

Colorado's Decision Support Systems (CDSS)

Overview

Version: 2010-05-10

Duration: Approximately 45 minutes

Level: Introduction/Overview



CDSS Overview

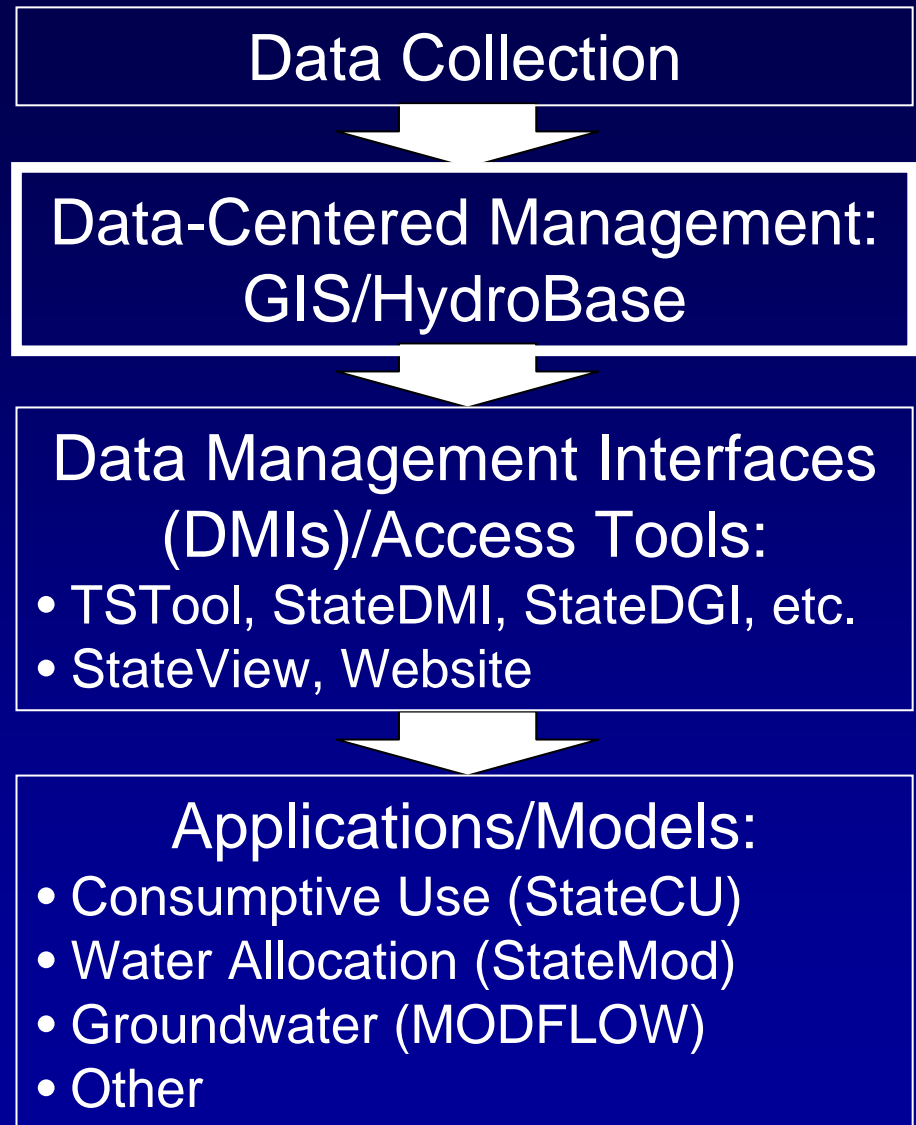
Colorado's Decision Support Systems (CDSS) are data and tools that help users make more informed decisions about Colorado's water resources.

<http://cdss.state.co.us>



Data-Centered Approach

- Open access to data
- Share data for multiple uses
- Applications focus on analysis and generating results/products



CDSS Includes

Water Resources Planning DSS (basin models):

- Colorado River (CRDSS)
- Rio Grande (RGDSS)
- South Platte (SPDSS)
- Arkansas (ArkDSS) – feasibility study in process

Integrated Systems

“CDSS” refers collectively to the Water Resources Planning (Basin) DSS, and other integrated DSS used by the State of Colorado.

The remainder of this presentation focuses on the Basin DSS aspects of CDSS, which provide core data and tools to analyze water supply issues and support more specialized DSS efforts.

More Information

Basin model documentation describes in detail the sources of data, estimates, and processes that were used to create the data sets, and summarizes results.

Numerous task memoranda, reports, software documentation, and other documents provide technical information and are available on the CDSS web site.

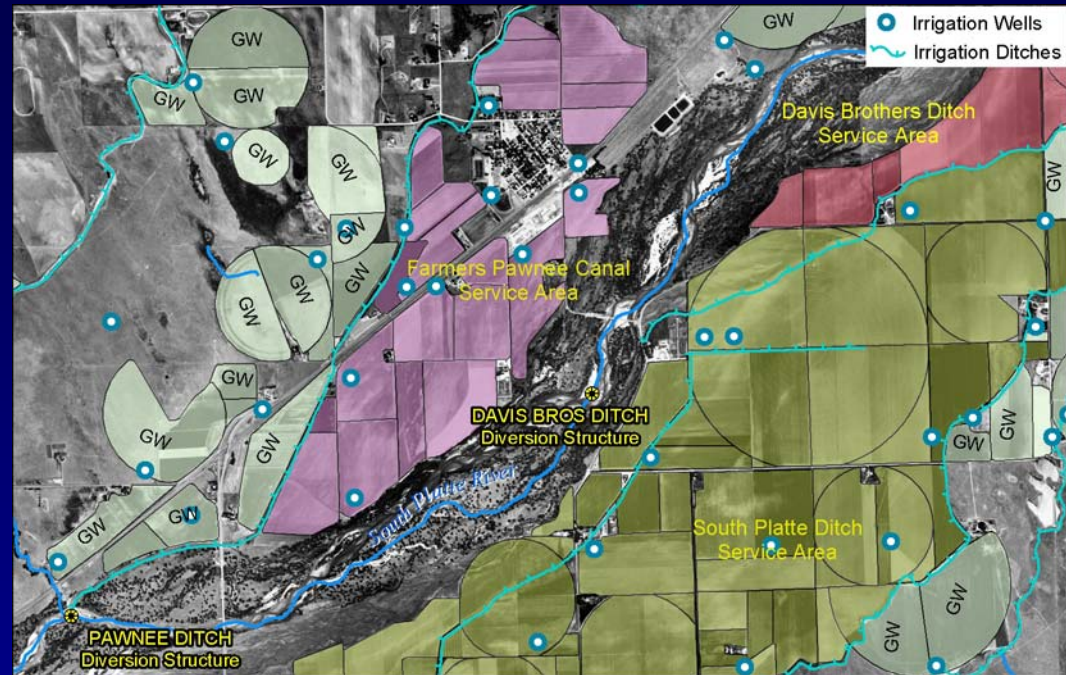
<http://cdss.state.co.us> (see Products links)

Main CDSSS Activities/Areas

- Data collection
- Data management
- Software tools
- Baseline model data sets
- Access/distribution
- Management, coordination, application, extension

Data Collection – Irrigated Lands

- New evaluation approximately every 5 years
- Crop type
- Irrigation method
- Supply sources
 - Ditches
 - Wells
- Input to consumptive use analysis



Data Collection – Observations

- New gages
- New observation wells
- Well tests
- GPS locates
- Additional data facilitates model calibration and water resource administration

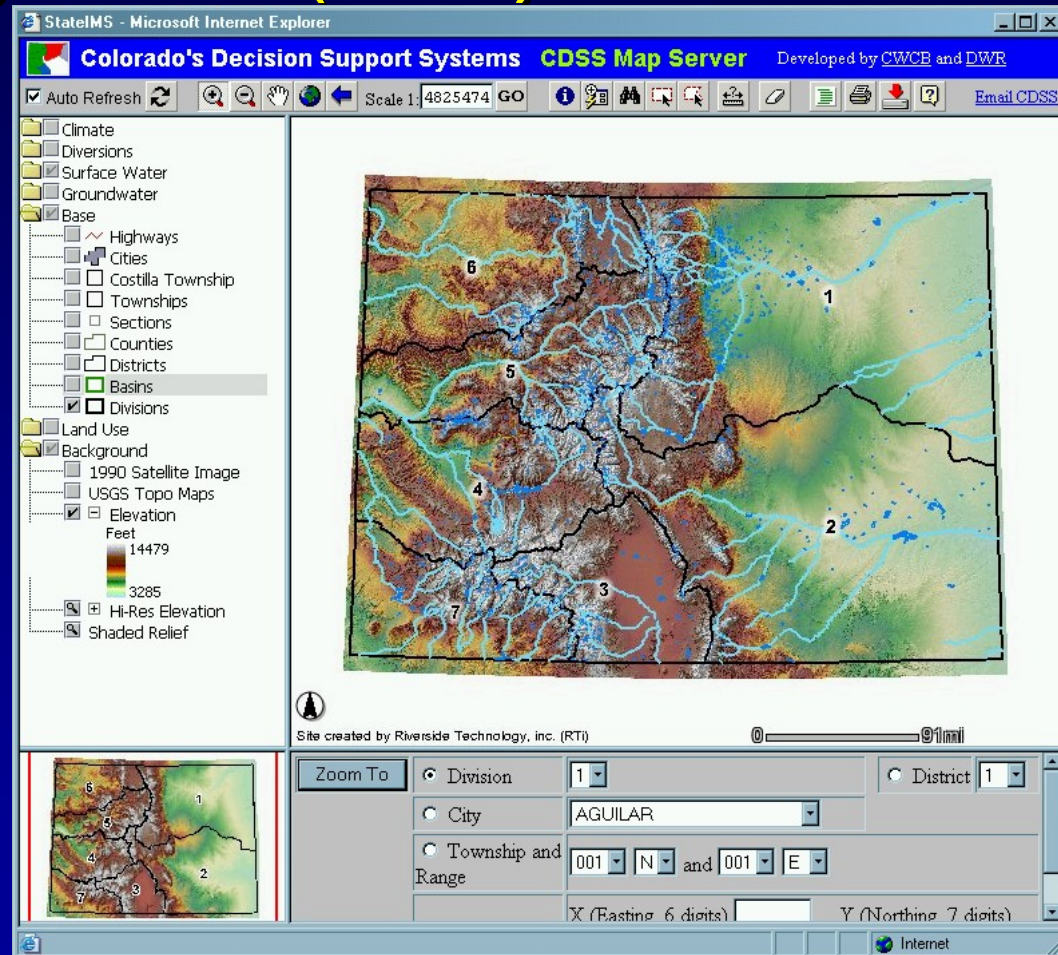


Data Management – HydroBase

- Maintained by DWR
- Distributed as SQL Server Express on DVD with TSTool and StateView software (no real-time data)
 - Structures, diversion records, water rights
 - Climate and stream gages with time series
 - Well characteristics and permits
 - Irrigated lands
 - Many other useful data types
- Accessible via web (includes real-time data)
- Does NOT contain model results
- <http://cdss.state.co.us> (see View Data links)

Data Management – Geographic Information System (GIS)

- Irrigated lands
- Point layers extracted from HydroBase
- Imagery and background layers
- Other useful layers



<http://cdss.state.co.us> (see Map Viewer and Products...GIS)

Software – StateView

- Desktop HydroBase viewer
- Available on HydroBase DVD
- Query filters
- Standard display tools
- Export data

StateView - Water Rights - Query

Query Options:

Water Division/District: Division 1: South Platte

Water Rights Type: Net Amounts

Where: Decreed Rate (Abs), cfs Greater than 500

Where: Structure Type Matches 1 - Ditch

Where: Matches

Column Order: Summary

Get Data

Water Rights Records: 32 records returned in 0.251 seconds

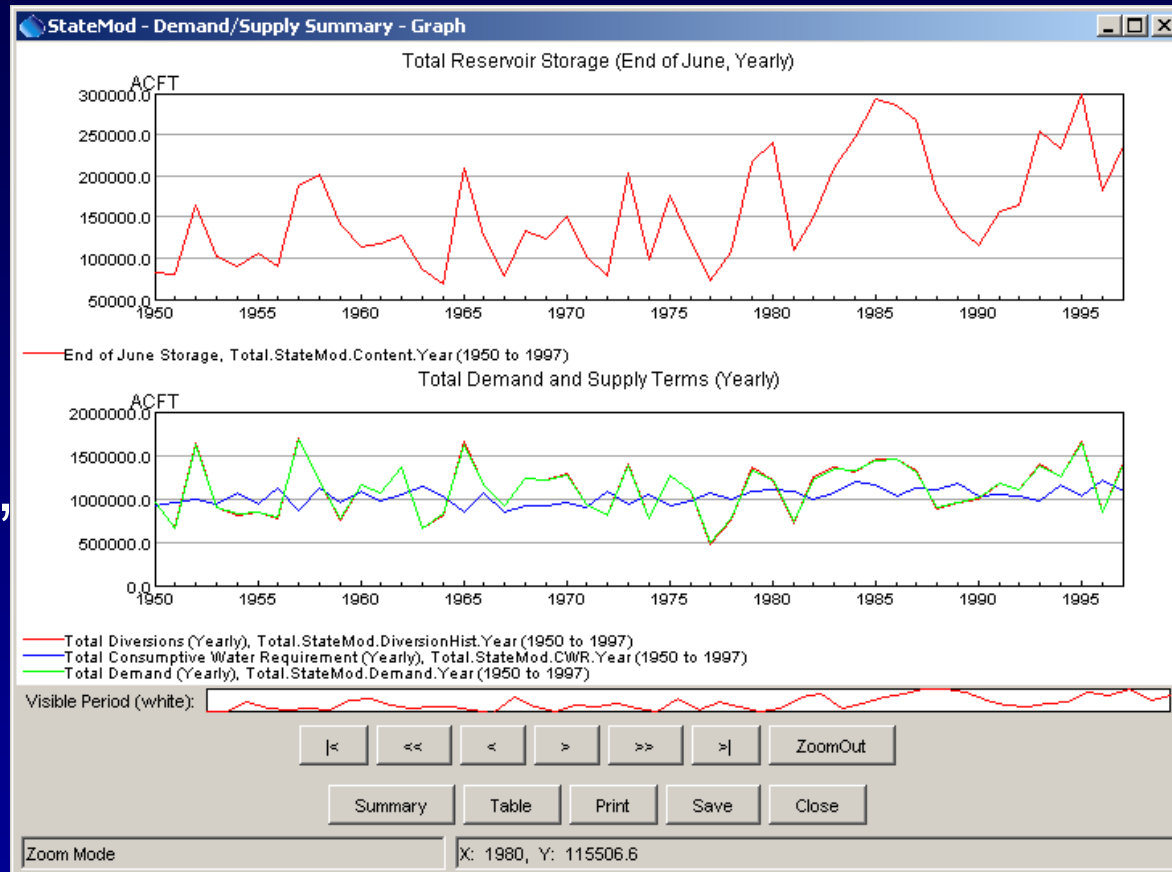
	DIV	WD	ID	WATER RIGHT NAME	WATER SOURCE	ADJ DATE	PADJ DATE	APPROPRIATION DATE	ADMINISTRATION NUMBER	O N
1	1	5	603	LEFT HAND DITCH	LEFT HAND CREEK	1882-06-02		1870-06-01	7457.00000	
2	1	3	919	LARIMER WELD IRR CANAL	CACHE LA POUDRE RIV	1882-04-11		1878-09-18	10488.00000	
3	1	8	1004	HIGHLINE CNL	SOUTH PLATTE RIVER	1883-12-10		1879-01-18	10610.00000	
4	1	3	994	NORTH POUDRE CANAL	N FK CAC LA POUDRE R	1882-04-11		1880-02-01	10989.00000	
5	1	3	919	LARIMER WELD IRR CANAL	CACHE LA POUDRE RIV	1904-12-09		1890-07-08	14799.00000	
6	1	4	501	BARNES DITCH	BIG THOMPSON RIVER	1916-06-29	1890-03-22	1893-01-14	15720.00000	
7	1	9	731	ARNETT/HARRIMAN DITCH	BEAR CREEK	1935-09-24	1884-02-04	1893-02-11	15748.00000	
8	1	7	569	FARMERS HIGHLINE CNL	CLEAR CREEK	1936-05-13	1895-10-09	1890-01-01	16718.14611	

View Report: Administrative Summary List (Admin #, ID)

32 records returned in 0.251 seconds.

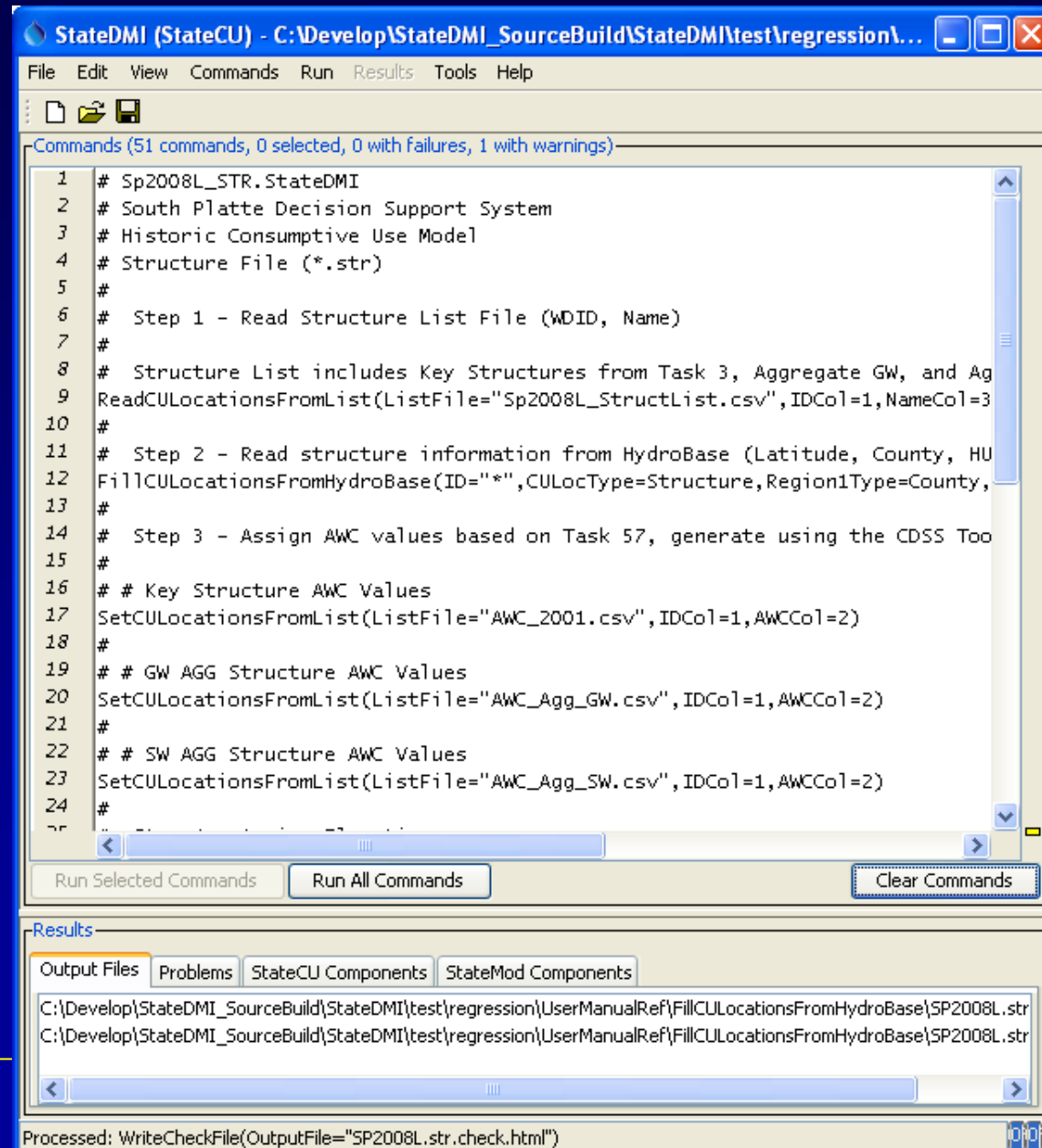
Software – TSTool

- Processes time series
- Reads model files, HydroBase, other inputs
- Filling, analysis, quality control, etc.
- Product generation
- Can be automated



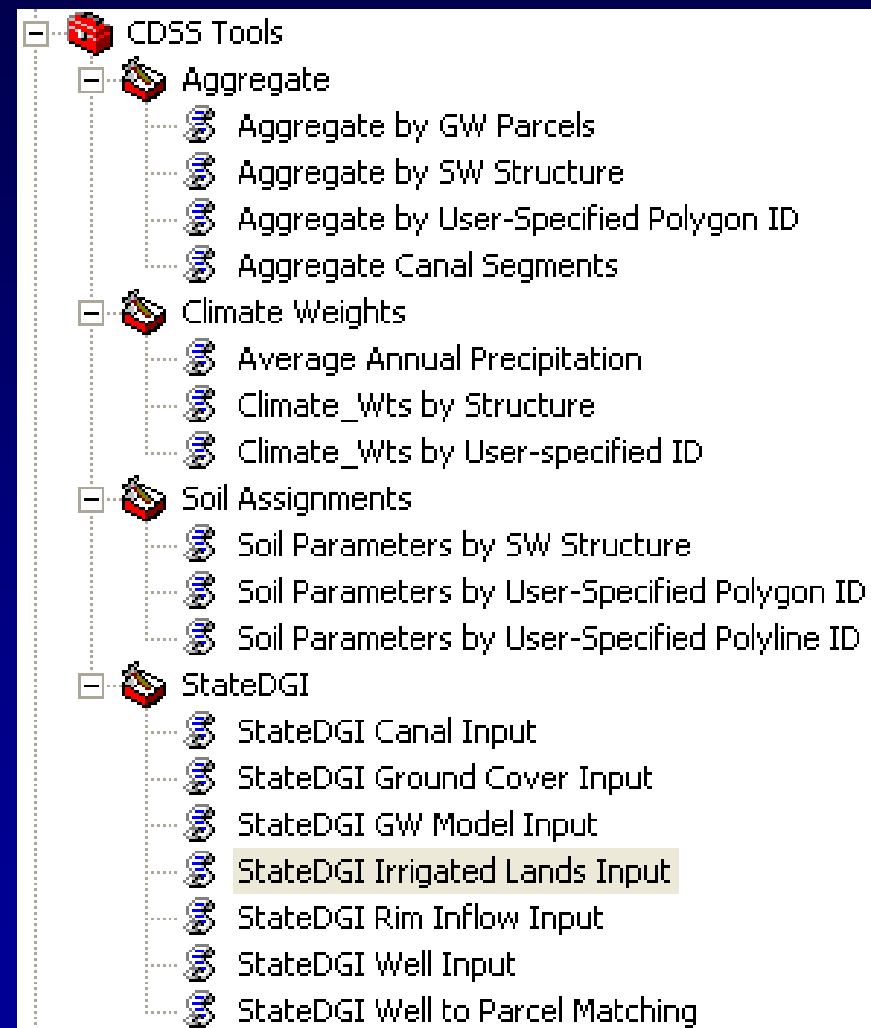
Software – StateDMI

- Processes input files for StateCU and StateMod
- Provides editors for commands
- Provides data viewers
- Can be automated



Software – StatePP, StateDGI

- Uses ArcGIS
- MODFLOW file generation
 - Recharge
 - ET
 - Wells
 - Drains
- Process StateCU/StateMod structure data to cells



Software – StateCU Model

- Consumptive use model
- Compatible with StateMod and groundwater model
- Calculates agricultural, municipal, and industrial demands

StateCU - Structure Information

File Help

Select a structure:

Name	ID
MCKAY DITCH	360734 ..
PALMER-MCKINLEY DITCH	360765 ..
PLUNGER DITCH	360780 ..
SAUMS DITCH	360796 ..
SLATE CREEK DITCH	360800 ..
SMITH DITCH	360801 ..
WESTLAKE DITCH	360868 ..
BRAGG NO 1 DITCH	370519 ..
CHATFIELD BARTHOLOMEW D	370539 ..
C M STREME GATES DITCH	370548 ..
CREAMERY DITCH	370560 ..

View/Edit Additional Structure Information

Climate Station Assignments

Historical Surface Water Diversions

Historical Ground Water Pumping Data

Crop Acreage Data

Efficiency Information

Irrig. Method and Max Pumping Rate Data

Selected Structure Data

MCKAY DITCH

Location1: SUMMIT

Location2: 14010002

Latitude (deg): 39.67

Elevation (ft):

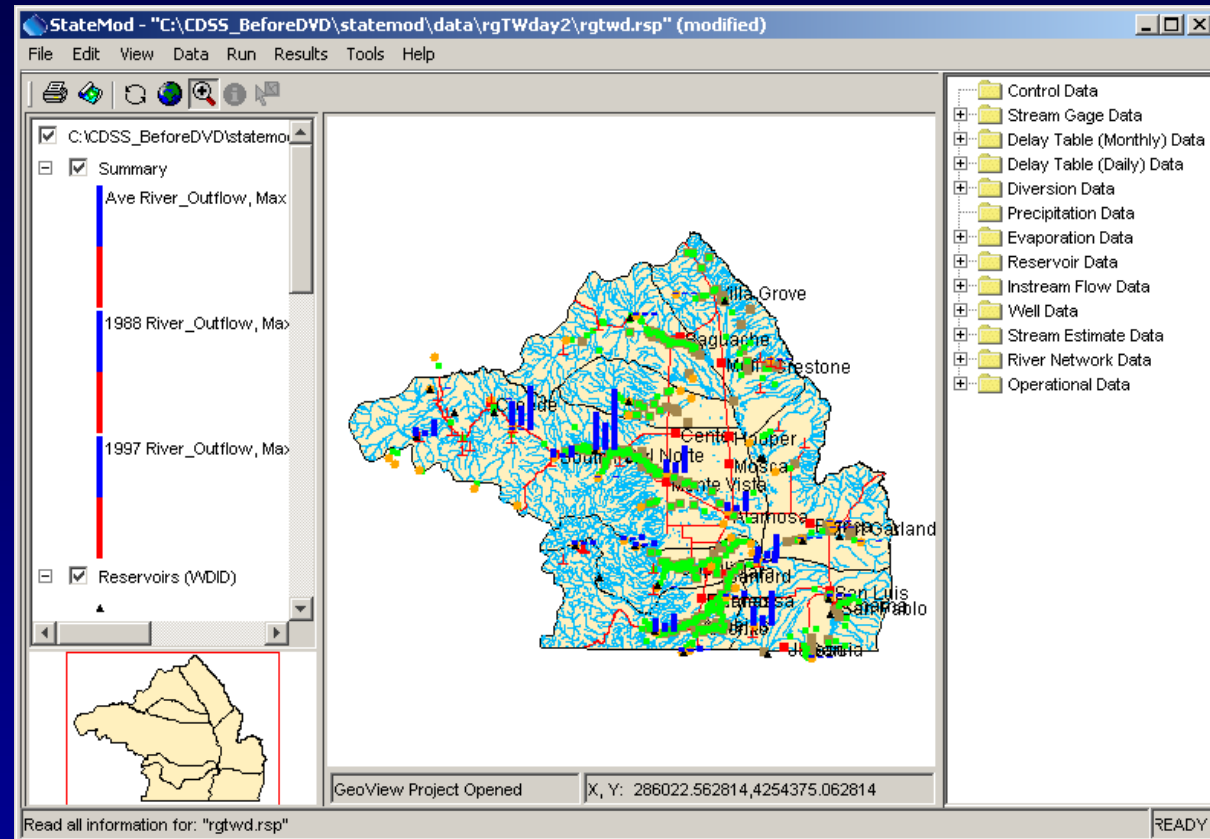
Soil Moisture Capacity (in/in): 0.1300

Water Rights Information (view only):

Decree Amount (cfs)	Administration Number

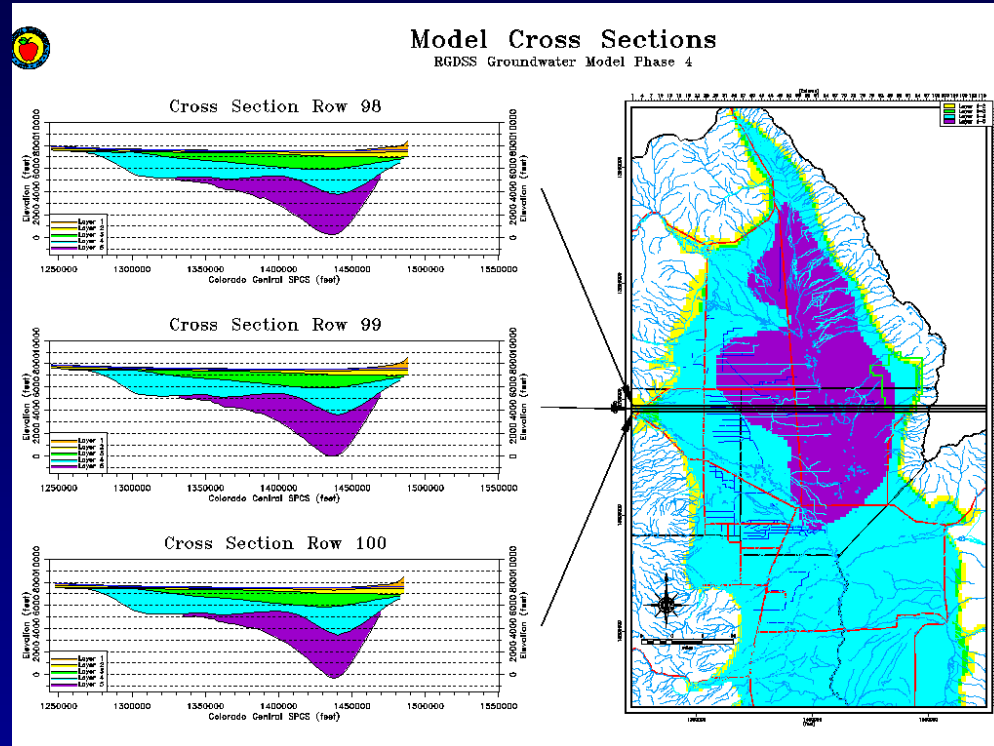
Software – StateMod Model

- Water allocation model
- Distributes water supply to meet demand based on system definition, water rights, and operations
- Shares files with StateCU and MODFLOW



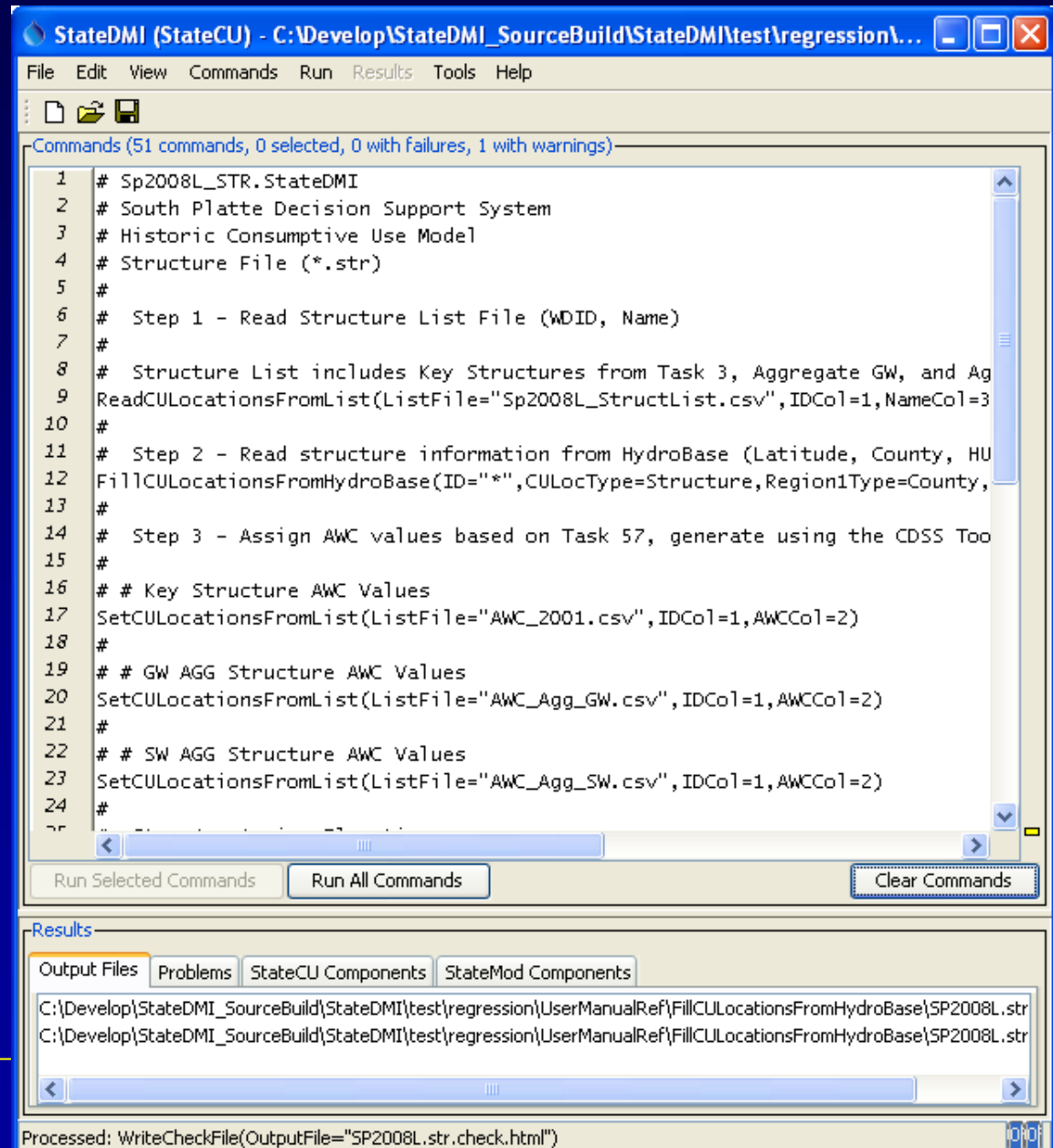
Software – Groundwater Model

- Based on USGS MODFLOW software
- Compatible with various visualization tools
- Rio Grande and South Platte data sets



Data Set Processing

- Use HydroBase, GIS for input
- Automate processing with TSTool, StateDMI, StateDGI, StatePP, etc.
- Follow CDSS modeling procedures
- Repeatable

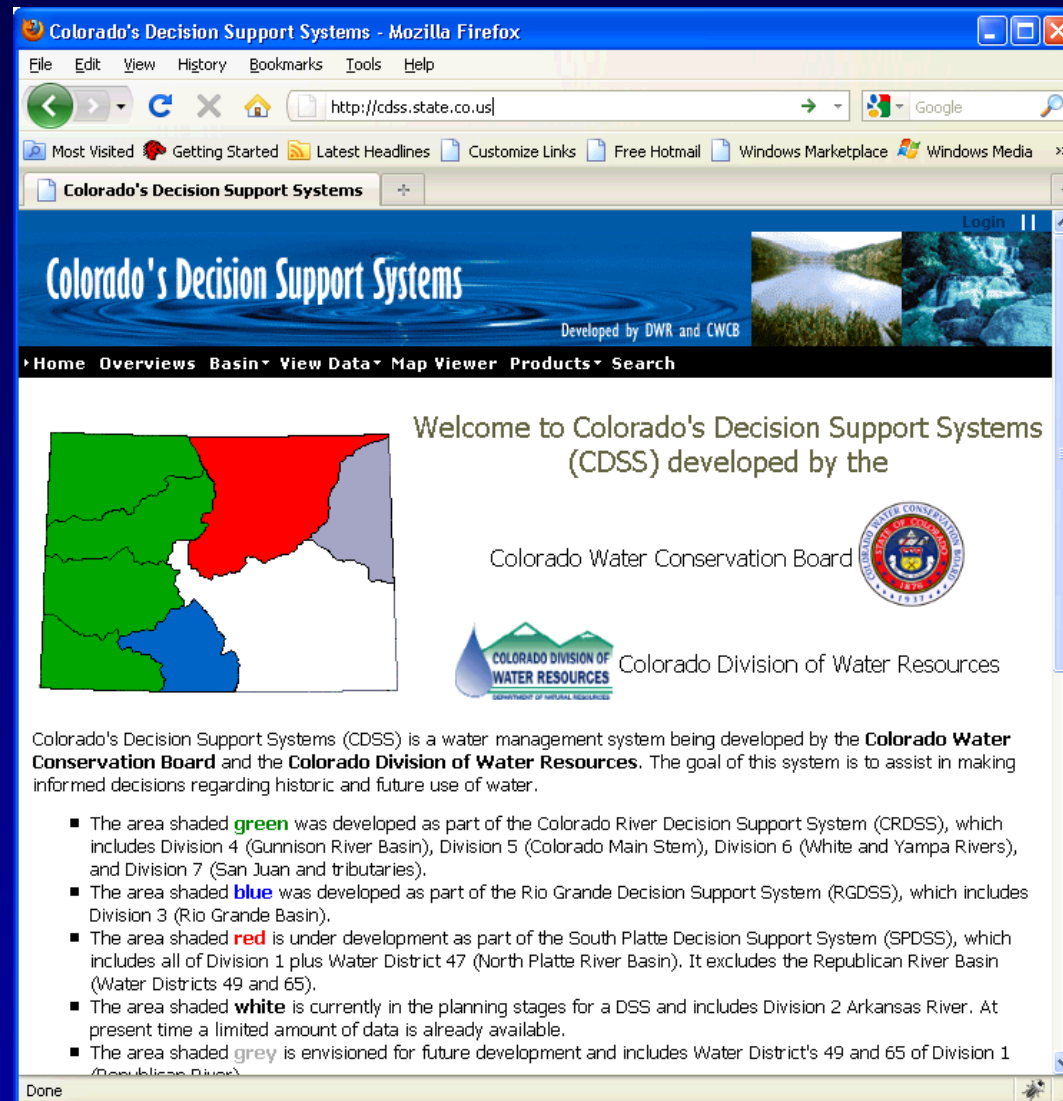


Baseline Model Data Sets

- Created for major river basins
 - Demand, supply, allocation, water balance
- StateCU, StateMod, MODFLOW files are maintained separately, and specific files are shared where needed
- Updated periodically to incorporate new data
- Available on CDSS web site
- Model output files are typically not distributed due to size – must rerun models
- Documentation describes input, processing, and results

Access to Data and Tools

- CDSS website: cdss.state.co.us
- HydroBase DVD
- Email: ray.alvarado@state.co.us
- See also presentations for specific tools



The screenshot shows the Mozilla Firefox browser window displaying the Colorado's Decision Support Systems (CDSS) website. The browser's address bar shows the URL <http://cdss.state.co.us>. The website's header features the title "Colorado's Decision Support Systems" and the text "Developed by DWR and CWCB". Below the header is a navigation menu with links: Home, Overviews, Basin, View Data, Map Viewer, Products, and Search. The main content area includes a map of Colorado with regions shaded in green, red, blue, white, and grey. To the right of the map is a welcome message: "Welcome to Colorado's Decision Support Systems (CDSS) developed by the Colorado Water Conservation Board" and the Colorado Division of Water Resources. Below the map and text are logos for the Colorado Water Conservation Board and the Colorado Division of Water Resources. A paragraph of text describes the CDSS as a water management system developed by the Colorado Water Conservation Board and the Colorado Division of Water Resources, aimed at assisting in making informed decisions regarding historic and future use of water. A bulleted list provides details about the different shaded regions on the map.

Colorado's Decision Support Systems (CDSS) is a water management system being developed by the **Colorado Water Conservation Board** and the **Colorado Division of Water Resources**. The goal of this system is to assist in making informed decisions regarding historic and future use of water.

- The area shaded **green** was developed as part of the Colorado River Decision Support System (CRDSS), which includes Division 4 (Gunnison River Basin), Division 5 (Colorado Main Stem), Division 6 (White and Yampa Rivers), and Division 7 (San Juan and tributaries).
- The area shaded **blue** was developed as part of the Rio Grande Decision Support System (RGDSS), which includes Division 3 (Rio Grande Basin).
- The area shaded **red** is under development as part of the South Platte Decision Support System (SPDSS), which includes all of Division 1 plus Water District 47 (North Platte River Basin). It excludes the Republican River Basin (Water Districts 49 and 65).
- The area shaded **white** is currently in the planning stages for a DSS and includes Division 2 Arkansas River. At present time a limited amount of data is already available.
- The area shaded **grey** is envisioned for future development and includes Water District's 49 and 65 of Division 1 (Republican River).

CDSS Future Activities

- Complete SPDSS implementation
- Complete ArkDSS feasibility study, followed by full DSS implementation
- Maintain/update existing DSS
- Use CDSS for specific applications, such as the Colorado River Water Availability Study (CRWAS)