during and after emergencies. The SVI takes into account socioeconomic status, household characteristics, racial and ethnic makeup, housing type and transportation, healthcare quality and access, and medical vulnerability. The full dataset including county-level measures can be downloaded from this site.

Available at https://minorityhealth.hhs.gov/minority-health-svi

Ambulatory Health Care Data.

The National Hospital Ambulatory Medical Care Survey (NHAMCS) is designed to collect data on the utilization and provision of ambulatory care services in hospital emergency and outpatient departments and ambulatory surgery locations. Data include counts and rates of emergency department visits from 2016-2022 for ten leading primary diagnoses and can be stratified by patient demographics or hospital characteristics.

Available at https://www.cdc.gov/nchs/ahcd/index.htm

National Program of Cancer Registries (NPCR).

The National Program of Cancer Registries (NPCR) was established in 1992 to monitor cancer trends over time, identify high risk groups, inform planning of cancer control programs, and assist in health resource allocation. The NPCR collects data on cancer incidence (including type, extent, and location of the cancer), the type of initial treatment, and outcomes. This information is then linked with mortality data from the National Center for Health Statistics. The NPCR site includes an interactive data visualizer, or users can download datasets to analyze independently.

Available at https://www.cdc.gov/cancer/npcr/index.htm

Injuries, Illnesses, and Fatalities (IIF) Program.

The Injuries, Illnesses, and Fatalities (IIF) program aggregates data from the Survey of Occupational Injuries and Illnesses and the Census of Fatal Occupational Injuries. Data includes information on fatal and non-fatal injuries and illnesses, and can be used to calculate incidence rates specific to industry, race/ethnicity, age group, nature of condition, or source of injury.

Available at https://www.bls.gov/iif/home.htm

Asthma Surveillance Data.

Asthma surveillance data includes collection of asthma data at both the national and the state level. National data is available on asthma prevalence, activity limitation, days of work or school lost, rescue and control medication use, asthma self-management education, physician visits, emergency department visits, hospitalizations due to asthma,

and deaths due to asthma. Asthma surveillance data at the state level include adult and child asthma prevalence from the Behavioral Risk Factor Surveillance System (BRFSS) and in-depth state and local asthma data through implementation of the BRFSS Asthma Call-back Survey (ACBS).

Available at https://www.cdc.gov/asthma/asthmadata.htm

BEAM Dashboard.

The BEAM (Bacteria, Enterics, Ameba, and Mycotics) dashboard combines data from various other CDC surveillance programs to track illnesses caused by bacteria, parasites, fungi, and viruses. Outbreak data includes information on pathogen, genotype, route of exposure, number of illnesses, number of deaths, and more. The BEAM dashboard allows individuals to explore pathogen-specific data spatially, temporally, by specimen source or by isolate.

Available at https://www.cdc.gov/ncezid/dfwed/beam-dashboard.html

National Survey on Drug Use and Health (NSDUH).

The National Mental Health Services Survey (N-MHSS) is disseminated annually amongst all public and private mental health facilities in the United States. The survey collects data on interventions, populations served by the facility, awareness and commitment to diversity, equity, and inclusion policies, licensing and accreditation, and payment/insurance types accepted.

Available at https://www.datafiles.samhsa.gov/dataset/national-survey-drug-use-and-health-2019-nsduh-2019-ds0001

Rapid Acceleration of Diagnostics (RADx) Data Hub.

The RADx Data Hub allows researchers to access de-identified COVID-19 data to support efforts in revealing risk factors and vulnerable populations. The hub aggregates results from 125 studies and includes clinical, behavioral, diagnostic, survey/interview, sequencing, and imaging data. Users can download data or analyze it within the RADx hub.

Available at https://radx-hub.nih.gov/home

Data.gov.

A searchable collection of datasets available courtesy of the U.S. General Services Administration. Datasets can be sourced from national, state, or local level governments, and can be downloaded in a variety of file types. Information ranges from crime statistics to prices of fruits and vegetables to winning lottery numbers.

Available at https://data.gov/

Data Query System (DQS).

As a unit within the CDC, the National Center for Health Statistics has access to vast amounts of data at the national level. The Data Query System (DQS) allows users to access health data covering over 120 topics, choose specific demographic traits and time frames, view the data presented in charts, tables, or maps, and also download data either as a graphic or in a spreadsheet format.

Available at https://www.cdc.gov/nchs/dataquery/healthtopics.htm

Colorado

No additional data sources found.

Idaho

No additional data sources found.

Montana

Community Health Needs Assessment Data Hub.

The Community Health Needs Assessment (CHNA) Data Hub aggregates data from multiple projects within Montana State University. Users can access health reports, county-level datasets, and resources specific to rural health. County-level data includes measures of chronic disease, infectious disease, screening, sociodemographics, mortality, risky behaviors in youth, and health disparities. Rural-health specific resources include maps of social determinants of health including critical access hospitals, population density, access to internet, and percent of Montanans over 65 years of age.

Available at https://healthinfo.montana.edu/morh/chsd/data-hub/index.html

Health Data and Statistical Reports.

The Montana Department of Public Health and Human Services shares data and statistical reports on birth/death records, behavioral health surveillance, chronic and communicable diseases, and community health.

Available at https://dphhs.mt.gov/StatisticalInformation/

Utah

Health Data Dashboard.

The Health Data Dashboard provides health-related data on opioids, tobacco, and wastewater surveillance. Users can view time and geographic trends in data visuals and overall descriptive statistics depending on the topic.

Available at https://dhhs.utah.gov/health-dashboards/

Health Topics.

The Health Topics subsection of the Health and Human Services site provides data on topics such as asthma, birth defects, cancer, COPD, foodborne illnesses, heart attack, and reproductive health. Background info is given for each health condition along with the data which can typically be viewed on a state-wide scale or by local health district.

Available at https://ibis.utah.gov/epht-view/topic/CChangeHealth.html

Wyoming

No additional data sources found.

Tribal Nations

American Indian and Alaska Native Population Health Data.

Population-level statistics on health outcomes such as chronic diseases, immunization rates, mental health, and certain communicable diseases are available for the American Indian and Alaska Native (AI/AN) populations courtesy of the Office of Minority Health.

Available at https://minorityhealth.hhs.gov/american-indianalaska-native-health

West Denver

No additional data sources found.

San Luis Valley

Community Health Needs Assessment.

The SLV community health needs assessment identifies current health issues within the community to prioritize needs and develop goals. Factors considered for the assessment include access to quality healthcare, impact of COVID-19, access to food and housing, mental health, mortality, and overdose rates. A survey was also disseminated to the community to identify perceived pressing health issues, services that would be most beneficial, and barriers to accessing healthcare.

Available at https://www.sanluisvalleyhealth.org/about-us/in-the-community/community-health-needs-assessment/

SLV Community Food & Agriculture Assessment.

Jointly funded by CDPHE and the Colorado Health Foundation, the SLV Community Food & Agriculture Assessment aims to build capacity within the valley in terms of access to affordable and healthy foods. The report identifies key programs and resources in the valley, environmental factors affecting agriculture in the region, results from a community-wide survey, barriers to agricultural production, and emergency food planning.

Available at https://slvlocalfoods.org/cfaa/

Comprehensive Economic Development Strategy.

Designated an Economic Development District by the U.S. Department of Commerce, Economic Development Administration (EDA), the SLV is annually evaluated on several

outcomes relating to their local economy. The report's purpose is to build economic resilience within the SLV by creating jobs, protecting resources, developing and improving infrastructure, and enhancing quality of life.

Available at https://www.slvdrg.org/comprehensive-economic-development-strategy/

San Luis Valley Community Needs Assessment.

The Community Needs Assessment presents findings from a survey distributed among residents in the SLV, highlighting primary needs within the community. Identified areas of concern include transportation, affordable housing, emergency services, healthcare, and nutrition. The report underscores unique characteristics of the SLV that impact residents' daily life and responsibilities such as geographic isolation and high cost of living combined with elevated levels of poverty.

Available at https://www.slvdrg.org/research-data/

San Luis Valley Statistical Profile.

The San Luis Valley Development Resources Group acts as a hub for data and research carried out in the SLV. Needs assessments, statistical reports, economic impact analyses and more can be found on the site. The group also notes that individuals, governments, and organizations can reach out to them if needed for more information.

Available at https://www.slvdrg.org/research-data/

Indoor Air Quality Report.

This report evaluates various interventions as part of an EPA grant on increasing capacity in the San Luis Valley regarding indoor air quality education and asthma management. The project focused primarily on air quality within homes, schools, and childcare centers. The report provides specifics on activities, reach, and impact for each piece of the Indoor Air Quality Project, as well as some commentary from community members on the efficacy of the interventions.

Environmental/Climate Datasets

Sources in this section contain data on environmental and climate indicators only. Each annotation details the types of information included in the source, ways to view or interact with data, and embedded tools to create reports if available.

National

Climate Mapping for Resilience and Adaptation Assessment Tool.

CMRA's Assessment Tool aims to give a picture of past, present, and future exposure to a variety of climate-related indicators. The site includes datasets in categories such as extreme temperature, coastal inundation, drought, flooding, and climate projections. Many datasets can be explored in the form of interactive maps or can be downloaded for customized spatial analyses.

Available at https://resilience.climate.gov/pages/open-data

Clean Air Markets Program Data.

The Clean Air Markets Program Data (CAMPD) web application is the data publication warehouse for allowance, compliance, emissions and facility/unit attributes data collected under EPA's federal emissions trading programs: Cross-State Air Pollution Rule (CSAPR), CSAPR Update, Revised CSAPR Update, Acid Rain Program (ARP), and other retired programs. The CAMPD site includes a data visualizer to interact with information or users can submit data queries to download the datasets of their choice.

Available at https://campd.epa.gov/

Emissions & Generation Resource Integrated Database (eGRID).

The Emissions & Generation Resource Integrated Database (eGRID) is a comprehensive source of data from EPA's Clean Air Power Sector Programs on the environmental characteristics of almost all electric power generated in the United States. The data includes emissions, emission rates, generation, heat input, resource mix, and many other attributes. eGRID is typically used for greenhouse gas registries and inventories, carbon footprints, consumer information disclosure, emission inventories and standards, power market changes, and avoided emission estimates.

Available at https://www.epa.gov/egrid

Greenhouse Gas Reporting Program (GHGRP).

The Greenhouse Gas Reporting Program (GHGRP) requires reporting of greenhouse gas (GHG) data and other relevant information from large GHG emission sources, fuel and industrial gas suppliers, and CO_2 injection sites in the United States. Approximately 8,000 facilities are required to report their emissions annually, and the reported data are made available to the public in October of each year.

Available at https://www.epa.gov/ghgreporting

Climate Data Online (CDO).

Climate Data Online (CDO) provides free access to an archive of global historical weather and climate data in addition to station history information. These data include quality controlled daily, monthly, seasonal, and yearly measurements of temperature, precipitation, wind, and degree days as well as radar data and 30-year climate normals.

Available at https://www.ncei.noaa.gov/cdo-web/

EnviroAtlas.

EnviroAtlas is part of an ongoing commitment to sustainable and healthy communities and safe and sustainable water resources. EnviroAtlas was developed collaboratively by EPA in partnership with the U.S. Geological Survey (USGS), the U.S. Department of Agriculture (USDA), and other federal and non-profit organizations, universities, and communities including state, county, and city-level stakeholders. EnviroAtlas provides data at the U.S. national extent and at higher resolution for selected populated places.

Available at https://www.epa.gov/enviroatlas

National Climate Assessment Interactive Atlas.

The National Climate Assessment (NCA) Interactive Atlas provides digital access to climate projections maps used in the Fifth U.S. National Climate Assessment (NCA5). With the NCA Interactive Atlas, users can access and explore climate data for locations across the U.S., even if those data were not explicitly presented in the NCA5. The Atlas also includes features to help users interpret and compare maps by integrating plain-language summaries of what maps are showing and a comparison feature to visualize projected conditions at various levels of global warming.

Available at https://atlas.globalchange.gov/

National Water and Climate Center.

The National Water and Climate Center (NWCC) supports the collection and organization of data pertaining to snowpack, water supply forecasting, and soil. NWCC incorporates data on precipitation, streamflow, and reservoir data from other federal agencies to their repository as well. All data collection is quality controlled to ensure the most accurate estimates.

Available at https://www.nrcs.usda.gov/programs-initiatives/sswsf-snow-survey-and-water-supply-forecasting-program/national-water-and

SDS: Available Climate-Health Data in the Mountain West

WestMap.

WestMap utilizes innovative spatial analytic tools to generate highly localized estimates of monthly, yearly, and event-based climatic indicators including precipitation, temperature, and dew point. The site uses point data, digital elevation models, and other spatial data to create the most accurate maps, even for unique situations such as high mountain environments or regions prone to temperature inversions. This spatial data is useful for professions in climatology, hydrology, natural resources, global climate change, land use, planning, relocation, education, and geography.

Available at https://cefa.dri.edu/Westmap/Westmap_home.php

RE Data Explorer.

The RE Data Explorer is a user-friendly geospatial analysis tool for analyzing renewable energy potential and informing decisions. Developed by the National Renewable Energy Laboratory (NREL) and supported by the U.S. Agency for International Development (USAID), RE Data Explorer performs visualization and analysis of renewable energy potential that can be customized for different scenarios. RE Data Explorer can support prospecting, integrated planning, policymaking, and other decision-making activities to accelerate renewable energy deployment.

Available at https://data.re-explorer.org/subscribe

SLOPE (State and Local Planning for Energy) Platform.

The State and Local Planning for Energy (SLOPE) Platform is an online platform that integrates and delivers jurisdiction-level potential and projection data. Spatial data include emissions, energy consumption, transportation, energy efficiency, wind, geothermal, hydropower, cost of energy, and more. Each data set includes a description detailing the assumptions, methodology, tools and models used to generate the data.

Available at https://maps.nrel.gov/slope/

NSRDB (National Solar Radiation Database).

The National Solar Radiation Database (NSRDB) is a collection of hourly and half-hourly values of meteorological data and the three most common measurements of solar radiation: global horizontal, direct normal and diffuse horizontal irradiance. This data can be used to make historical estimates or future predictions on the amount of solar energy available at a given time and location in the U.S.

Available at https://nsrdb.nrel.gov/

Pumped Storage Hydropower.

The interactive map allows users to explore potential sites for pumped storage hydropower by analyzing various factors such as topography, hydrology, and existing infrastructure. It provides data and maps that can assist in identifying suitable locations for pumped storage projects.

Available at https://maps.nrel.gov/psh

Wind Resource Database (WRDB).

The Wind Resource Database (WRDB) provides data on modeled wind resource estimates and other meteorological factors that can be used for wind energy research. Wind resource estimates are available in five-minute increments or as averages over certain time periods. These estimates can be used to make power forecasts for selected sites and have high value in academia, industry, and national laboratories.

Available at https://wrdb.nrel.gov/

Simple Model of the Atmospheric Radiative Transfer of Sunshine (SMARTS).

The National Renewable Energy Laboratory developed the Simple Model of the Atmospheric Radiative Transfer of Sunshine (SMART) to calculate how atmospheric changes affect the distribution of solar power or photon energy. Atmospheric conditions can be chosen from 10 standard options within the SMART tool, or users can input their own data. This tool can be used to test the performance of spectroradiometers, develop reference spectra, establish uniform testing conditions for materials research, optimize daylighting techniques, and verify broadband radiation models. Users must register for free before downloading the software.

Available at https://www.nrel.gov/grid/solar-resource/smarts.html

WINDExchange.

WINDExchange contains a plethora of information pertaining to the benefits and impacts of wind energy across the U.S. The site includes maps of each state with wind power capacity at various heights, locations of land-based and offshore wind turbines which include corresponding project information and turbine technical specifications, and locations of wind energy education and training programs.

Available at https://windexchange.energy.gov/

National Water Dashboard.

The National Water Dashboard contains real-time data from over 13,000 hydrological stations across the U.S. Information for each sampling station can be viewed in context with current weather conditions by toggling layers of the map on or off. Data are updated

every minute and can be downloaded from the National Water Information System if needed for further analysis.

Available at https://dashboard.waterdata.usgs.gov/app/nwd/en/?aoi=default

AirData.

The AirData website provides access to current and historical air quality data collected at outdoor monitoring stations across the U.S. AirData allows individuals to view and download hourly, daily, and annual data on overall AQI data and particle pollution. The site enables users to create reports, visualize data, explore interactive maps, or download information to analyze independently.

Available at https://www.epa.gov/outdoor-air-quality-data

Air Emissions Inventories.

The National Emissions Inventory (NEI) is a comprehensive and detailed estimate of criteria pollutants and hazardous pollutants from air emissions sources. The NEI is released every three years based primarily upon data provided by state, local, and tribal air agencies for sources in their jurisdictions. The NEI dataset can be filtered by location, pollutant, source type, or can be searched for specific point source emitters.

Available at https://www.epa.gov/air-emissions-inventories

EnviroFacts.

Envirofacts consolidates data from multiple EPA databases, allowing users to access information on air quality, water quality, toxic releases, hazardous waste, and other environmental concerns across the U.S. Users can search by location, facility, and other criteria to find detailed records on environmental factors impacting specified areas.

Available at https://enviro.epa.gov/

Watershed Assessment, Tracking & Environmental Results System (WATERS).

WATERS integrates information from various EPA water programs, allowing individuals to access comprehensive information about the quality of surface water in a specified location. Data includes designated uses of a waterbody, water quality metrics, causes and sources of impaired waters, public beach closures, and location of dischargers. WATERS has embedded numerous tools on the site that allow users to perform analyses such as modeling climate scenarios, effects of interventions, and pollution control measures, to name a few.

Available at https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system

Distributed Active Archive Center.

The Oak Ridge National Laboratory (ORNL) partners with many data centers and organizations around the country to aggregate publicly available earth science data. Categories include arctic ecosystems, biomass, carbon cycle, climate, fire, hydrology, land use, soils, and vegetation/forests. Within each category there are hundreds of datasets available for download, and the site includes additional tools for data visualization.

Available at https://daac.ornl.gov/get_data/#themes

Earth Data.

The Earth Data website from NASA provides a comprehensive platform for accessing a wide range of environmental and Earth science data. Users can explore data related to various aspects of the Earth, including the atmosphere, land, water, cryosphere, and anthropogenic effects. The website allows users to select specific demographic characteristics and time periods to analyze the data visually through charts, tables, and maps. Additionally, users have the option to download the data in different formats for further analysis depending on their needs.

Available at https://www.earthdata.nasa.gov/?_fsi=BqJ6IiI5

Colorado

Colorado Environmental Cleanup Sites.

This site includes an interactive map displaying all environmental cleanup sites within the state of Colorado. Users can filter by site type, add/remove layers to the map, and access additional information on some sites via integrated links. The map includes details on geographic location of cleanup sites, activity status, type of pollutants, and party in charge of the site.

Available at https://cdphe.maps.arcgis.com/apps/webappviewer/index.html?id=dbca3a2942764fd8bdb947826a5a2228

Idaho

No additional data sources found.

Montana

Climate Data Explorer.

The Climate Data Explorer is an interactive map that displays humidity, temperature, precipitation, wind speed, ground cover and more. Data is shown as a heatmap across the state or can be limited to time periods and counties in the form of a line graph.

Available at https://fcfc-mesonet-staging.cfc.umt.edu/climate/

Utah

Environmental Public Health Tracking.

Utah's Department of Health and Human Services provides a wealth of data on environmental topics such as air quality, cadmium, drinking water, hazardous substances, and mercury. Within each topic, they give an overview of why the material is hazardous along with data and reports on the specific hazard.

Available at https://epht.health.utah.gov/epht-view/topic/Environment.html

Climatological Trends in Utah.

This report covers temporal climate trends in Utah such as temperature, snowpack, air quality, carbon dioxide concentrations, and weather events. It briefly covers the associated health impacts due to air quality.

Available at https://d36oiwf74r1rap.cloudfront.net/wp-content/uploads/ClimateDataPts-June2019-Final.pdf

Utah Climate Center.

The Utah Climate Center oversees 16 automated weather stations across the state that collect measurements of air temperature, relative humidity, solar radiation, wind and precipitation. They translate these metrics into publicly available data on topics such as surface weather, pest management, fruit growth, and freeze dates.

Available at https://climate.usu.edu/

State Climate Summary 2022.

The report provides a comprehensive overview of Utah's climate patterns and trends, highlighting significant changes observed since the early 20th century and projections for the future. The summary includes graphs on extremely hot days, precipitation and flooding, snowfall, and drought, along with discussion of how these factors are evolving with climate change.

Available at https://statesummaries.ncics.org/chapter/ut/

Wyoming

No additional data sources found.

Tribal Nations

Tribal Energy Atlas.

The Tribal Energy Atlas is an interactive mapping tool that provides data to conduct energy related analysis on tribal lands. Tribes can use the Atlas to understand their current energy baseline and analyze potential options. Data sets include renewable energy resource potential on tribal lands, existing energy infrastructure, tribal land boundaries, end user energy costs, and land class categories for each tribal area.

Available at https://maps.nrel.gov/tribal-energy-atlas/

Tribal Climate Resilience Annual Awards Dashboard.

The dashboard can be used to view financial awards to tribes for climate resilience. The Bureau of Indian Affairs breaks down the monetary value of the award and the purpose of the award. This map could be used to identify under-resourced areas, or, alternatively areas that have the most vulnerability to climate externalities.

Available at https://experience.arcgis.com/experience/49f7458ad70c4bac949f421ddf5081c3/

Tribal Climate Tool.

This predictive tool allows users to specify the tribal land they are interested in and view a variety of climate-related variables either in map or graph form. The tool is extremely customizable; users can choose high or low emissions predictions, modify the time period they are interested in, and see summaries of the projections in a side bar as either tables, text explanations, or raw data.

Available at https://cig.uw.edu/resources/tribal-vulnerability-assessment-resources/tribal-climate-tool/

West Denver

Denver Annual Climate Summary 2024.

This report summarizes climate driven weather events for the Denver Metro area, that are likely being exacerbated by climate change. It reviews annual temperature, precipitation/snowfall, and extreme weather events.

Available at https://www.weather.gov/media/bou/Annual_Climate_Summary_2024.pdf

San Luis Valley

Modeling of Dust Levels Associated with Potential Utility-Scale Solar Development in the San Luis Valley-Taos Plateau Study Area.

The report examines the impacts of solar energy development in the San Luis Valley – Taos Plateau region, emphasizing concerns about dust generation and air quality. The report investigates key questions regarding dust levels during construction and operations, considering factors like soil erodibility, land cover, and the use of dust suppressants. The analysis aims to inform a solar regional mitigation strategy by identifying mitigation measures to address unavoidable impacts and ensure responsible solar development in the SLV.

Available at https://www.blm.gov/sites/blm.gov/files/uploads/Dust%20Report%20SLV%20July%202016%20508C.pdf

Greenhouse Gas Accounting of Rural Agrarian Regions: The Case of San Luis Valley

Rural regions, with a dominant agricultural economic base, have a vastly different greenhouse gas (GHG) emissions profile than urban regions and hence require a unique accounting method. This paper presents a GHG inventorying methodology tailored specifically for rural agricultural regions. The methodology was applied to San Luis Valley (SLV) in south central Colorado with an intent to establish a clear emissions baseline and to analyze, in fine detail, the regions emission profile. The results show that SLV has an annual per capita emission of 30.5 MT CO_2e while the average for the United States is about 21 MT CO_2e. The higher per capita emissions can be attributed to the production of agricultural goods and services that are primarily exported rather than consumed in the region. Since per capita emissions might not paint an accurate picture for export based economies, we recalibrated the data on per dollar GDP basis. We find that, on this basis, SLV emissions are almost twice that of the national average indicating that, with all things being equal, agricultural activities contribute disproportionately more towards GHG emissions. In addition, through a detailed analysis we show that SLV, with its significant solar resource base, has the potential to offset much or all of their carbon emissions. The findings from this paper offer useful insights for local stakeholders to develop plans and implement policies toward GHG mitigation.

Available at https://pubs.acs.org/doi/10.1021/acssuschemeng.6b01424

San Luis Valley Air Toxics Analysis.

This report evaluates air pollution in the San Luis Valley using the National Air Toxics Assessment model. Data on 187 air toxics was gathered from monitoring stations around the valley from 2000 to 2011. The report presents its findings as well as the implications of air pollution on health in the valley.

Results from CARE Questionnaire.

As a recipient of a CARE grant (Community Action for a Renewable Environment), the San Luis Valley Ecosystem Council developed a risk ranking evaluation worksheet as a starting point to discern which facets of environmental health were a priority in their community. The questionnaire covered agricultural chemicals, indoor and outdoor air quality, water quality, land use, and solid waste. Results from each county as well as from the San Luis Valley as a whole can be explored in this sheet.

Accessing Data Sources

Notes on Using Population-Level Data

Most of the data sources identified in this report include population-level data, as opposed to individual level data. Information at this level of granularity is useful for:

- Pilot studies

- Building an argument for grant proposals

- Policy development

- Resource allocation

- Health equity and advocacy

Population-level data is highly versatile and can serve vast audiences. However, population-level data should not be used to make assumptions about individuals. This error in interpretation is commonly known as the ecologic fallacy. Aggregated data can only describe characteristics or relationships at the population level, and further analysis is needed to understand these relationships on an individual scale.

Best Practices in Secondary Data Analysis

Utilizing secondary data may require a different skill set compared to primary data collection and analysis. As the researcher, you have less power over what data is available to you and how the information was collected, coded, or input into a system before being made available to the public. The tips below are meant to guide you through the process of selecting and beginning to process secondary data to answer your research question.

Identifying the Appropriate Datasets

To identify datasets for your analysis, you first need to think about your research question or goal. It may be better to familiarize yourself with data that is publicly available before you land on a specific research question, as you may find that certain metrics are not always easily accessible. Remember that this is an iterative process; your research goal may change after you learn what data is readily available. Some things to keep in mind when perusing secondary data sources are:

- **Validity of data** – the quality of your data is critical. If you start off with unreliable information, you will end up with unreliable results. Essentially all data sources listed in this report are products of data collected by the government, which is the gold-standard of data quality. If you look outside of this report for a data source, be sure to read and think critically about methodology: consider how information was collected, for what purpose, and potentially compare information to other sources to check consistency.

- **Granularity of data** – at what level of geography are you aiming to do your analysis on? Is your community of interest confined to a few census tracts? One county? A

metropolitan area? Be sure to confirm that data you find will be able to answer your research question at the level of specificity that you need.

- **Temporality of data** – confirm that your data source includes information for the time period that you are interested in, and that data collection was consistent during this period. Some information collected by the federal government over long periods of time may include changes in definitions of variables or changes in measurement tools. Read through data documentation to understand these changes and how they may impact the reported information.

- **Lack of data/missing data** – publicly available data must protect the privacy of individuals who were sampled to collect information. In some cases, this means that data will be suppressed in areas with low population numbers or for rare risk factors or outcomes. This can be a challenge when working with rural communities or investigating uncommon outcomes. You may have to expand your geographic or temporal range in order to have enough data to work with for these circumstances.

- **Consider proxy variables** – particularly when dealing with small populations or variables that have large proportions of missing data, it is possible to explore the use of a proxy variable instead of directly measured values. This means using a variable that tends to have less missing information and that is highly correlated with the variable of interest. For example, if you want to include data on socioeconomic status using income, you may encounter many missing values. A widely accepted proxy for socioeconomic status or income is educational attainment. People are much more likely to share their educational background than how much money they make, so there should be less missingness in the data and you will still be able to estimate socioeconomic status fairly accurately from this information.

Downloading Data

Many of the secondary sources listed in this report include integrated tools for exploring data. Some allow users to create reports, figures or graphs of data, while others contain interactive maps. We highly recommend taking advantage of these tools to achieve your research goals if possible before diving into more complicated analyses. After all, **a simple analysis interpreted correctly is worth vastly more than a complicated analysis interpreted poorly**.

If you do need to download data to analyze independently, the universally preferred file type for non-spatial data is typically a comma separated values file (.csv). This file type can be opened in user-friendly software like Excel, or easily imported to coding programs like SAS or R.

Joining Datasets

Before joining datasets, ensure that they are from the same time-period and that they were collected at the same geographic level. It is also possible to collapse smaller geographic entities into larger units if their spatial boundaries allow it. The figure below outlines which geographic units can easily be combined.

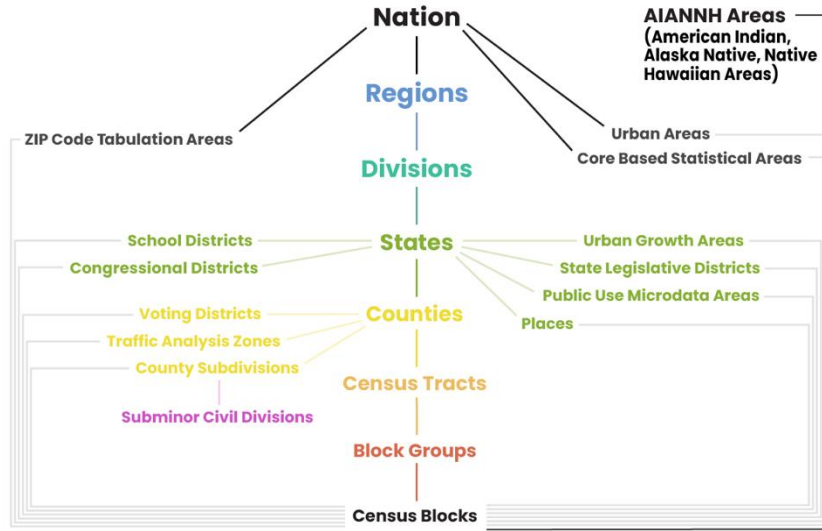## Standard Hierarchy of Census Geographic Entities

Image source: Data Driven Detroit

To join multiple datasets, there must be a shared variable to merge on; this shared variable is sometimes called the "primary key" or "key variable". The primary key may be a measure of time or space, for example a FIPS code to link census-tract level data on demographics with data on point source emitters. It could also be a subject ID if you are only utilizing health data.
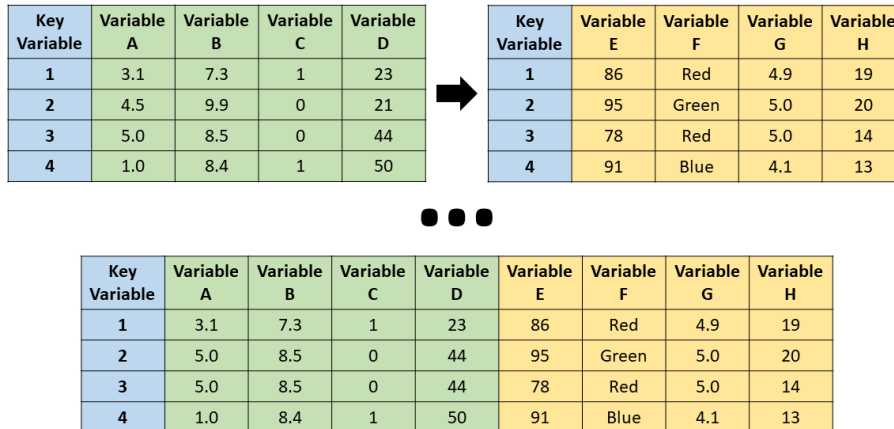
Key Variable	Variable A	Variable B	Variable C	Variable D
1	3.1	7.3	1	23
2	4.5	9.9	0	21
3	5.0	8.5	0	44
4	1.0	8.4	1	50

Key Variable	Variable E	Variable F	Variable G	Variable H
1	86	Red	4.9	19
2	95	Green	5.0	20
3	78	Red	5.0	14
4	91	Blue	4.1	13

Key Variable	Variable A	Variable B	Variable C	Variable D	Variable E	Variable F	Variable G	Variable H
1	3.1	7.3	1	23	86	Red	4.9	19
2	5.0	8.5	0	44	95	Green	5.0	20
3	5.0	8.5	0	44	78	Red	5.0	14
4	1.0	8.4	1	50	91	Blue	4.1	13

Image source: R for HR

Discussion and Takeaways

Our team made some notable observations while accumulating these resources. Our top-down search methods were chosen due to our team's knowledge of state-level data sources. In many instances, county- and state-level decision making relies on data gathered from federal agencies. While it is prudent to efficiently manage government resources, relying on data collected at the national level may include limitations. The necessity of encompassing numerous geographical areas, socio-environmental factors, and other sub-population groups, may limit national data gathering efforts in their ability to focus on subtle regional differences. Analysis run on this data may be limited in generalizability due to such a large national scope.

Additionally, most of the sources listed in this report do not intuitively allow for investigation into environmental-climate health issues. Only eighteen sources directly include data relating the environment to human health. This is relatively small in comparison to the total amount of available data. While these disjointed datasets can be merged – it limits the ability of communities to act and suggests a lack of priority for environmental public health. We encourage policy and decision makers to promote more intentional planning for data collection and database structures.

For More Information

For additional information about the Mountain West Climate-Health Engagement Hub and the National Institutes of Health's Alliance for Community Engagement in Climate and Health Program, please see the following:

https://www.mw-climatehealth.com/

https://www.nih.gov/climateandhealth