



Public Quick Start Guide for using the CDSN WebGIS application at

http://www.ColoradoWaterData.org/cdsnwebgis_2013.html

Note: This guide assumes the Public user is familiar with basic GIS operations, terminologies, and capabilities. Please check our GIS web page for tutorials, videos, and other training materials, as we are adding more often. Also, at anytime you can access the full ArcGIS Online Help Index here:

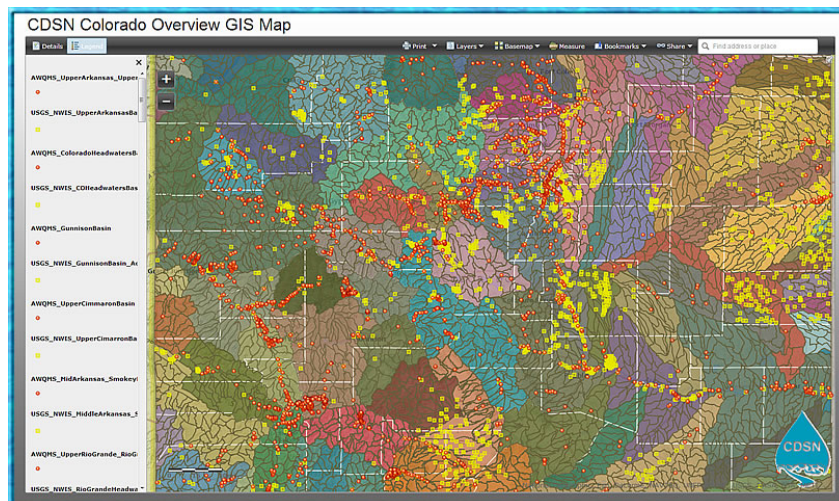
<http://resources.arcgis.com/en/help/arcgisonline/index.html>

The CDSN Web GIS utility allows for use of GIS data in 4 different platforms: The Web Application (no login), and with an ArcGIS User Account login-- ArcGIS Online ArcExplorer, ArcGIS Online Map Viewer, and ArcGIS Desktop. This quick start-guide is provided to help the public access the application in the simplest way, without needing an ESRI User Account. Each platform has different features and capabilities for simple or advanced GIS analyses. More advanced features can be accessed by using this application in the ArcGIS Online environment with a User Account or ArcGIS Desktop. For more information on these other options, please see our "ArcGIS Online with User Account" guide and other tutorials on our CDSN WebGIS webpage.

In addition you can download the GIS files created for this application straight from the CDSN GIS web page, if you wish to bypass ArcGIS Online and simply use your ArcGIS desktop or another GIS program like Google-earth that is enabled to be compatible with shapefiles.

Use the CDSN WebGIS application:

1. Go to the CDSN WebGIS page: http://www.ColoradoWaterData.org/cdsnwebgis_2013.html
2. Click on the GIS map image or the link below it:



Open Web GIS Application

3. This will open the GIS application in a separate browser window. Depending on the speed of your internet service and also how busy the ArcGIS Online service is, this may take a minute or more to begin rendering.

Note: The Map works best with [Mozilla](#) and [Google-Chrome](#) (which can be downloaded and installed on your computer for free. For IE9 and IE10 users you may need to alter your compatibility settings just as with AWQMS and the CDSN Google-map. See this fact sheet for assistance: [Important Information When Using AWQMS with Internet Explorer versions 9 and 10](#). On iPads we recommend using the Puffin Browser (available at the App Store), which has flash capability.

4. To speed up loading of the application, we have turned off some of the GIS data layers. Other layers may only become visible once you have zoomed in. The default view upon loading will be with the "**Legend**" tab active; displaying a state-wide view with the HUC 8 and HUC 12 polygons visible, County boundaries visible, and the AWQMS and USGS NWIS monitoring locations visible. You can zoom into the map by clicking the + and - buttons in the upper left of the map. You can re-center or pan the map by clicking your left mouse button, holding it down while dragging the map, and releasing the mouse button when you have the map re-centered to your liking.

CDSN Colorado Overview GIS Map

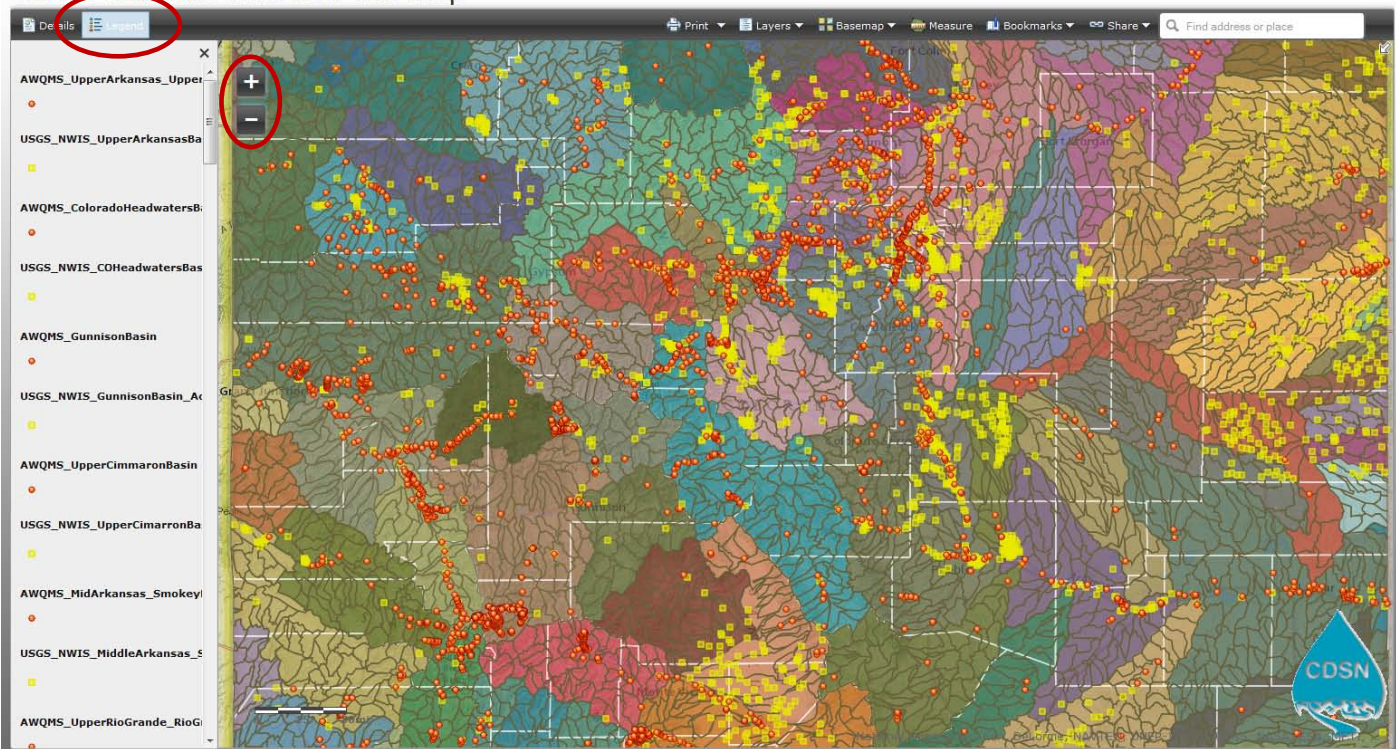


Figure 1: Showing the default view of the CDSN GIS Map upon loading into an internet browser window, with the Legend tab active. Also showing the location of the + and - zoom buttons. You can pan (re-center) the map by holding down your left mouse-button and dragging the map into a new position.

5. To view background information about this CDSN GIS application, click on the "**Details**" tab:

CDSN Colorado Overview GIS Map

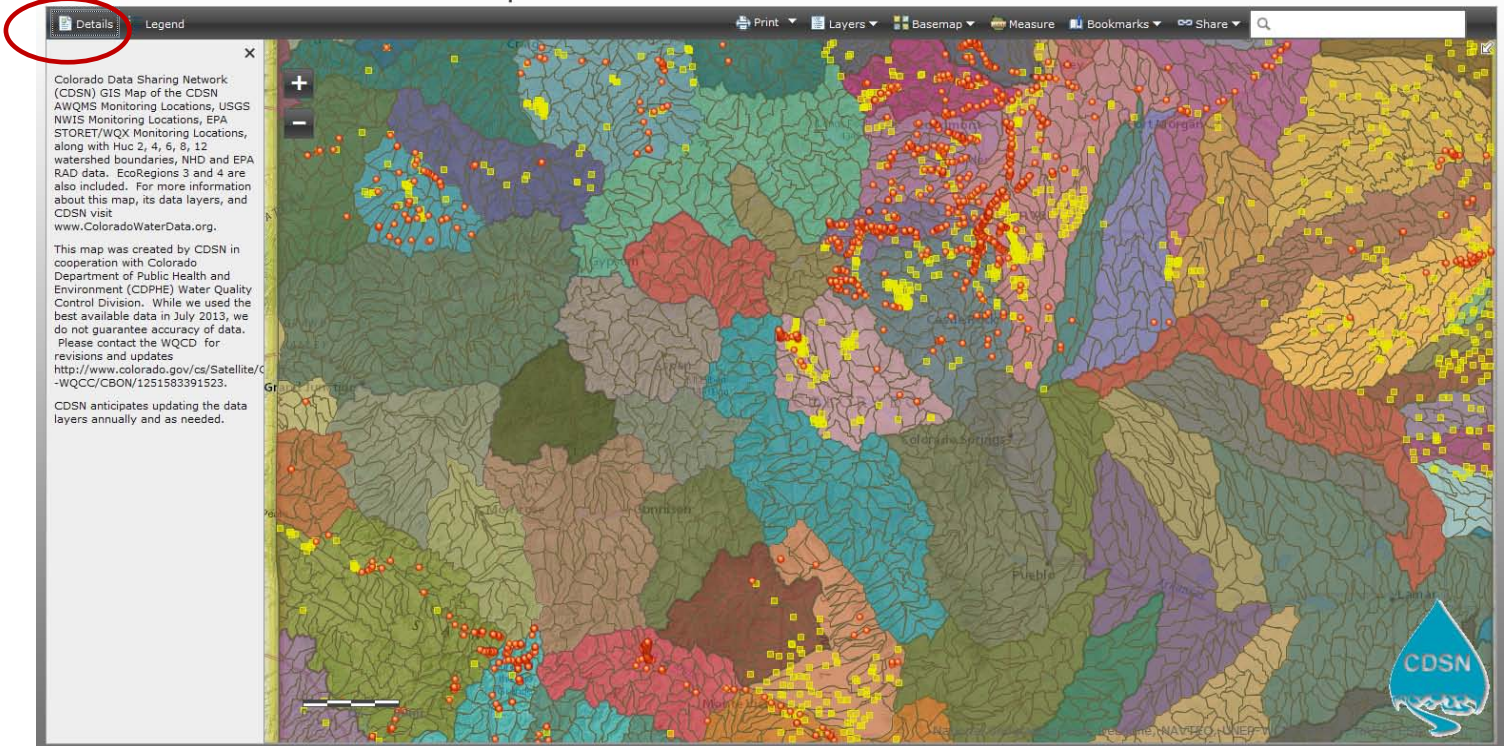


Figure 2: Showing the Details tab view of the CDSN GIS Map upon loading into an internet browser window.

6. Let's briefly explore the other menu items in the black bar on the top of the GIS application (from left to right). Clicking on the **"Print"** drop-down menu will allow you to print to your printer or Adobe .pdf format in portrait or landscape orientations:

CDSN Colorado Overview GIS Map

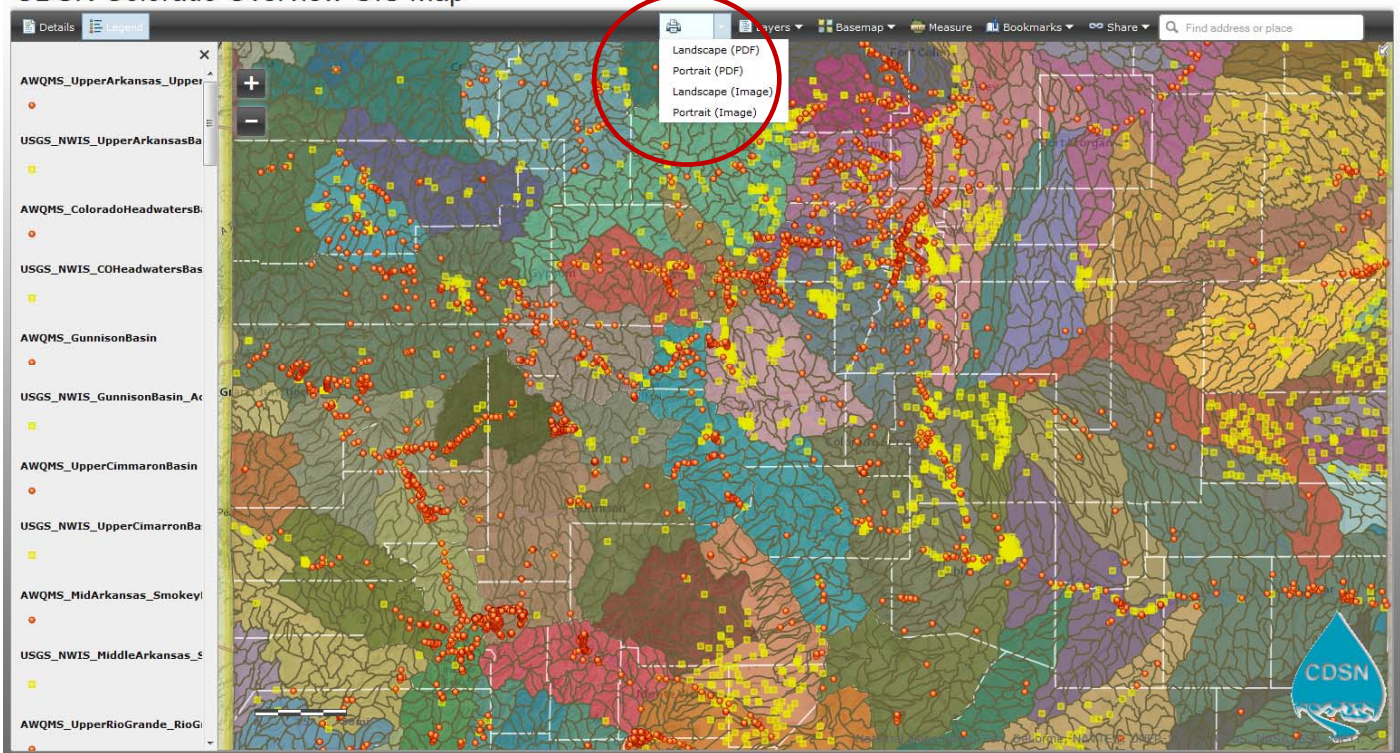


Figure 3: Showing the Print drop-down menu options.

7. The "Layers" Drop-down menu will let you customize which layers are visible. Note that some are turned off when the application first loads. Turn layers on or off by clicking the check-boxes. Because ArcGIS Online limits the number of vectors in a single layer to 1,000, several of our datasets were cut up into separate shapefiles (layers) by basin or subbasin. For example, you will see the AWQMS monitoring locations, USGS NWIS monitoring locations, and HUC 12 polygons have all been cut into separate layers by clipping them to basins and/or subbasins, such as the Gunnison Basin. The Default view has all of the AWQMS, USGS NWIS, and HUC 12 layers turned on. Having all these layers means that the drop-down list may not display ALL of the layers in the GIS application. You may need to change your *browser's* zoom level temporarily to turn on or off some of the other layers.

CDSN Colorado Overview GIS Map

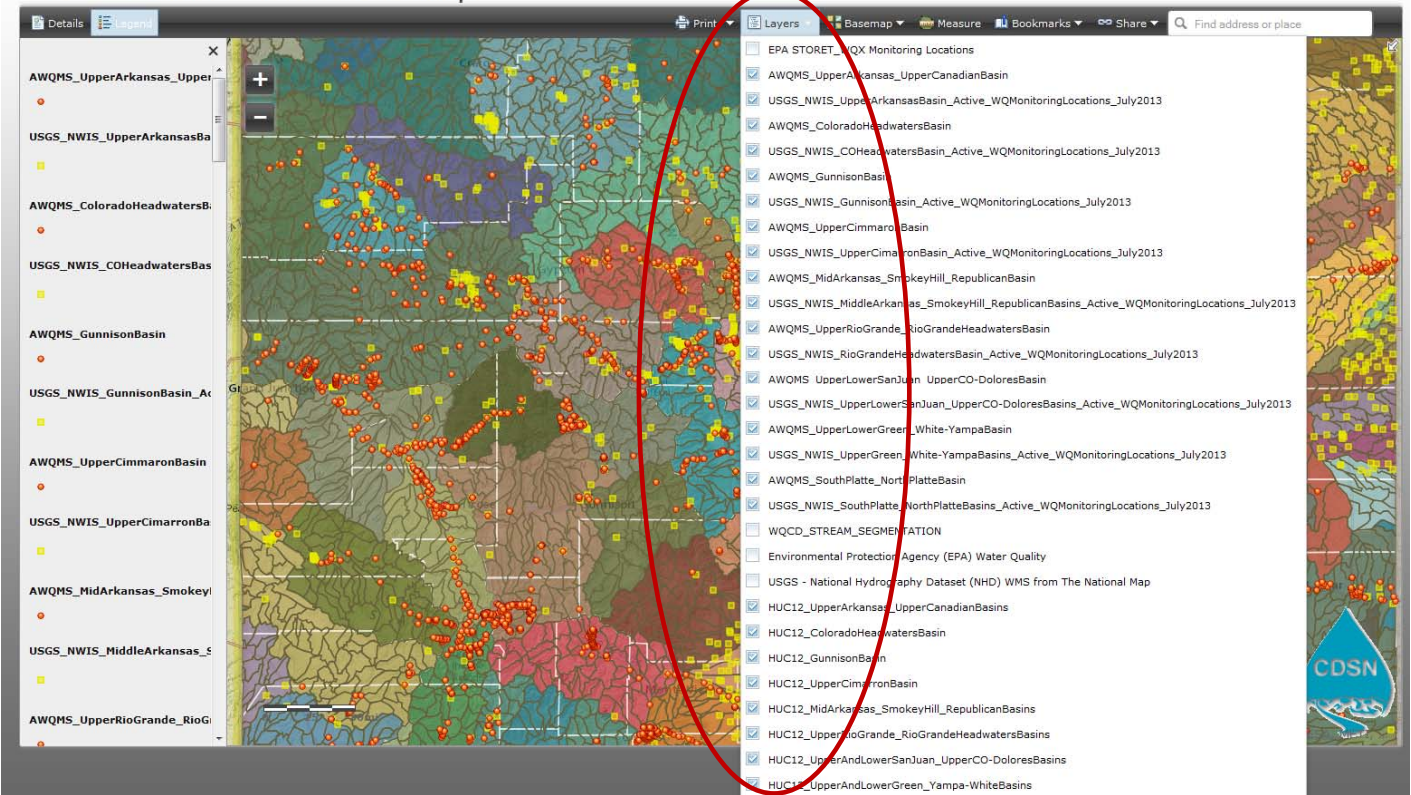


Figure 4: Showing the Layers drop-down menu check boxes. Check or un-check a box to turn a layer on or off. In this view, not all of the layers are visible in the list. To see the other layers, we need to temporarily change the zoom level of our *BROWSER*.

8. For example, in Mozilla Firefox, we had to go to the Mozilla "View" menu and select "Zoom Out" several times:

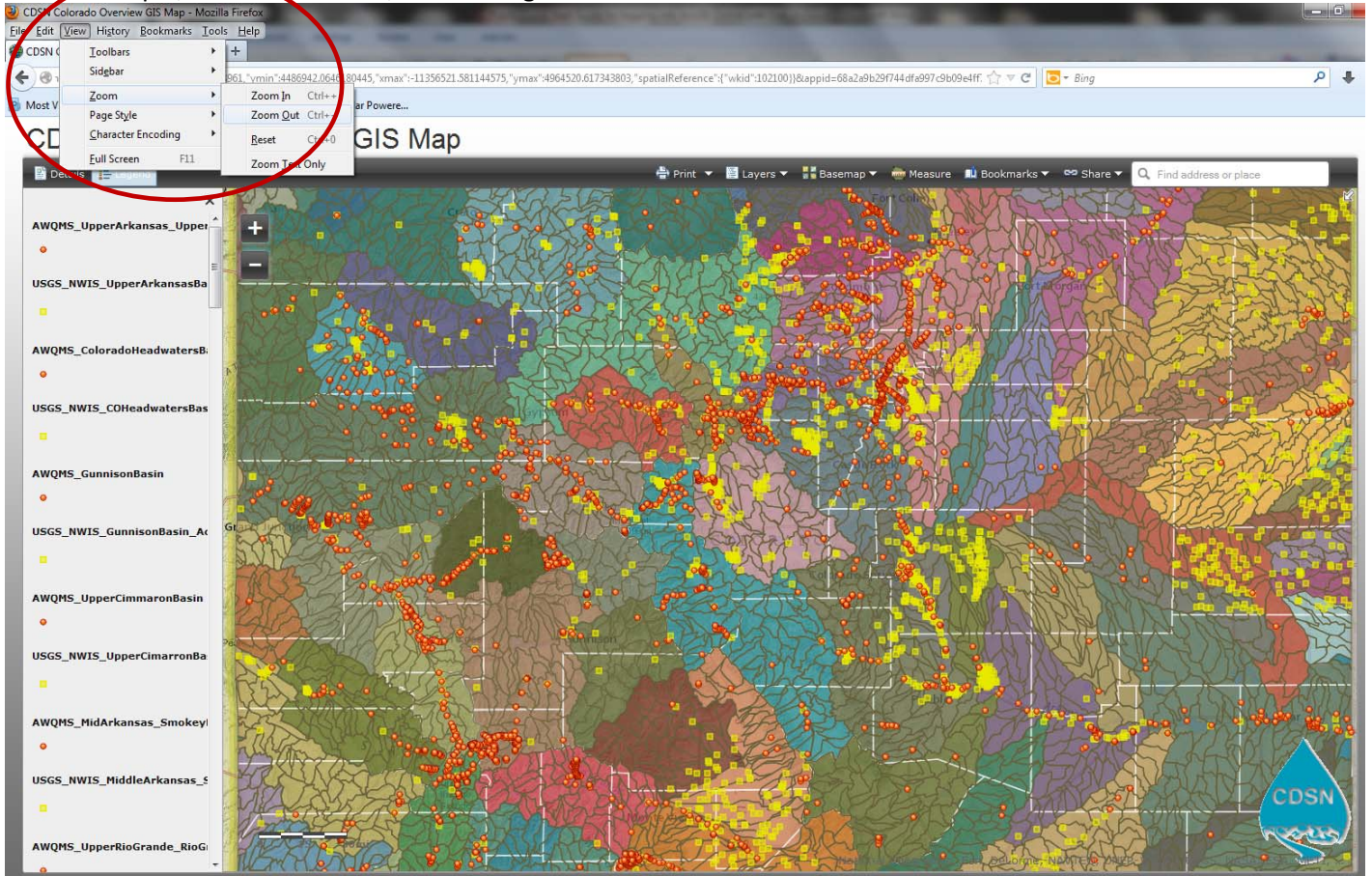


Figure 5: Showing the location of the *Browser* view - zoom controls. It will typically be located within the View menus of different browsers.

CDSN Colorado Overview GIS Map

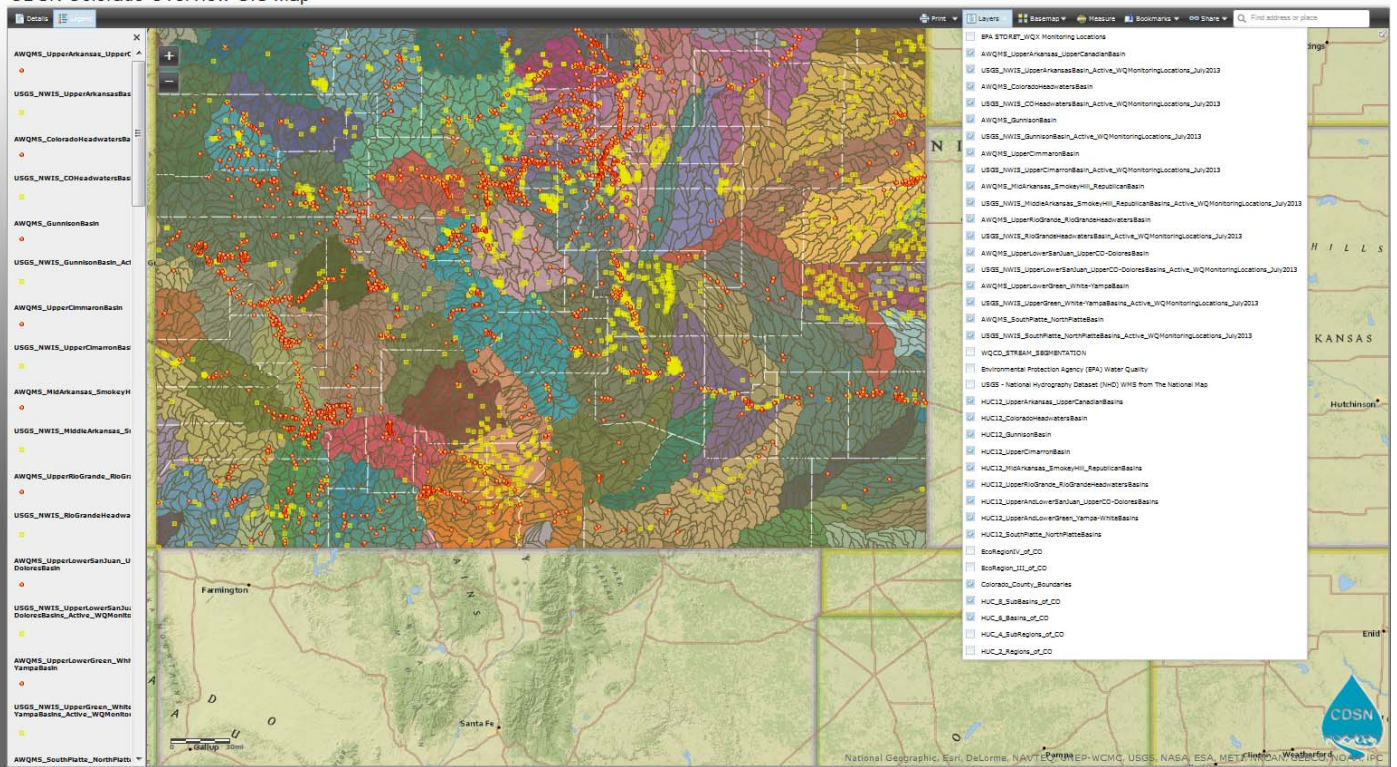


Figure 6: Showing the full list of layers, after using the Browser Zoom Out command several times. The last layer on the bottom of the list is "HUC_2_Regions_of_CO".

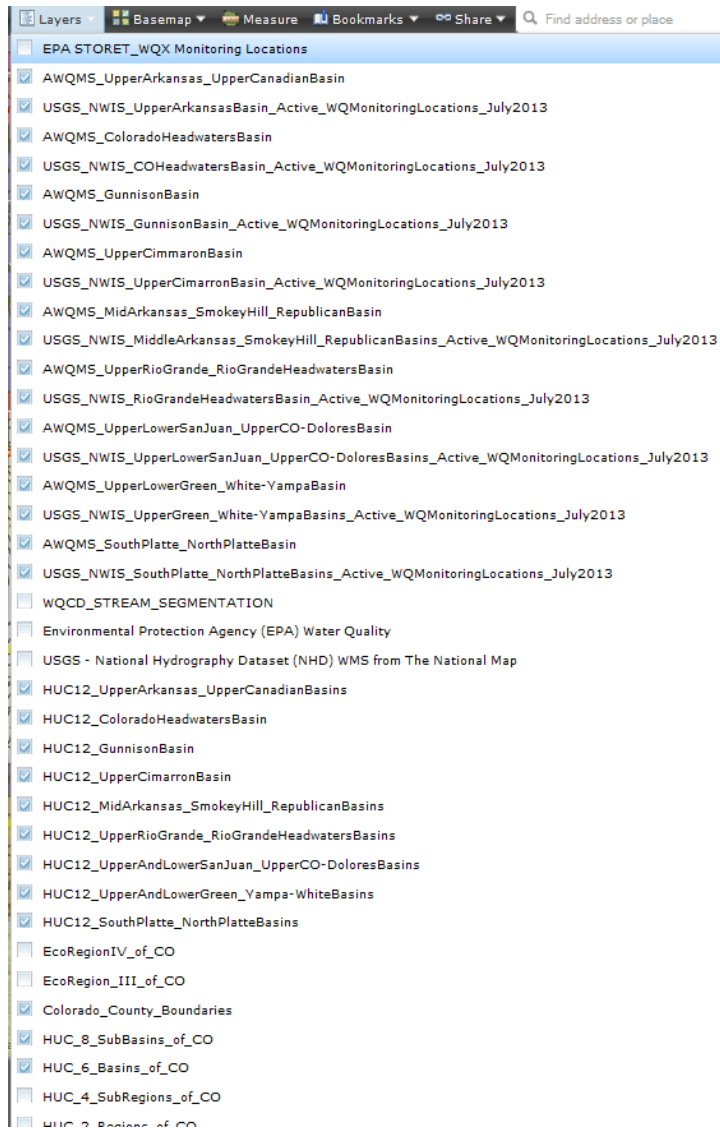


Figure 7: Showing the full list of layers, after using the Browser Zoom Out command several times. The last layer on the bottom of the list is "HUC_2_Regions_of_CO". **Default view has the EPA STORET_WQX Monitoring Locations, EPA RAD (305b, 303d, etc.), NHD, EcoRegion III, EcoRegion IV, HUC 4, and HUC 2 polygons turned off for faster loading. More information about data sources can be found on the CDSN GIS web page.**

9. You can select from different aerial, topographic, and terrain basemaps using the "**Basemap**" drop-down menu; basemaps will automatically change in scale and detail as you zoom in via the "+" and "-" zoom tools in the upper left of the map area.

CDSN Colorado Overview GIS Map

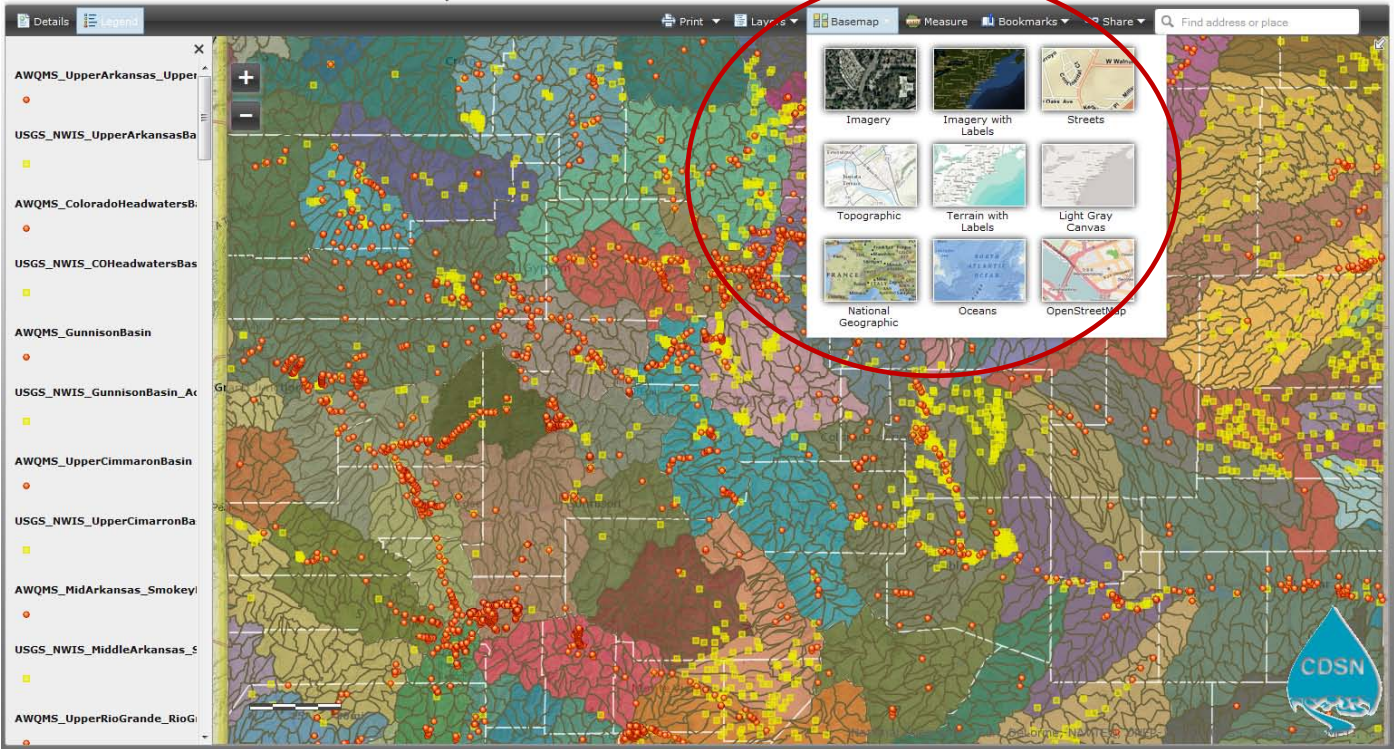


Figure 8: Showing the Basemap drop-down menu options -- click on your choice to switch basemaps.

10. Clicking on the **"Measure"** menu link will pop-up a Measure tool that will allow you to measure areas, distances, and locations in various units:

CDSN Colorado Overview GIS Map

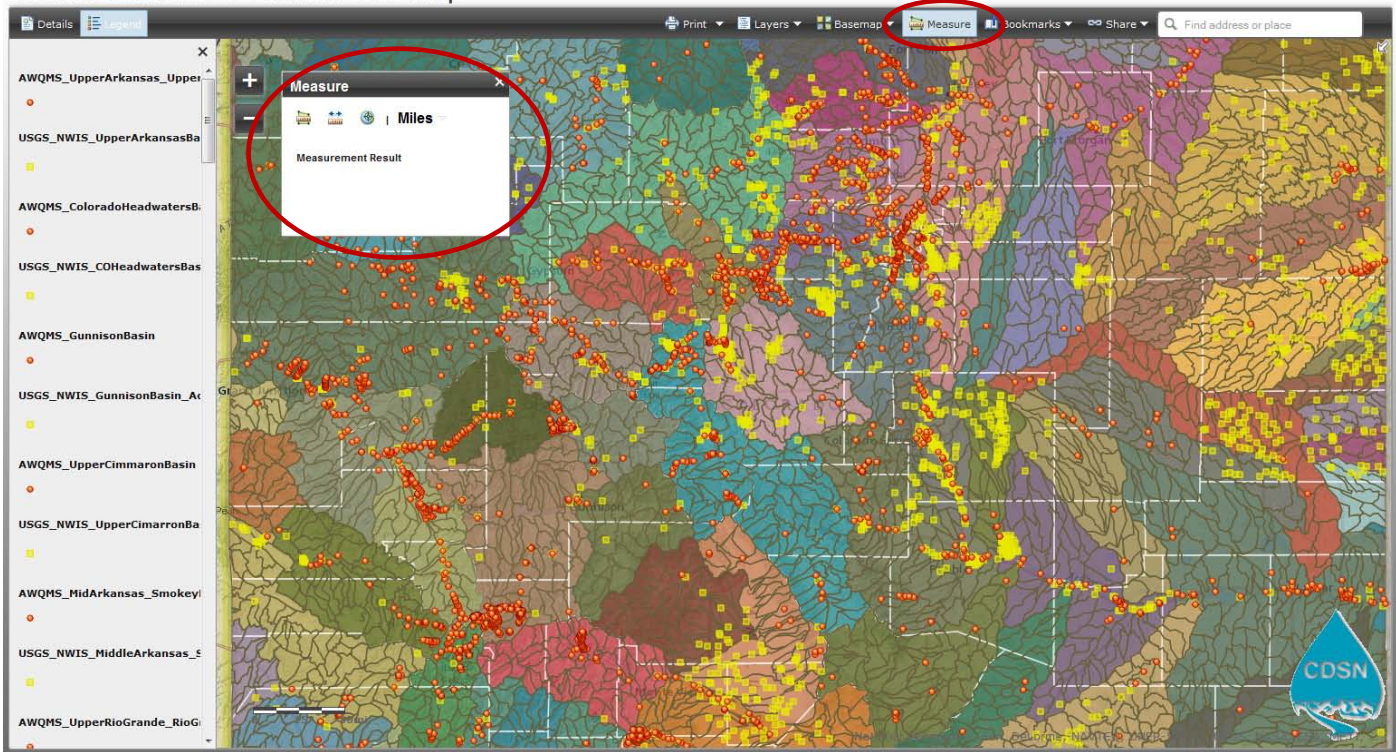


Figure 9: Showing the Measure pop-up box

To use this function, click on which measurement tool you want to use and select the units. We selected "distance" and used miles as the units. Click on a feature (we clicked on an AWQMS monitoring location in orange) and then click on another feature (we clicked on a proximal USGS NWIS monitoring location in yellow). The results are displayed in the Measure box while the green flags show what are the endpoints of our distance line:

CDSN Colorado Overview GIS Map

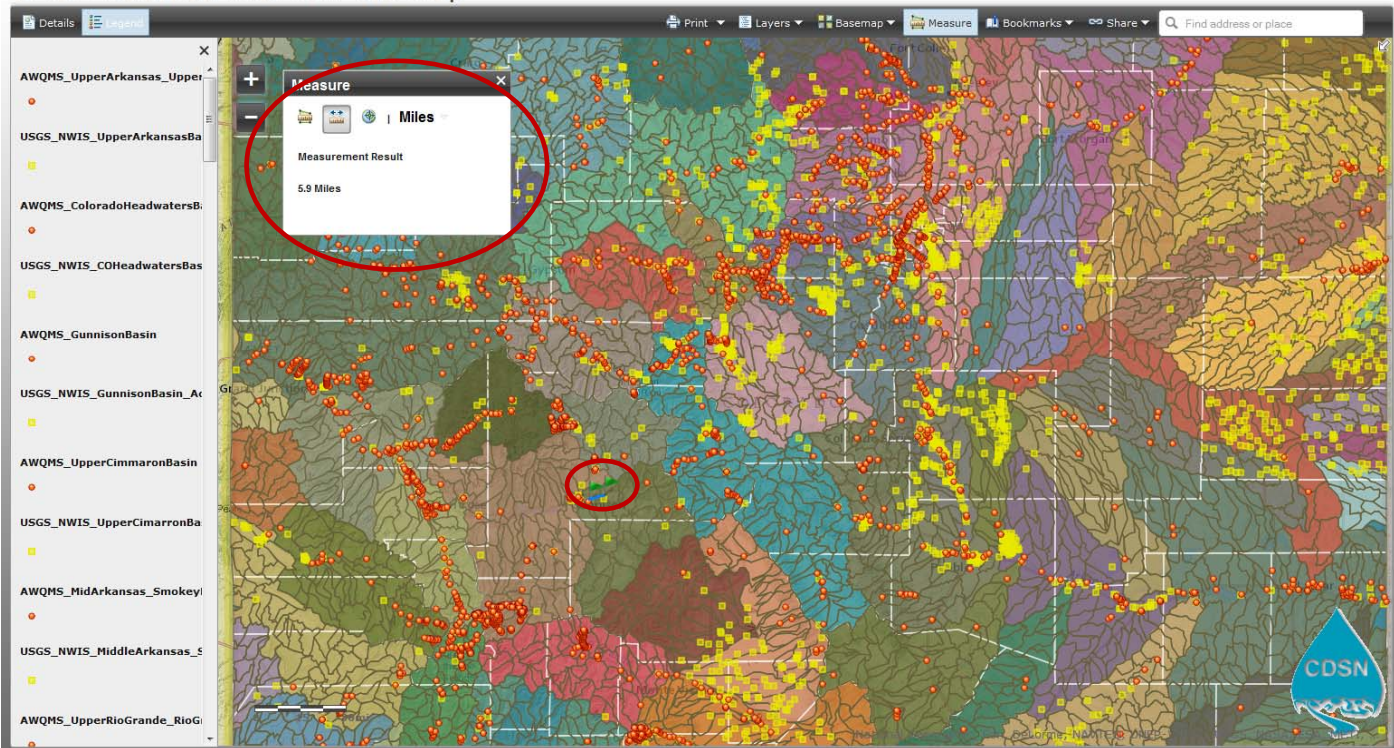


Figure 10: Showing the results of a simple distance measurement between two monitoring locations (shown with green flags) in Gunnison County - the result is 5.9 miles and is displayed in the Measure pop-up box.

11. The **"Bookmarks"** drop-down menu lets you select from several basin and/or subbasin views -- selecting one will automatically zoom the map to that view.

CDSN Colorado Overview GIS Map

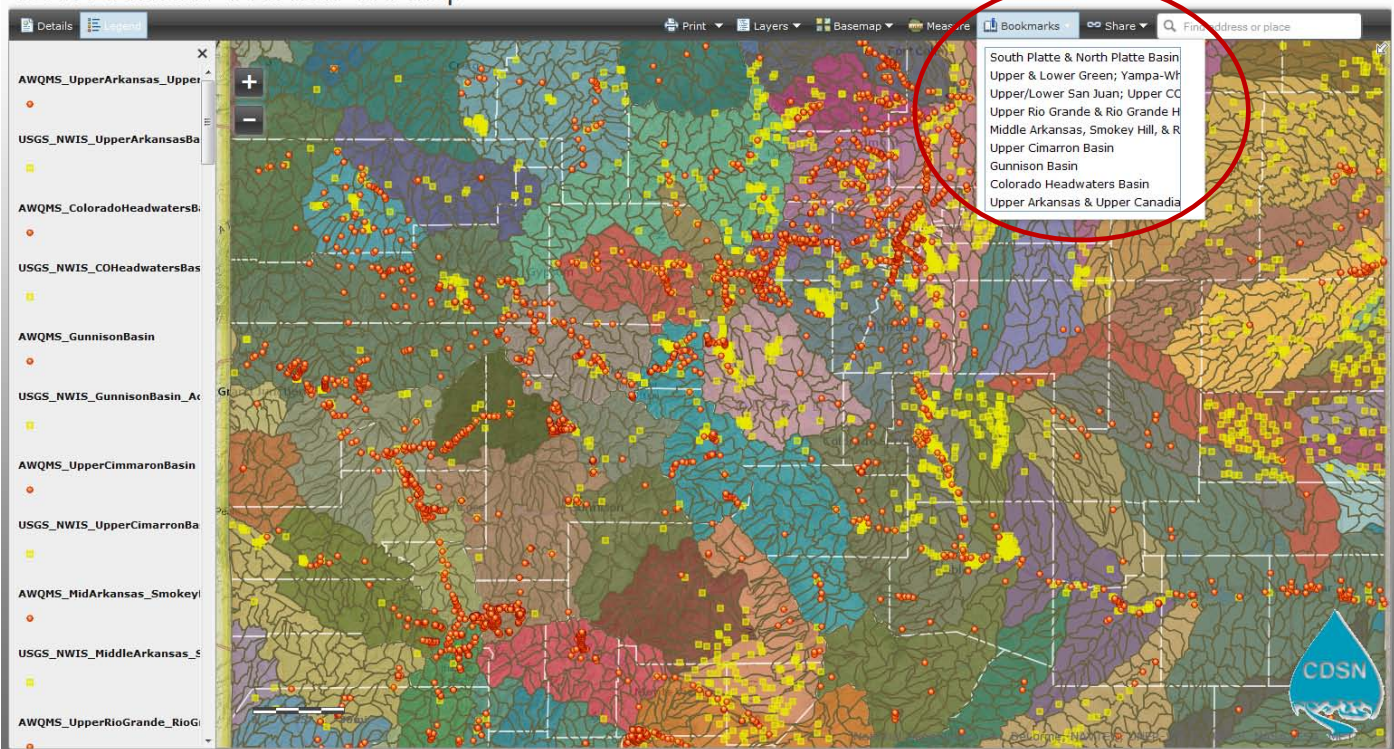


Figure 11: Showing the drop-down menu of several major basin/subbasin views within Colorado that you can jump to.

We selected Gunnison Basin:

CDSN Colorado Overview GIS Map

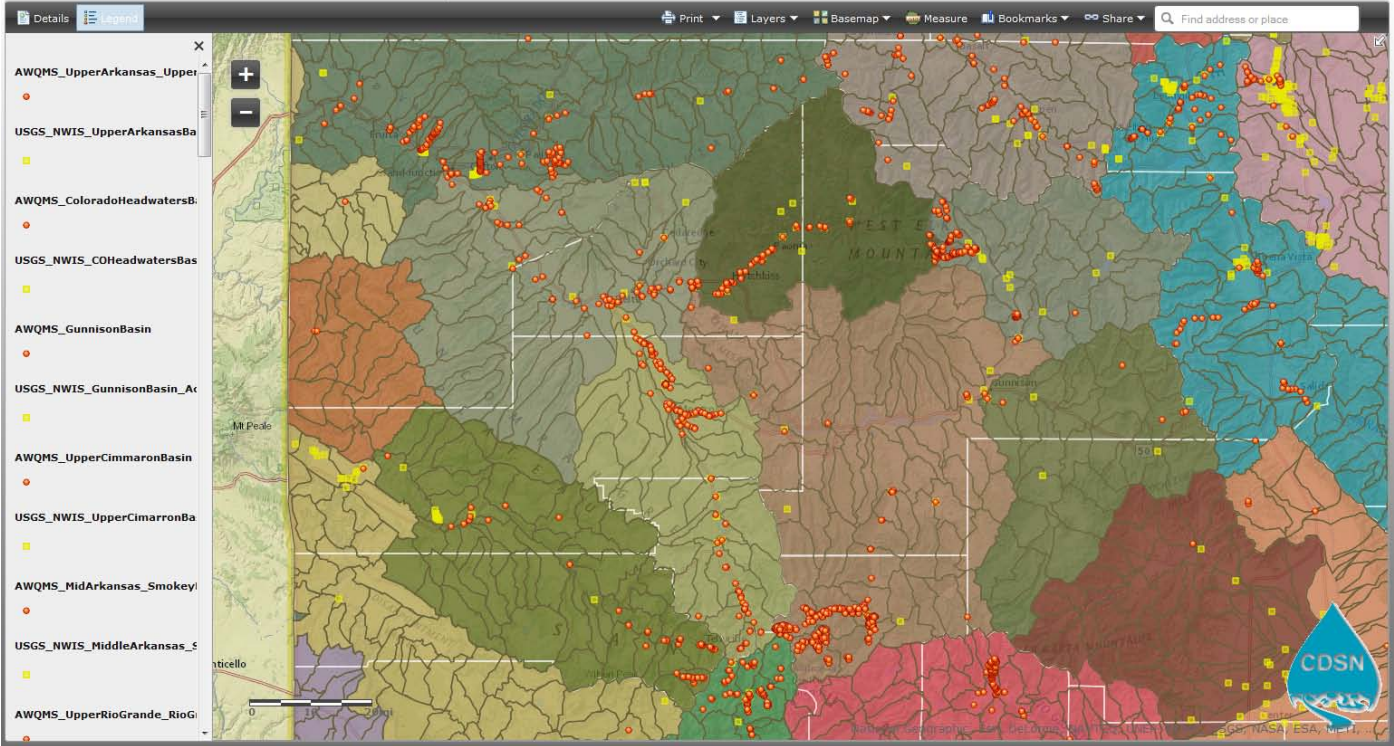


Figure 12: Showing the results if you select Gunnison Basin from the Bookmarks menu.

12. The **"Share"** drop-down menu will allow you to share this GIS application via email, Facebook, or Twitter:

CDSN Colorado Overview GIS Map

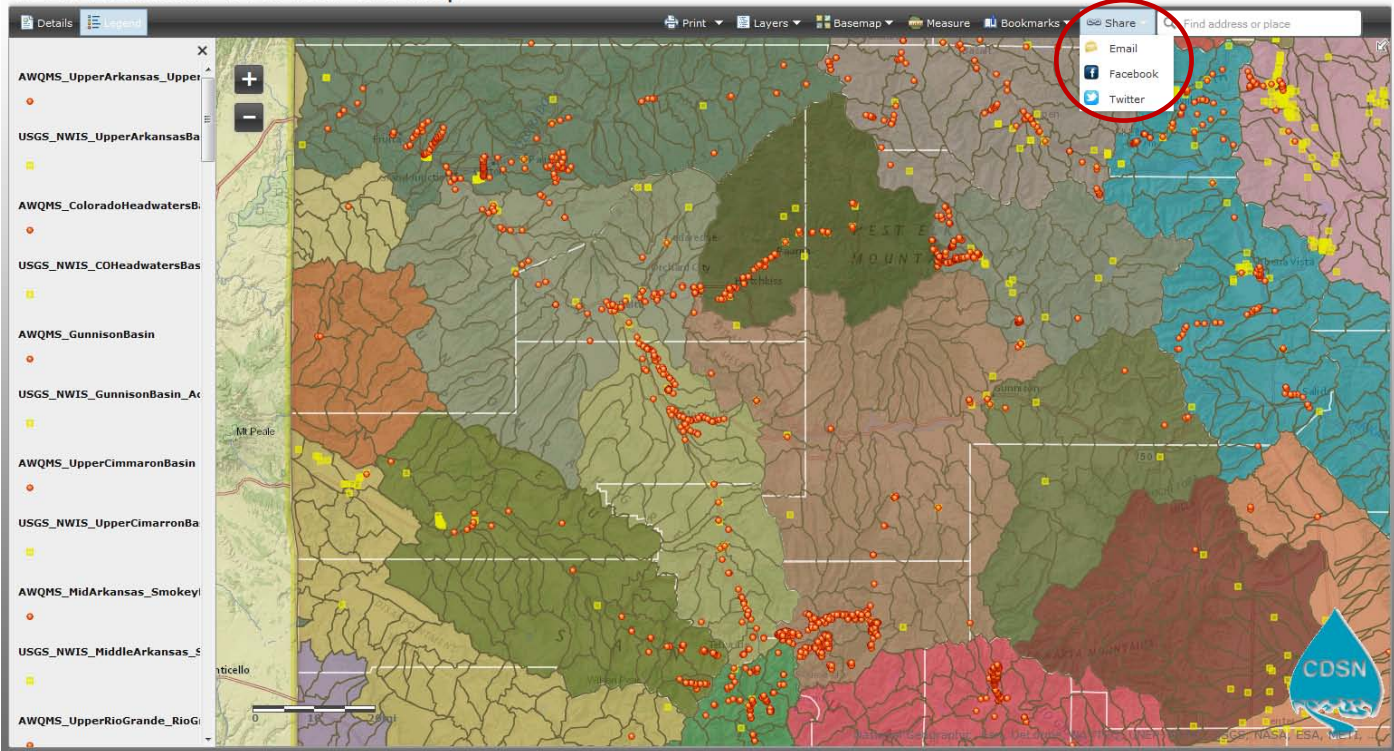


Figure 13: Showing the Share drop-down menu.

13. The "Find an address or place" search box will let you type in a place like a park, airport, town, creek (careful, there are many with the same names in Colorado), or even zip code. When you hit return it will zoom you to the result. Here we typed in Crested Butte and hit return.

CDSN Colorado Overview GIS Map

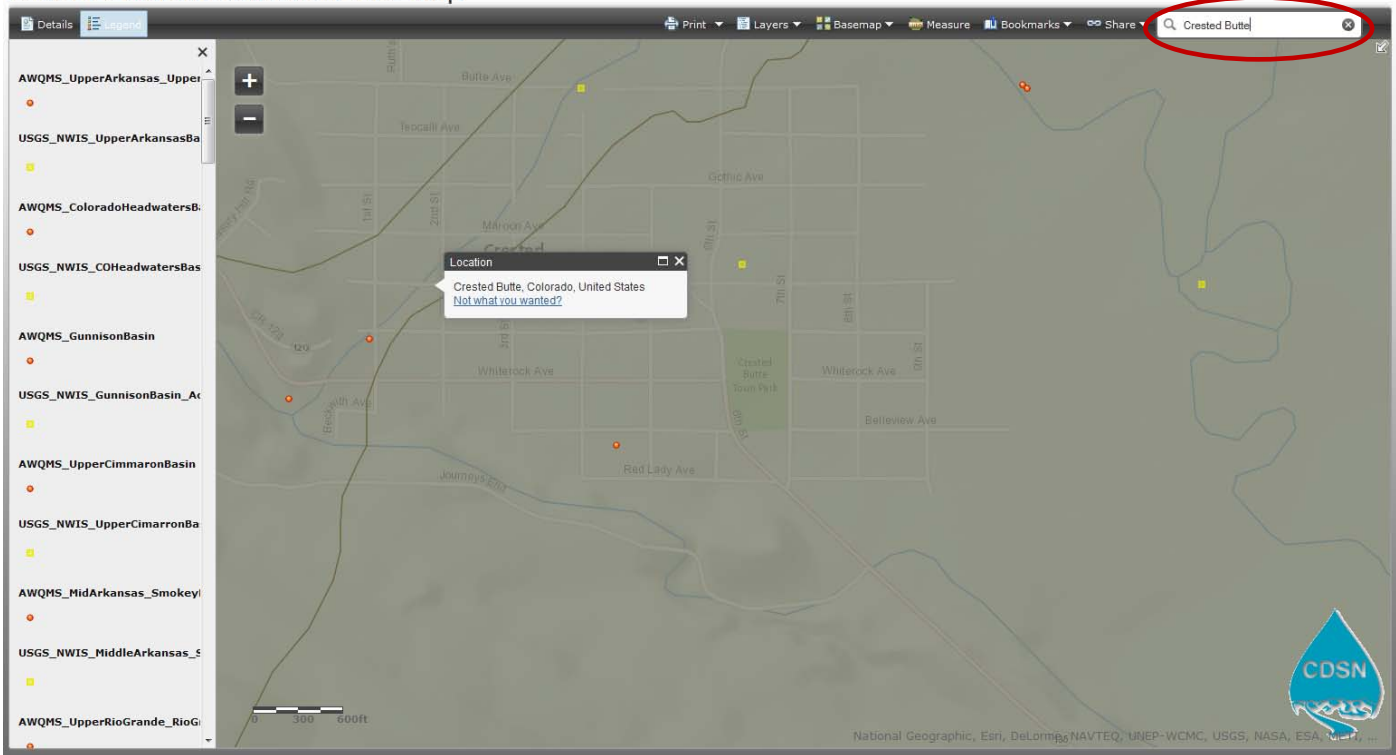


Figure 14: Showing the result if we type Crested Butte into the Find box.

14. To get metadata about any feature in active layer, just click on the feature. If multiple features are visible and present at the point that is clicked on, the metadata for each layer will be displayed. For example, we clicked on a USGS NWIS monitoring location. Note the pop-up detail box says "(1 of 8)" meaning that by clicking on the ">" arrow in the upper right of the pop-up box you will scroll through all 8 layers' metadata. By clicking on the square next to the arrow, you can enlarge the pop-up box.

CDSN Colorado Overview GIS Map

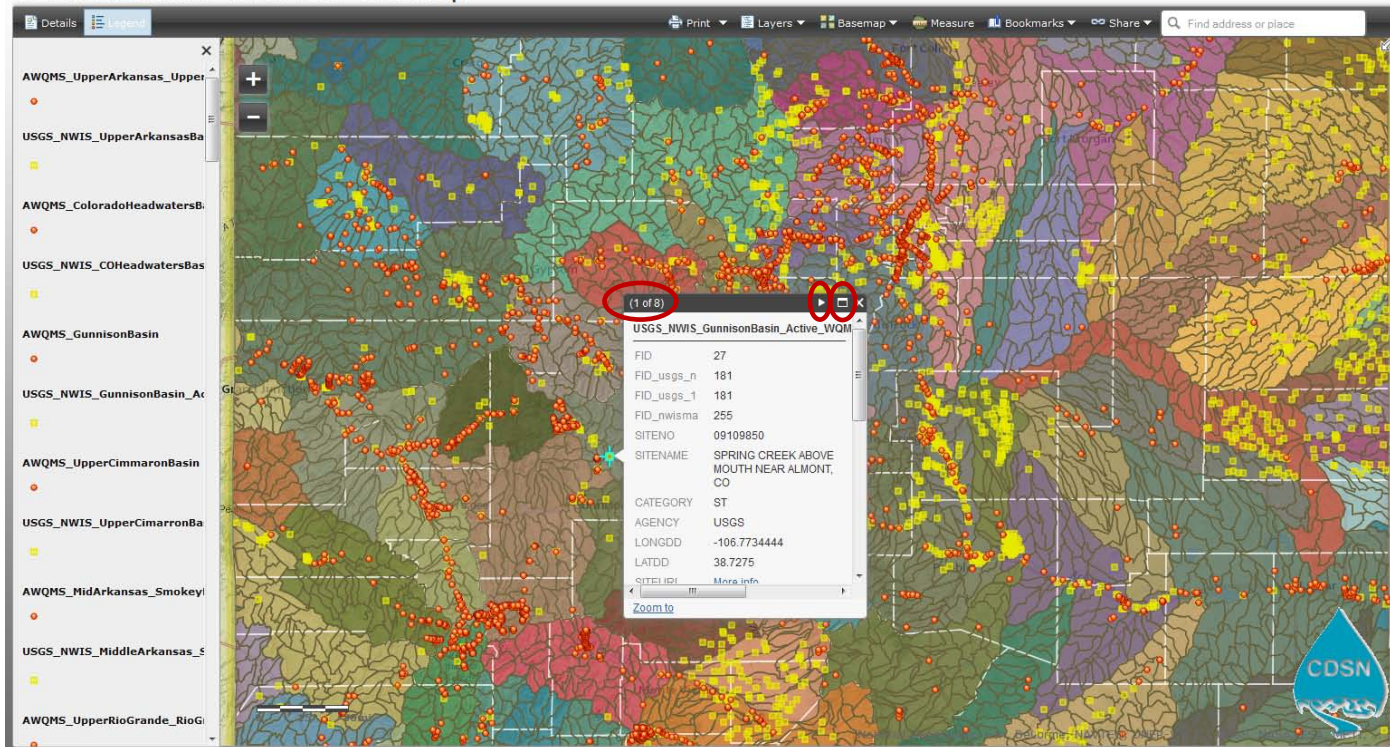


Figure 15: Showing the pop-up detail box from clicking on a USGS NWIS monitoring location.

Next, some helpful background information about the Monitoring Locations:

AWQMS Monitoring Locations (orange dots):

AWQMS monitoring locations were downloaded from the CDSN AWQMS data management system in early July, 2013. A shapefile was created, and additional metadata was added to it, including Organization ID; Monitoring Location ID; Monitoring Location Type (Media); Latitude; & Longitude.; full Organization Name; Contact info; and Monitoring Location Datum. In addition, HUC 2, 4, 6, 8, and 12 codes were added and the website for each organization was linked to the metadata so that the organization's website can be clicked on in a popup detail box which will immediately open an internet browser pointed to the website. The AWQMS monitoring locations had to be cut into 9 different shapefiles for uploading to ArcGIS Online, and the master shapefile for all of Colorado is downloadable from the CDSN GIS web page. We anticipate updating this shapefile with the new AWQMS monitoring locations at least annually, around April or May of each year. Multiple updates each year may be accomplished as needed if there are large numbers of new monitoring locations.

Sample list of metadata from an AWQMS monitoring location displayed in the pop-up detail box:

```
FID          248
Join_Count   1
```


Join_Cou_1 1
 ORGID CORIVWCH_WQX
 MLID 989
 MLNAME Blw Repository
 TYPE River-Stream
 COUNTY Saguache
 STATE CO
 LAT 38.30
 LONG -106.20
 HORIDATM NAD83
 ELEV 7913
 EUNIT ft
 WELLTYPE 0
 WDEPTH 0.00
 WDUNIT 0
 HUC8GEN 0
 X -106.15
 Y 38.27
 OID_ 15
 ORGID_1 CORIVWCH_WQX
 ORGNAME COLORADO RIVERWATCH
 WEBSITE [More info](#)
 REGION Rio Grande Region
 SUBREGION Rio Grande Headwaters
 BASIN Rio Grande Headwaters
 SUBBASIN San Luis
 HUC_2 13
 HUC_4 1301
 HUC_6 130100
 HUC_8 13010003
 HUC_12 130100030102
 HU_12_Name Cottonwood Creek-Kerber Creek
 HU_12_Type S
 TNMID {F4F90C4F-D7E1-4D53-B36D-E231893EE5A3}
 CNTY 109
 NAME SAGUACHE
 CreationDate 7/10/2013
 Creator cdsngis
 EditDate 7/10/2013
 Editor cdsngis

USGS NWIS Monitoring Locations (yellow squares):

Active USGS NWIS monitoring locations having water quality data stored in NWIS were downloaded from the USGS NWIS Mapper in early July 2013. These files came with full metadata, including a url that links directly to the USGS web page with data details and data downloads for the monitoring location. In addition, HUC 2, 4, 6, 8, and 12 codes were added to the resulting shapefile. The USGS monitoring locations had to be cut into 9 different shapefiles for uploading to ArcGIS Online, and the master shapefile for all of Colorado is downloadable from the CDSN web page. We anticipate updating this shapefile with the new AWQMS monitoring locations annually, around April or May of each year, at the same time of the AWQMS monitoring locations updates. USGS monitoring locations are generally stable in number and location.

Sample list of metadata from a USGS monitoring location displayed in the pop-up detail box:

FID	20
FID_usgs_n	156
FID_usgs_1	156
FID_nwisma	247
SITENO	09114500
SITENAME	GUNNISON RIVER NEAR GUNNISON, CO.
CATEGORY	ST
AGENCY	USGS
LONGDD	-106.9497661
LATDD	38.54193567
SITEURL	More info
CNTY	51
NAME	GUNNISON
REGION	Upper Colorado Region
SUBREGION	Gunnison
BASIN	Gunnison
SUBBASIN	Upper Gunnison
HUC_2	14
HUC_4	1402
HUC_6	140200
HUC_8	14020002
LoadDate	10/14/2012
HUC_12	140200020204
HU_12_Name	Steers Gulch-Gunnison River
HU_12_Type	W
TNMID	{375ACC7E-8640-4150-8954-ED8424C09197}

EPA STORET_WQX Monitoring Locations (green triangles, when layer is turned on and sufficiently zoomed into):

The EPA STORET/WQX monitoring locations are provided via a live link to the monitoring locations through the EPA web service (http://watersgeo.epa.gov/ArcGIS/rest/services/OWRAD/STORET_WMERC/MapServer). Since this is a live link to an EPA web server, these monitoring locations will not need to be updated annually.

Sample list of metadata from a STORET_WQX monitoring location displayed in the pop-up detail box:

Water Monitoring Locations : COAL-02	
COMID	39,332
PERMANENT_IDENTIFIER	{91B799DC-7D54-7FE5-E040-0A0AE9010186}
EVENTDATE	
REACHCODE	14020001000416
REACHSMDATE	12/31/1989
REACHRESOLUTION	3
FEATURECOMID	1,332,946
FEATURE_PERMANENT_IDENTIFIER	
FEATURECLASSREF	3
SOURCE_ORIGINATOR	STANDARD
SOURCE_DATADESC	332225
SOURCE_FEATUREID	COAL-02
FEATUREDETAILURL	
MEASURE	1.05
EVENT_OFFSET	0.00
EVENTTYPE	STORET
GEOGSTATE	CO
CYCLE_YEAR	
START_DATE	6/30/2010
END_DATE	
WBD_HUC12	140200010204
WBD_HUC12_PERCENT	1.00
NAVIGABLE	Y
VERTICES	1

16. Viewing Assessed and Impaired waters and stream segmentation:

For several technical reasons the NHD+, 305 (b), and 303 (d) data are linked to the WebGIS via WQCD, EPA or USGS web services so that these files are able to be automatically updated. NHD segmentation and other metadata within the assessed and impaired waters datasets maintained by CDPHE (formerly EPA) are in the process of being re-segmented and are experiencing ongoing and very frequent updates. The sheer volume of vectors in these shapefiles precludes cutting them into 1,000 vector files as the files would number in the hundreds and not only would be unwieldy for users, they would be expensive to update. Therefore, the CDSN WebGIS application utilizes live links to the best available NHD+ GIS data via a web service: USGS - National Hydrography Dataset (NHD) WMS from The National Map <http://services.nationalmap.gov/ArcGIS/rest/services/nhd/MapServer>. The medium resolution shapefile (600mb) obtained from the USGS is available for download via the CDSN web site.

The draft CDPHE stream segments for 2012-present (in which many stream segments have different identifiers than the 2010 dataset) are joined via a live link via a web service:

WQCD_STREAM_SEGMENTATION -

http://maps.dphe.state.co.us/ArcGIS/rest/services/WQCD/WQCD_STREAM_SEGMENTATION/MapServer

The full and latest available EPA RAD data layers (vintage 2010) are similarly joined via a live link via a web service: Environmental Protection Agency (EPA) Water Quality:

http://watersgeo.epa.gov/ArcGIS/rest/services/OWRAD/ALL_OW RAD_NAD83/MapServer. This allows for

quick disconnect by unlinking the service and connecting to a WQCD live link as soon as the data becomes available for 2012 - present in a way WQCD is comfortable with releasing to the public.

To explore these features in the CDSN WebGIS application make sure you have used the Layers menu and checked these boxes into the 'on' position:

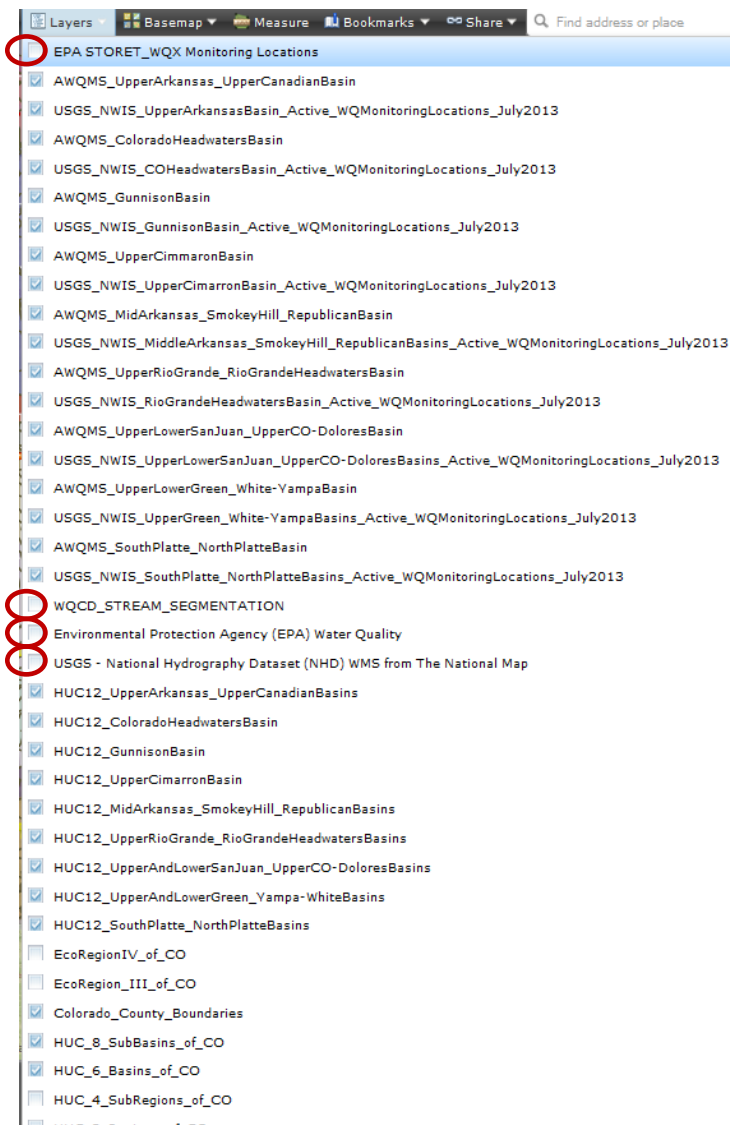


Figure 16: Showing the Layers drop-down menu where boxes must be checked to display the WQCD stream segmentation (draft 2012), EPA RAD datasets (2010), USGS NHD+ datasets (2010), and EPA STORET_WQX monitoring locations, if desired.

By connecting via live link to the EPA RAD map server, we are linking to 303(d), 305(b), CBR, CWNS, FISH, FSHTD (fish tissue data), GRTS (non point source features), PCS, TMDL, and WQS (water quality standards) data -- all of which features a url to the EPA RAD detail web page in the feature's popup metadata. For more information about these data sets please see the documentation on the CDSN WebGIS webpage. The EPA data is slow to load because it is loading data from two different web servers. If you are zooming into an area that you suspect has been assessed or even has impaired waters or a TMDL, please be patient. Many of the EPA features will have url's in the pop-up detail box that you can click for more information; these url's open web pages for the specific feature on the EPA's web site.

CDSN Colorado Overview GIS Map

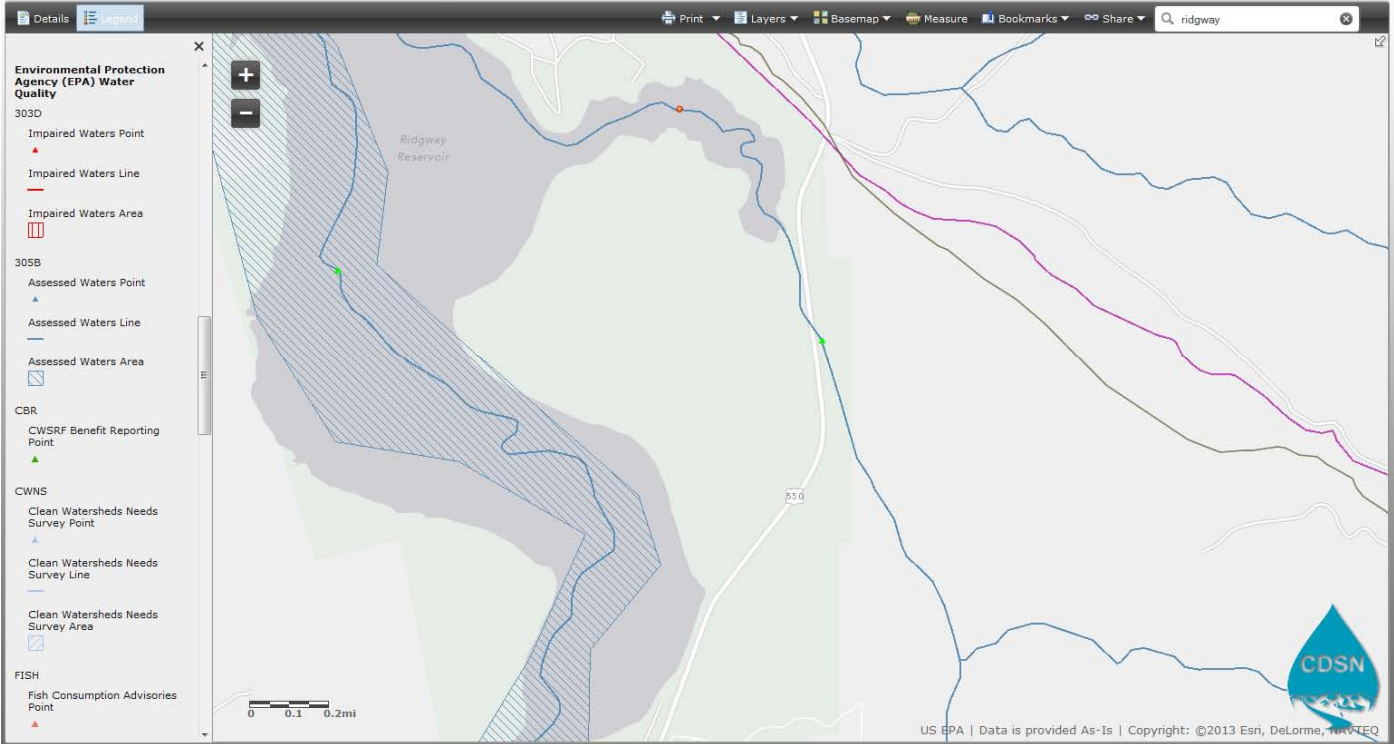


Figure 17: Showing the EPA RAD datasets, which become visible in the legend and on the map when sufficiently zoomed in close enough.

CDSN Colorado Overview GIS Map

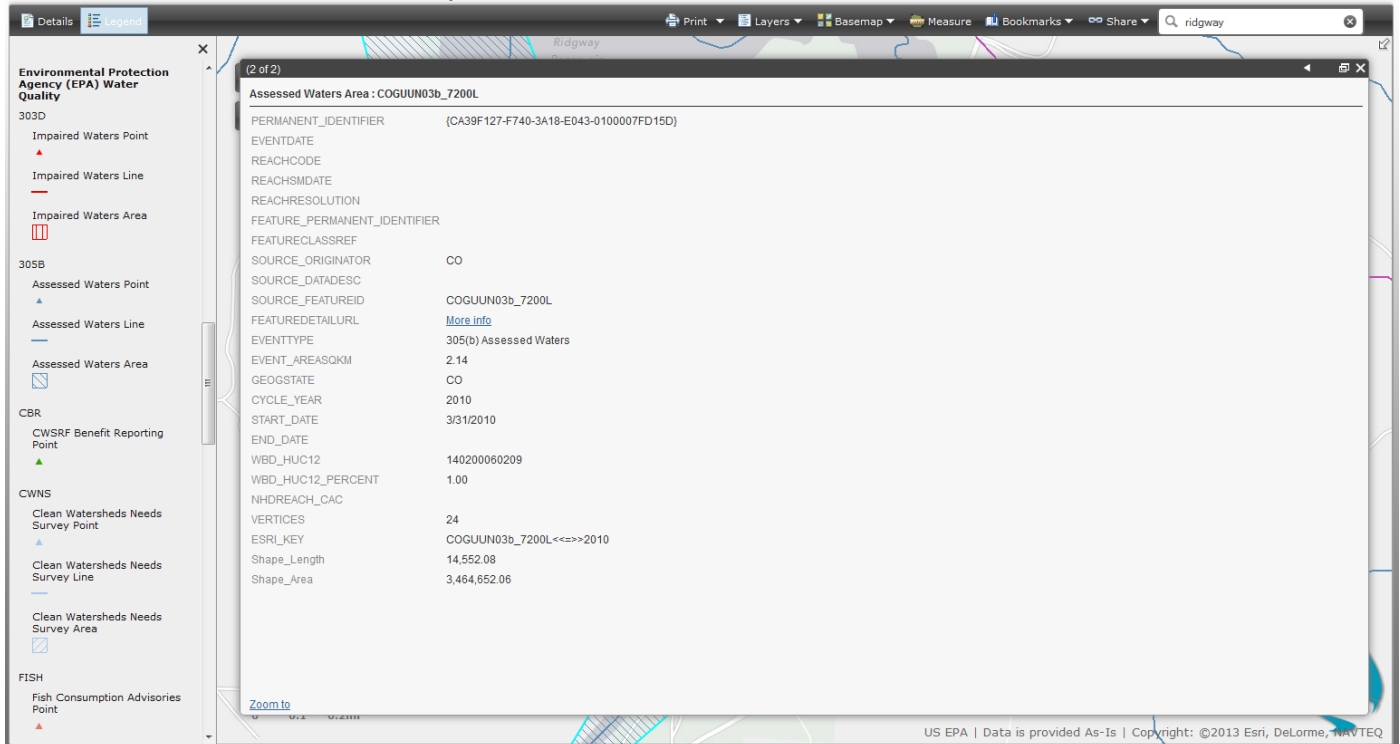


Figure 18: Showing the pop-up detail on the Ridgway Reservoir assessed waters polygon.

17. One limitation of the EPA web service is that we cannot alter the symbology of their features. Unfortunately, they have all of their line symbols the same width, so that an assessed water (blue) line overlies a yellow TMDL line of the same thickness. By clicking on a segment of the Animas River near Silverton, we will get pop-up detail for 4 different layers, including both the assessed waters metadata and the TMDL metadata, although it wasn't obvious from the map that there was a TMDL on this segment.

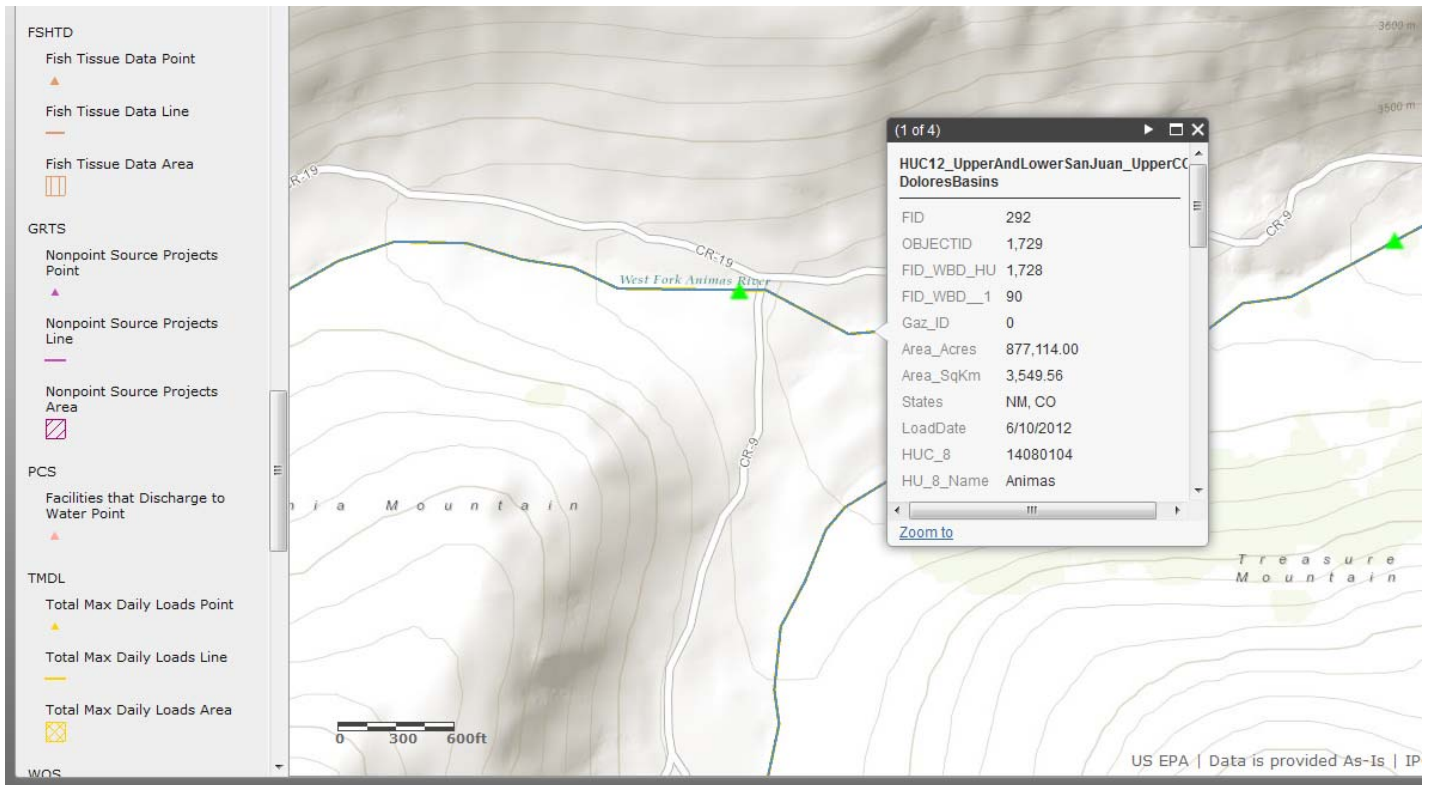


Figure 19: Showing the pop-up detail on an Animas River segment.

CDSN Colorado Overview GIS Map

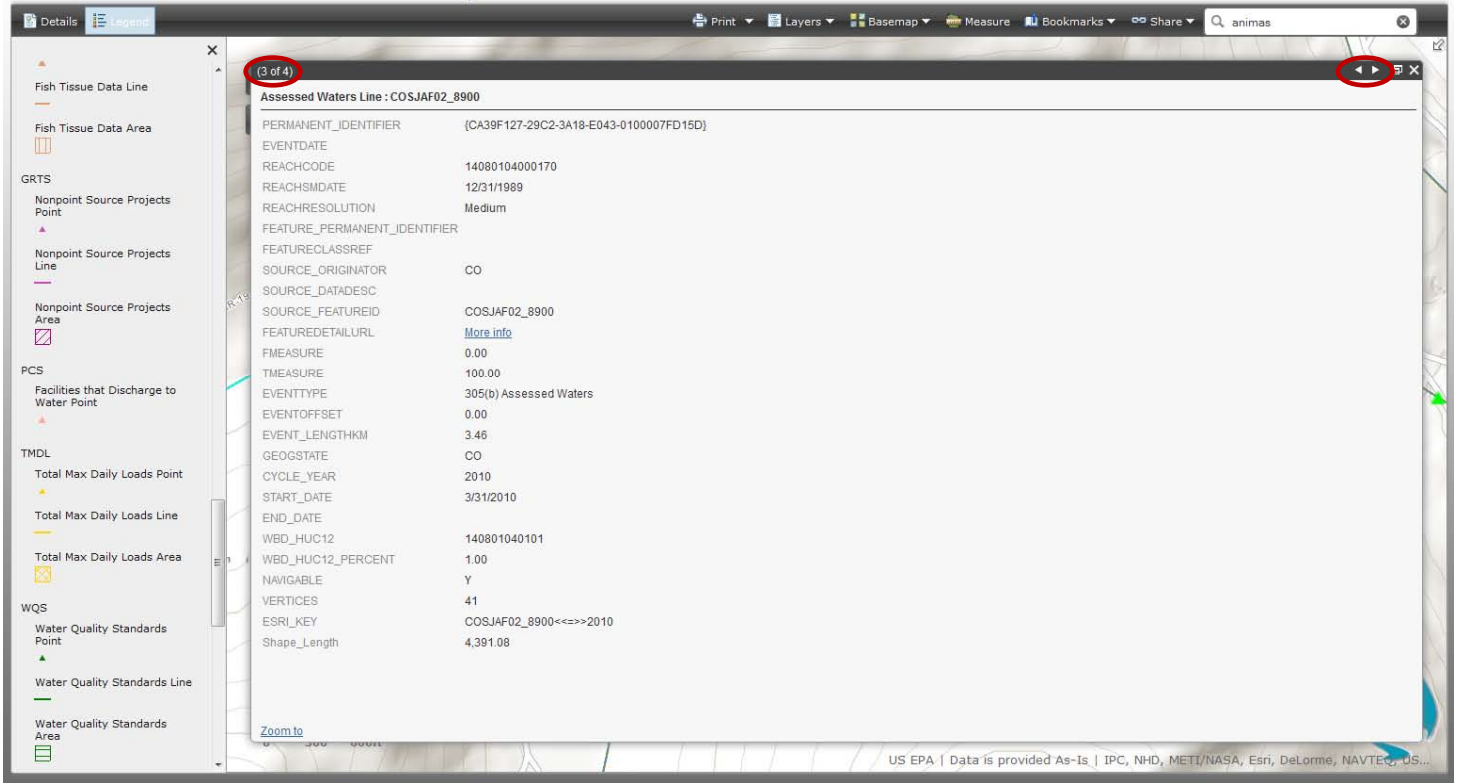


Figure 20: Showing the pop-up detail on an Animas River segment -- (3 of 4) is the Assessed Waters Line metadata, including a url link to the EPA website page for this feature.

CDSN Colorado Overview GIS Map

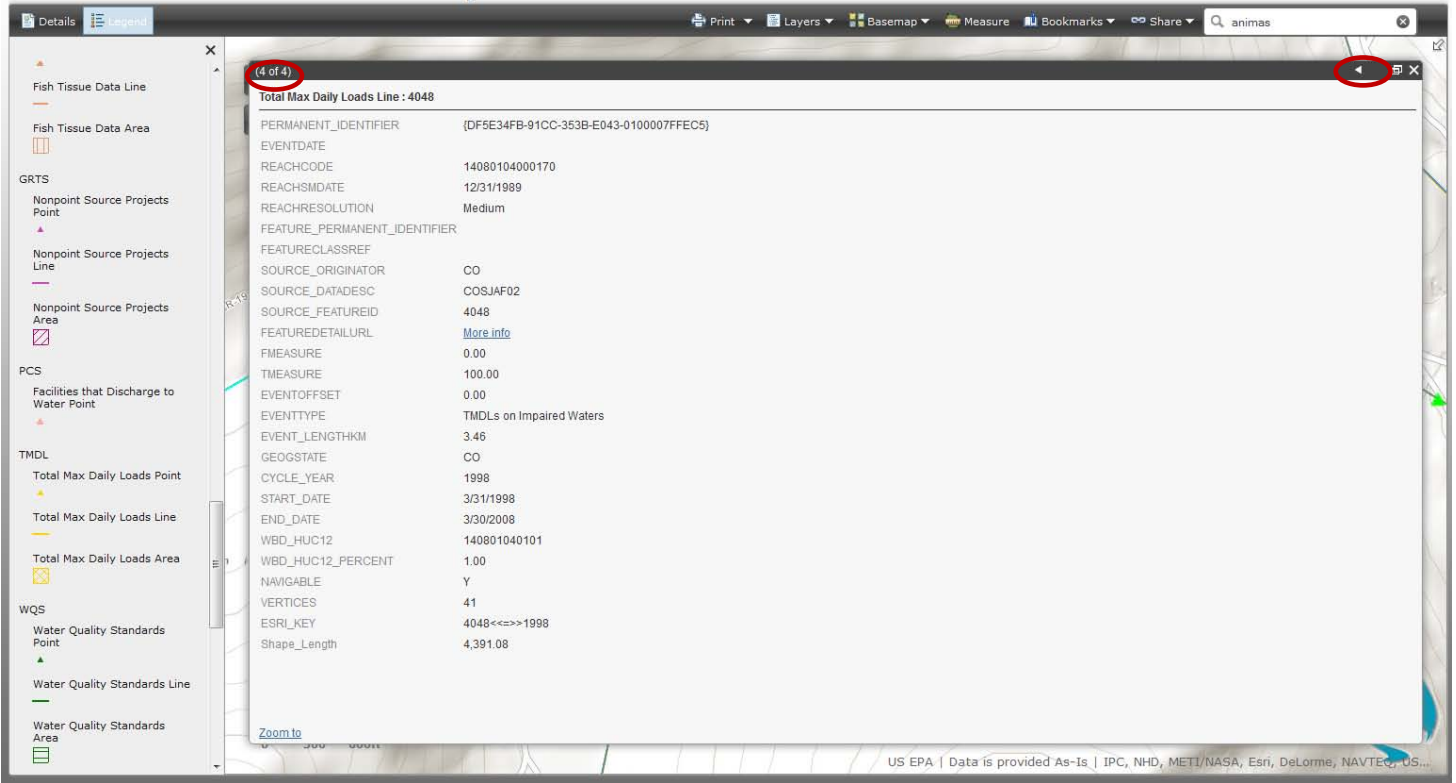


Figure 21: Showing the pop-up detail on an Animas River segment -- (4 of 4) is the Total Max Daily Loads Line metadata, including a url link to the EPA website page for this feature.

In addition you can download the GIS files created for this application straight from the CDSN GIS web page, if you wish to bypass ArcGIS Online and simply use your ArcGIS desktop or another GIS program. Below is a list of GIS layers you can download from the CDSN GIS webpage as of July 30, 2013:

DOWNLOADABLE GIS FILES -- Provided as zipped shapefiles for the most versatility. All GIS Files are considered the best available public information as of July 1, 2013. This GIS map application and its data layers were created, modified or obtained by CDSN in cooperation with Water Quality Control Division, EPA, and USGS. While we used the best available data in July 2013, we do not guarantee accuracy of data. Please contact the CDPHE Water Quality Control Division (WQCD) for revisions and updates <http://www.colorado.gov/cs/Satellite/CDPHE-WQCC/CBON/1251583391523>, or the primary agency as noted below.

Baselayers	Monitoring Locations
<ul style="list-style-type: none"> § Colorado State Boundary (polygon) § Colorado County Boundary (polygon) § HUC 2 Boundary, Colorado clip (polygon) § HUC 4 Boundary, Colorado clip (polygon) § HUC 6 Boundary, Colorado clip (polygon) § HUC 8 Boundary, Colorado clip (polygon) [6 mb] § HUC 12 Boundary, Colorado clip (polygon) [28 mb], courtesy of USGS, dated July 2013. § EcoRegion III, Colorado clip (polygon) § EcoRegion IV, Colorado clip (polygon) § National Hydrologic Dataset, Colorado clip (point, line, polygon) [616 mb], courtesy of USGS, dated June 2013. ☞ EPA Reach Address Dataset Download Center (305b, 303d, etc.) ☞ EPA Reach Address Dataset ArcGIS webservice (to connect to in your desktop GIS): http://watersgeo.epa.gov/arcgis/services 	<ul style="list-style-type: none"> AWQMS § CDSN AWQMS Monitoring Locations -- with County, HUC8, and HUC12 codes and organization websites USGS § Active USGS NWIS Water Quality Data Monitoring Locations (Stream, Surface Water, Other Surfical, Groundwater) -- with County, HUC8, and HUC12 codes and weblink to details & data STORET ☞ EPA Reach Address Dataset Download Center (ORAD STORET MERC) ☞ EPA Reach Address Dataset ArcGIS webservice (to connect to in your desktop GIS) -- monitoring locations can be displayed, queried(identified), and found: http://watersgeo.epa.gov/arcgis/services

Last, please again note that this GIS utility allows for use of GIS data in 4 different platforms: The Web Application (no login), and with an ArcGIS User Account login: ArcGIS Online ArcExplorer, ArcGIS Online Map Viewer, and ArcGIS Desktop. This quick start-guide is provided to help the public access the application in the simplest way, without needing an ESRI User Account. More advanced features can be accessed by using this application in the ArcGIS Online environment with a User Account or ArcGIS Desktop. For more information on these other options, please see our "ArcGIS Online with User Account" guide and other tutorials on our CDSN WebGIS webpage.