Colorado's Decision Support Systems

Colorado Decision Support System (CDSS)

CDSS was developed to provide credible information so water users can make timely decisions regarding historical and future management of Colorado's water resources.

CDSS is data-centered around a central database (HydroBase) containing real-time and administrative water resources data.

CDSS tools have been developed to access historical and current data stored in HydroBase for:
1) general information such as historical water use changes over time, and
2) input to surface water, ground water, and consumptive use models used to investigate both historical water uses and future "what-if" scenarios.

HydroBase, GIS Coverages, and planning tools can be viewed and accessed directly from the CDSS website without the need for special software.

CDSS is sponsored by the Colorado Water Conservation Board and the Colorado Division of Water Resources

COLORADO DIVISION OF WATER RESOURCES DEPARTMENT OF NATURAL RESOURCES

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

How Does CDSS Help with Upper Colorado Water Resource Management?

HydroBase is used by the Upper Colorado River water commissioners to view real-time streamflow and diversion data to assist in administering water rights; and to quality control and store information such as diversion records and reservoir contents.

The CDSS Consumptive Use Model (StateCU) is used to estimate Upper Colorado Basin Compact uses as required by the Colorado River Basin Project Act of 1968.

The CDSS Water Resources Planning Model (StateMod) was used in the Coordinated Facilities Operation Study (CFOPS) to investigate reservoir release options to meet 15-mile Reach fish flows, and quantify potential impact on water supply.

COLORADO'S DECISION SUPPORT SYSTEMS

Upper Colorado River Basin

Specific CDSS Products

GIS Coverages

- Irrigated acreage coverages with water supply and crop types
- Physical coverages such as hydrology, stream gages, topography, reservoirs, diversions, and soil information
- Administrative coverages such as counties, roads, water districts, and public land survey
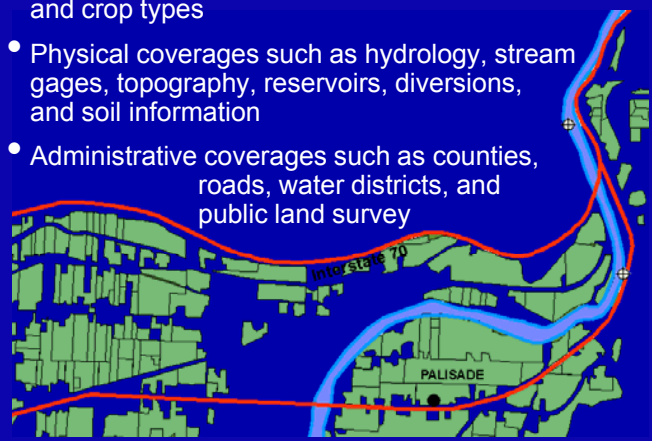
CU & Losses Report and StateCU Model

Colorado's Decision Support Systems
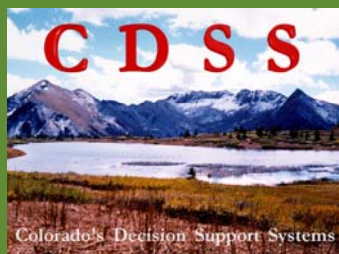
- Historical consumptive use by use category reported every five years
- Monthly Crop CU by basin, water district, and ditch
- Shortages and efficiency information

HydroBase

7200646-Grand Valley Project Diversions
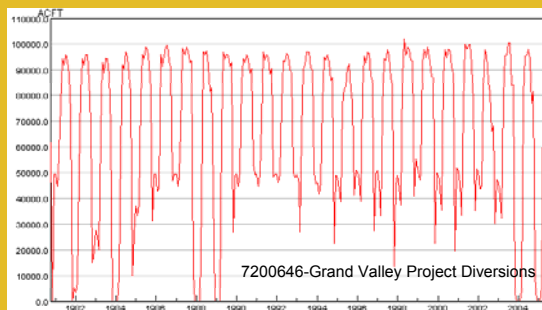
- Real-time streamflow and call data
- Historical data such as streamflows, storage, diversions, climate data, and population data
- Water rights information such as appropriation dates, absolute and conditional decreed rates, uses, and transactions
- StateView Interface with user-friendly query options

The combined CDSS products provide information regarding historical and current water management and tools to investigate future changes in water use

StateMod Water Resources Planning Model

Colorado River

- Represents 100% of basin CU and water rights
- Operates based on prior appropriation doctrine
- Historical depletions by basin, water district, and river reach
- Detailed project operations
- Available flow for future development
- Model to analyze proposed projects, changes in water use

D	Grand River Div
	09010500
M	512068
D	510848
O	512068_Dwn
	09011000
	Grand Lk
D	Adams Tunnel
M	953695

Basin Information Report

- Basin water resource development

Date	Project
1915	Grand Valley Project
1936	Fraser River Collection System
1938	Colorado-Big Thompson Project
1940	Williams Fork Diversion Projec
1948	Continental-Hoosier Diversion System
1959	Williams Fork Reservoir

- Water rights administration issues such as the "Cameo Call" and Senate Document 80
- Key diversion structures in the basin and water commissioner meeting notes
- Project descriptions and operations such as the Fryingpan-Arkansas Project and the Silt Project

Example Questions the CDSS Products Can Address

What conditional storage rights exist in the Upper Colorado/Frasier Basins?

- Query HydroBase (using StateView) for conditional decreed volume in water district 51. There are 106 conditional storage rights, most for small ponds. There are 4 conditional rights greater than 5,000 acre-ft (Ranch Creek, Jasper, Granby, and Vasquez Reservoirs).

StateView – Structure Data – Query

Query Options:
Div/Dist: 51 - Upper Colorado/Fraser Rivers
Where: Decreed vol (cond) — Greater than — 0
Where: — Matches
Where: — Matches

Structure Records: 106 records returned in 0.89 seconds

	DIV	WD	ID	STRUCTURE NAME
1	5	51	3690	RANCH CREEK RESERVOIR
2	5	51	3743	WINDY GAP PROJ JASPER R
3	5	51	4014	GRANBY RES STG RIGHTS
4	5	51	3706	VASQUEZ RESERVOIR

- View GIS Reservoir file for locations.

How have Green Mountain Reservoir operations changed over time?

- Section 2.1.2 of the Basin Information Report discusses historical and current operations of Green Mountain Reservoir.

StateCU can address questions about crop acreage, demands, shortages, and delivery efficiencies from basin to ditch level

What is the average annual crop consumptive use in the basin senior and junior to Shoshone's junior right?

- 100 percent of the identified basin irrigated acreage, assigned by ditch, is included in the StateCU scenario. The control input file can be revised to include the Shoshone junior water right admin number of 33023.28989 and diverted and consumed water is "colored" as senior and junior. Results can be summarized by ditch, water district, and basin.

Which diversions receive supplemental water from Vega Reservoir?

- Section 2.1 of the Basin Information Report describes operations of the Collbran Project. Section 5.9.15 of the Water Resources Planning Model User's Manual lists diversions that get supplemental water from Vega Reservoir.

Where is flow available for development in the basin? How much?

- Table 6.1 of the Water Resources Planning Model User's Manual shows average annual flow at stream gages. Over 33,000 af of flow is available on Williams Fork, subject to the Colorado River Compact. Figures in Chapter 6 graphically show both physically and legally available flow.
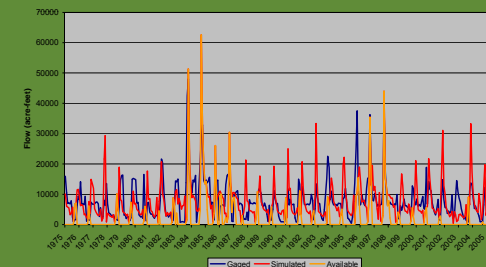
What is the firm yield of Wolcott Res. based on 1909 - 2005 hydrology?

- The StateMod Baseline dataset includes current uses and the proposed Wolcott Reservoir. The firm yield can be estimated by turning the reservoir 'on' and incrementally increasing a demand only supplied by Wolcott Reservoir until the demand is not completely satisfied.

StateMod can provide depletions and available flows by river reach and can answer "what-if" questions about future water development