SPDSS

The Newsletter for the South Platte Decision Support System

A publication of the Colorado Water Conservation Board, Colorado Division of Water Resources

July 2005 Issue 3

Featured in this Issue:

GIS Products Coming Together

Groundwater Data: A Lesson in Cooperation

On the Cover: Irrigated Lands Flyover – Future GIS Product

Other Exciting Products

This newsletter highlights only a portion of the work completed through the SPDSS. To find out more information on the products featured in this newsletter or to learn more about other exciting products being developed by the SPDSS team, such as models for surface water, groundwater, and consumptive use, visit the website.

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

The SPDSS Team

SPDSS is a part of Colorado's Desicision Support System, a water management system. The goal of CDSS is to assist users in making informed decisions regarding historic and future use of water.

The SPDSS team consists of members of various state organizations, such as the Colorado Water Conservation Board and the Colorado Division of Water Resources, and various consultants. For additional information, please visit the website at http://cdss.state.co.us/.

New GIS Products Put to Work

Over the last two years through Phases 1 and 2 of the SPDSS, the SPDSS team has been developing irrigated parcel boundaries and irrigation ditch service areas containing crop types and sources of irrigation water from 2001, a GIS tool for viewing groundwater data, and a Map Gazetteer displaying the SPDSS Orthoimage Base Map (aerial photography) and irrigated parcels.

To come up with the irrigated parcels, crop types and service areas, the SPDSS team hit the road to meet with water commissioners and with individual ditch companies. The ditch companies provide the best information about the water source for each irrigated parcel. The SPDSS team and folks from the ditch companies labored over mark-ups of parcel maps to make them as accurate as possible. The maps were edited in the GIS database and then taken back to water commissioners and ditch companies for a final review. Water districts in the Poudre River Basin and South Platte mainstem from Thornton to Julesburg received the final drafts of the irrigated parcel boundaries and irrigation service areas. Those for the rest of the South Platte Basin were delivered in draft format.

A GIS tool for viewing groundwater data contains all of the SPDSS groundwater data organized by aquifer. This setup allows the SPDSS team and others to quickly visualize the data.

A Map Gazetteer displays base map GIS data, the SPDSS Orthoimage Base Map, irrigated parcel boundaries and service areas, and data from HydroBase, the State's hydrologic database, for Water Districts 1, 2, 3, and 64. The Map Gazetteer is indexed and each map is printed at either 1:24,000 scale or 1:48,000 scale. The gazetteer is printed on water resistant paper and will be used primarily in the field by Division 1 Water Commissioners to assist them with their daily work.

Products on Website

Many of the GIS products are publicly available and can be downloaded at http://cdss.state.co.us/ftp/gis.asp

Irrigated Parcel Boundaries a Hot Item

The Northern Colorado Water Conservancy District has used the 2001 irrigated parcel boundaries and crop types developed by the SPDSS team to help them in setting up a system for monitoring crops and irrigated lands on an annual basis. The Central and Lower South Platte Water Conservancy Districts are using the irrigated parcels to assist in carrying out augmentation plans, modeling and visualizing the irrigation in their areas.

North Poudre Irrigation Company, in Wellington, Colorado, is using the 2001 irrigated parcels for an inventory of their system and for assessing efficiency of water delivery. They have taken the parcels in their service area and assigned them to individual canal headgates for a more detailed look at their system.

The SPDSS team is using the parcels to assist in meetings with water commissioners and to finalize the consumptive use model.

Groundwater Data

A Lesson in Cooperation

In pursuit of creating a comprehensive groundwater database, the SPDSS team searched existing data for information on aquifer properties, configuration, and changes in groundwater levels over time. The team successfully compiled reports published by government agencies such as the Colorado Department of Natural Resources, United States Geological Survey, universities, and local water conservancy districts.

The huge leap in expanding the existing knowledge base came when the SPDSS team obtained more than 140 previously unpublished reports of existing pumping tests in the bedrock aquifers – a tribute to the cooperation of dozens of water user groups, municipalities and individuals who are assisting in this project. During Phases 1 and 2 of SPDSS, 72 entities from all over the South Platte Basin cooperated in providing data, including Aurora, Castle Rock, Boulder and Sterling just to name a few. These plus other data collected by the SPDSS team more than tripled the amount of information on the properties of the region's aquifers.

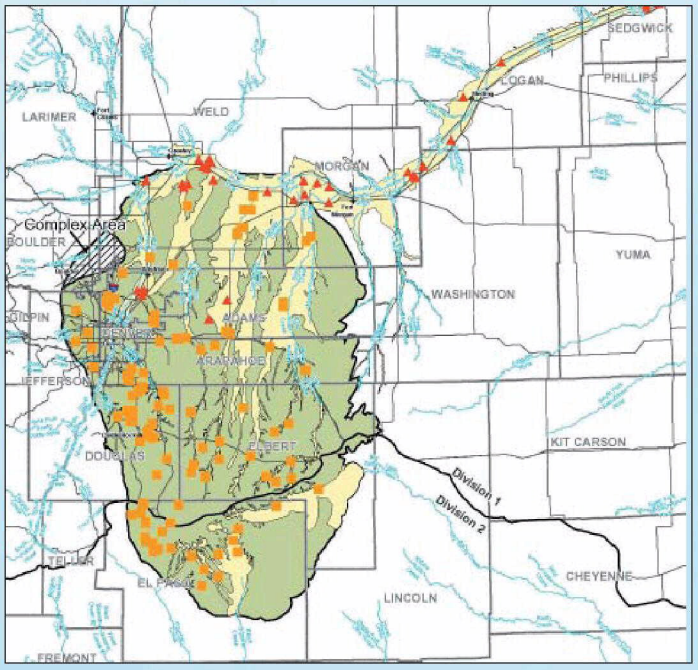
Phasing Leads to Efficient Field Work

The search for existing data shed light on gaps in the existing groundwater information knowledge base that needed to be filled. The data gaps were used to develop a focused field data collection program that began in 2003. Field activities have included:

- drilling approximately 40 observation wells in the alluvial aquifer and one in a bedrock aquifer, each equipped with water level data recorders
- conducting multi-well aquifer pumping tests at 13 wells in the alluvial aquifer and at 14 wells in the bedrock aquifer using existing irrigation or production wells
- measuring water levels in over 100 bedrock wells

Field activities have already provided insight into the size and shape of the aquifers, the direction and rate of groundwater flow, the amount of groundwater available in the aquifers, and the effects of pumping on the groundwater resource.

The two most heavily used groundwater systems have gained the spotlight: (1) the shallow alluvial aquifer underlying the South Platte River and its tributaries, and (2) the bedrock aquifers underlying the Denver Basin Region that extend from Colorado Springs to Greeley and from the foothills to Limon. Alluvial observation wells (red triangles) and bedrock water level monitoring sites (orange squares) show the widespread coverage of the investigation.



Benefits

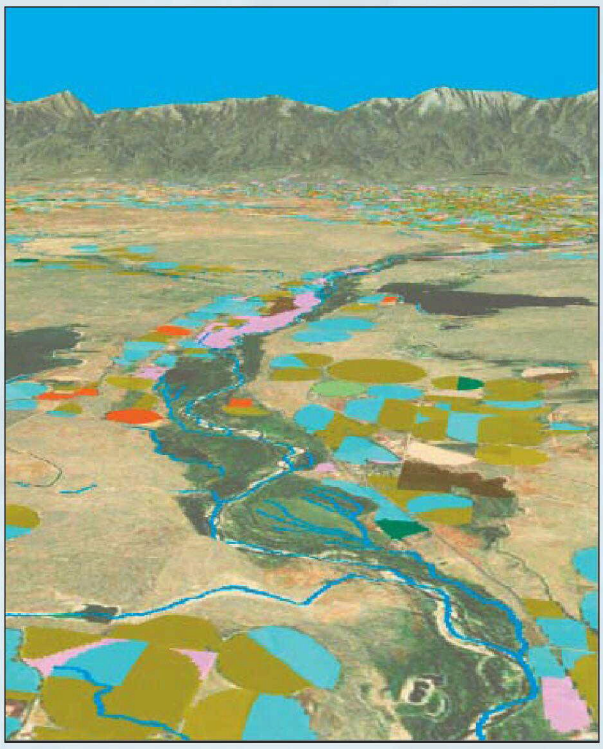
Data collected to date, along with future data collection, will be used to develop a detailed numerical groundwater flow model of the alluvial aquifer system. Such a model can assist in making various water management decisions.

Details on Website

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

The website contains Technical Memoranda describing various aspects of the groundwater data collection and analyses and contour maps of the information needed to characterize the aquifers. Raw data used in these Technical Memoranda are stored in HydroBase, the State's hydrologic database.

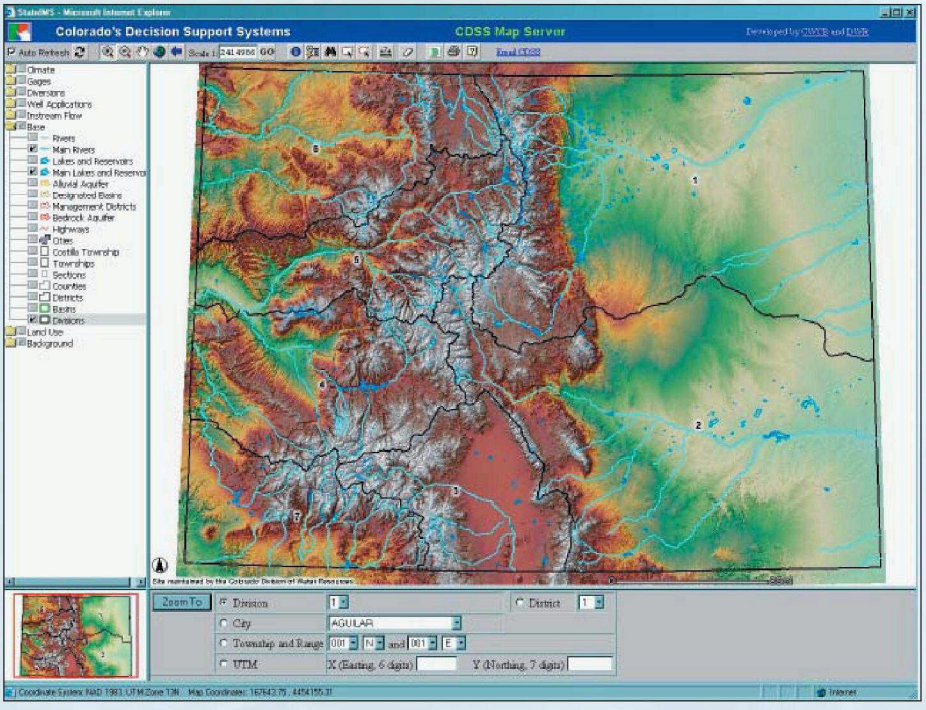
A Glimpse of Future GIS Products Coming in Phase 3



The SPDSS team will create visualizations of SPDSS datasets to gain a broader understanding of decision support systems. This may include **simulated flyovers of irrigated lands** (left), 3D visualizations of ground water data and aquifers, and changes in irrigation and water use over time.

Phase 3 will also mark the start of **mapping historic irrigated lands** in the South Platte Basin that can be applied to consumptive use models. Landsat satellite imagery and historic aerial photography will be used to map irrigated lands in the basin for the 1950s, 1970s, and 1980s. Water sources will be assigned using the current 2001 irrigation service areas as an accurate starting point.

The SPDSS team has created an Internet Map Server (**StateIMS**) that allows users to view and query the CDSS data in a map-based environment (below). Users will not need any special software other than an internet browser and a connection to the internet. The map will be statewide, and users can zoom and pan to any part of the state to view the desired data.



More Exciting Phase 3 Products

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

Other Phase 3 products being developed and coming to the website include surface water, groundwater and consumptive use models.

Website Up and Running During Improvements

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

While the CDSS website is experiencing a behind-the-scenes makeover, the website is operational and accessible by users.

For more information regarding SPDSS, previously developed CDSS products, or upcoming activities, visit the CDSS website or contact Ray Alvarado, Project Manager of SPDSS, at Ray.Alvarado@state.co.us.