



U.S. Geological Survey (USGS) Water-Use Data and Research (WUDR) Program Overview and Status as of October 22, 2020

What is the WUDR Program?

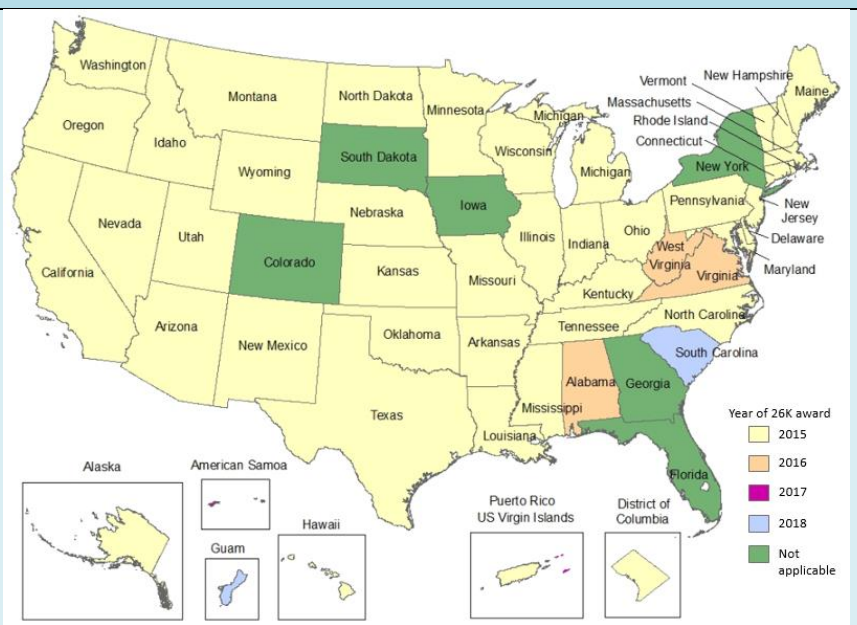
The USGS Water-Use Data and Research Program (WUDR) is an appropriated program that began in Federal fiscal year 2015 and is authorized under the SECURE Water Act (Sec. 9508 (c)). WUDR provides financial assistance through cooperative agreements to State water resource agencies.

- The WUDR Program has two main goals:**
- To improve the availability, quality, compatibility, and delivery of water-use data that are collected and/or estimated by States to support national water-use assessments; and
 - To integrate the water-use data into USGS databases in electronic or machine-readable formats.

- At a glance:**
- Each State can apply for up to \$250,000.
 - States apply for awards through *grants.gov*.
 - Non-competitive awards for \$26,000 are available to write workplans.
 - Competitive awards can be for 1 to 2 years.
 - Final technical report is due 90 days after the project completion date.

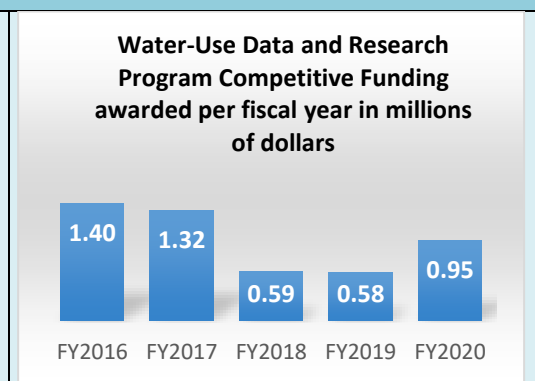
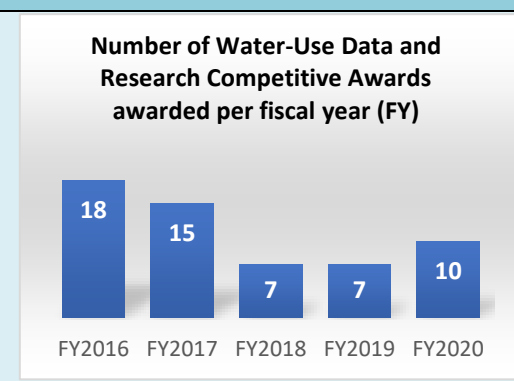
Non-competitive WUDR awards for workplans

During Federal fiscal year 2015 (FY15), the first-year funding was awarded, States were awarded non-competitive awards to develop workplans to better understand the water-use data collection in each State, identify water-use data gaps, and prioritize work to reduce water-use data gaps. Between 2015-2018, forty-nine States and territories have been awarded funding of \$26,000 each. Over 1.2 million dollars has been awarded for workplans. States must have an approved workplan prior to a competitive award application but can opt to write their workplans without non-competitive award funds. In those cases, the workplan funding amount can be used for competitive awards. Completed workplans and the baseline standards table are available on the WUDR home page at <https://water.usgs.gov/wausp/wudr>.



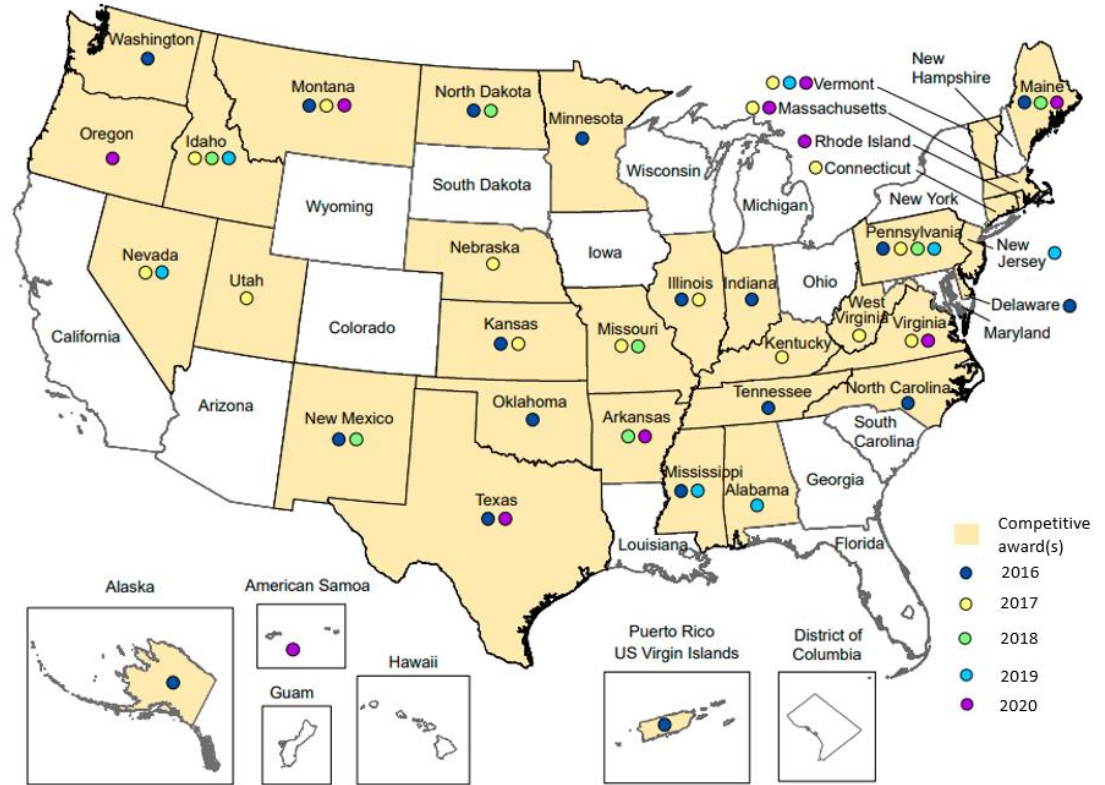
Competitive WUDR projects

The USGS WUDR started providing competitive awards in fiscal year 2016 and has awarded 57 projects between fiscal years 2016 to 2020 for a total of about 4.8 million dollars. While projects can range between one to two years in duration, in more recent years States have largely selected to have two-year projects.



States awarded competitive WUDR projects, 2015-2020

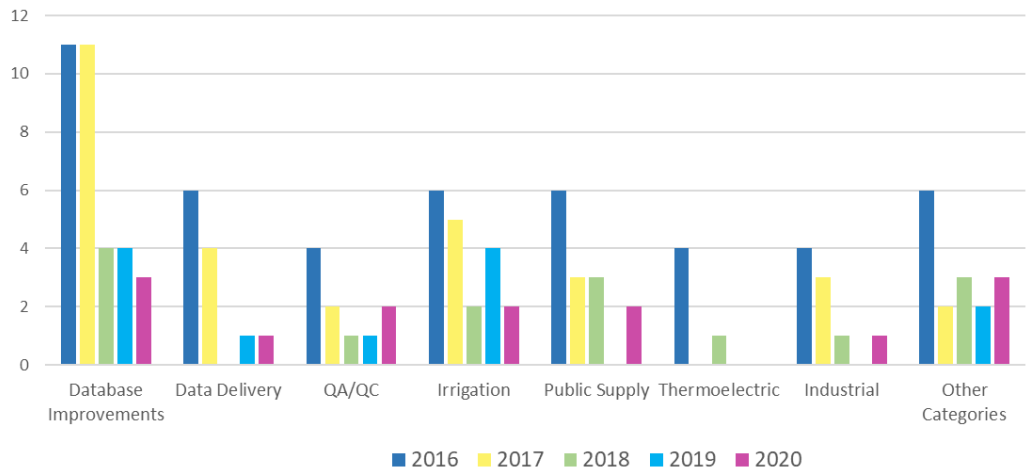
Alabama: 2019
 Alaska: 2016
 American Samoa: 2020
 Arkansas: 2018, 2020
 Connecticut: 2017
 Delaware: 2016
 Idaho: 2017, 2018, 2019
 Illinois: 2016, 2017
 Indiana: 2016
 Kansas: 2016, 2017
 Kentucky: 2017
 Maine: 2016, 2018, 2020
 Massachusetts: 2017, 2020
 Minnesota: 2016
 Mississippi: 2016, 2019
 Missouri: 2017, 2018
 Montana: 2016, 2017, 2020
 Nebraska: 2017
 Nevada: 2017, 2019
 New Mexico: 2016, 2018
 New Jersey: 2019
 North Carolina: 2016
 North Dakota: 2016, 2018
 Oklahoma: 2016
 Oregon: 2020
 Pennsylvania: 2016, 2017, 2018, 2019
 Rhode Island: 2020
 Tennessee: 2016
 Texas: 2016, 2020
 Utah: 2017
 Vermont: 2017, 2019, 2020
 Virginia: 2017, 2020
 Washington: 2016
 West Virginia: 2017



Priority topics for competitive projects include:

- Improve the collection process or quality assurance of water-use data or improve the transfer of water-use data to the USGS.
- Improve water-use data for irrigation, public supply, or industrial water-use categories.
- Conduct studies to develop methods and/or coefficients to improve water-use estimates for categories of use where measured or reported data are not available.

Water-Use Data and Research Program project topics by year



States with WUDR project topics for irrigation, public supply, and thermolectric water-use categories

Irrigation, public supply and thermolectric power account for 90 percent of water withdrawals in the United States.

Public Supply:

Alaska
 American Samoa
 Idaho
 Kentucky
 Maine
 Mississippi
 Montana

New Mexico
 North Dakota
 Rhode Island
 Tennessee
 Texas
 Utah

Thermolectric:

Alaska
 Illinois
 Minnesota
 Missouri
 Tennessee

Irrigation:

Alaska
 Idaho
 Illinois
 Maine
 Massachusetts
 Missouri
 Montana
 Nevada
 New Mexico
 Oregon
 Pennsylvania
 Puerto Rico
 Tennessee
 Virginia

WUDR 2016 awards		
State	Status	Project activities
Alaska Alaska Department of Natural Resources	Final technical report in progress	<ul style="list-style-type: none"> Improving data collection by estimating statewide monthly water use, 2011-15. Implementing and documenting quality assurance procedures. Improving data delivery for easier access by the public and USGS.
Delaware Delaware Department of Natural Resources and Environmental Control	Extended to December 2021	<ul style="list-style-type: none"> Developing a new application to provide a means to collect, store, and deliver water-use data to the USGS. Adding quality assurance checks on water-use data. Providing public water supply customer group data, quantifying consumptive use, and reporting withdrawal data by hydrologic unit code (HUC-8) and county levels.
Illinois Illinois State Water Survey	Completed	<ul style="list-style-type: none"> Reviewing annual records back to 2010 for missing data and contacting operators to improve completeness. Expanding to new categories not currently collected. Providing a more accurate estimate of self-supplied domestic use. Providing a more complete picture of irrigation across the State.
Indiana Indiana Department of Natural Resources	Extended to June 2021	<ul style="list-style-type: none"> Performing a quality assurance review of existing registered well and intake locations and identifying new unregistered significant water withdrawal facilities to ensure that the State is providing the USGS with accurate water-use data.
Kansas Kansas Department of Agriculture, Division of Water Resources	Completed	<ul style="list-style-type: none"> Migrating data to a new database Building a new database Building a user interface for the new database (data entry, queries, enhancements).
Maine Maine Department of Agriculture Conservation & Forestry	Completed	<ul style="list-style-type: none"> Improving data collection and estimation of crop and golf course irrigation and livestock water use. Surveying water users in ten county-level Soil and Water Conservation Districts. Estimating irrigation use per acre for major crop types using a soil water balance and crop demand model.
Minnesota Minnesota Department of Natural Resources	Completed	<ul style="list-style-type: none"> Improving data in the industrial, thermoelectric, and mining categories by checking older permits for categorization and correct information. Expanding permit types to agree with USGS definitions.
Mississippi Mississippi Department of Environmental Quality	Completed	<ul style="list-style-type: none"> Expanding online reporting tool to include other water-use categories. Updating database design with new screens and user interface. Migrating data to new system.
Montana Montana Department of Natural Resources & Conservation	Completed	<ul style="list-style-type: none"> Increasing the knowledge of water use by public water systems throughout the State. Measuring and estimating public supply water use with public water system surveys.
New Mexico New Mexico Office of the State Engineer, Interstate Stream Commission	Completed	<ul style="list-style-type: none"> Creating statewide agricultural crop/water-use spatial polygons to be used in a geographic information system. Creating polygons of golf course areas.
North Carolina North Carolina Department of Environmental Quality, Division of Water Resources	Completed	<ul style="list-style-type: none"> Expanding and improving data collection efforts to align with USGS guidelines. Creating a web service that will establish a single, unified location for users to access the Division of Water Resources' water-use data. Pulling data from multiple databases into one web service.
North Dakota North Dakota State Water Commission	Completed	<ul style="list-style-type: none"> Surveying selected municipalities. Analyzing data to determine water use across the State and how it changes based on municipality size. Determining who is responsible for water-use data, how data are recorded and stored, if data are public, and if conservation measures are used.

WUDR 2016 awards		
State	Status	Project activities
Oklahoma Oklahoma Water Resources Board	Final technical report in review	<ul style="list-style-type: none"> • Modernizing the State water-use information system. • Improving the return rate of Water Use Report forms. • Identifying opportunities for the collection of additional data. • Developing tools to improve efficient, compatible, and timely data delivery.
Pennsylvania Pennsylvania Department of Environmental Protection	Completed	<ul style="list-style-type: none"> • Building online report services for the public to readily retrieve up-to-date water-use datasets.
Puerto Rico Puerto Rico Department of Natural and Environmental Resources	Completed	<ul style="list-style-type: none"> • Developing a web-based application to enable users to submit water-use information electronically which will be entered directly into a water-use database.
Tennessee Department of Environment & Conservation	Completed	<ul style="list-style-type: none"> • Improving water-withdrawal data collection and delivery. • Evaluating and improving data quality assurance/quality control.
Texas Texas Water Development Board	Completed	<ul style="list-style-type: none"> • Developing an online application that displays the service areas for community public water systems and allows water system contacts to update the service area boundaries through a web browser. • Allowing service areas to be downloaded as shapefiles that can be used by other agencies and organizations. • Linking the boundary map to historical water-use data reports.
Washington Department of Ecology State of Washington	Completed	<ul style="list-style-type: none"> • Upgrading the metering database. • Improving the metering program.
WUDR 2017 awards		
State	Status	Project activities
Connecticut Connecticut Department of Energy and Environmental Protection	Completed	<ul style="list-style-type: none"> • Building upon recent efforts to organize, centralize and report past water-use data. • Developing a methodology for future data organization, collection, and reporting.
Idaho Idaho Department of Water Resources	Completed	<ul style="list-style-type: none"> • Identifying points of diversion and place of use records for sites that are missing a geographic component. • Improving metadata standardization, data discoverability, and data delivery. • Investigating potential database improvements.
Illinois Illinois State Water Survey	Completed	<ul style="list-style-type: none"> • Cataloging older records. • Tracking down new high-capacity wells and intakes across the State. • Supporting archival and digitization of records.
Kansas Kansas Department of Agriculture	Final technical report in progress	<ul style="list-style-type: none"> • Building new reports and interfaces with other programs to improve transferability and accessibility to interested parties. • Developing quality control/assurance queries to check for common issues and establishing routine data checks to improve data quality.
Kentucky Kentucky Division of Water	Final technical report in progress	<ul style="list-style-type: none"> • Synthesizing existing well-construction, geological, and hydrogeological data needed to identify and designate aquifers being used by industry and public water suppliers.
Massachusetts Massachusetts Department of Environmental Protection	Final technical report in progress	<ul style="list-style-type: none"> • Converting from paper to electronic collection in several water-use categories. • Developing a better methodology for estimation of self-supplied domestic use and for cranberry bog consumptive use estimation. • Collecting additional data types including source aquifer types and irrigated acreages of farms and golf courses.

WUDR 2017 awards		
State	Status	Project activities
Missouri Missouri Department of Natural Resources, Missouri Geological Survey	Completed	<ul style="list-style-type: none"> • Identifying self-supplied golf courses statewide and contacting these golf courses to determine the amount of water used for irrigation. • Increasing awareness of water-use reporting through education, publications, and presentations. • Identifying HUC-8 for surface-water sources and aquifers for groundwater sources for all major water users. • Determining water type (fresh or saline) for groundwater sources.
Montana Montana Department of Natural Resources & Conservation	Completed	<ul style="list-style-type: none"> • Improving estimates of surface-water withdrawals for irrigated agriculture where measured data are not available.
Nebraska Nebraska Department of Natural Resources	Final technical report in review	<ul style="list-style-type: none"> • Researching existing State data acquisition programs. • Developing a data acquisition process for target uses. • Developing a prototype database.
Nevada Nevada Division of Water Resources	Completed	<ul style="list-style-type: none"> • Improving and expanding collection of water-use data, improving quality assurance, and increasing the transferability of data collected and maintained by Nevada Division of Water Resources (NDWR). • Expanding the current NDWR-maintained water-use database to customers across the State who are not presently included and entering all historical pumpage data not currently included in the database. • Conducting field work to verify site and totalizer meter information for newly added sites and conducting quality assurance checks on all current and newly added data. • Making technical enhancements to a NDWR-maintained water-use database to improve its accuracy, reliability, usability, and ensure long-term data accessibility.
Pennsylvania Pennsylvania Department of Environmental Protection	Completed	<ul style="list-style-type: none"> • Providing quality-assurance enhancements to Pennsylvania's electronic reporting application. • Linking sub-facility and primary facility reports to improve quality assurance of reported water-use data.
Utah Utah Department of Natural Resources, Division of Water Rights	Completed	<ul style="list-style-type: none"> • Improving online water-use reporting tool for industrial/commercial users. • Improving database storage of water-use data for public supply, industrial, and commercial data. • Creating a program to transmit data electronically to the USGS and other entities.
Vermont Vermont Department of Environmental Conservation	Completed	<ul style="list-style-type: none"> • Improving location data for drilled wells. • Assigning hydrologic unit (HUC-12) and aquifer codes. • Moving snowmaking data from PDF-format records to a spreadsheet. • Determining intake locations and assigning HUC-12 to community water systems, non-transient non-community water systems, and transient non-community water systems.
Virginia Virginia Department of Environmental Quality	Completed	<ul style="list-style-type: none"> • Developing a set of data retrieval and export tools to supply updated National Pollutant Discharge Elimination System (NPDES) Discharge Monitoring Report (DMR) data to the VAHydro data system, and to then export withdrawal, discharge, and consumptive use data from VAHydro in a machine-readable format consistent with USGS Site-Specific Water-Use Data System requirements. • Leveraging this DMR data to estimate consumptive use across different user categories, assess trends in consumptive use through time, and develop statistical models for estimating non-reported consumptive use.

WUDR 2017 awards		
State	Status	Project activities
West Virginia West Virginia Department of Environmental Quality	Final technical report in progress	<ul style="list-style-type: none"> • Improving data collection, quality assurance, and delivery of water-use data. • Improving the Water Resources Management Plan Mapping Tool to have the capability of displaying on both desktop and mobile devices, therefore enhancing data accessibility in the field. • Streamlining data accessibility using GIS Web Applications. • Connecting the Water Withdrawal Guidance Tool to the National Water Model. • Creating a West Virginia Spring and Well Reporting Tool to crowdsource voluntary information on privately owned wells and springs.
WUDR 2018 Awards (Project end date September 2020 and Final Technical Report due December 2020 unless noted)		
State	Status	Project activities
Arkansas Arkansas Natural Resources Commission	Final technical report in review	<ul style="list-style-type: none"> • Building the hardware, software, and workflow system to enable migration of the Arkansas Water-Use Database from the USGS Arkansas Water Science Center to the Arkansas Natural Resources Commission and improve the collection process and quality assurance of water data, retrieval, and transfer of data to USGS. • Receiving data electronically directly into the database with data reported on paper being scanned into the system.
Idaho Idaho Department of Water Resources	Completed	<ul style="list-style-type: none"> • Creating a methodology for using Sentinel Imagery Normalized Difference Vegetation Index (NDVI) to determine irrigation status using a three-class classification (irrigated, non-irrigated, semi-irrigated).
Maine Maine Geological Survey	In progress Project end date Mar. 2021 Final technical report due June 2021	<ul style="list-style-type: none"> • Developing an improved, semi-automated process for compiling and quality controlling data that are currently reported by public water utilities to the Maine Public Utilities Commission. • Studying per capita coefficients for domestic water users using detailed customer meter data donated by selected public water utilities and develop improved estimates of populations that are served by public water systems versus those that are self-supplied.
Missouri Missouri Department of Natural Resources	In progress Project end date June 2021 Final technical report due Sept. 2021	<ul style="list-style-type: none"> • Improving water-use data for golf course irrigated acres. • Developing quality checks in the online reporting system to catch any water use reporting that is greater than the pump capacity. • Developing tools associated with the online reporting system to assist major users of irrigation in estimating water use. • Contacting livestock facilities to determine if they are a major water use, what their water source is, and what their annual water use is. • Contacting thermoelectric facilities to verify amount of water consumed versus returned to the water system as well as verifying the quantity used and source of the water. • Developing a long-term vision to manage current water resources and chart the path for development of water resources in the future.
New Mexico New Mexico Office of the State Engineer, Water Use and Conservation Bureau	Final technical report in review	<ul style="list-style-type: none"> • Creating geospatial data for the Public Water Supply use category. • Refining the methodology used in the development of livestock water-use data.
North Dakota North Dakota State Water Commission	Final technical report in progress	<ul style="list-style-type: none"> • Distinguishing water use and similarities and differences in industrial vs. municipal permits (i.e. which industry would be included under municipal and which is not, and why). • Assessing water use pre-oil boom, during boom, and post-oil boom.
Pennsylvania Pennsylvania Department of Environmental Protection	In progress Project end date Dec. 2020 Final technical report due Mar. 2021	<ul style="list-style-type: none"> • Improving the quality of registration by converting existing paper forms to online forms for electronic submission.

WUDR 2019 awards (Project end date September 2021 and final technical report due December 2021 unless noted)		
State	Status	Project activities
Alabama Alabama Department of Economic and Community Affairs	In progress	<ul style="list-style-type: none"> Updating the data management application used to collect, house, and manage information in support of the Alabama Water Use Reporting Program. The project will use a combination of custom code development and the purchase of a commercial off-the-shelf product to allow for online access and data reporting.
Idaho Idaho Department of Water Resources	In progress Project end date Dec. 2020 Final technical report due Mar. 2021	<ul style="list-style-type: none"> Consolidating the display and transferability of water-use measurement data locations by creating a one-stop web mapping application with tools to relate water measurement data to points of diversion. Displaying water-measurement data from three separate systems that record measurement data into one mapping application and georeferencing surface water measurements as events on the National Hydrography Dataset (NHD) using linear referencing and make those events available through the NHD Linked Data Registry. Improving water-use data for irrigation by performing checks on the geographical location.
Mississippi Mississippi Department of Environmental Quality	In progress	<ul style="list-style-type: none"> Installing and maintaining real-time flow meters and telemetry to improve water-use estimates for the Mississippi Delta and better understand water availability.
Nevada Nevada Division of Water Resources	In progress	<ul style="list-style-type: none"> Conducting field efforts to improve the quality of data that are collected from the annual crop and pumpage inventory work. Adding enhancements to the Meters database to make the reports more user-friendly and make queries that will allow the user to obtain water-use data easier. Constructing an interactive web map that will allow users to view groundwater pumpage by basin and county.
New Jersey New Jersey Department of Environmental Protection	In progress	<ul style="list-style-type: none"> Comparing agricultural metered data with traditional estimates. <ul style="list-style-type: none"> Analyzing the data. Producing a report that compares the new metered data to traditional estimates based on pump capacity and pumping hours.
Pennsylvania Pennsylvania Department of Environmental Protection	In progress	<ul style="list-style-type: none"> Establishing a data-sharing protocol to readily share water-use data between the three agencies in Pennsylvania that routinely collect water-use reports from users and the regulated community (Pennsylvania Department of Environmental Protection, Susquehanna River Basin Commission, and Delaware River Basin).
Vermont Vermont Department of Environmental Conservation	In progress	<ul style="list-style-type: none"> Locating a high percentage of the remaining approximately 30,000 wells in 3 counties (Addison, Orleans and Rutland). Compiling reported wastewater data, improving data for aquaculture (fish hatcheries) and irrigation (golf courses), assigning HUC 8 codes for hydroelectric power facilities.

WUDR 2020 Awards (Project end date September 2022 and Final Technical Report due December 2022 unless noted)		
State	Status	Project activities
American Samoa American Samoa Power Authority	In progress	<ul style="list-style-type: none"> Creating a data system to extract public supply production and use data from existing systems to feed data to USGS and to a public interface intended to promote water conservation. Developing an initial database of “village water systems” which supply domestic use in an unknown number of small communities. Installing pressure meters and flow meters at selected sites to improve information about non-revenue water aimed at reducing system losses.
Arkansas Arkansas Department of Agriculture, Natural Resource Division	In progress	<ul style="list-style-type: none"> Selecting, purchasing, and implementing software to allow digital signatures so that legal applications and permits can be completely processed electronically Purchasing and implementing a reporting module to enhance reporting capabilities.

WUDR 2020 Awards (Project end date September 2022 and Final Technical Report due December 2022 unless noted)

State	Status	Project activities
<p>Maine Maine Geological Survey</p>	<p>In progress</p>	<ul style="list-style-type: none"> • Compiling data currently reported by industrial wastewater permittees to the Maine Department of Environmental Protection (DEP), and then surveying these industrial water users to determine their sources of water, consumptive use ratios, and water used for thermoelectric power generation. • Surveying ski areas about water sources and volumes used for snowmaking.
<p>Massachusetts Massachusetts Department of Environmental Protection</p>	<p>In progress Project end date Mar. 2022 Final technical report due June 2022</p>	<ul style="list-style-type: none"> • Matching as many of the unlocated wells to statewide parcel data as possible and tying this information to a Well Completion Report (WCR, depth, lithology, static water levels, yield, etc.). • Creating a map viewer to the Well Driller Database in order to associate well data points with WCRs through point and click technology. • Developing an online application to flag improperly located wells submitted by well drillers to improve the quality of WCR submissions. • Providing training for well drillers on proper WCR data submittal and geologic formation identification for each well drilled.
<p>Montana Montana Department of Natural Resources and Conservation</p>	<p>In progress</p>	<ul style="list-style-type: none"> • Syncing the Water Rights Information System (WRIS), which is managed by the Montana Department of Natural Resources and Conservation to the Groundwater Information Center (GWIC), which is managed by the Montana Bureau of Mines and Geology (MBMG) and contains information on groundwater resources. By syncing the two databases, users will be able to estimate annual groundwater withdrawals from source aquifers using the appropriated volumes from WRIS and source aquifer names from GWIC. The source aquifers will be listed as the MBMG aquifer codes developed for Montana-specific aquifers, which can be easily converted to principal aquifer names used by USGS.
<p>Oregon Oregon Water Resources Department</p>	<p>In progress Project end date Sept. 2021 Final technical report due Dec. 2021</p>	<ul style="list-style-type: none"> • Developing datasets for field-level evapotranspiration (ET) and consumptive use (using ET minus effective precipitation). • Developing GIS polygons of agricultural fields with field attributes (irrigation status, irrigation source type, crop type, and irrigation method). • Increasing irrigation data resolution (these datasets are accurate to the field-level being based on Landsat imagery which has a resolution of 30 meters). • Improving the collection, processing and quality assurance of irrigation water-use data.
<p>Rhode Island Rhode Island Water Resources Board</p>	<p>In progress</p>	<ul style="list-style-type: none"> • Creating an inventory of all public water systems (PWS) and owners, verifying geographic information, and assigning HUC-8, -10, and -12 basins, for all wells and intakes. • Compiling monthly withdrawals for 18 PWS that report withdrawals by specific wells/intakes for at least the years 2015-2020. • Collecting metered data (if available) or estimating withdrawals for the non-reporting PWS using USGS methods and populations served. • Designing a relational database and populating it with all PWS data including geographic information for all wells/intakes, HUC basins, and historical monthly metered and estimated withdrawal data. The project will accomplish the public supply goals to develop site-specific annual and monthly withdrawals by well/intake, water source, and water type.
<p>Texas Texas Water Development Board</p>	<p>In progress</p>	<ul style="list-style-type: none"> • Quantifying current and historical water use for hydraulic fracturing including produced water volumes. • Identifying the sources of water for hydraulic fracturing. • Developing projections of future water demand for oil & gas (2030–2080). • Identifying locations of operations and quantifying current and projected future water use for aggregates and coal and lignite mining. • Developing an interactive data dashboard to display mining water-use estimates and demand projections.

WUDR 2020 Awards (Project end date September 2022 and Final Technical Report due December 2022 unless noted)

State	Status	Project activities
Vermont Vermont Department of Environmental Conservation	In progress	<ul style="list-style-type: none"> • Developing interactive data dashboards for public supply, domestic, irrigation, aquaculture, hydroelectric power, wastewater-treatment releases and snowmaking. • Delivering data updates and a final report on the State’s water use.
Virginia Virginia Department of Environmental Quality	In progress	<ul style="list-style-type: none"> • Developing coefficients to estimate unreported agricultural water withdrawals at the county level based on irrigation data from the U.S. Department of Agriculture (USDA) Agricultural Census, the USDA Irrigation and Water Management Survey, and literature-based estimates of crop water requirements. • Combining the coefficients with reported irrigation withdrawals to generate a time series of monthly total irrigation withdrawals (reported plus nonreported) for major agricultural counties in Virginia. • Using the coefficients and reported irrigation withdrawals to estimate a range of total irrigation withdrawals under different weather scenarios (e.g. average year conditions, moderate drought conditions, and extreme drought conditions).

Additional Information

Kimberly H. Shaffer,
 WUDR Coordinator
 Email: wudr-coordinator@usgs.gov
[WUDR Program information](#)

[Water Use in the United States](#)

The WUDR Program regularly hosts a [Water-Use Open Forum](#) (WUOF) where USGS, State, university, and other agency personnel share water-use data experiences. The WUOF is typically held on the last Wednesday of the month at 2 pm ET and has 50-80 participants. Please contact wudr-coordinator@usgs.gov to receive notifications about upcoming presentations.

