
Colorado Water for the 21st Century roundtable process: GIS applications

*GIS Applications in Water Supply and Water
Conservation Workshop*

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Introduction

- *Research on organizational leadership*
- *Acknowledgements*
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- *Roundtables examined*
 - *Denver Metropolitan*
 - *South Platte*

Colorado Water for the 21st Century Act (2005)

Purpose: “To facilitate continued discussions within and between basins on water management issues, and to encourage locally driven collaborative solutions to water supply challenges” (37-75-104).

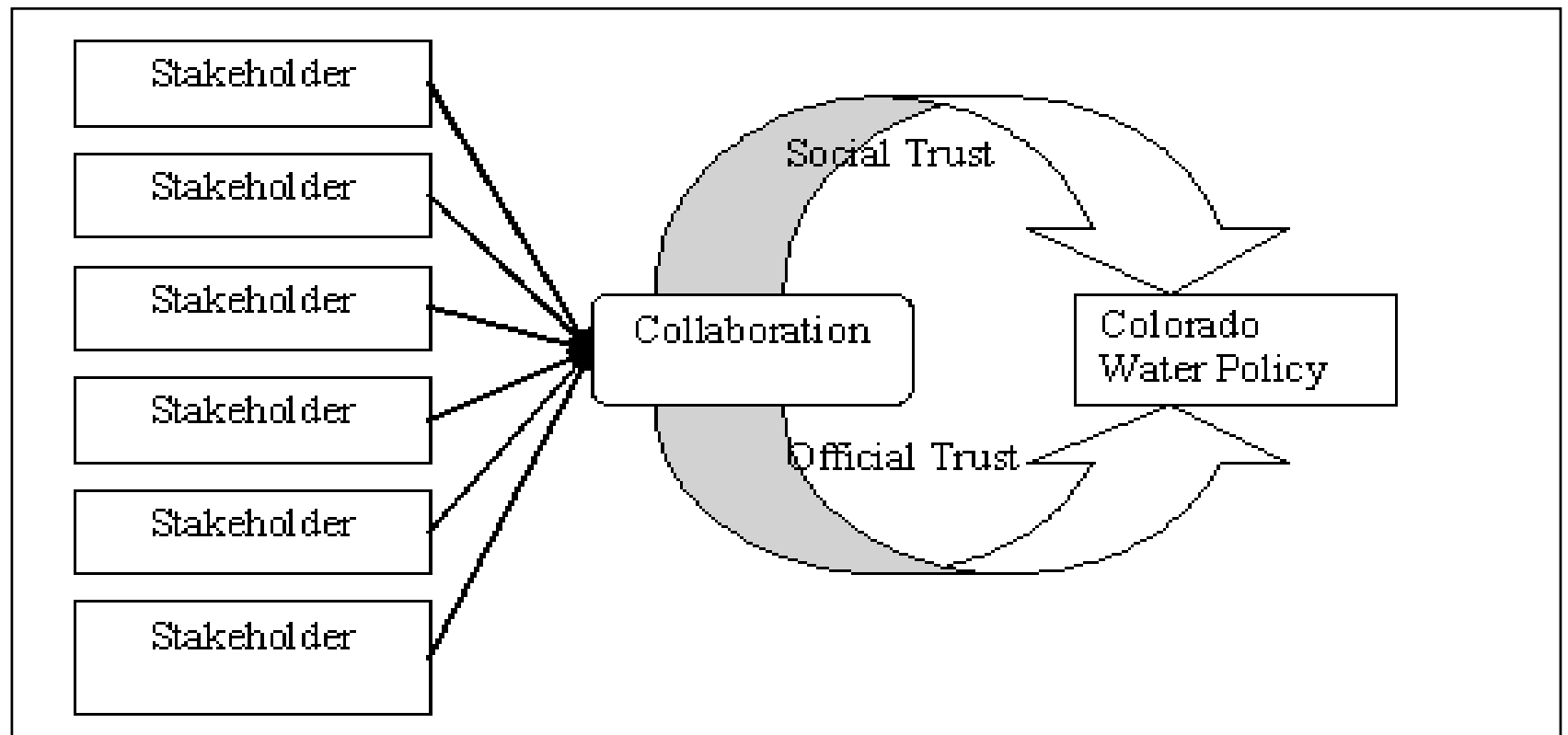
Functions:

Self-govern

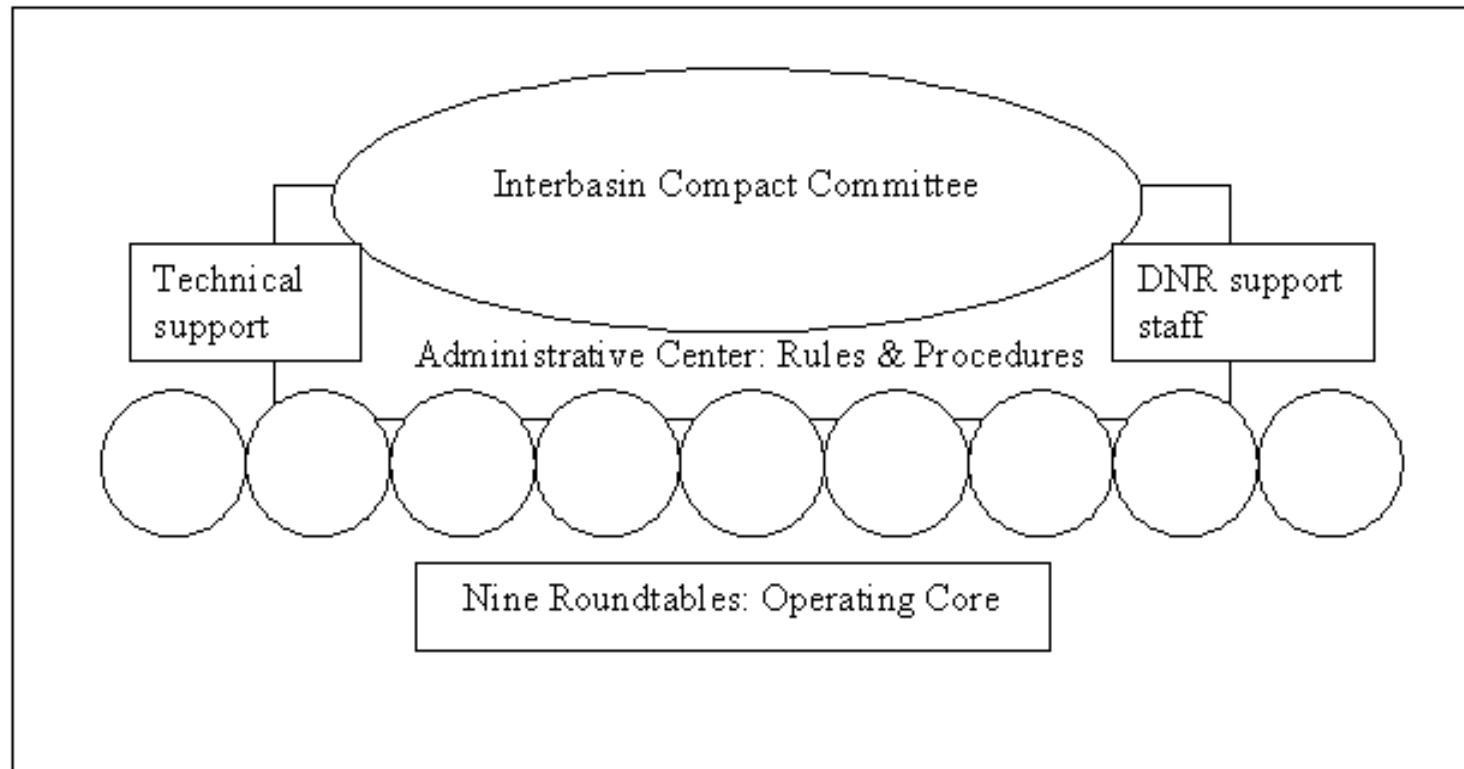
“Develop a basin-wide consumptive and nonconsumptive water supply needs assessment, conduct an analysis of available unappropriated waters within the basin, and propose projects or methods. . . for meeting those needs” (37-75-104)

“Serve as a forum for education and debate regarding methods for meeting water supply needs” (37-75-104).

Process Model



Roundtable and IBCC organization



Resources

- *Statewide Water Supply Initiatives (SWSI)*
 - *SWSI I*
 - *SWSI II*
- *Basin Needs Assessments*
 - *Abiotic*
 - *Biotic*
 - *Human Use*
- *GIS Themes*

Data

- *National*

- *National Hydrography Dataset*
- *USGS*

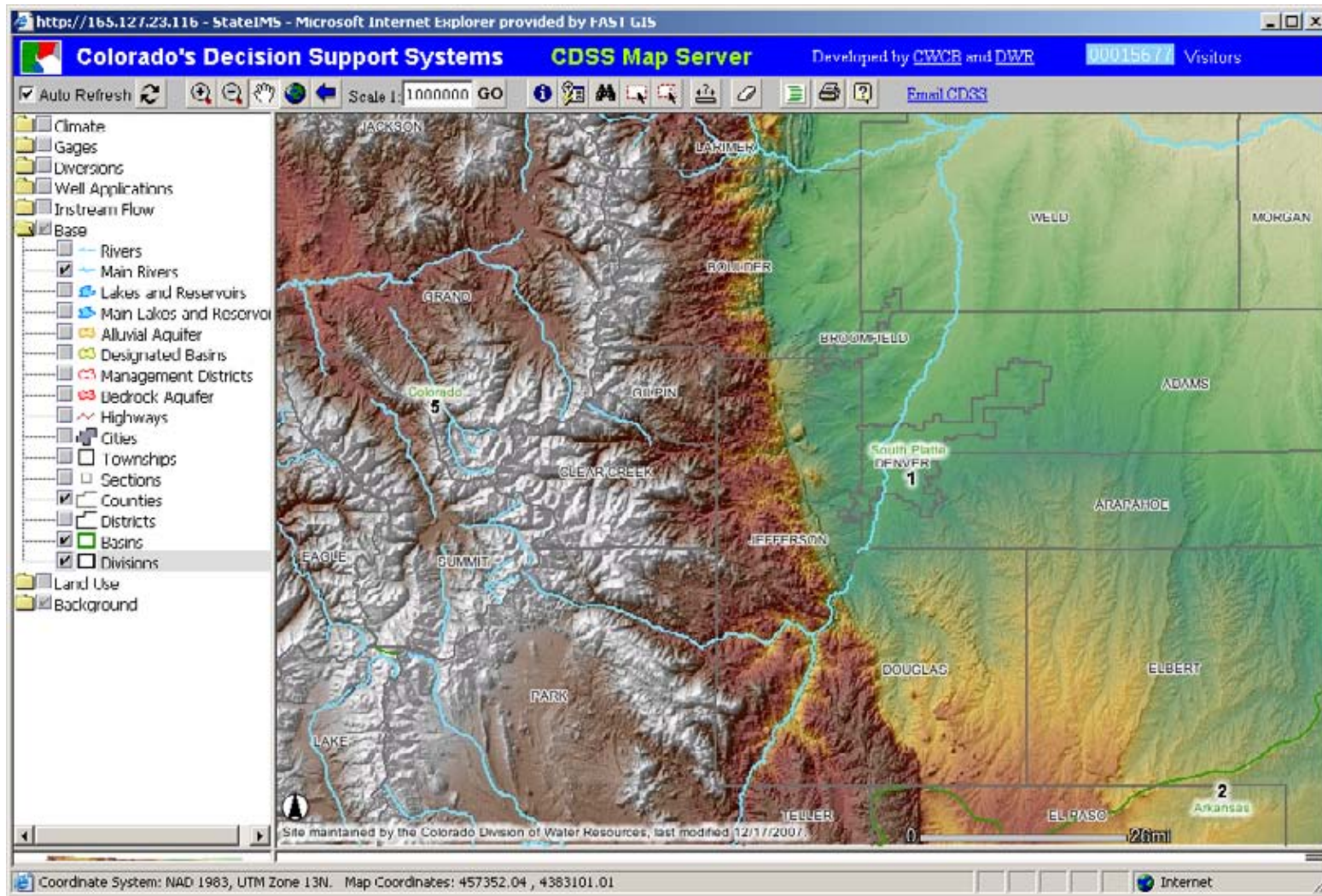
- *State*

- *Colorado Decision Support Systems (CDSS)*
 - *Colorado River and Rio Grande DSSs*
 - *South Platte and Arkansas, in progress*
- *Water Resources Information Center (CWCB)*

National Hydrography Dataset

The screenshot shows the NHD Geodatabase web application running in Microsoft Internet Explorer. The browser's address bar displays <http://nhdgeo.usgs.gov/viewer.htm>. The application interface includes a navigation menu on the left with options like Overview, Zoom In, Zoom Out, Zoom to State, Zoom to Sub-basin, Previous Extent, Full Extent, and Pan. The central map area shows a topographic map of a region with yellow hydrographic lines. A scale bar at the bottom of the map indicates 114 km. On the right side, there is a control panel with a Scale slider, Layers and Legend tabs, and a list of active layers including Local Hydrologic Units, NHD Status (with sub-options for Local, High, and Medium), Base Map Features, and Shaded Relief. The footer contains navigation links (NHD Home, NHD Stewardship, Metadata, Partners, Map Services, What's New, Staged), contact information for the U.S. Department of the Interior, U.S. Geological Survey, and logos for EPA, USDA, and USA.gov. The status bar at the bottom shows map coordinates: Map: -102° 36' 08", 37° 09' 00" -- NatGrid: 135 GB 12930 14207 (NAD83) -- ScaleFactor: 0.0342 dec d.

Colorado Decision Support System



Consumptive Needs Assessment

- *State wide M&I and SSI projection of a 53 percent increase in water consumption from 2000 to 2030 (p. 5-8).*
- *Occurrence and effect of Level 1 conservation*
- *Agricultural irrigated water use per acre and changes in irrigated acres*

Non-consumptive Needs Assessment

- *Identify water-dependent species and ecosystems*
- *“Assess the environmental demands (or ecological flow needs) of those systems” (p. 6-1).*

What is GIS?

- *“A geographic information system is a geographic analysis tool that analyzes differences in multiple spatial data layers to create new spatial information not available by studying the data layers separately.”
(Decker, 2001, p. 11)*

Three Components of GIS analysis

- *Data analysis*
- *Modeling*
- *Visualization*

Schema to Address Water Supply and Conservation Issues

- *Resource issues*
- *Data*
- *Procedures*
- *Tests*
- *Results*

GIS Applications: Setting the Bar

- *Decision Support Systems*
 - *Colorado Layers: Climate, Gages, Diversions, Well Applications, Instream Flow, Base Map, Land Use*
- *GIS and Enterprise Resource Planning interface (SAP)*
 - *Long-term strategies: Gauging water supply and transfers, abstractions, water releases, assessment of climate change, and new infrastructure planning*
 - *Operational controls: Comparing costs of pumping to the costs of using reservoirs for cost effective decisions*
 - *Climate change: Reservoirs refill faster winter with lower levels in summer.*
 - *GIS/ERP integration helps to investigate remedial measures.*
 - *SCADA (supervisory control and data acquisition system) and ERP integration result in greater efficiency of an entire transfer system of multiple pumping stations. Plus, fault warning systems for preventative maintenance.*
 - *Hydrologic modeling*

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