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Office of the State Engineer's Hydrographic Survey and Mapping Bureau Documents New Mexico's Water Uses

By Dario Rodriguez-Bejarano, Bureau Chief, Hydrographic Survey and Mapping Bureau

(SANTA FE, New Mexico) – The Hydrographic Survey and Mapping Bureau of the Office of the State Engineer performs the hydrographic surveys of the water uses within the State of New Mexico. These hydrographic surveys form the technical basis for the adjudication of water rights (containing the elements of a water right) throughout the state as well as producing a database of irrigated lands and water use features that can be a valuable data source for our entire agency and water users throughout the state. A main utilization of these data will be on a statewide administration of water resources by the Office of the State Engineer.

Technical staff in the program's Hydrographic Survey and Mapping Bureau performs hydrographic surveys and provides the foundation documentation for all adjudications. This initial documentation will determine the elements of a water right: ownership, priority, purpose of use, place of use, point of diversion, acreage being irrigated, and amount of water being used.

The hydrographic survey process has evolved over time from a hand-drawn, manual data collection into a computer-based, digital/GIS-mapping environment. As a part of that digital/Geographic Information System (GIS) mapping process, digital orthophotography forms the mapping base used in all of our planned and current Hydrographic Survey Projects. Accurate aerial digital ortho-rectified imagery allows the Hydrographic Survey and Mapping Bureau to produce maps based on the interpretation of this imagery to delineate irrigated parcels and then to present that information to the public and the court on informative and understandable maps. By using digital ortho-rectified imagery, our map base allows us to integrate a wide variety of data including field inspections of all types of water use features, Global Positioning System (GPS) locations of those features, ownership data from deeds, plats and county assessor data as well as scanned and georeferenced maps from a variety of sources. The use of Color Infrared Photography in the production of the digital orthophotographs would introduce another very important and useful piece of data in the identification and mapping of irrigated lands and crop patterns.

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Besides these ortho-rectified images, we also use satellite imagery. Satellite imagery does not yet have the high resolution of the aerial digital imagery but it can be acquired on a user-need basis and over a wider area, and much more quickly than aerial digital imagery. It also lends itself to computer interpretation that may yield fast information about agricultural activity over wide areas of the state. The State Engineer is actively directing Hydrographic Survey and Mapping Bureau staff to determine the advantages of this kind of analysis to produce an annual estimate of total agriculture area, which can in turn give an indication of total water use.

The application of GIS in the office and GPS receivers in the field is dramatically reducing the time needed by the Hydrographic Survey and Mapping Bureau to produce its surveys. Hydrographic surveys, required by statute to begin the adjudication process, determine historic water uses and quantities and must be precise.

The Office of the State Engineer together with other state and federal agencies obtained 2005 one-meter resolution statewide satellite imagery. This imagery has allowed the Hydrographic Survey and Mapping Bureau to create proto-surveys of the seven newly declared basins. This imagery could also be used for various statewide analyses such as determining the total irrigated acreage in the state. Aside from this 2005 imagery, the Office of the State Engineer this year acquired one-foot resolution aerial digital imagery over the Middle Rio Grande, the Lower Rio Grande and parts of the Fort Sumner basin.

Currently the Hydrographic Survey and Mapping Bureau is actively working in the Chama River, Lower Rio Grande and Fort Sumner basins, in the San Juan River area, and in the Taos area of the Upper Rio Grande Basin. The bureau has completed or is in the process of completing the San Juan/La Plata Project, Animas Valley Hydrographic Survey, Aamodt Adjudication, Zuni Hydrographic Survey, San Jose Hydrographic Survey Review, Lower Rio Grande Crop Pattern Determination, Taos Historical Acreage Review, and Statewide Agricultural Area Determination. Hydrographic Survey and Mapping Bureau is also engaged in overseeing a federally funded hydrographic survey of the Jicarilla Apache, San Jose and Zuni Indian areas.

Our data use encompasses aerial photography, airborne digital imagery, satellite imagery, digital elevation models, digital raster graphics and other data sources from federal, state and private entities. We produce a great variety of visual products for the benefit of our immediate internal users, the court system, sister state agencies, and for periodic reporting to the State Legislature. For additional information, please contact the librarian at 505/827-6158 or polly.mccord@state.nm.us.

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The Office of the State Engineer is charged with administering the state's water resources. The State Engineer has power over the supervision, measurement, appropriation, and distribution of all surface and groundwater in New Mexico, including streams and rivers that cross state boundaries. The State Engineer is also Secretary of the Interstate Stream Commission and oversees its staff.

The Interstate Stream Commission is charged with separate duties including protecting New Mexico's right to water under eight interstate stream compacts, ensuring the state complies with each of those compacts, as well as water planning.

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