Colorado's Water Data Initiatives

National Water Use Data Workshop
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COLORADO'S
Decision Support Systems
CWCB / DWR

Data Centered • Transparent • Reproducible

- Joint program between Colorado Water Conservation Board (CWCB) and Colorado Division of Water Resources (DWR)
- Approximately 120 water commissioners (from Colorado's DWR) gather data and administer rivers
- The CWCB performs planning studies and uses water data for use in modeling and quantification of water use and demands

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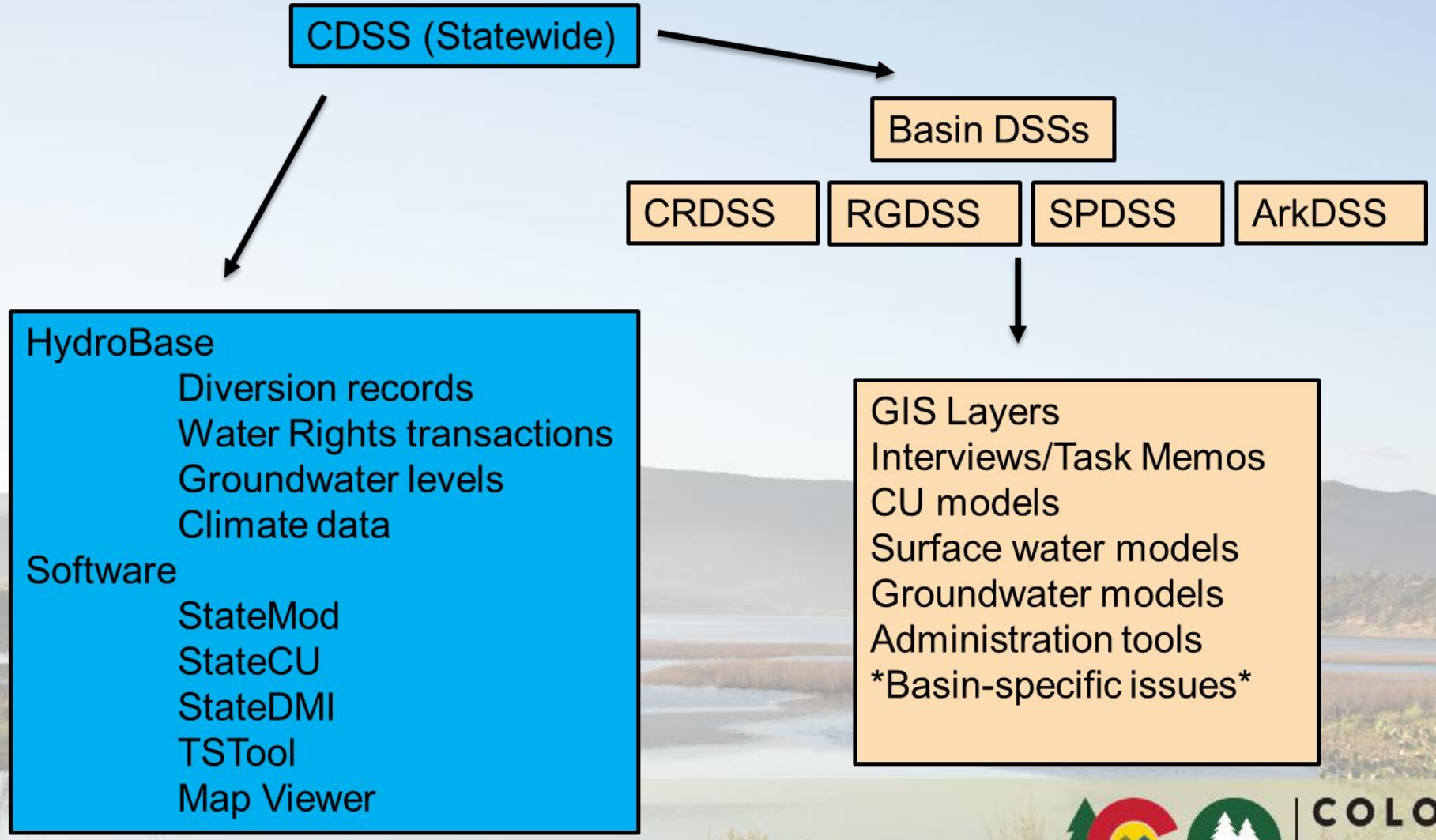
Colorado's Decision Support Systems (CDSS) History

- Colorado River Decision Support Systems (CRDSS) Feasibility Study 1992-1993 (Dames & Moore and CADSWES)

- Enhancements have typically come through Basin DSS efforts
  - CRDSS (CO River) in 1993
  - RGDSS (Rio Grande) in 1998
  - SPDSS (South Platte River) in 2001
  - ArkDSS (Arkansas River) in 2011

- CDSS was created to streamline data and tools statewide

Basin DSS Approach



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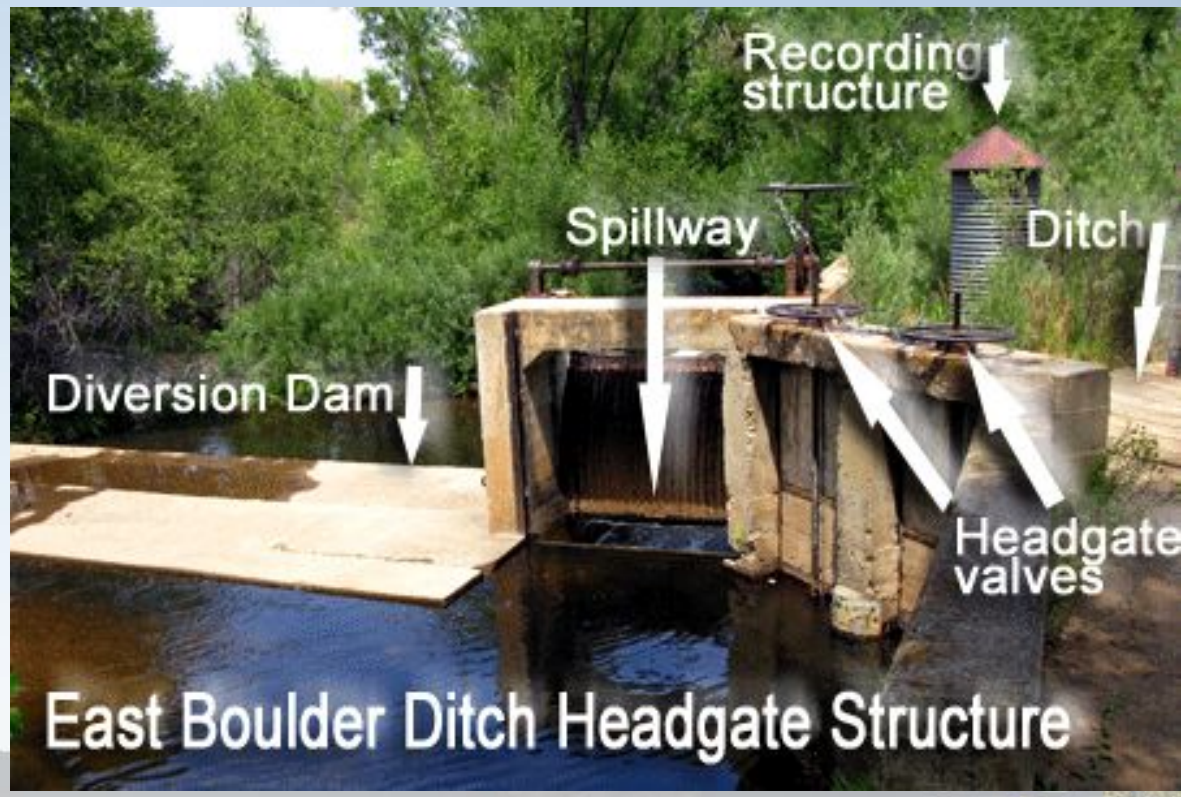
CDSS Tools

- HydroBase (SQL database)
- Online Data Tools
- GIS / Map Viewer
- Crop Consumptive Use Modeling (StateCU) Datasets
- Water Allocation Modeling (StateMod) Datasets
- Supporting software (TSTool, StateDMI, StateDGI, Lease Fallow Tool, etc.)

Publicly available at:
cdss.colorado.gov

HydroBase Data Types

- Diversions
- Well Metering
- Streamflow
- Reservoir Stage and Releases
- Water Rights
- Call Chronology
- Aquifer Levels
- Climate data
- GIS
  - Crop acreage and type
  - Structure locations



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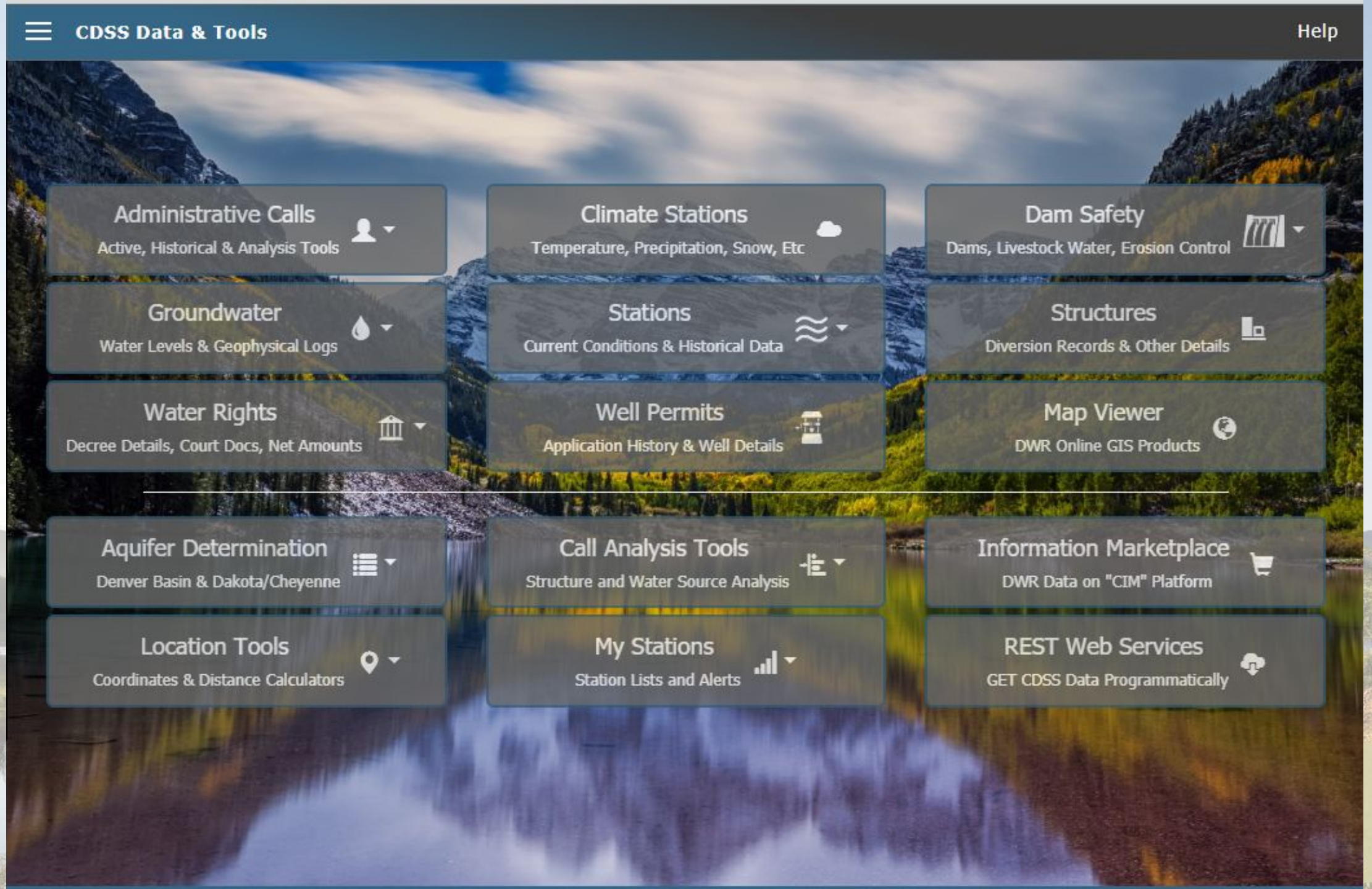
Online Data Tools

- Query and visualization of HydroBase
- Call Analysis Tool
- Aquifer Determination Tool
- My Stations / Alerts
- Colors of Water
- REST Web services

dwr.state.co.us/Tools


CDSS Data & Tools
Help
Administrative Calls
Active, Historical & Analysis Tools
Climate Stations
Temperature, Precipitation, Snow, Etc
Dam Safety
Dams, Livestock Water, Erosion Control
Groundwater
Water Levels & Geophysical Logs
Stations
Current Conditions & Historical Data
Structures
Diversion Records & Other Details
Water Rights
Decree Details, Court Docs, Net Amounts
Well Permits
Application History & Well Details
Map Viewer
DWR Online GIS Products
Aquifer Determination
Denver Basin & Dakota/Cheyenne
Call Analysis Tools
Structure and Water Source Analysis
Information Marketplace
DWR Data on "CIM" Platform
Location Tools
Coordinates & Distance Calculators
My Stations
Station Lists and Alerts
REST Web Services
GET CDSS Data Programmatically

Water Rights - Transactions

Water Right Name: GUNNISON RIVER (NAT PARK) (6201498) **Permit:**

Structure Type: Minimum Flow **Water Source:** GUNNISON RIVER

Location

Water Right Net Amounts

Structures | Report | Help | Login

Structure Overview | Diversion Records | Water Rights | Measuring Points | Irrigated Lands | Imaged Documents

Structure Name MOFFAT WATER TUNNEL (5104655)
Structure Type PIPELINE
CIU Code Active Structure with contemporary diversion records (A)
Associated Permits
Water Source Type Tributary
Water Source FRASER RIVER [00178386] @ Stream Mile: 25.36

Search Fields

Record Type: Diversions - Summary

Full Record: **1975 to 2017**

From 1975 To 2017

Totals Water Classes

Include all associated water classes

Water Class
5104655 S:1 F: U:0 T: G: To:
5104655 S:1 F: U:2 T: G: To:
5104655 S:1 F: U:Q T: G: To:
5104655 S:1 F: U:Q T: G: To:5101327
5104655 S:1 F: U:Q T:0 G: To:

5 1 - 5 of 18 items

Search

Graph Options

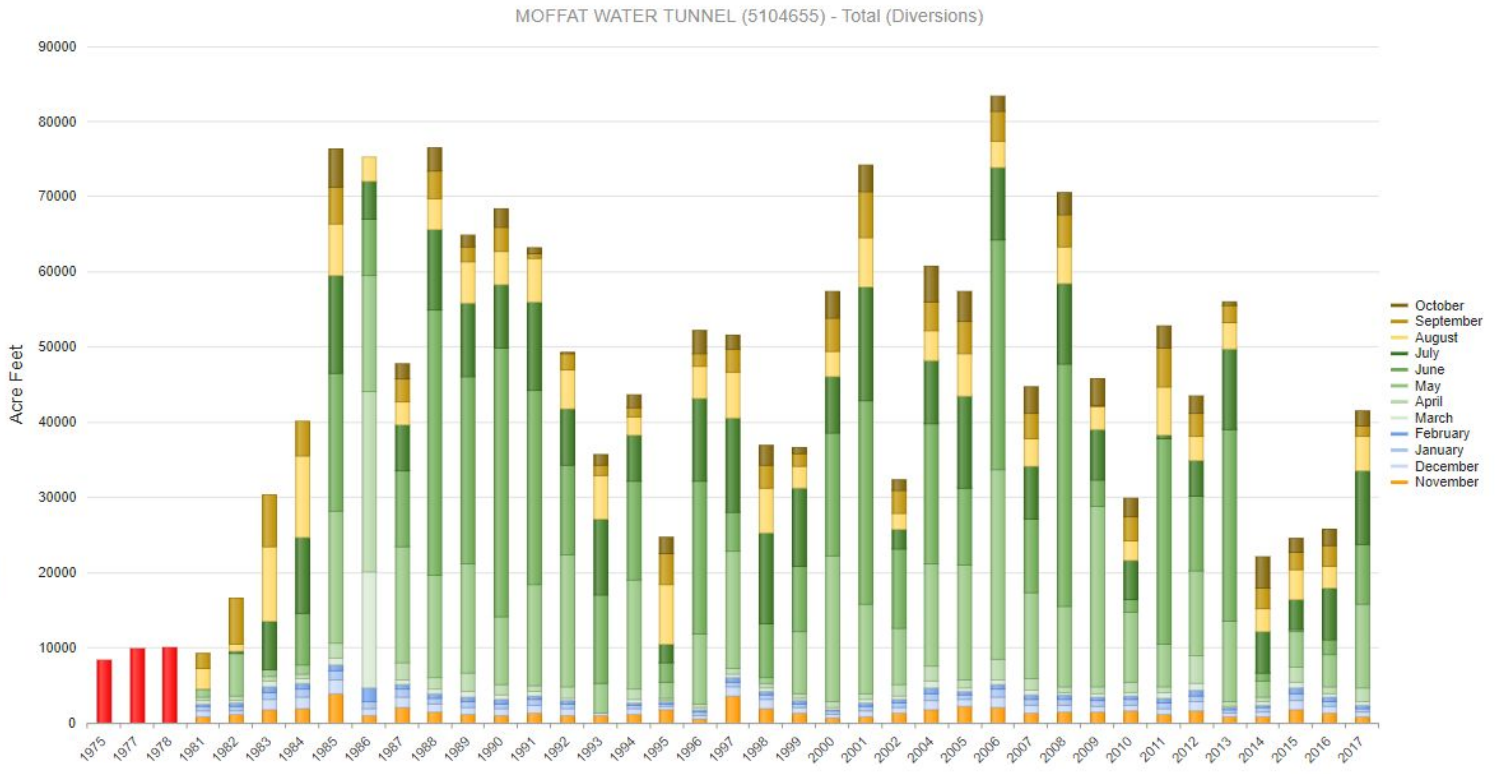
Title MOFFAT WATER TUNNEL (5104655) - T

Y Axis Max

Y Axis Min

Refresh

Table | Graph PDF



Active Calls

dwr.state.co.us/Tools/AdministrativeCalls/Active?submitButton=Submit#

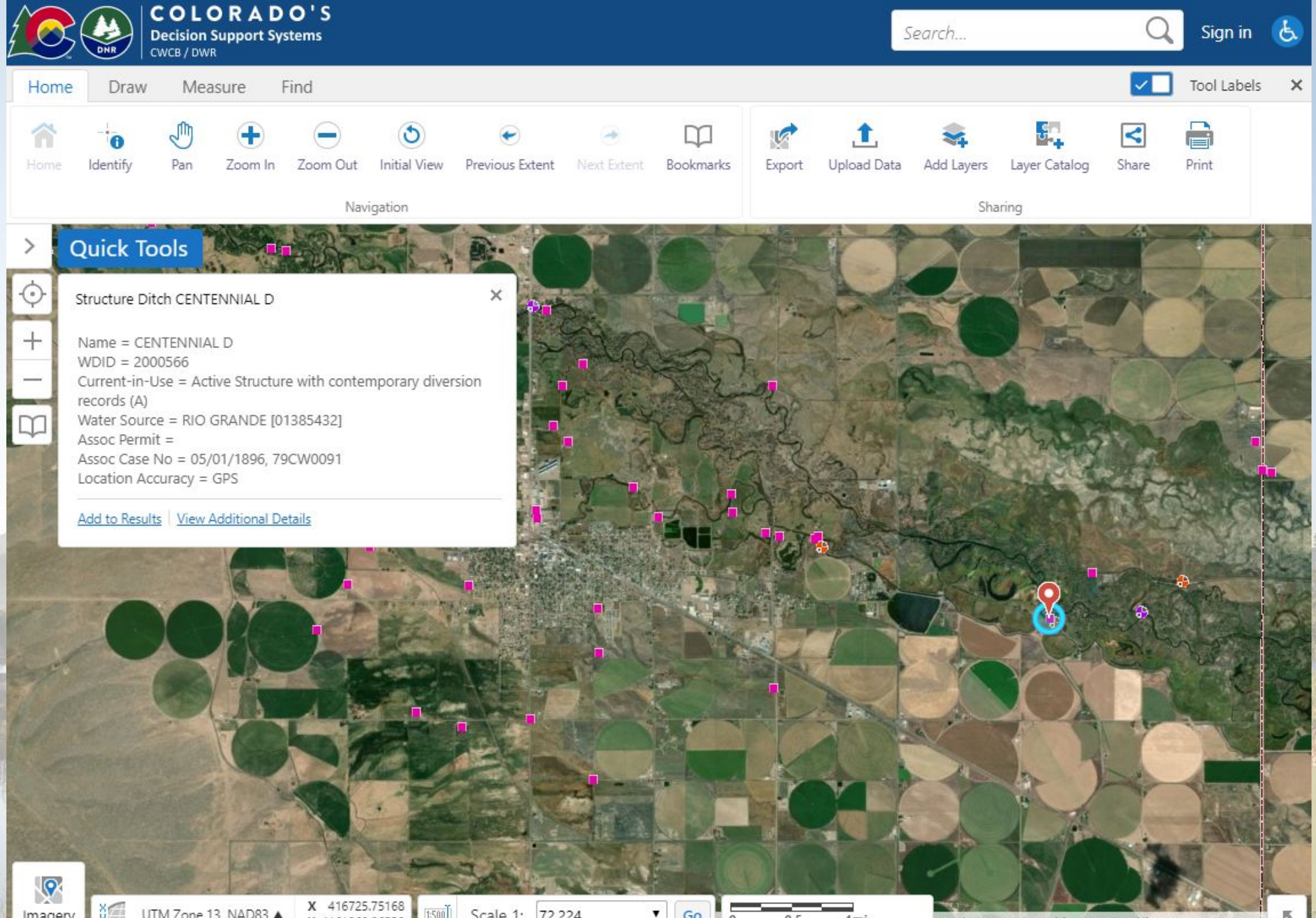
Administrative Calls - Active

Export Help My Account

>> Table Map

Map Options

Map Points: 46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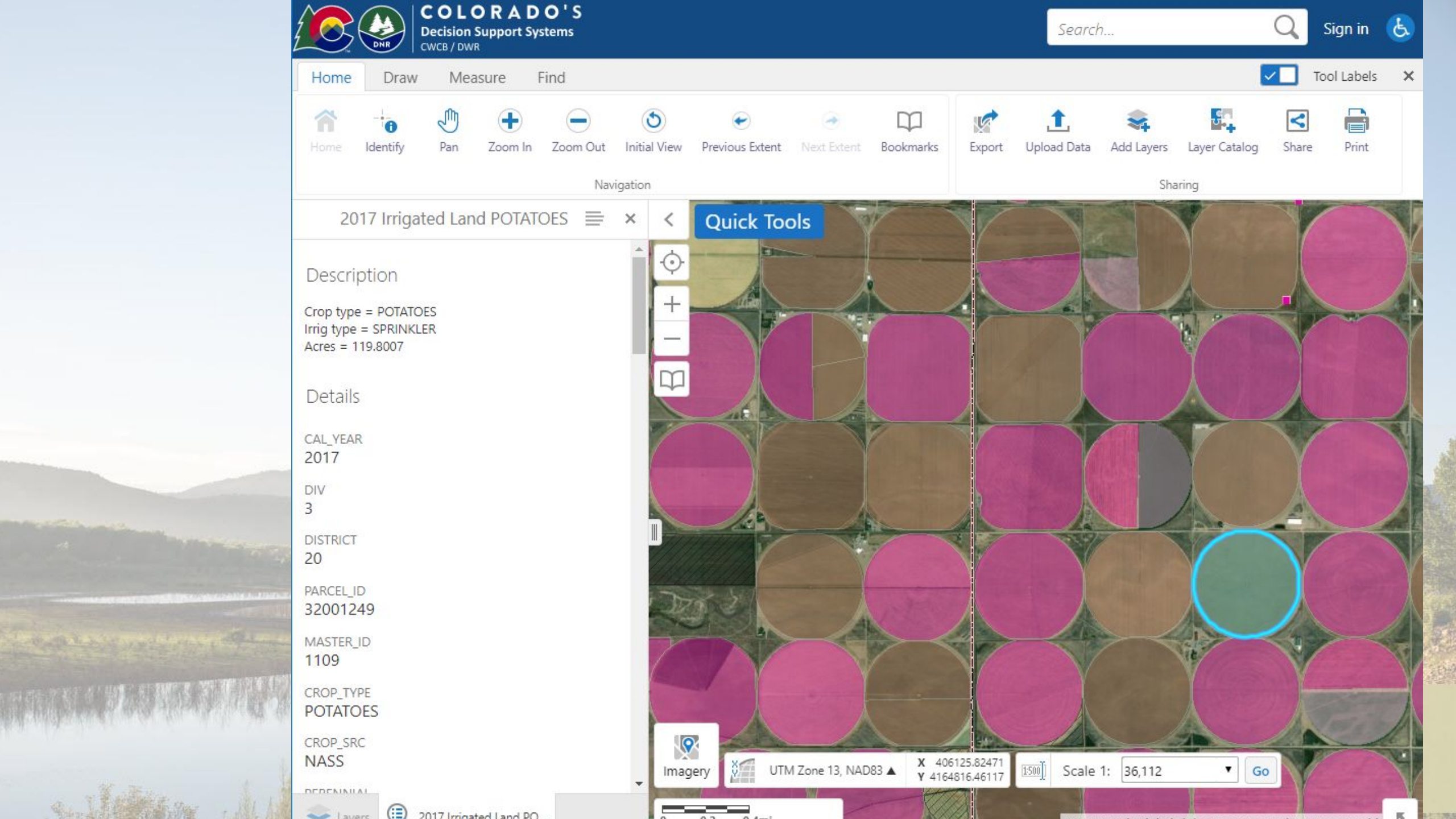
Search...
Sign in
Home
Draw
Measure
Find
Tool Labels
Home
Identify
Pan
Zoom In
Zoom Out
Initial View
Previous Extent
Next Extent
Bookmarks
Navigation
Export
Upload Data
Add Layers
Layer Catalog
Share
Print
Sharing
Quick Tools
Structure Ditch CENTENNIAL D
Name = CENTENNIAL D
WDID = 2000566
Current-in-Use = Active Structure with contemporary diversion records (A)
Water Source = RIO GRANDE [01385432]
Assoc Permit =
Assoc Case No = 05/01/1896, 79CW0091
Location Accuracy = GPS
Add to Results
View Additional Details
Imagery
UTM Zone 13, NAD83
X 416725.75168
Scale 1:
72,224
Go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Decision Support Systems
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Search...
Sign in
Home
Draw
Measure
Find
Tool Labels
Home
Identify
Pan
Zoom In
Zoom Out
Initial View
Previous Extent
Next Extent
Bookmarks
Navigation
Export
Upload Data
Add Layers
Layer Catalog
Share
Print
Sharing
2017 Irrigated Land POTATOES
Description
Crop type = POTATOES
Irrig type = SPRINKLER
Acres = 119.8007
Details
CAL_YEAR
2017
DIV
3
DISTRICT
20
PARCEL_ID
32001249
MASTER_ID
1109
CROP_TYPE
POTATOES
CROP_SRC
NASS
Quick Tools
Imagery
UTM Zone 13, NAD83
X 406125.82471
Y 4164816.46117
Scale 1:
36,112
Go

StateCU (CU Modeling)

- Consumptive Use modeling software produced by Colorado
- Monthly Modified Blaney-Criddle or Daily Penman-Monteith

- **Inputs:**
  - GIS coverage of acreage, crop type, irrigation type, and structure association
  - Climate data

- **Outputs:**
  - Potential consumptive use
  - Supply-limited consumptive use
  - Unlagged return flow
  - Effective Precipitation

Open source licensing and source code:

http://opencdss.state.co.us/opencdss/

https://github.com/opencdss

StateMod (Water Allocation Modeling)

- Water allocation modeling software produced by Colorado
- Prior appropriation and Colorado operations (Compacts, augmentation, etc.)

- **Inputs:**
  - Crop/municipal/industrial demands
  - Water Rights
  - Natural Flows

- **Outputs:**
  - Streamflow
  - Diversions
  - Well pumping

Open source licensing and source code:

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HydroBase REST Web Services

- REST API - GET and POST
  - Allows public to access data (GET) programmatically in things like web applications, spreadsheets, etc.
    - JSON, XML, CSV, TSV, GeoJSON
  - Allows public to share data (POST) programmatically for things like water rights accounting and well monitoring
  - Account Login for API key (higher volume of data), permissions for POST, personalization of webpages

The CDSS REST services provide HydroBase data programmatically for consumption by outside entities. Users can request data from the services in two ways:

- Enter a properly constructed URL in your browser or other application (such as a spreadsheet)
- Send a properly constructed request object with a header

Datasets | Technical Information & Help

Datasets - All

API	Description	Url Generator	Area
GET api/v2/administrativecalls/active	Returns list of active administrative calls	Active Administrative Calls Generator	Administrative Calls
GET api/v2/administrativecalls/historical	Returns list of historical administrative calls	Historical Administrative Calls Generator	Administrative Calls
GET api/v2/analysisservices/watersourcerouteanalysis	Returns all WDID(s), and their stream mile, located between two different stream locations on the DWR Water Source Framework.	Water Source Route Analysis Info Generator	Analysis Services
GET api/v2/analysisservices/watersourceroute framework	Returns the DWR source route framework reference table for the criteria specified	Water Source Route Framework Info Generator	Analysis Services
GET api/v2/analysisservices/callanalysisbywdid	Performs a call analysis that returns a time series showing the percentage of each day that the specified WDID and priority was out of priority and the downstream call in priority.	Call Analysis Structure Info Generator	Analysis Services

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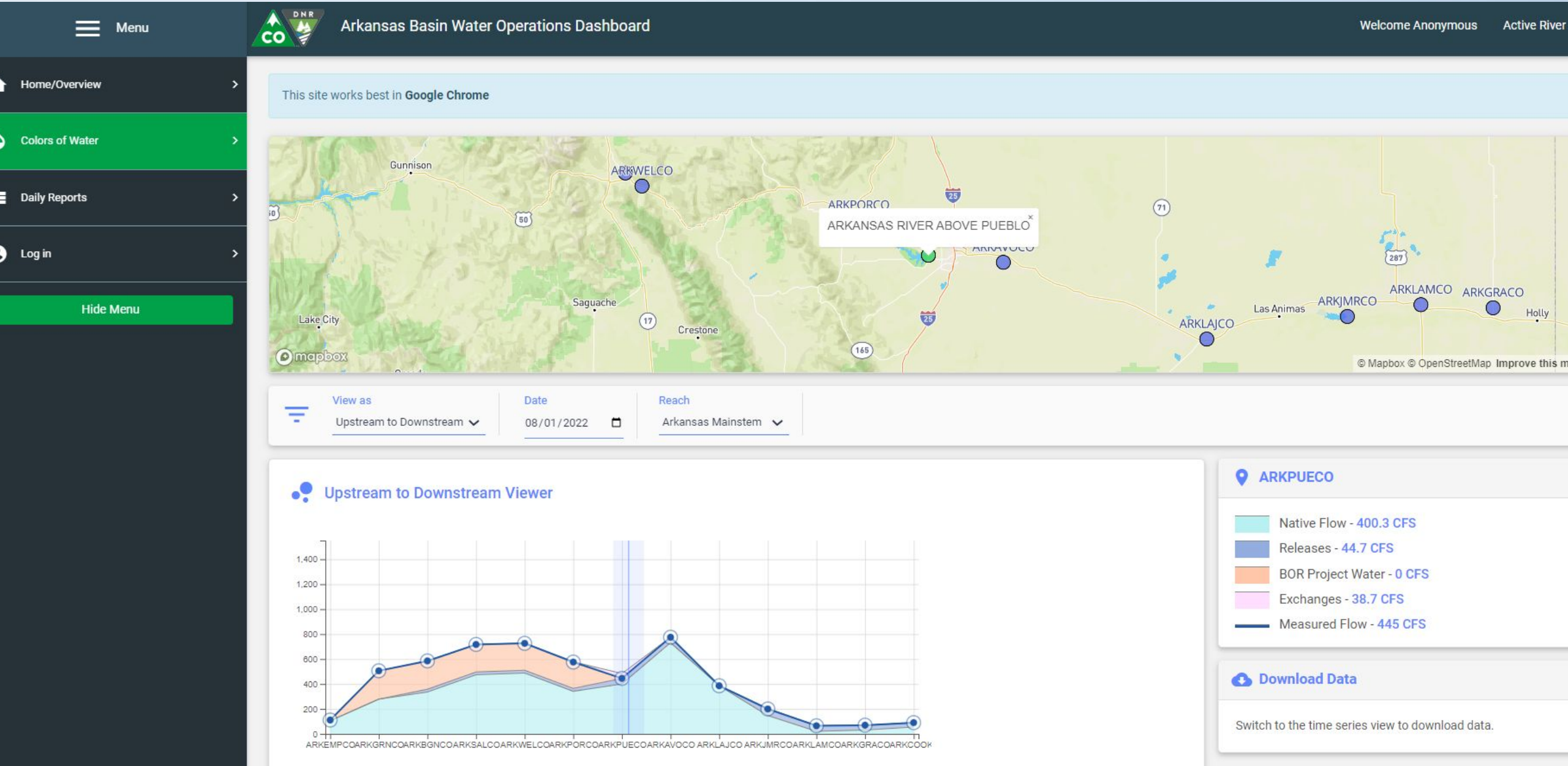
Arkansas River Colors of Water Tool



THANK YOU

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