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Water Quality Control Division
Department of Public Health & Environment

Regional Watershed Data and Summary Information

Colorado DPA Guide for Developing 208 Plans

Overview

Designated Planning Agencies need to understand existing and forecasted watershed conditions as an important foundation for 208 plan development. The Watershed Rapid Assessment Program tool (WRAP tool) extracts, organizes, and analyzes data and information at various watershed scales, including HUC 12, HUC 10, and HUC 8 levels. These data extracts can be used to characterize existing conditions in watersheds. The WRAP tool can also use the extracted data to calculate a number of watershed health indicators. The user assigns importance to these indicators which results in a relative comparison of watershed health conditions correlated to value-based decisions made by the user.

Information from the WRAP tool is summarized in various graphs displaying time series data such as precipitation, temperature, snowpack, stream flow, water quality, and more. Additionally, WRAP's interactive maps allow users to examine spatial data including land use, aquifer extent, soil drainage classification, impervious surface, and more. The raw data (time series, raster maps) are also available for download.

Additional Resources

Colorado State University (CSU), in collaboration with state and federal agencies, developed resources to assist in statewide planning and decision making. Access the tools and additional resources developed by CSU using the weblinks below:

- WRAP Tool Resources: https://erams.com/catena/tools/colorado-collaborative/watershed-assessment/
    - Technical documentation, webtool access, video tutorials, overview information
    - How-to video link: https://youtu.be/Ci1Sktrf1nc
- Additional DPA Resources: https://erams.com/catena/tools/colorado-collaborative/co-dpa-resources/
    - Access the suite of customized resources developed for DPAs

QUICK START GUIDE

The WRAP tool provides a variety of features for assessing watershed health characteristics. Deciding which features to use will depend on how the data will be incorporated into 208 plan development. The following information can be summarized and/or analyzed using the WRAP tool:

- Population summary (current) and forecast (projection)
- Current and projected changes in land use
- Current and projected stormwater systems
- Location of permitted wastewater treatment facilities

- [Water quality impairments and classifications](#)

Procedure

1. [Define Area of Interest](#): select desired geospatial boundary
   a. Known boundary options include: counties, cities, HUC 8, 10 or 12 watersheds
   b. Upload boundary (user supplied geospatial layer)
2. [Extract Data](#): an extensive amount of data is available for summary, however, the most relevant resources for DPAs include:
   a. Population, Land Use, Stormwater Systems, Water Quality, Wastewater Treatment Facilities
3. [Generate Watershed-Based Plan (Optional)](#): this tool will generate a zip file that includes maps, data, figures, and word document with prompts for completing a Watershed-Based Plan consistent with the [EPA 9-Element Watershed Plan guidance](#).
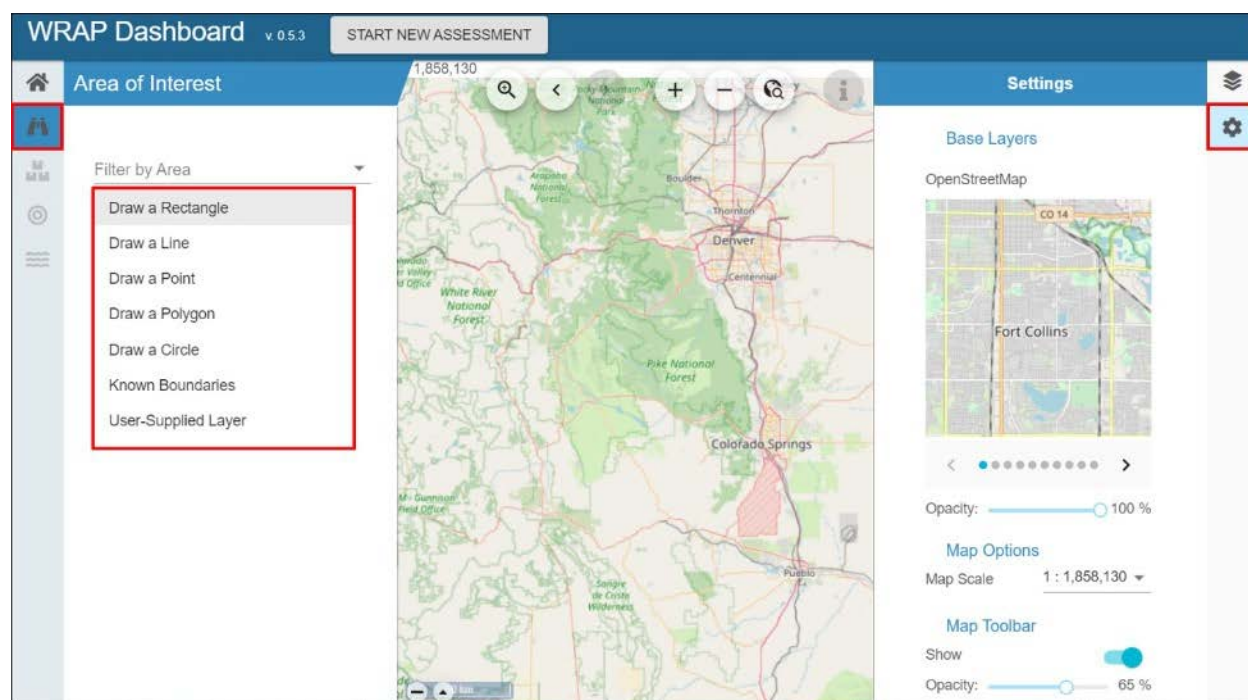
Define Area of Interest
https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=122s

Figure 1 Define area of interest and modify base map (optional).

From the WRAP tool home page (https://cdphe-wrap.erams.com/), click the "Select Area of Interest" (binoculars icon) section from the left dashboard. Define your watershed boundary by selecting one of the desired methods:

- Known boundary list includes states, counties, cities, HUC 8, 10 or 12
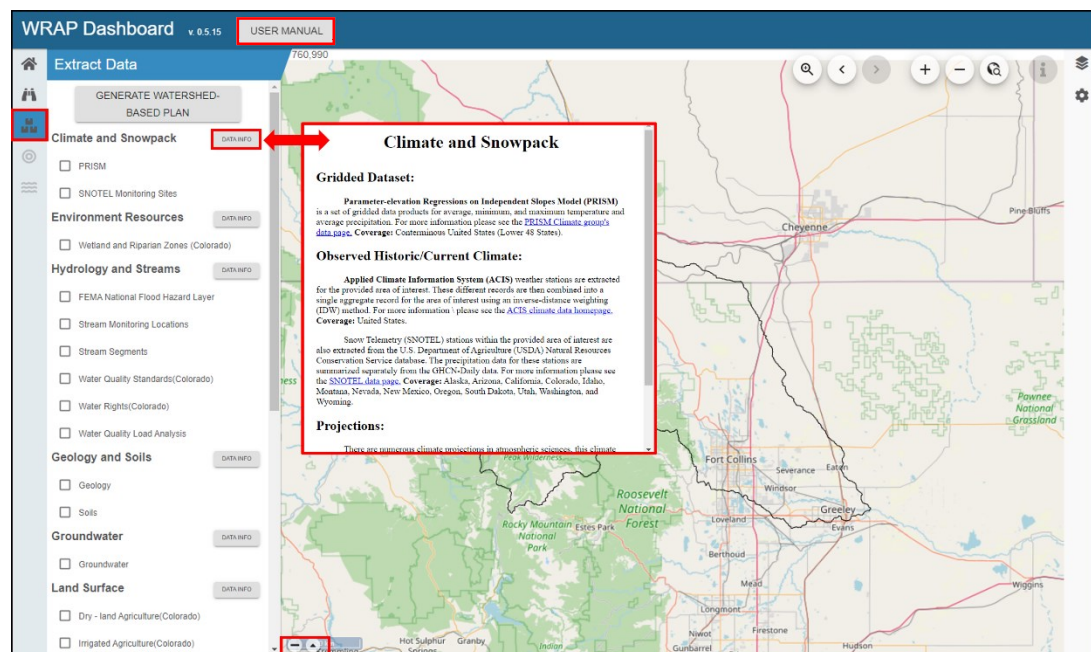- Upload boundary (user-supplied geospatial layer)

Extract Data

https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=189s

Figure 2 Select and extract desired data, help text available.

The "Extract Data" section on the left dashboard retrieves numerous datasets live from their respective sources, as described in further detail in the technical user manual. Depending on the data selected, the processing time may take a few minutes to complete the extraction. Inline help and links to the data sources are available in the WRAP tool by clicking the "DATA INFO" button next to each data category (Figure 2). The direct link, source and/or citation information for each dataset is also included in the optional watershed-based plan (Step 3 - Optional).

A detailed discussion and summary of all available data, including individual data sources, can be found in the WRAP tool technical user manual (**see page 10**) available here:
https://erams.com/catena/tools/colorado-collaborative/watershed-assessment/

Once the watershed boundary (area of interest) is defined and the desired data has been selected, new tab(s) will process and summarize the selected watershed data which will appear in the teal table below the map.

Users can toggle the map on/off by selecting the arrows at the bottom of the map canvas (Figure 3). Stream monitoring locations can be zoomed to from the summary tab by clicking the pin at the specific location to display additional information (**Figure 3**). Once a station is selected, any accessible water quality (bullseye icon) and flow (water lines icon) data will be available for further summary.

Population
https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=487s

If you would like to estimate population growth in your area, WRAP includes both current/historic population from U.S. Decennial Census (2000, 2010, 2020) and American Community Survey (individual years) and projected population estimates from the Colorado State Demographer. An examination of current and projected population can be used to estimate population growth in your area.

Land Use
https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=432s

The WRAP Land Use summary can be used to explore current land use data available from both the National Land Cover Database (NLCD) and National Agricultural Statistics Service (NASS). Additionally, existing MS4 and Urban Clusters identify current urban areas and potential future growth/redevelopment centered around these. To acquire the most updated data, refinement of these initial estimates should be made through interaction with local municipal stakeholders, knowledgeable about their individual development and growth plans, and can be aggregated for inclusion in a 208 agency regional plan.

Stormwater Systems
https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=675s

WRAP includes MS4 and Urban Clusters for the areas currently defined as Urban Areas with municipal separate storm-sewer systems (MS4) and additional nearby associated urban areas (Urban Clusters) which are the center of potential future growth and redevelopment. Further refinement of these initial stormwater system extents can be made through collaboration with municipal stakeholders that are knowledgeable about their municipality's individual development and growth plans for summary and inclusion in a 208 agency regional plan.

Wastewater Treatment Facilities
https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=626s

If you would like to summarize wastewater treatment facility (WWTF) locations in your area, WRAP provides current permitted discharge location(s) for wastewater treatment facilities from both Colorado Regulation 85 monitoring facilities and the EPA National Pollution Discharge Elimination System (NPDES) permit system. An estimate of current WWTF locations can be used to define which stakeholders to work with as well as combined with population to provide help estimate changes in WWTF effluent discharge and quality over time. Further refinement of these estimates should be made through collaboration with municipal stakeholders who know ongoing, upcoming improvements and planned changes to WWTFs.

Stream Monitoring Locations
https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=725s

To examine water quality data WRAP provides access to the U.S. EPA STORET database of stream monitoring locations (average daily discharge). This information will be used in the Water Quality section of the WRAP tool.

Water Quality
https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=807s

To better understand water quality restoration needs in your area, WRAP's Stream Segments feature provides both an overview of state waters with their designated uses and attainment status, as well as the 303(d) list of impaired waters. This combination of impairments and deviation from designated uses form the list of waterbodies requiring restoration of water quality.

Additionally, WRAP provides a summary of available water quality data for stream and lake sites under the *Stream Monitoring Sites* summary including both USGS National Water Information Systems (NWIS) and EPA Water Quality Portal monitoring locations. This information is available in the "Water Quality Data" (bullseye) step on the left dashboard.

Water quality data, either within WRAP or downloaded from it, can be used to assess and plan TMDL development with DPAs and their municipal and state stakeholders to set reduction targets for impaired water quality parameters. For step-by-step instructions on accessing and analyzing water quality data, please refer to **page 19** of the technical user guide.

Generate a Watershed-Based Plan (Optional)
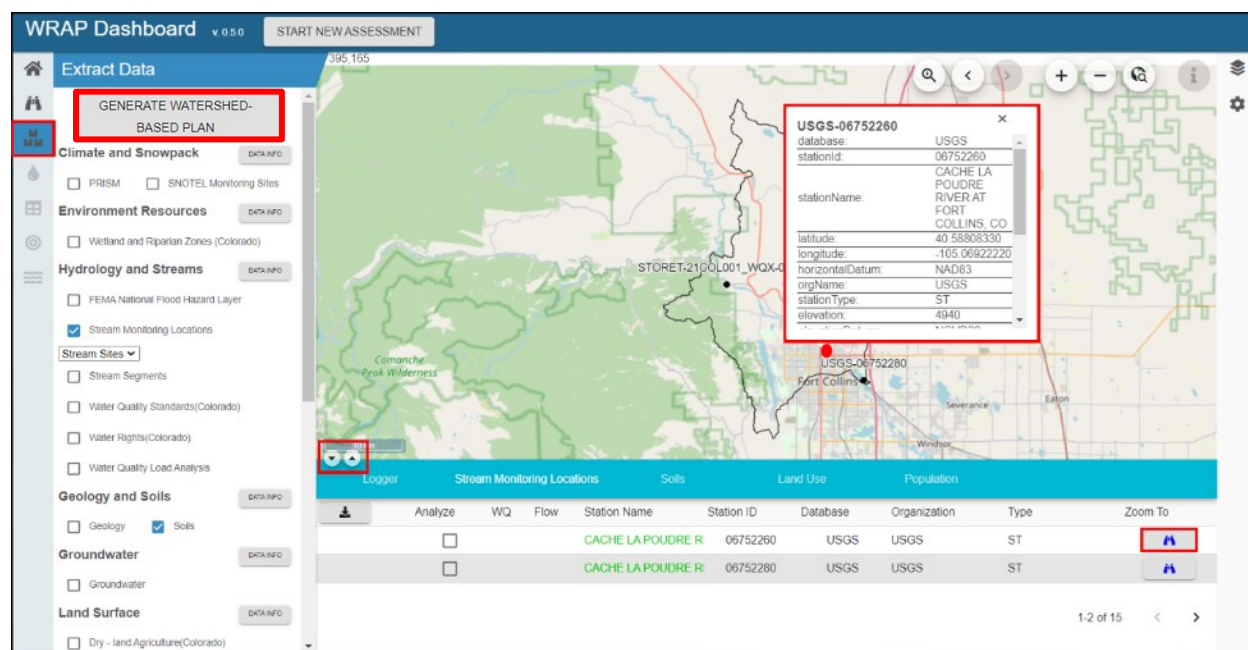https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=1286s

Figure 3 Complete analysis for desired data to be included in the report template

An optional feature provided by WRAP includes the ability to download its maps, tables, and figures into a pre-formatted word document by clicking on the "Generate Watershed-Based Plan" button near the top of the extract data section (Figure 3). This report template was developed in collaboration with CDPHE to assist with preparation of dataset(s) necessary for the development of watershed-based plans by providing a uniform template and auto-populating several recommended datasets and figures.

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DPAs may find it useful to leverage the automatically generated maps and figures in their own reports. However, this feature does not replace the need for an assessor to interpret the data and describe their findings as related to watershed planning.

*Note: Popups must be enabled to initiate the report for download (i.e., not just for a specific website as this tool generates unique tokens, therefore any **browser application** used to block pop-ups must be completely disabled). See here:* https://www.youtube.com/watch?v=Ci1Sktrf1nc&t=372s

Additional Features & Information

Map Features & Layers
https://youtu.be/-3LoHpUeC0E
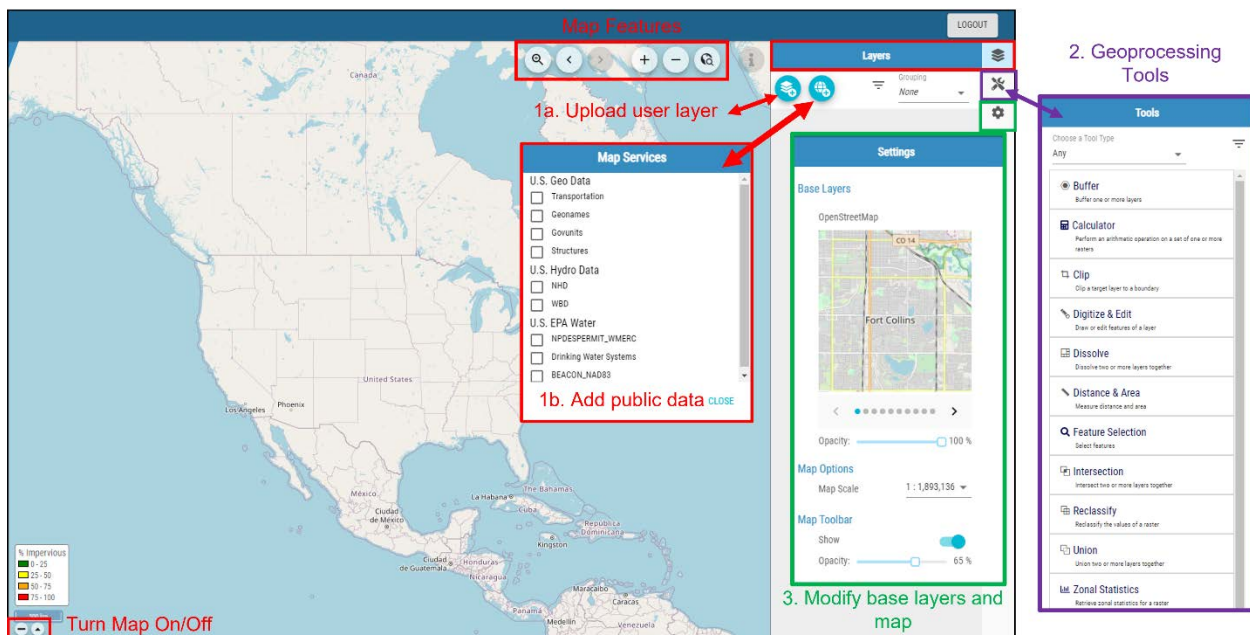
Figure 4 Add user layers, import public data, and navigate map features and geoprocessing tools.

Users can upload geospatial layers (Figure 4) and add their own information under the "layers" section located on the right dashboard (shown in red):

- Upload their own geospatial layers (shapefile, kmz, GeoJson)
- Import data from public sources such as U.S. Geo Data, U.S. Hydro Data and U.S. Environmental Protection Agency water data.

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The dashboard also allows users to navigate basic mapping features from the toolbar located on top of the map canvas (search location, zoom in/out/to specific place, enter location, layer attributes). A suite of geoprocessing tools and services is also provided under the "tools" icon (shown in purple). The base map can be modified under the "settings" icon (shown in green).

Downloading Information

Each data category is summarized using interactive maps and graphs which are accessible from the results tab(s) that automatically populate under the map canvas. The results tabs can be maximized or minimized and the map canvas can be hidden by clicking the arrows at the bottom left corner of the map canvas.

The graphs (png, jpeg, pdf, svg) as well as the raw data including time series (xls, csv) and raster maps can be downloaded from the dashboard. These figures are interactive and hovering your mouse over any section will reveal additional information.

WRAP Raw Data Download

Unique to the WRAP tool, raw data can be downloaded from the results loaded during Step 2. Select the download button (down-arrow) from the results table (Figure 6). A zip file will be prompted that includes raw data (csv, shx, shp, prj, dbf) as well as map images (png files).

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