User Guide
Version: 3.4.2
Updated: 18 July 2025
Domain: https://cdphe-wrap.erams.com/

WRAP

Watershed Rapid Assessment Program

CATENA ANALYTICS

One Water Solutions Institute
Colorado State University

CONTENTS

INTRODUCTION

Watershed protection programs aim to maintain or restore the physical, chemical, and biological integrity of waterbodies. The development and implementation of these watershed plans require analysis of watershed conditions which are both spatially and temporally variable. Therefore, assessment of current and historic data and information is vital for continuously updating management plans in response to changing land use, climate, and watershed conditions.

The Watershed Rapid Assessment Program (WRAP) is a summary tool that extracts, organizes, and analyzes data and information at various watershed scales, including HUC-12, HUC-10, and HUC-8 levels. Utilizing the extracted data, the WRAP tool calculates a number of watershed health indicators to create an overall summary of the watershed condition.

Catena Analytics offers powerful platforms for building accessible and scalable analytical tools and simulation models. Our services are used to assist with strategic and tactical decision making for sustainable management of land, water, and energy resources. Thank you for choosing Catena Analytics and the eRAMS platform to meet your data, modeling, analysis, and geospatial needs.

WHO WRAP IS FOR

This tool is intended for use by urban planners and water managers, academic groups, regulatory officials, and consultants, as well as state, local and federal agencies planning for the future of water resources.

PURPOSE

WRAP is intended to facilitate comparison of different Colorado watersheds. It allows users to conduct a variety of analyses, ranging from simple watershed summaries to more complex analyses, such as TMDL planning and implementation.

NEED HELP?

If you need additional assistance after reviewing the guide, we are here to help! If you find any aspect of the tool challenging or missing information from this guide, please engage an eRAMS expert to guide you through any hurdles. Contact us at: eramsinfo@gmail.com.

Software Availability

Domain

https://cdphe-wrap.erams.com/

Documentation URL

https://erams.com/catena/tools/colorado-collaborative/watershed-assessment/

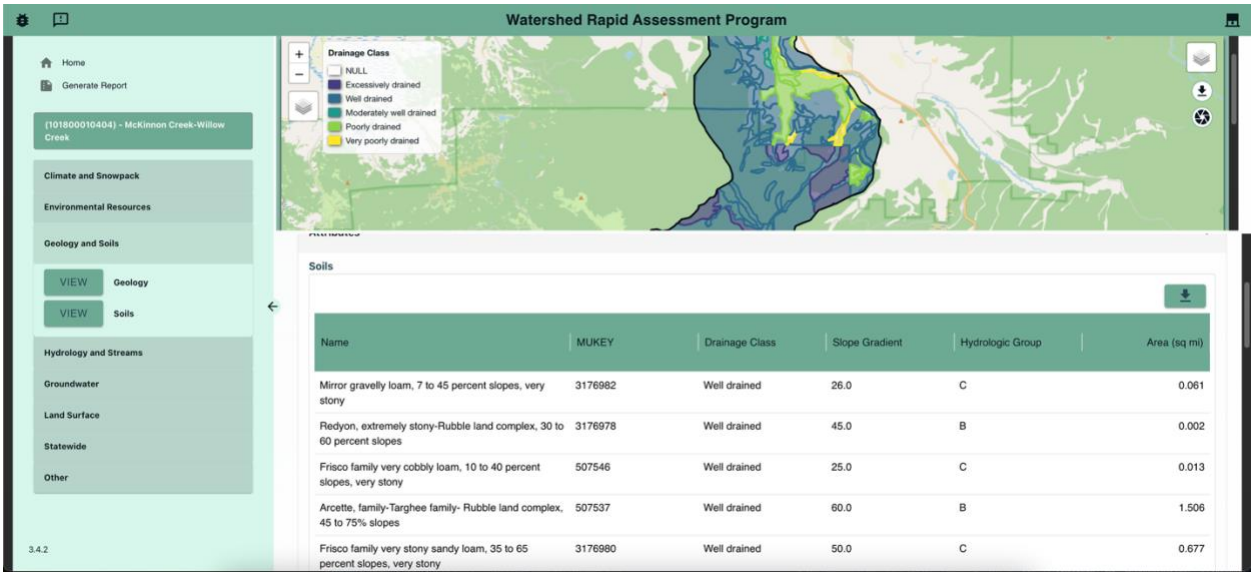
Publication/Citation

Arabi, M, T. Wible, and M. Smith. 2015. Watershed Rapid Assessment Program (WRAP) Presentation. 2015 Colorado Watershed Assembly Conference.

System Requirements

A modern web-browser is required to connect and run the WRAP. Examples include Chrome v.138, Firefox v.140, and Edge v.138.

Safari v18.6 does not support Report Template generation, but *can* be used to browse datasets, generate tables and images, and perform other WRAP functionality.



VERSIONING

As a cloud-based software tool, WRAP may add, remove, or change features as it evolves. This user guide may not be perfectly in-sync with the most recent version of the application. See the first page of this document for the target software version. Again, feel free to contact us if you need assistance with the current version.

AUTHORIZED USE PERMISSION

The information contained in the Watershed Rapid Assessment Program (the "Service") is for general information purposes only. Colorado State University's One Water Solutions Institute ("CSU-OWSI") assumes no responsibility for errors or omissions in the contents of the Service. You agree to hold neither the creators of the software platform, nor CSU-OWSI, liable for any action resulting from use or misuse of the Service. In no event shall CSU-OWSI be liable for any special, direct, indirect, consequential, or incidental damages or any damages whatsoever, whether in an action of contract, negligence, or other sort, arising out of or in connection with the use of the Service or the contents of the Service. CSU-OWSI reserves the right to make additions, deletions, or modification to the contents of the Service at any time without prior notice.

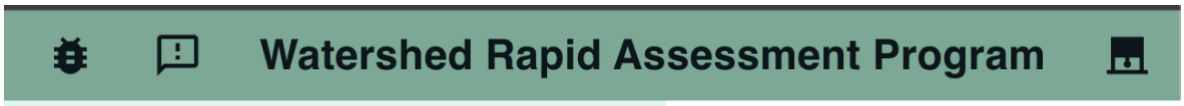
INTERFACE

First, a quick overview of the interface.

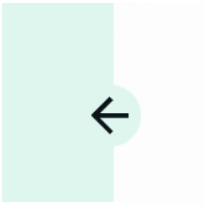
HEADER

The header has three important buttons.

1. **Bug Report** – WRAP is an evolving tool with a lot of complex interactions; reporting any anomalies you see is a big help.
2. **Feedback Survey** – This takes you to a simple, two-page feedback survey where you can share your impressions of the tool and hopes for how it might develop further. All feedback is helpful and welcome.
3. **Map State** – This toggles the map between three positions. By default, the map starts in the 'closed' position, meaning that maps will appear inline.



SIDE PANEL

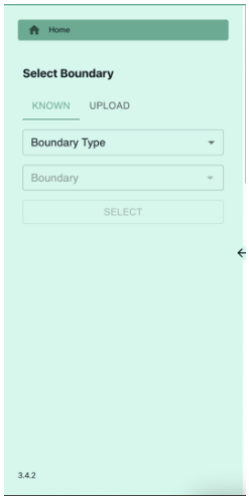


Hide or Reveal Panel

The side panel is used to select areas and datasets for viewing. It can be hidden or revealed by clicking the small 'arrow' button about halfway down the panel.

In the bottom-left corner of the side panel, you can see the current version of the application.

GETTING STARTED – AREA OF INTEREST



WRAP can be used to generate Watershed-Based Plan templates, or to browse data. Either way, your first step will always be to select an Area of Interest (AOI). This can either be one of the predefined areas, or one you upload directly.

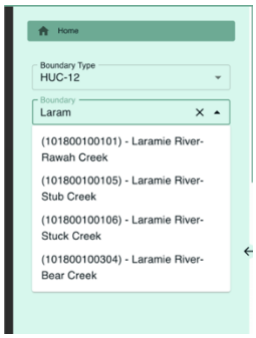
Initially, the left-hand panel contains tools for selecting your Area of Interest. If the panel is hidden, it can be restored by clicking the docking arrow, visible along the left edge of the screen.

If, for some reason, the panel shows other information, the AOI controls can be restored by simply returning to the 'Home' page.

Known Boundaries

WRAP has thousands of predefined regions, covering all HUC-8, HUC-10, and HUC-12 regions within Colorado. To use a known boundary:

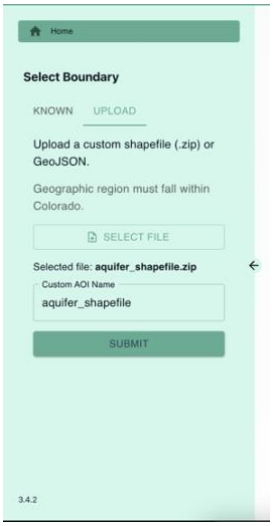
1. Make sure "Known" is selected.
2. Choose your boundary type; for example, HUC-10. Making a choice will 'unlock' the next dropdown menu.
3. Choose your specific boundary. Either directly select the one that you want, or simply begin typing in the box to instantly filter the options based on partial text match.
4. Click "Submit". Once the system has verified your choices, the submit button will turn green and opaque, indicating it is ready to be clicked.



Partial Text Match on "Laram"

Upload Boundary

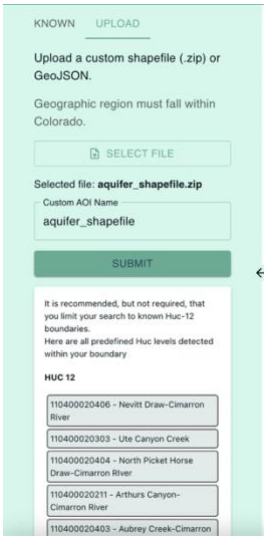
You can also upload your own custom boundary, in either geojson or zipped shapefile format.



1. Make sure 'Upload' is selected.
2. Choose "Select File".
3. Upload a zipped shapefile or valid geojson file from your hard drive. Valid file extensions are *.zip, *.json, and *.geojson.
4. If the file is accepted, you will have the opportunity to provide a custom name for your AOI. This name will be used when determining default names for downloads, and it will be used as a title for some tables and maps.
5. Click "Submit".

A Note on Custom Boundaries

While you can upload any valid boundary you wish (within Colorado) and view targeted information for that region, a major focus of Watershed-Based Plans is that they target an actual, specific watershed.



After a brief delay to scan your custom boundaries, every HUC-12 that falls entirely or partially within your AOI will be listed beneath the Submit button.

Clicking any one of the listed HUC-12s will load that predefined watershed boundary, *instead of* your custom boundary. This could be used to eliminate any minor errors in your borders, for example, or to build up a series of logically-sized watershed reports that cover your AOI when read together.

Snapping to predefined areas is an optional feature. Clicking 'Submit' will continue forward, using your custom boundary exactly as provided.

GENERATE REPORT TEMPLATE

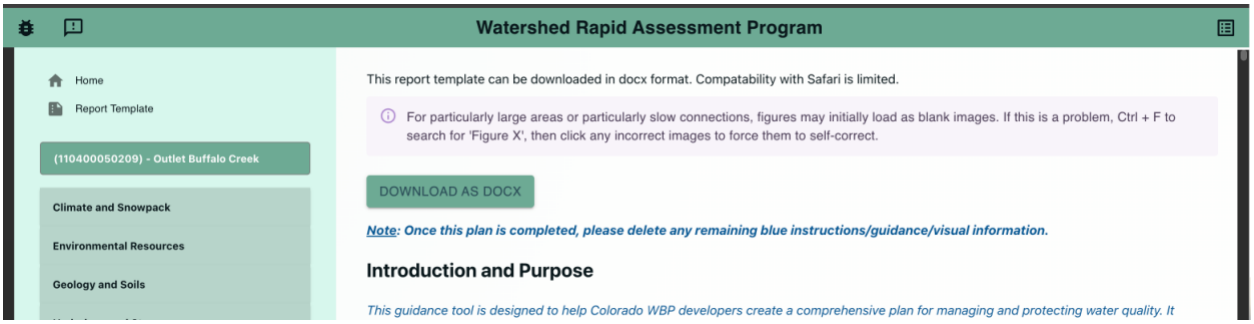
The WRAP tool can be used to help prepare a template for writing a Watershed-Based Plan, or other formal watershed management report, in .docx format. While you will still need to write your own conclusions, it will suggest a useful layout to follow and prepopulate many of the key tables and images you may need, based on your chosen area of interest.

GENERATING REPORT

Once your area of interest is chosen, a "Report Template" button will appear above the region name and below the home page link. Clicking that will begin a process of loading any missing data and verifying any pre-loaded data. This can take several minutes on larger datasets.

VIEWING AND SAVING THE TEMPLATE

When the datasets have completed loading, the screen will refresh to show the complete report template. Click the 'Download as DOCX' button at the top of the report to compress the information into an editable docx file.

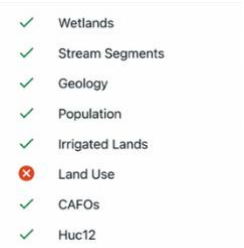


USING THE TEMPLATE

The template is self-documented and has extensive text in the color blue to give instructions, provide examples, and generally provide recommendations for what to write and how. Tables and maps will be added and filled with information specific to your region of interest. While you're not required to use any of them, the work of tracking down and copying the data is already completed for you.

Be sure to delete all the blue text once you have completed your report; it is intended for your use only while you prepare your management plan.

Troubleshooting - Loading



If any datasets fails to connect properly to external services, they can be refreshed and reconnected by clicking the red alert ('X') icon.

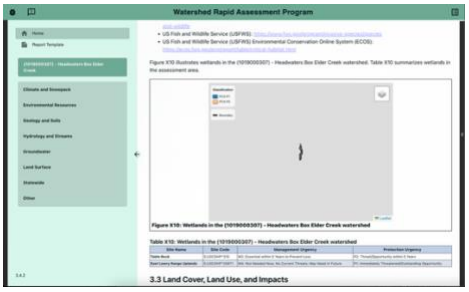
Some large regions will overwhelm the 'Soils' service, causing an infinite loading icon. Refreshing the page may solve this issue. Preloading the Soils dataset in the main tool may also help. If neither solution works, you may need to focus on a smaller region while we look for a long-term solution. The report template generator is primarily designed for the HUC-12 level, as that is the most accepted size for Watershed-Based Plans.

Troubleshooting – Report Preview

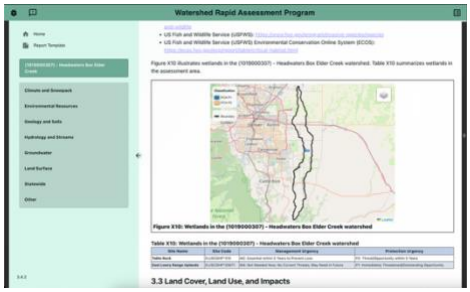
Some large datasets, or unusually slow connections, may initially render visibly incomplete maps and graphs. Clicking any map, graph, or chart on the online template preview will force it to refresh with the most recent information.

Ctrl + F can be used to search for "Figure X", which makes it easy to preview if any images need to be refreshed.

Of course, if you later find an incomplete image in your downloaded report, it can easily be replaced by using the screenshot feature on any map or chart in the main WRAP tool. One of its primary purposes, after all, is to help you generate appropriate displays for nearly area of interest.



A Visibly Incomplete Image



Click the Image to Repair It

LOADING AND SELECTING DATASETS

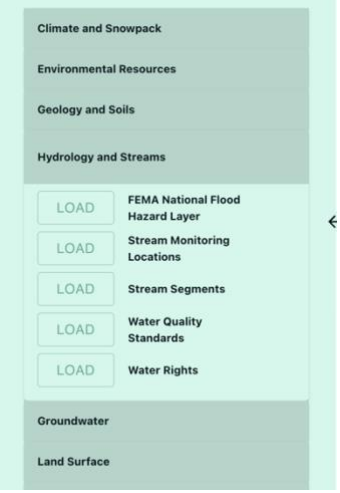
Instead of generating a report template, WRAP can also be used to browse a wide variety of datasets, with information scoped to your Area of Interest. This will generate various maps, charts, and tables, all of which can be saved and downloaded in a variety of formats.

With each request, data is fetched and processed from live sources. This means you're getting the most up-to-date, accurate information available. Automatically loading (over 20) datasets from multiple sources would be slow and inefficient, however. Instead, you choose the individual datasets you're interested in, giving you the just things you want, with as little unnecessary processing as possible.

Selecting Datasets

Select Category

First, choose a general category of information to see the datasets it contains. For visibility reasons, only one category is open at a time, but all your choices are remembered and any active processing continues without interruption if you switch categories.



The Hydrology Category has Five Datasets

Load Dataset

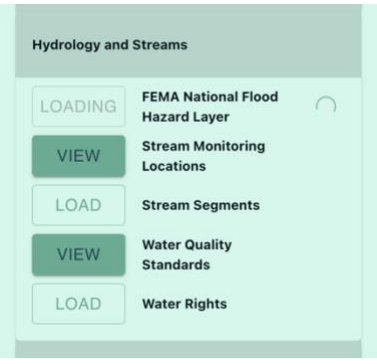
Click 'Load' next to any datasets you're interested in. WRAP will begin compiling the information in the background. You can load basically any number of datasets at once, although loading all of them at once will slow the process considerably.

View Dataset

Once all compiling, processing, and analysis is done for a given dataset, the 'Load' button will be replaced with an opaque, green 'View' button. Click View to see results.

GETTING STARTED SUMMARY

Select your area of interest by choosing a boundary type (e.g. HUC-10) and a specific boundary; or by clicking "Upload" and providing your own boundary. Either way, click Submit when you have made your choices. Load the datasets you are interested in, then use the View button to see them once they are finished loading.



Two Datasets Are Ready to View

What Can I Safely Do?

Most things that you can do in the side panel are nondestructive and 'forgiving.'

What if I accidentally close a category I was using?

That's **safe.** Anything processing will continue processing at the same speed. Anything loaded will remain fully loaded. Just click the previous category to go back to it.

What if want to go back to a dataset I already viewed?

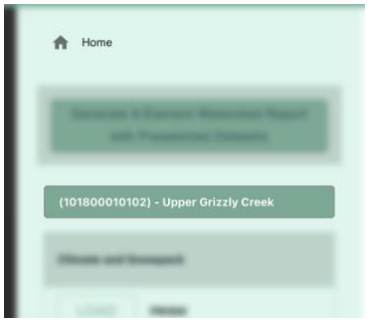
That's **safe**. Anything loaded will remain loaded until the webpage is manually refreshed, or until the area of interest is cleared. Click between individual datasets as much as you'd like.

What if I load all the datasets at once?

That's **safe**. That will be the slowest that loading can be, however, so it's not really the best user experience.

What if I change my area of interest?

Changing the area of interest will remove all loaded datasets from memory, freeing up necessary space for new data. When you go back to a previous area of interest, you'll need to load the relevant datasets again. User-submitted boundaries are not stored, and will need to be uploaded again once that AOI has changed.



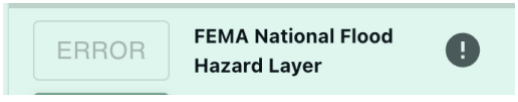
Two Options for Restarting

Restarting

Clicking either the Home button or the name of the selected Area of Interest will give you the option of replacing the current area of interest with a new one. Setting a new area of interest will unload all datasets from memory, allowing you to start fresh.

Dataset Errors

In some cases, the system may be unable to connect to the data source. This may indicate a momentary problem with the source's API -- or just a random network hiccup. In either case, this is temporary. Clicking 'error' will allow the dataset to be attempted again.



Temporary Error Connecting to FEMA

A user-uploaded area of interest that falls significantly outside the bounds of Colorado may also cause some datasets to report an error. Boundaries outside of Colorado are not currently supported.

VIEWING DATASETS

Each dataset contains between two and four sections, which always appear in the same relative order.

Description
The description gives a basic overview of the dataset and often provides links for more information about the sources used.

Attributes
This section provides a direct display of information, usually in grid form. Clicking the 'Attributes' header will shrink this section, if it is not of interest. See 'Accuracy and Projection' for more information.

If Analysis exists, Attributes begins collapsed, since Analysis is often more useful for at-a-glance information. Click the Attributes header to expand it.

Analysis
Graphs or charts of the information, designed to bring out interesting comparisons or relationships that are hard to visualize by reading numbers in a grid. Like Attributes, it can be collapsed or expanded by clicking the Analysis header bar.

Map
Each dataset comes with its own map, which may contain additional options for slicing or filtering the data.

The map positioning and visibility are controlled by the button in the upper-right of the screen, and the widget above the inline map. Clicking either allows you to set the map to appear within dataset, to share space with the dataset in approximately a 30/70 split, or to fill 100% of the available screen space.

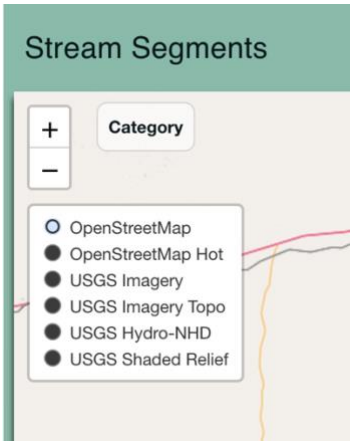
THE MAP

Data Options – Map

Maps may (or may not) have multiple dropdowns displayed immediately above the map itself. These have various effects, from changing the subsection of data to changing the year of record. Any changes made are immediately visible on the map; there is no 'Submit' button.

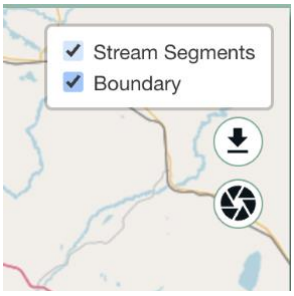
Displaying Stations by Type, Reporting Source, or Owner

Other Map Controls



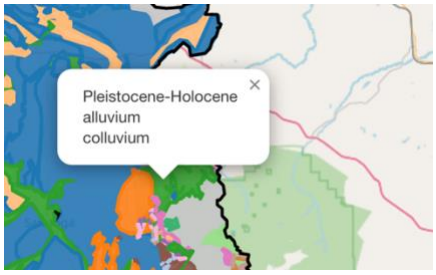
Lefthand Side: Change Base Map

There are a few other map controls worth noting. On the left, there is a square button that opens a submenu. It allows you to change the underlying base map to, for example, a topography or aerial map.
On the right, there is another square button that opens a submenu which allows you to turn the 'Boundary' layer on or off.
Below that is a button to download the current map (with currently selected options) in a GIS format, and a button to take a screenshot of the current map view.



Righthand Side: Boundary, Download, and Screenshot

Many of the maps feature the ability to hold your cursor over any portion to trigger a pop-up that provides more information, the legend information for that color, or some other context.



Mobile users can tap to get the same information, with the obvious caveat that it's much more difficult to be precise with a touchscreen than with a mouse. Zooming in a lot can help.

SAVING DATA

Already Mentioned

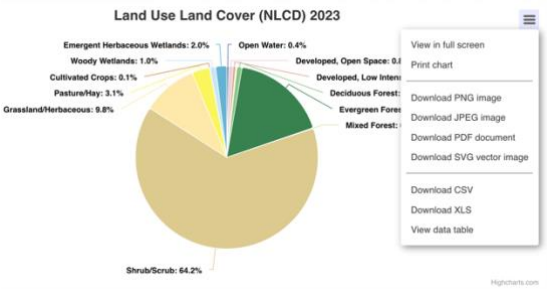
Every map has a screenshot button and a button to download the source files, both located in the upper-right corner of the map.

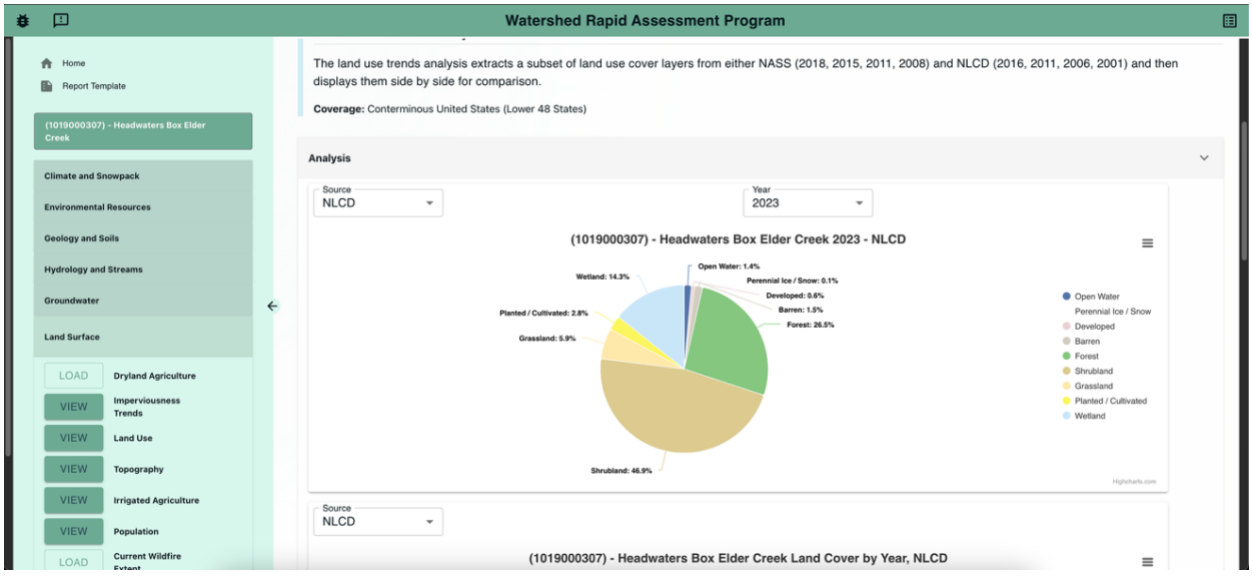
Generated report templates can be saved as docx files, by clicking the 'Download as Docx" button at the top of the report template preview.

Additional Features and Buttons

All data grids (or tables) have an 'export' button in the upper left, which allows you to download the data in csv format.

Charts and graphs have a popout menu in the upper right that allows you to download them in a variety of formats, including PDF and CSV.





ACCURACY AND PROCESSING DATA

WRAP pulls from a large variety of sources, including FEMA, the United States Geological Survey, the Colorado Natural Heritage Program, and others. However, you may notice that the results in WRAP are not necessarily an exact match for what these organizations report.

There are two reasons for this. The first is that WRAP allows you to select from literally thousands of areas of interest in Colorado. Inevitably, some of them do not match up with the provided map units and boundaries – perhaps including only half of a region with a specific overall population.

Every effort has been made to handle these cases in the most reasonable and mathematically defensible way. Continuing the example of the population map with a partial map unit: in this case, we combined the population map with the imperviousness map, and distributed the known overall population in such a way that the densest clusters correspond with the most impervious ground. This method (and others like it) allow us to provide realistic estimates, even along geographical boundaries the original data never allowed for.

The second reason is that our various sources almost exclusively provide shapefiles in EPSG:4326, which defines shapes in degrees. While this is generally a flexible and precise format, it is not particularly appropriate for calculating area and length. This is generally accounted for in the measurements that the original data provides. However, since not all boundary lines match up, WRAP remeasures area and length using EPSG:2231, 2232, or 2233 – changing to whichever is the most accurate for the portion of Colorado the area of interest falls primarily within.

In some cases, this is a higher level of projection accuracy than the original projections accounted for, while still keeping the original EPSG:4326 as the accurate source of truth.

Statistically, these differences should be extremely minor. However, it's worth knowing that this is the reason some results may appear different from the original sources – WRAP automatically reprojects to the most locally-appropriate projection, and it simulates any new boundary lines.