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Science and the Courtroom: How Modeling Is Changing the Game

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Looking forward, Professor Griggs posed several issues likely to come up in the future of interstate water, such as how states will respond over the next fifty years as water in the Ogallala decreases and if there will be compact litigation over water quality?

Erica Montague

**UNIVERSITY OF DENVER WATER LAW REVIEW ANNUAL
SYMPOSIUM 2017: AT THE CONFLUENCE: THE PAST, PRESENT,
AND FUTURE OF WATER LAW**

Denver, Colorado

April 7, 2017

**SCIENCE AND THE COURTROOM: HOW MODELING IS CHANGING THE
GAME**

Meg Frantz, an engineer at Brown & Caldwell, moderated this panel discussion on science, data, and math modeling in water law. The panel featured: Dick Wolfe, State Engineer & Director of the Colorado Division of Water Resources; Chris Sanchez, a Hydrogeologist at Bishop-Brogden & Associates, Inc.; and Burke W. Griggs, visiting professor at Washburn University School of Law.

Chris Sanchez, who has testified in the Division 1 Water Court providing expert testimony about water, oil, and gas rules, offered a view from the perspective of an engineer and spoke about the difficulties related to communication especially with the more technical aspects of hydrology and water law. Sanchez also spoke about the varying accuracy models have in accounting for the interaction between groundwater and surface water. He indicated that current models can account for surface water fairly easy, but using models to make predictions about groundwater is much more difficult because there are still many unknowns and missing information in the field of groundwater modeling. Complicating this issue is that groundwater moves slowly and that some aquifers are buried and can be shallower, deeper, or more connected than others.

Moreover, Mr. Sanchez said that the impacts of groundwater wells on these aquifers and streams is also hard to predict because of all the variables and inputs involved, including the fact that aquifer depletion continues after the pumping stops. Mr. Sanchez's said that the ground-surface water interaction is determined by the attributes of that individual, which are not always easily to isolate for the purposes of modeling. Next, Mr. Sanchez explored some of the different models used in many courtrooms—such as Modflow and others based on Glover inputs—before discussing communication and cultural issues in the world of water law. From the perspective of an engineer, Mr. Sanchez expressed that it is not always easy to communicate the technical work he does even to skilled attorneys and consultants. He continued on this theme and said that it was even more difficult to defend the models and work that water engineers do in court. He elaborated on the difference in the kind of testimony required when he appears in front of a water court judge or in front of a jury.

Dick Wolfe also offered an engineer's perspective. Mr. Wolfe has been Colorado's State Engineer for the Division of Water Resources for the last ten

years. Mr. Wolfe spoke about the use of groundwater models in intra/interstate litigation and advocated for developing models for purposes other than litigation. However, Mr. Wolfe also discussed the importance challenging current groundwater models through litigation because states cannot manage what they cannot measure accurately. Mr. Wolfe pointed out the practical use of models in helping to develop rules, then later the operational plans based on these rules. He gave three instances of models being used in this way: creating irrigation rules in Arkansas River Basin, creating Compact compliance rules in the Republican River Basin, and in developing the Rio Grande Aquifer new-use rules in the Rio Grande decision support system. However, Mr. Wolfe explained that these models took a long time to create and were fairly expensive. But, this was not a recommendation to stop using models because Mr. Wolfe also emphasized the importance of science leading the way in policymaking and ensuring that the state legislature bases new laws on science and reality, not mere speculation.

Dr. Burke Griggs, a lawyer and professor at the Washburn University School of Law, provided an overview of some of the most contentious litigation between states over water-related issues. For example, Dr. Griggs talked at length about the Daubert motions for expert witness testimony in a case where Kansas sued Colorado. He emphasized the common practice of relying on their one's own experts with their own models to make their case. He characterized this situation as being a "battle of the experts" and discussed the cultural differences that can arise when lawyers interact with engineers and other water resource professionals. Dr. Griggs also explored how the federal government can assist states by creating models used in litigation. For example, he said the USGS can help states develop more expansive Modflow models and pointed to a federally funded groundwater analysis used when a dispute arose between Mississippi and Tennessee. Dr. Griggs' point was that federal funding has really helped modeling because without the funds from federal agencies, creating models is much more difficult for individual litigants.

Members of the panel followed their remarks by answering questions from the audience. In responding to the question of how to resolve the tension between legal and engineering cultures, panelists said that having proper expectations, developing realistic outcomes, and acknowledging differences in the different fields were all positive ways to make headway towards increasing communication. Another audience member asked about high transactions costs for litigants and what changes can be made to reduce them. Mr. Wolfe responded to this question by pointing to Colorado's Decision Support System, a program that allows for anyone to browse a wide range of water-related databases and records, and explaining that it has made a lot of progress towards reducing these costs through increasing transparency.

Next, an audience member asked whether there could be a risk of repression of these models as there currently has been with climate change data. Panelists answered that models are relatively insulated from data repression by an unfriendly federal government because of the extensive framework that exists around these models and jurisdictional difficulties with the federal government trying to interfere as most models exist at the state level.

Following that question, another person asked whether water law is moving more towards a mediation-based practice and if so, if that would be any better

than the current system. Mr. Dick Wolfe responded that there are problems with high transaction costs in water courts and that water judges were working to solve those issues. However, Mr. Wolfe was not entirely sure that a mediation-based model would work much more effectively than the current system, pointing to required non-binding arbitrations in the Republican River Compact that have led to little actual progress. Alternatively, Mr. Wolfe also said that mediation has worked well in the Platte River Compact because it is more focused on species conservation.

The final question was about how to ensure courts are using the best science. The panelists responded to this by saying that water decrees have made things more complicated and that scientific tools are used on a case-by-case basis, so it is hard to know exactly what the “best” science is in an individual situation because each is so vastly different. But, they also said that the legislature can help make sure that scientists have the best tools and data that they need to present the “best” science in the courtroom through enacting legislation that enables science to continue to move forward and make more discoveries.

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**SEPARATION OF POWERS: A COMPARISON OF ADMINISTRATIVE,
LEGISLATIVE, AND JUDICIAL WATER REGIMES**

This panel brought in three experts to discuss the benefits and drawbacks of water law regimes that are administrative, legislative or judicial in nature. Sturm College of Law Professor Tom Romero moderated the panel.

David Barfield, the Kansas Chief Engineer, spoke first and discussed the administrative regime. He explained the background of Kansas water law and the historical development of its administrative regime. The population of Kansas mostly resides in the wetter southeast, while most irrigation occurs in the west. This, combined with occasionally unavailable surface water, has led western irrigators to rely upon the groundwater of the Ogallala-High Plains aquifers. These aquifers do not interact with the surface stream and receive essentially no recharge.

To deal with these issues, Kansas has used several different water regimes. Before 1945, Barfield explained that Kansas used a judicial regime with few water laws. The state instead relied on the common law of riparian rights. The courts also interjected some elements of prior appropriation, creating a confusing mix of doctrines. In 1944, the Kansas Supreme Court decided this system no longer worked. The legislature responded, passing the 1945 Kansas Water Appropriation Act. Barfield said this legislative regime lasted from 1945 to about 1978. During this period, the legislature entered interstate compacts, partnered with the federal government to improve water storage, created an office dedicated to water planning, and much more. In 1978, the legislature made