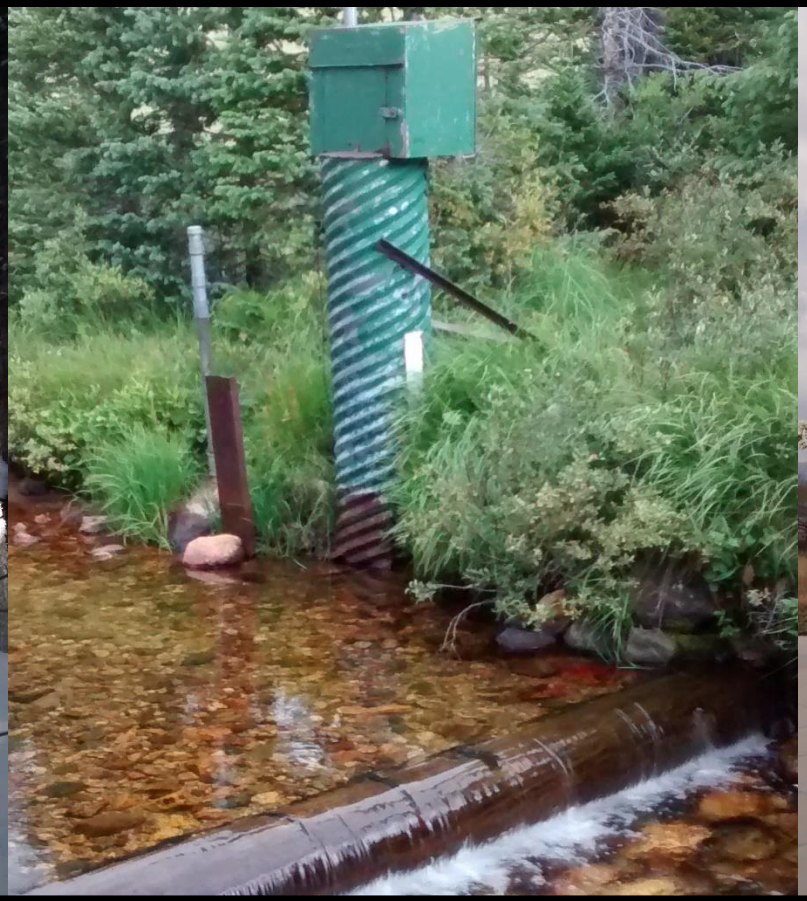
# SNODAS Data Product Tool Update

## Water Availability Task Force, April 18, 2017



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# Open Water Foundation

Social enterprise 501(c)3 nonprofit focusing on developing open source software and open data tools to help make better decisions about water resources. Water is a public resource, and water data and software tools should also be public.

open data | open software | open decisions

openwaterfoundation.org

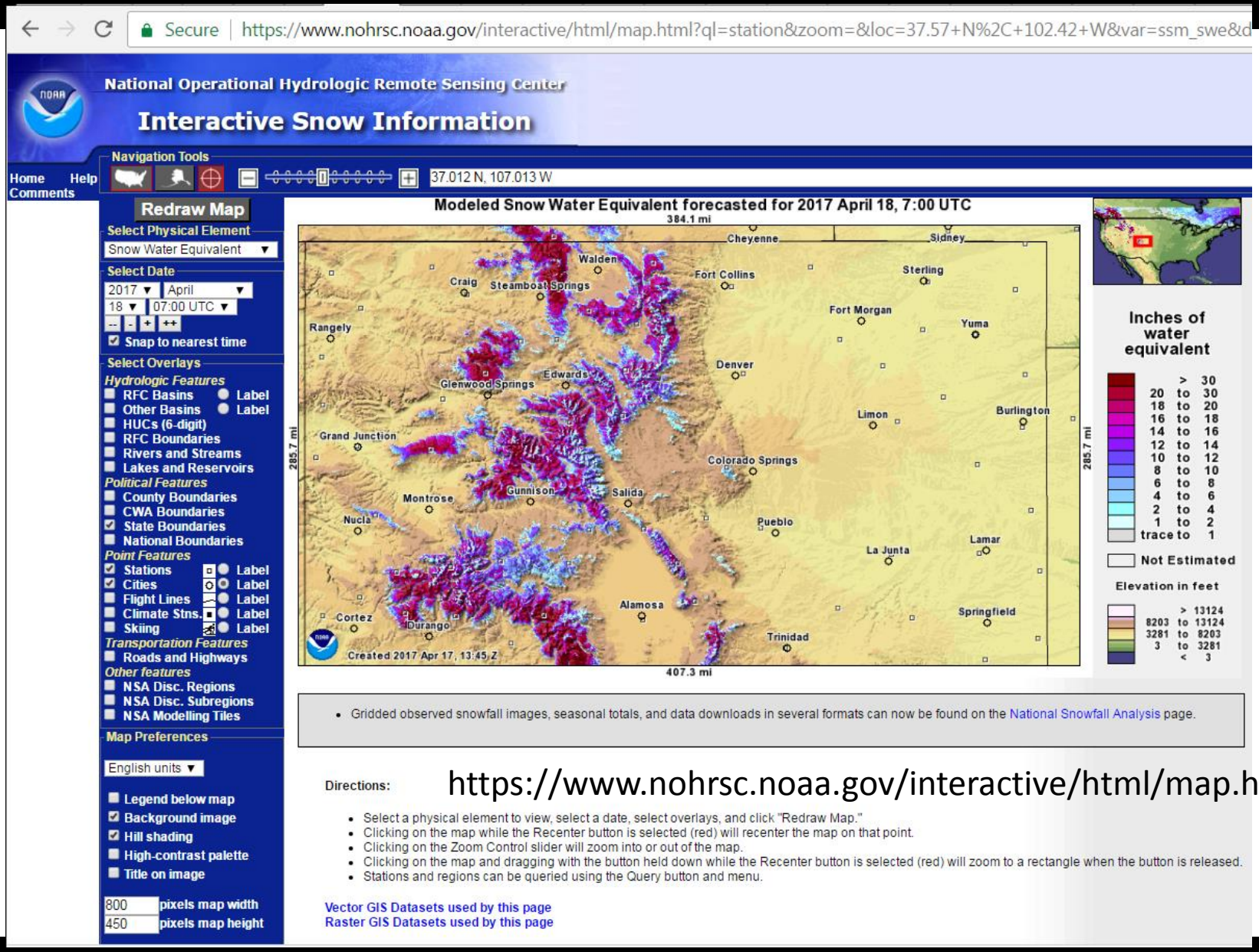
# Project Overview

- CWCB Severance Tax Project - $50k budget
- Team led by the Open Water Foundation, Brendle Group as subcontractor
- Main goals of project, from scope of work:
  - Improve water resources data access and transparency
  - Help water managers visualize their supply basins
  - Improve information for water providers and customers

# Project Need

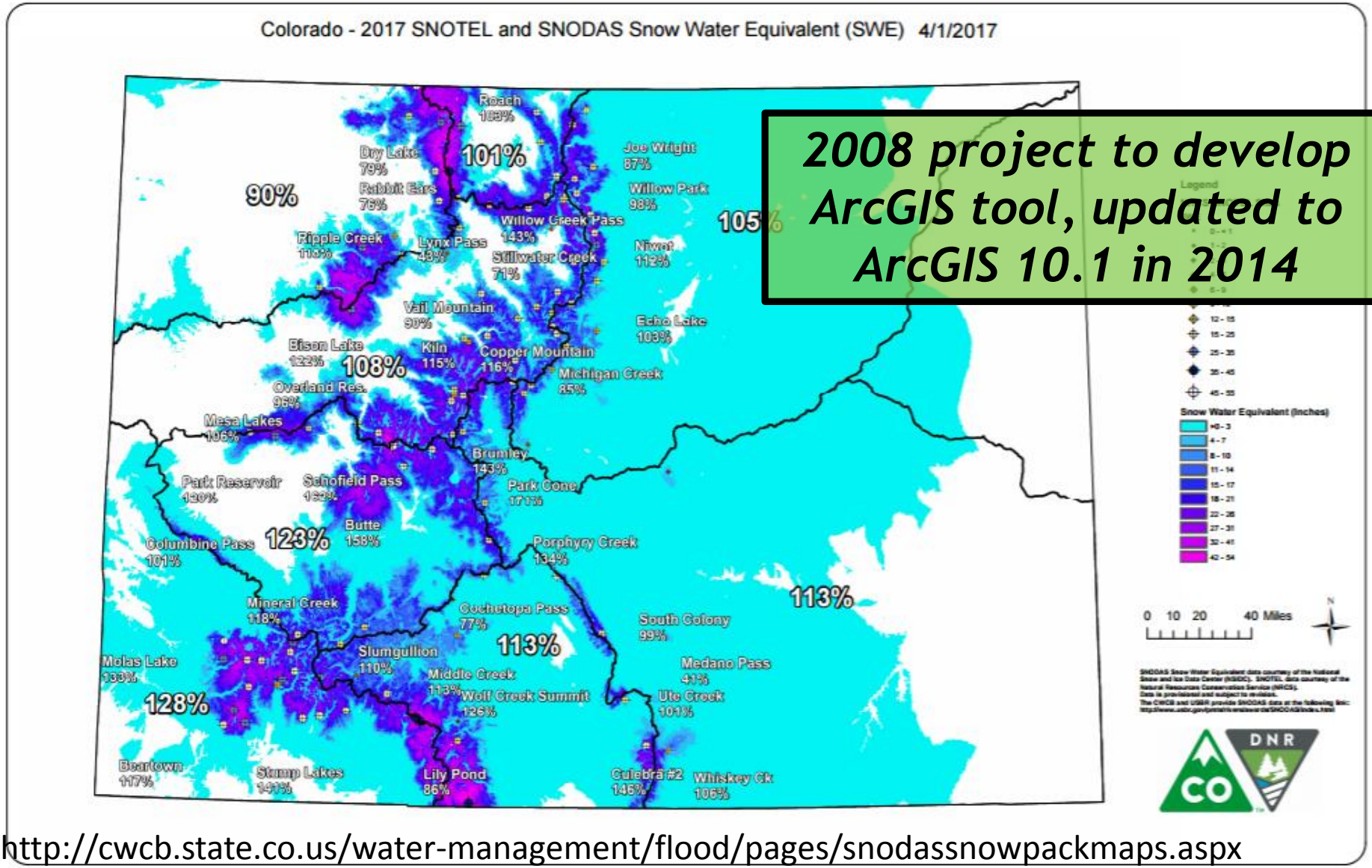
- Some basins do not have monitoring stations (SNOTEL)
- Existing monitoring stations are not representative of snow conditions across the entire watershed
- Water managers lack late-season information because snow has melted out at observing stations

# What is SNODAS?




https://www.nohrsc.noaa.gov/interactive/html/map.html

# Previous CWCB Projects

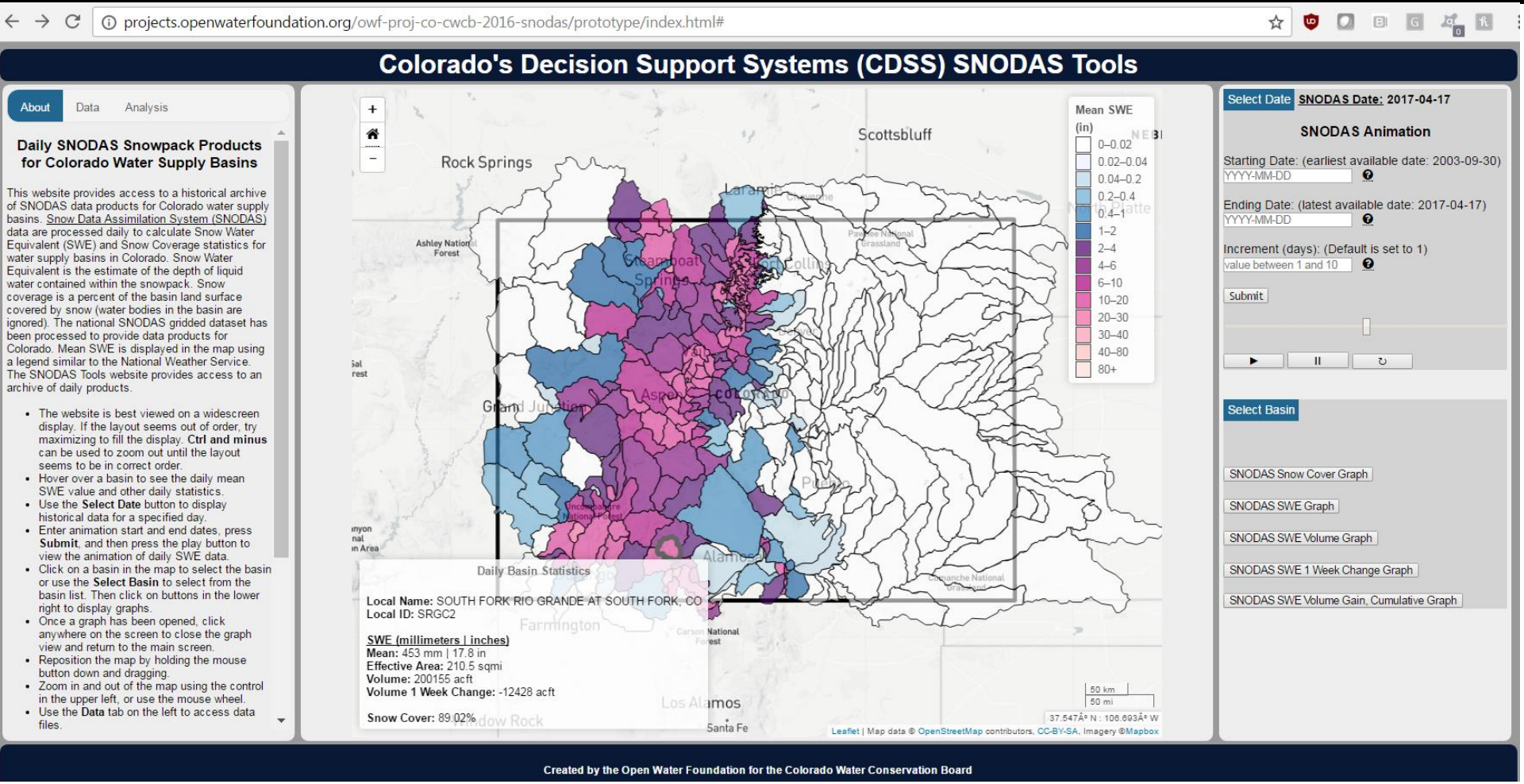



http://cwcb.state.co.us/water-management/flood/pages/snodassnowpackmaps.aspx

# Previous CWCB Projects

- 2008-2009 - SNODAS map products for Rio Grande Water Conservation District
- 2012-2013 – SNODAS map products for Dolores Water Conservancy District
- 2015 – Open Water Foundation updated Colorado Surface Water Supply Index (SWSI) process.

# Enhanced Snowpack Products




http://projects.openwaterfoundation.org/owf-proj-co-cwcb-2016-snodas/prototype

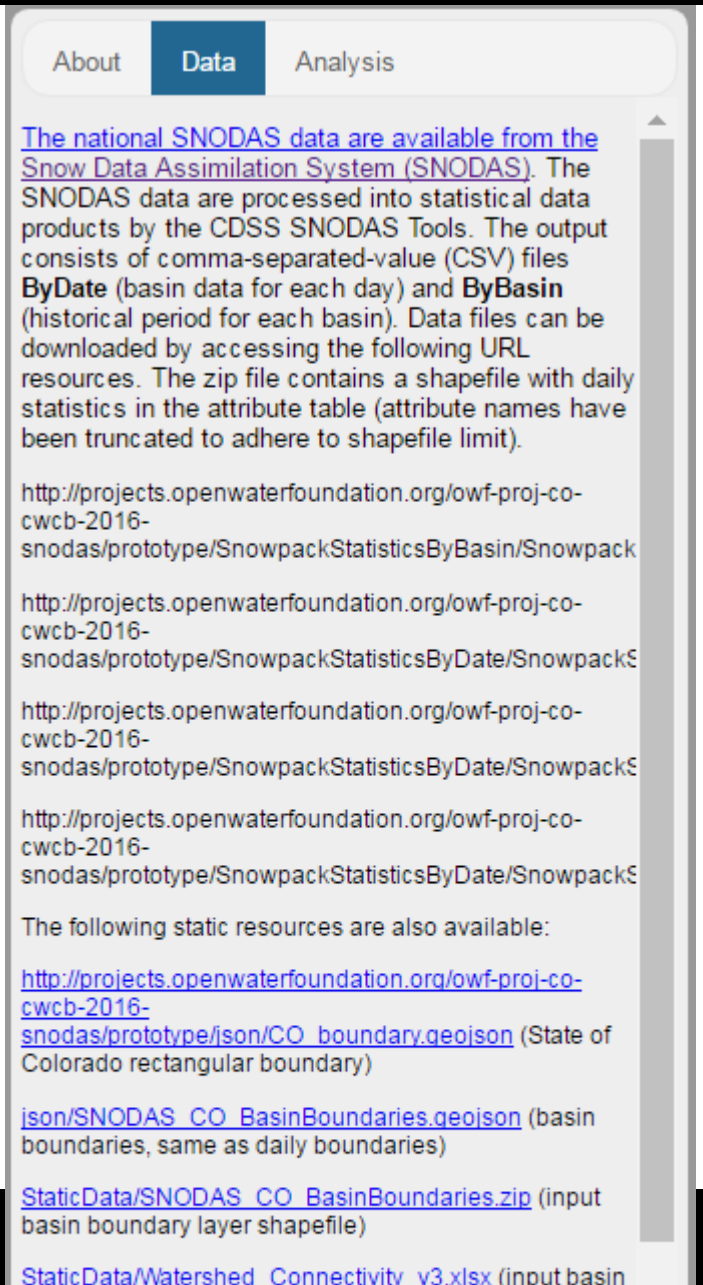
# Approach

1. Download daily SNODAS SWE grid
2. Clip to Colorado basins
3. Calculate statistics for basins
4. Output to CSV, GeoJSON, Shapefile.
5. Process CSV files into time series graph products.
6. Publish to the web (80 GB total for 2003-2017)

***Software:***

- ***QGIS, PyQGIS, GDAL for spatial processing***
- ***Leaflet for web mapping***
- ***TSTool for time series products***

# Downloadable Data Files




- *Comma-separated-value (CSV)*
- *Shapefile*
- *GeoJSON*

- *Static data for basins*

# Developer and User Documentation

software.openwaterfoundation.org/cdss-app-snodas-tools-doc-user/process/processing-steps/



## 1. Download SNODAS Data

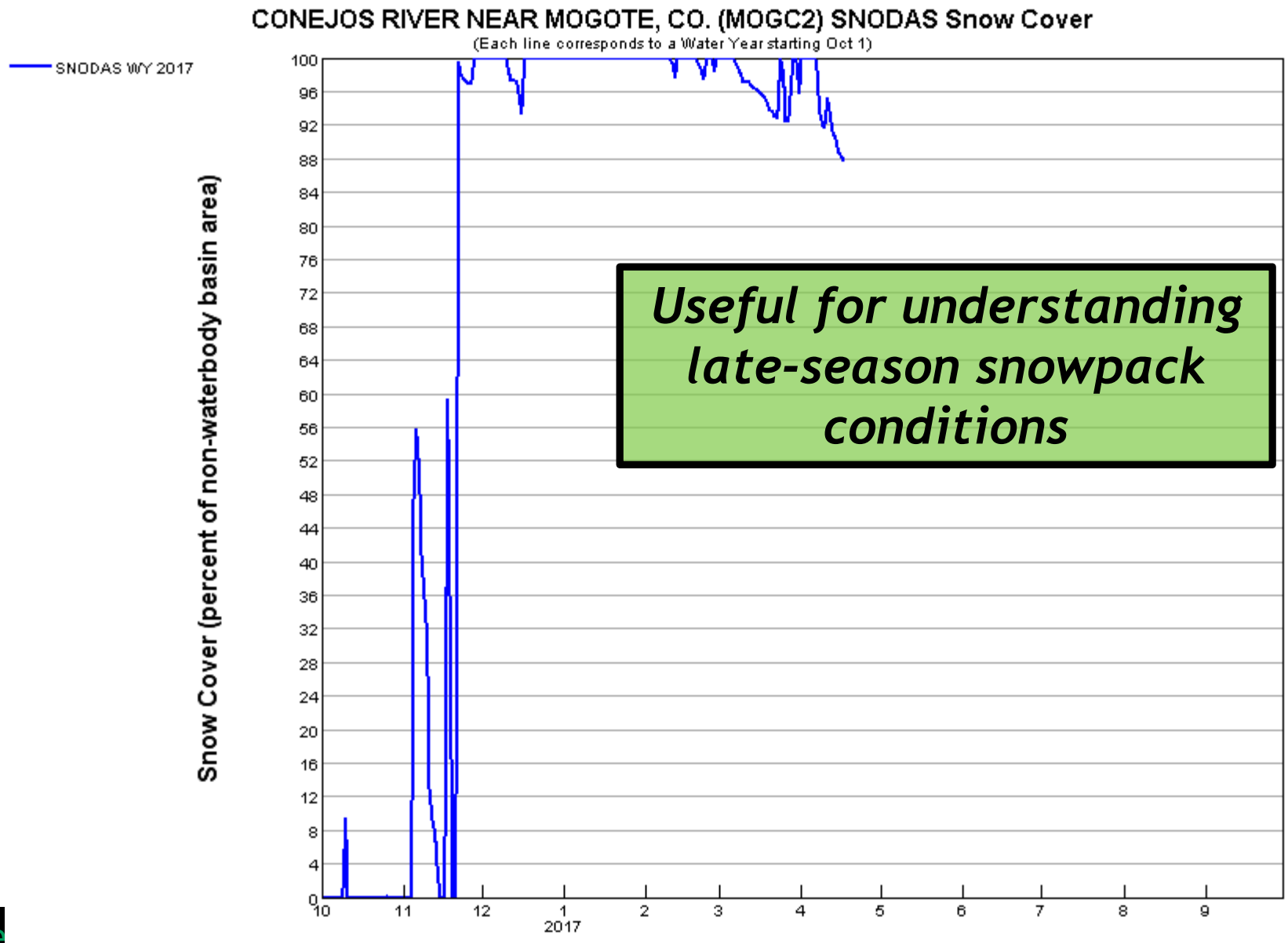
National SNODAS grids are downloaded to the SNODAS Tools computer for processing into products that are relevant to Colorado.

Daily SNODAS data grids are national grids representing a variety of snowpack parameters. They are developed by NOAA National Weather Service's National Operational Hydrologic Remote Sensing Center (NOHRSC) and hosted by the National Snow and Ice Data Center (NSIDC). NSIDC stores the daily grids, dating back to September 30th, 2003, in a public FTP site that is updated every day. Although, as mentioned before, the SNODAS products contain many grids of snowpack parameters, the SNODAS Tools are designed to specifically calculate snowpack statistics in regards to the Snow Water Equivalent (SWE) grid. Below is an image of a daily SNODAS grid representing SWE values across the nation. The areas of higher SWE are represented by blue while the areas with lower, or no SWE values, are represented by brown.

*SNODAS Snow Water Equivalent Masked Grid for January 16th, 2017*

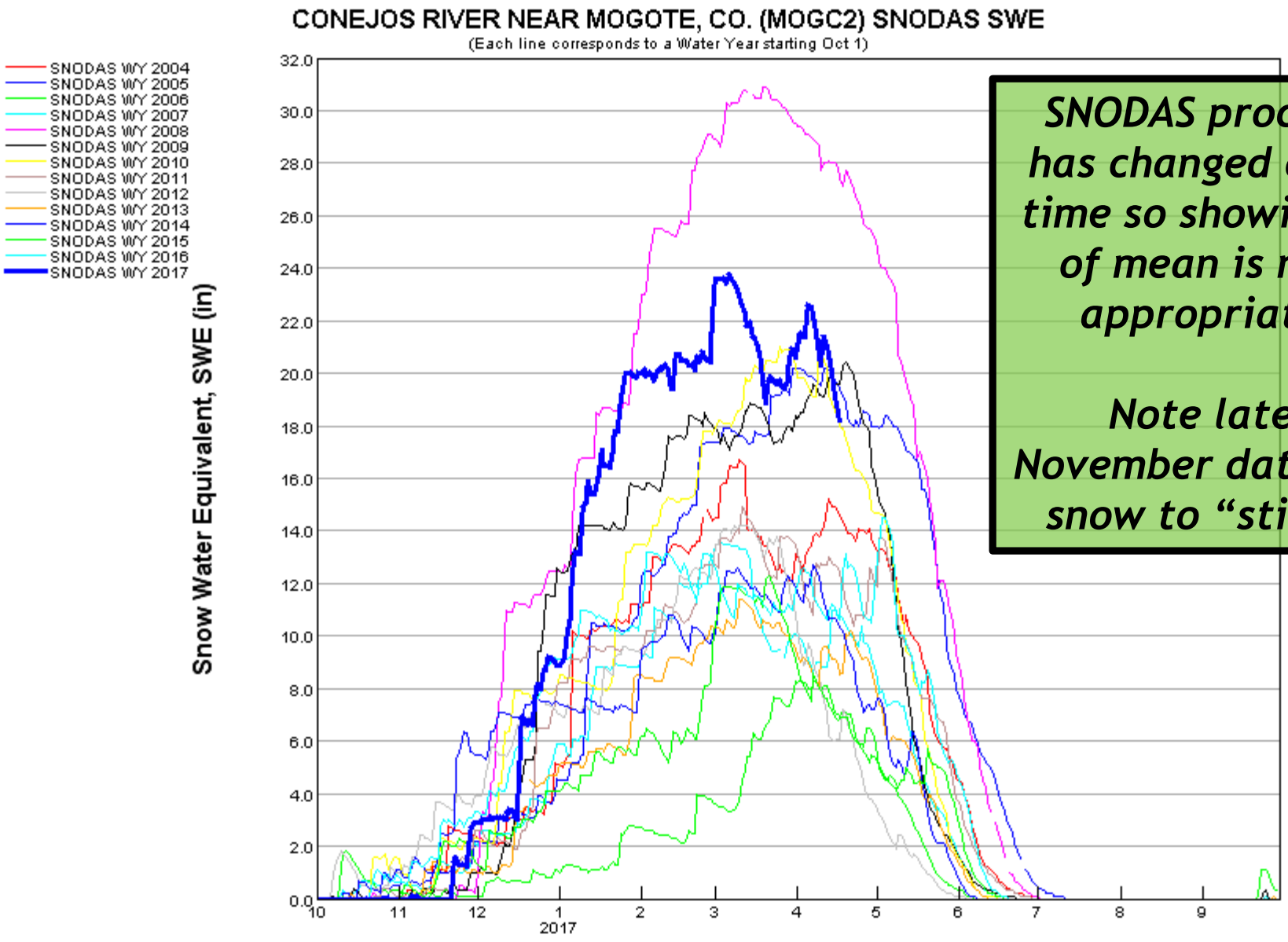
The SNODAS Tools are designed to process all available daily SNODAS SWE grids from September 30th, 2003 to the current date. A full historical repository of daily snowpack statistics gives insight

# Snow Cover (Percent)




***Useful for understanding late-season snowpack conditions***

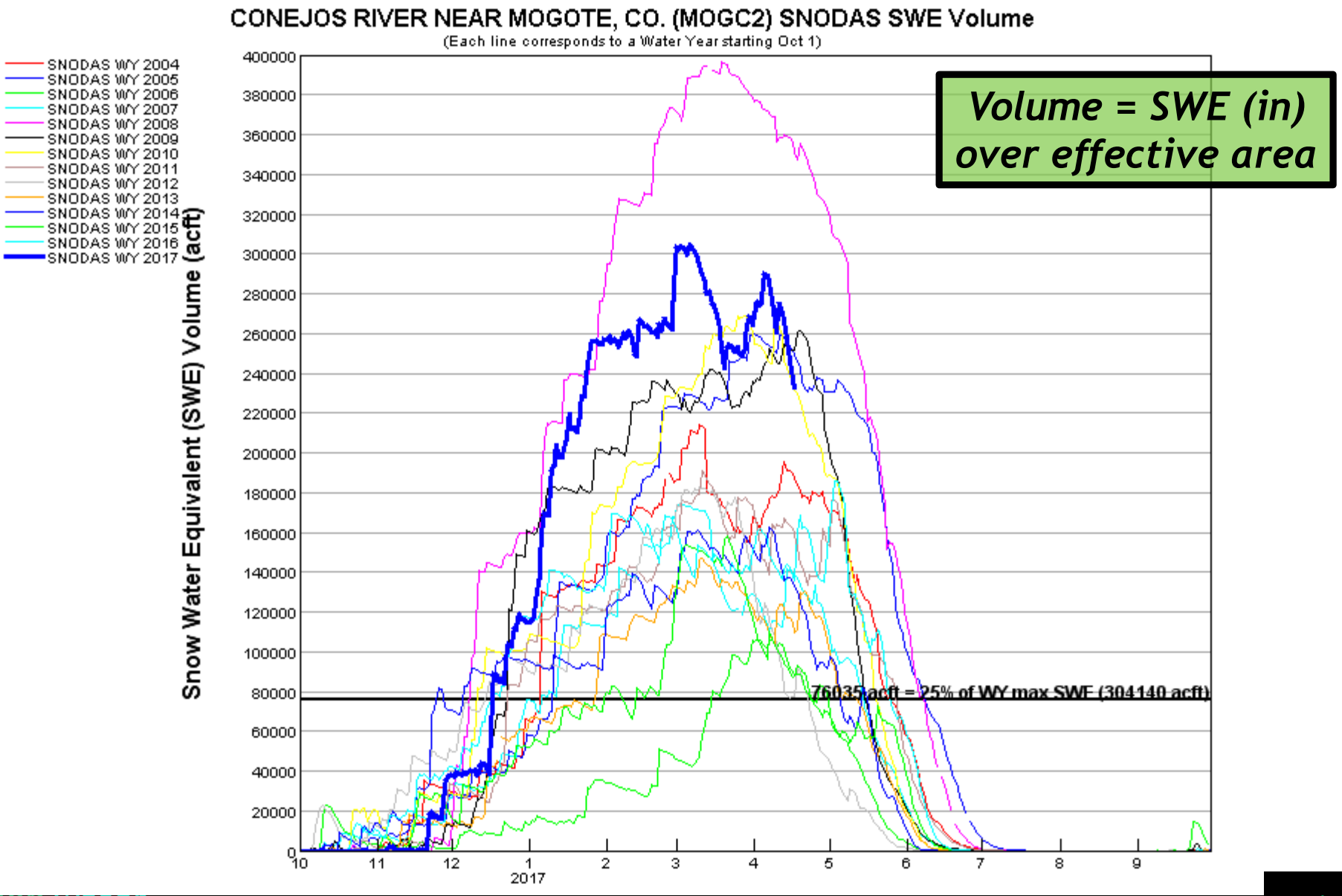
# SNODAS Snow Water Equivalent




***SNODAS process has changed over time so showing % of mean is not appropriate***

***Note late November date for snow to "stick"***

# SNODAS SWE Volume

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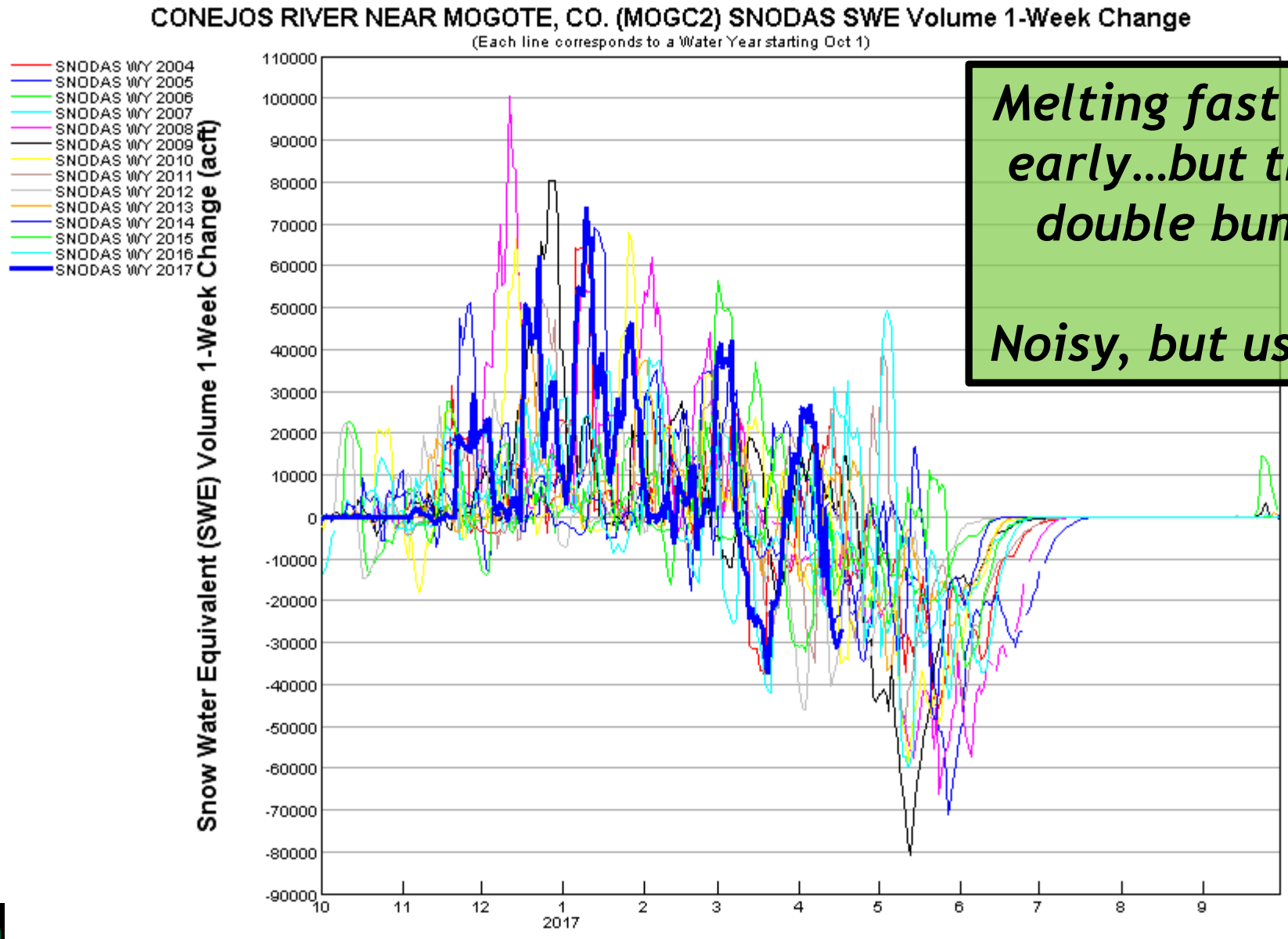
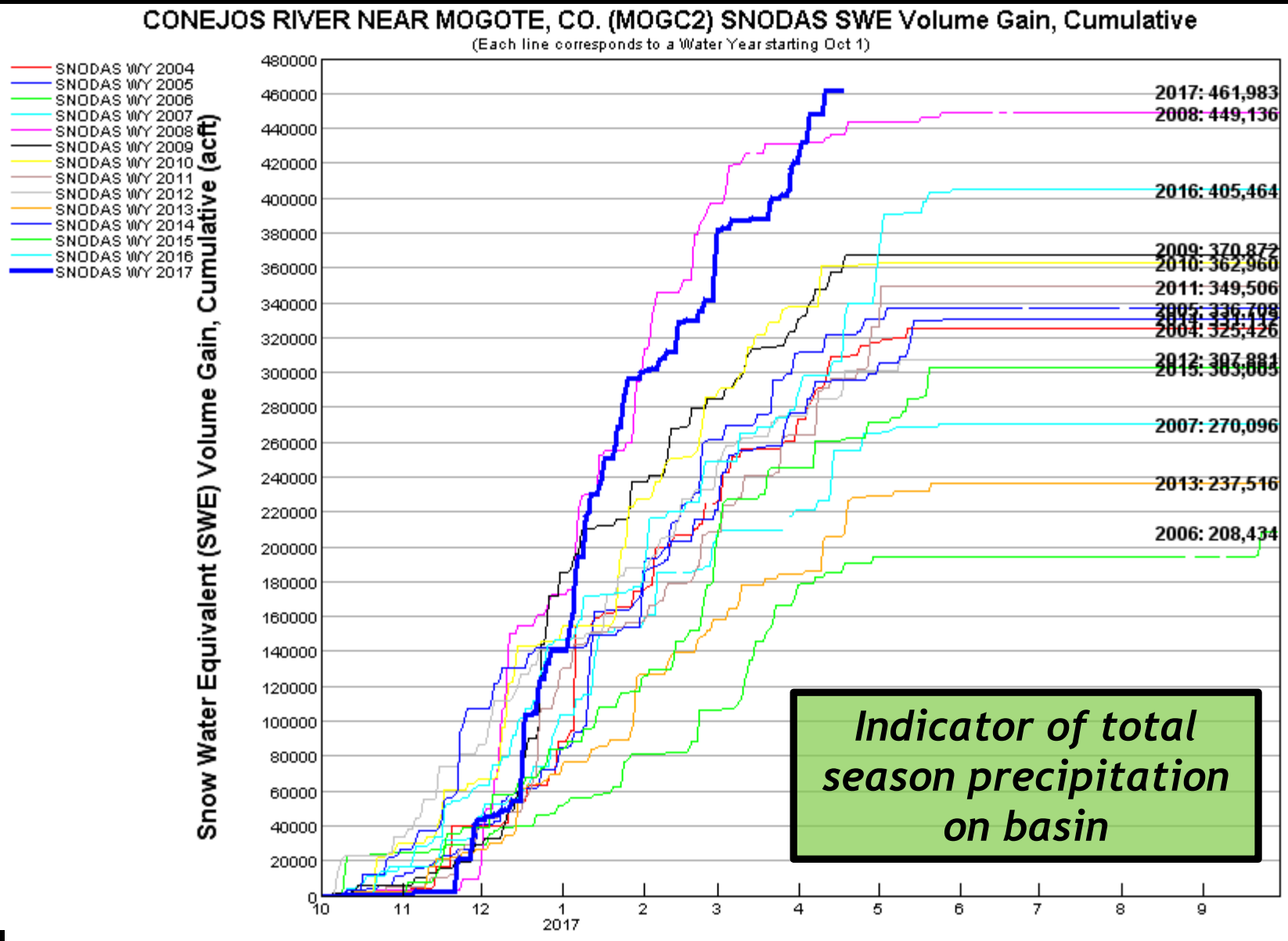
# SNODAS SWE Volume 1-Week Change



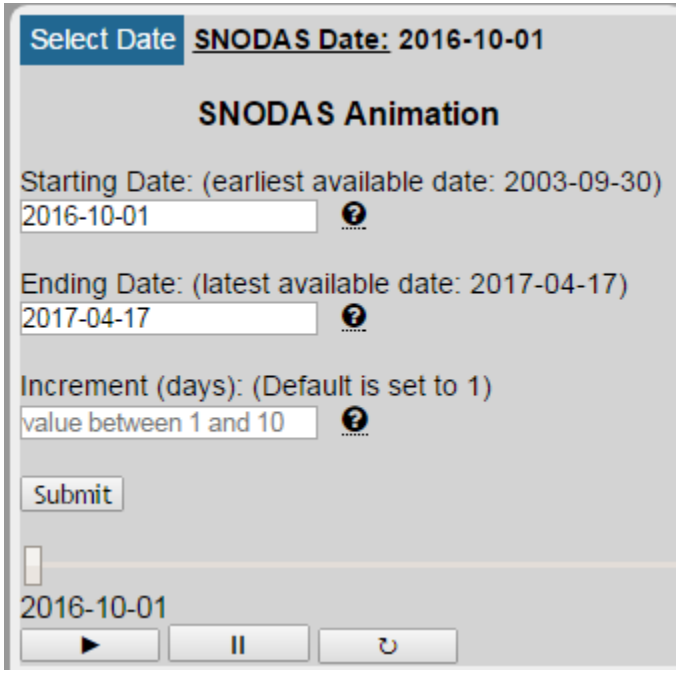

***Melting fast and early…but then double bump***

***Noisy, but useful***

# SNODAS SWE Volume Gain, Cumulative



# Daily SWE Map Animation




- *It is pretty cool!*
- *Can see storm events*
- *Can see when snow started to accumulate and melt out*

# Next Steps

- Minor cosmetic changes to website
- Add graph products for total basin (upstream of current basin)
- Move system to State cloud-hosted server
- Get feedback from stakeholders
- Project ends June 30, 2017

# Share It



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