

**Rio Grande Reservoir Symposium**

April 22, 2006

*Sponsored by*

The Utton Transboundary Resources Center

and

The Natural Resources Journal

University of New Mexico School of Law

The Utton Center and the Natural Resources Journal at the University of New Mexico School of Law are sponsoring the Rio Grande Reservoir Symposium to discuss the reservoirs on the Rio Grande. The purpose of the symposium is to raise the level of understanding of water managers, attorneys, and other professionals on the issues associated with legal authorizations for reservoirs, historic issues, and the constraints and opportunities that may exist for optimizing management of the reservoirs.

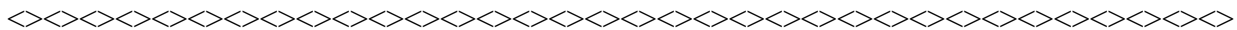
Em Hall – Welcome

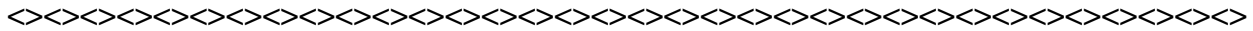
Em Hall is a professor of law at the University of New Mexico and the editor-in-chief of the School of Law’s Natural Resources Journal. He is the author of *Four Leagues of Pecos: A Legal History of the Pecos Grant* (1984) and *High and Dry: The Texas/New Mexico Struggle for the Pecos River* (2002). He teaches in the natural resources area.

Susan Kelly – Overview/Background

Susan Kelly is an attorney and the Associate Director of the Utton Center. Susan works on projects related to the Center’s mission of helping stakeholders who share a water resource manage the resource instead of litigating over it. She works with all of the major water institutions in New Mexico and works with law students on projects related to water rights. Major Utton Center projects that Susan is currently working on include: the Energy/Water Nexus Program with Sandia National Laboratories, the Adjudication Ombudsman Program, CLE organization, U.S./Mexico border issues, and the organization of the Center’s activities concerning reservoir issues.

Prior to joining the Utton Center in 2003, Susan was the Water Rights Manager for the City of Albuquerque, New Mexico. Susan worked in community and regional planning for eight years, including policy development and infrastructure capital planning.





**The Utton Transboundary Resource Center**

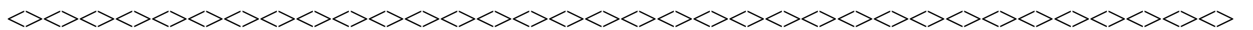
The Utton Center is a water policy center located at the University of New Mexico, School of Law which conducts research and engages in projects related to its mission of promoting equitable and sustainable management and utilization of transboundary resources. The Center recognizes the futility of extensive litigation over natural resources and acts impartially to assist stakeholders in reaching long-term, fact-based resolutions. Many projects build on others so that the effects are synergistic and have a reach beyond their individual significance. The transboundary projects take place at all levels – local, state, tribal, national and international. Education is the keystone to all of our activities.

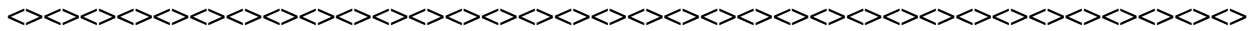
Marilyn C. O’Leary, Director  
Susan Kelly, Associate Director

**Natural Resources Journal**

The Natural Resources Journal (NRJ) is published four times per year by the University of New Mexico School of Law. NRJ is an international, interdisciplinary forum devoted to the study of natural and environmental resources. The *Journal* is policy oriented, and seeks to make research available not only to fellow scholars, but also to decision makers who mold natural and environmental resource policy.

NRJ contributors come from various disciplines, represent many countries, and provide many approaches to the complex issues raised by the need to balance resource development and environmental concerns. The NRJ editorial board and staff are made up of students from the University of New Mexico School of Law. An editor-in-chief from the faculty of the law school provides guidance for the *Journal*. The students and editor-in-chief are assisted by a managing editor and a business manager, both of whom are law school staff.





**Overview of Reservoir Operations and Water Management in New Mexico**

*Presented by*

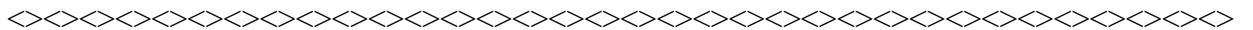
Kevin G. Flanigan, Hydrologist, Interstate Stream Commission

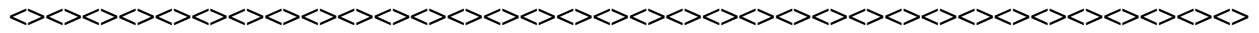
*Speaker Biography:*

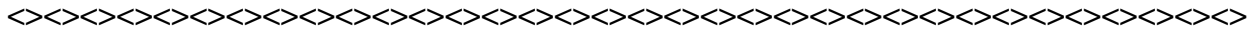
Kevin Flanigan is a Sr. Hydrologist with the Rio Grande Bureau of the New Mexico Interstate Stream Commission. He has a B.S. degree in Civil Engineering from the University of Michigan and an M.S. in Hydrology from the New Mexico Institute of Mining and Technology. He is a registered Professional Engineer and has approximately 20 years of experience in hydrology and water resources engineering and water rights administration, with the bulk of that experience in the Rio Grande basin of New Mexico.

*Abstract:*

There are six major reservoirs within the upper Rio Grande basin in New Mexico above Elephant Butte Reservoir. Three, Heron, El Vado and Abiquiu Reservoirs, are located on the Rio Chama, which is the major perennial tributary to the Rio Grande in New Mexico. One, Cochiti Reservoir, is located on the mainstem of the river about 50 miles upstream of Albuquerque. Two, Galisteo and Jemez Canyon Reservoirs, are located on ephemeral tributaries downstream of Cochiti. Heron Reservoir was authorized by Congress as the primary storage facility for imported San Juan-Chama Project water. El Vado Reservoir was constructed and permitted by the Middle Rio Grande Conservancy District to provide storage for irrigation use. The other four, Abiquiu, Cochiti, Galisteo and Jemez Canyon, were authorized by Congress as part of the Middle Rio Grande Project for the primary purpose of flood and sediment control. The U.S. Bureau of Reclamation operates Heron and El Vado Reservoirs on the Rio Chama. The U.S. Army Corps of Engineers operates the four Middle Rio Grande Project flood control reservoirs. Operations of these various reservoirs are subject to a number of legal authorities, including the Rio Grande Compact, specific federal legislation and state statute. The term “reservoir operations” refers to the rate and timing of releases from storage or the rate and timing at which additional water is added to storage. The term “water operations” refers to both ongoing reservoir operations and downstream monitoring of flows to ensure that specific uses or requirements are met. Water operations in the middle Rio Grande include irrigation, flood control, environmental and recreational operations. Irrigation operations consist primarily of adjusting releases from El Vado Reservoir to meet the irrigation diversion demand of the Middle Rio Grande Conservancy District. Flood control operations consist of the adjustment of releases or detention of storage at Abiquiu, Cochiti, Galisteo and Jemez Canyon Reservoirs to prevent or alleviate downstream flooding. Environmental operations consist primarily of providing supplemental flows for the endangered Rio Grande Silvery Minnow below Cochiti Reservoir by releasing leased storage in Heron, El Vado or Abiquiu Reservoirs. Environmental operations are also conducted on the reach of the Rio Chama between El Vado and Abiquiu Reservoirs to maintain flows during the winter for the brown trout fishery within that reach. Recreational operations are conducted in the reach between El Vado and Abiquiu Reservoirs to provide summer weekend rafting flows.







**Environmental Perspectives on the Reservoirs**

*Presented by*

Kara Gillon, Staff Attorney, Defenders of Wildlife

*Speaker Biography:*

Kara Gillon is a Staff Attorney with Defenders of Wildlife, an advocacy group with over 475,000 members and supporters, dedicated to protecting plants and animals in their natural ecosystems. Ms. Gillon specializes in water and endangered species issues in the Lower Colorado River, Middle Rio Grande and other western river basins. She also works on public lands and other issues in the Sonoran Desert and U.S.-Mexico borderlands. Ms. Gillon received her B.A. from Georgetown University and received her J.D. from Vermont Law School.

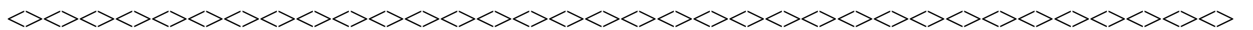
*Abstract:*

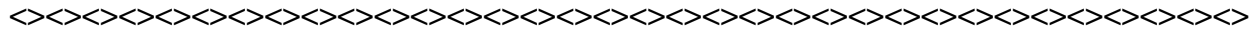
In 1996 we witnessed vast drying and the subsequent deaths of thousands of silvery minnows in the Middle Rio Grande. Since then, a coalition of national and local conservation groups<sup>1</sup> has been fighting for the life of the Rio Grande: specifically, to ensure that the Rio Grande would have a legal right to its own water adequate to sustain the endangered species that depend on this river. After several years of discussions and negotiations with water managers and water users, we filed suit in federal court under the Endangered Species Act (ESA); all the key water players in this region are now parties. The litigation seeks ESA compliance in connection with management of native Rio Grande water and San Juan-Chama Project water.

As the home of one-third of the people in New Mexico, and the largest contractor to the San Juan-Chama project, Albuquerque’s intervention in the litigation addressed issues relating to the San Juan-Chama (SJC) Project. During the course of the litigation, the plaintiffs and the City of Albuquerque/Albuquerque-Bernalillo County Water Utility Authority discussed the possibility of reaching a settlement agreement. In February 2005, we announced a momentous agreement that is a step forward in ensuring the survival of the Rio Grande and a step toward ensuring a permanent water supply for the people of Albuquerque.

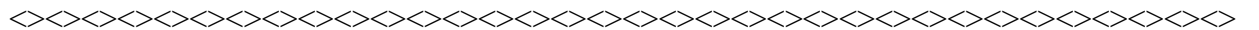
The settlement creates two mechanisms to ensure that the Rio Grande has a right to its own water and establishes an environmental bank account so that these waters can be stored and released at a time when the river needs it most. The most notable feature of the agreement marks a major step forward for the river with the creation of space to store environmental water in Abiquiu Reservoir. In order to acquire water for environmental uses, the City/Authority and plaintiffs committed \$250,000 towards a pilot water leasing program. Lastly, the settlement also helps connect the city’s urban population to the river by requiring the city to modify its water billing system so that residents have the choice to add \$1 per month to their bills to go towards the purchase of environmental water for the Rio Grande.

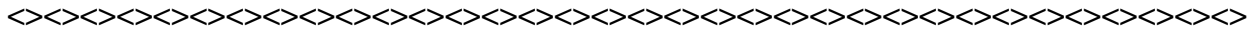
<sup>1</sup> The groups who ultimately became the plaintiffs in the silvery minnow litigation are Defenders of Wildlife, Sierra Club, National Audubon Society, Forest Guardians, New Mexico Audubon Council, and Southwest Environmental Center.





The environmental pool takes effect when the Authority begins full diversions for its Drinking Water Project, so until then the parties have a good deal of work ahead in order to realize this agreement. The first step is the URGWOPS review, looking at flexibilities in water operations within existing authorities and requirements. The next steps include determining the source of the water to be stored. Both native and SJC water may be stored in Abiquiu, but through different mechanisms. The City/Authority has a contract with the Corps of Engineers to store SJC water in Abiquiu. The reservoir is also authorized to store native Rio Grande water when space is not needed for SJC water and subject to a state engineer permit, a Corps deviation from normal operations, concurrence by the Compact Commission, and environmental compliance.





**History of Cochiti Lake from the Pueblo Perspective**

*Presented by*

Regis Pecos, Cochiti Pueblo

*Speaker Biography:*

Regis Pecos was born and raised at Cochiti Pueblo and is a lifetime member of the Traditional Tribal Council. He has been a Council member since 1978 and has served terms as Governor as well as Lt. Governor.

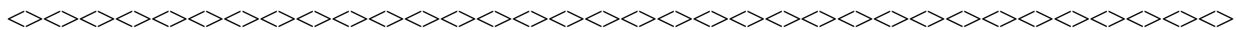
Mr. Pecos has spent much of his professional life advancing the interests of American Indian citizens at the tribal, state and national levels. Previous posts include Executive Director of the New Mexico Office of Indian Affairs (a position he held for 16 years under four governors of the State of New Mexico), Economic Development Specialist and Director of Research for Americans for Indian Opportunity and Instructor at the Institute for the Development of Indian Law. Currently, Mr. Pecos is the Chief of Staff for the Speaker of the House of the State of New Mexico.

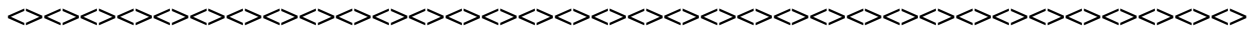
Mr. Pecos also has served on numerous committees, boards and task forces at all levels of government. At Cochiti, he has been a member of the Economic Development Review Committee, the Environmental Review Committee, the Education Task Force and the Land Reacquisition Task Force; in the latter role, he led the fight to return over 35,000 acres of land to the Pueblo's control. Beyond his service to the Pueblo, Mr. Pecos has been a member of the Bernalillo Public Schools Board of Education and the Santa Fe Indian School Board, which he served as Chairman for 12 years. He has served the State of New Mexico and U.S. government as a member of the Governor's Council of Policy Advisors on Rural Economic Development, the Planning Committee for the National Indian Policy Institute, the National Task Force on Cultural Resource and Rights Protection and the National Environmental Protection Agency Pollution Prevention Environmental Education Task Force.

He is Senior Advisor to the John F. Kennedy School of Government, Harvard University, a Senior Advisor and Member of the Advisory Council of Native Nations Institute, Udall Center for Studies in Public Policy, University of Arizona, a Senior Advisor to the Ben Lujan Leadership and Public Policy Center, Highlands University and a Member of the Advisory Council at the Dr. Alfonso Ortiz Center for Intercultural Studies, University of New Mexico.

In 1996, Mr. Pecos became the first American Indian to be appointed as a member of the Board of Trustees for Princeton University. In 1999, he received New Mexico's highest honor, as he was named New Mexico's Distinguished Public Servant.

Mr. Pecos received a B.A. in history and political science in 1977 from Princeton University and is currently a Ph.D. candidate at the University of California, Berkeley. He is also the Director and co-founder of the New Mexico Leadership Institute and is devoted to bringing Native people of New Mexico together in forums to discuss the issues challenging the indigenous nations.

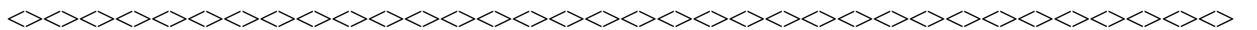




*Abstract:*

In the last 30 years Cochiti Pueblo has been in a fight for their survival, culturally, politically, legally, economically and environmentally. The construction of Cochiti Lake, one of the largest man made lakes in the country built by the U. S. Corps of Engineers, devastated nearly all of the available agricultural lands, destroyed the majority of traditional summer homes, drastically changed the eco-system and desecrated cherished places of worship. This was the beginning of what the Cochiti people defined as their nightmare. To make matters worse, just a few years after the closure of the gates that created Cochiti Lake, seepage occurred and put under water the remaining agricultural lands creating wetlands, transforming the world of the Cochiti. From nearly a 100% of the lands under cultivation pre-Cochiti Lake, over night, the Cochiti lost its agricultural way of life and have suffered profound consequences as a result.

The presentation will share the firsthand experiences of these challenges of the last 30 years. From the lawsuit against the U.S. Corps of Engineers and the United States to hold them liable for the destruction, desecration and devastation, to Congressional oversight hearings, the threat of Hydro-electric power development and the debates of religious and cultural protection in Congress, the impacts of the ill-advised development of Town of Cochiti Lake and the 99 year master lease, the struggles of management of Cochiti Lake, the long struggle to restore lands destroyed and the ultimate reconciliation of the Pueblo and U.S. Corps of Engineers. The past legal battles, policy debates, rights lost, rights regained, a newly defined relationship between the U.S. Corps and the Pueblo dictate the present and future mitigation, management issues and decisions pertaining to Cochiti Lake. Just as we have regained standing, the issues of the silvery minnow and the drought raises new and equally difficult challenges.







**Federal Perspective – Upper Rio Grande Operations Model/URGWOPS Update**

*Presented by*

April Sanders, Corps of Engineers

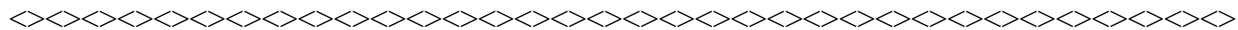
*Speaker Biography:*

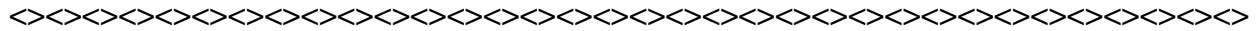
April Sanders – Project Manager with the U.S. Army Corps of Engineers, Operations Division at the Albuquerque District. Ms. Sanders’ background is in hydraulic engineering, decision making model developer and as a project manager. She has a Masters degree in Water Resources from the University of New Mexico and is currently Program Manager for the Middle Rio Grande ESA Collaborative Program and the Upper Rio Grande Water Operations Review.

*Abstract:*

Upper Rio Grande Water Operations EIS is a joint effort between the Corps of Engineers, Alb. District, the U.S. Bureau of Reclamation, Alb. Area Office, and the New Mexico State Engineer, Interstate Stream Commission (JLA). The main purposes of the EIS are to evaluate system wide water operation and identify flexibilities that might improve system performance in meeting competing demands, provide a historical baseline, ensure regulatory compliance, improve communication, increase efficiency, improve decision making and public involvement. The JLA and other cooperative agencies collaborated to develop and enhance the Upper Rio Grande Water Operation Model (URGWOM). URGWOM is a comprehensive model that links several upstream reservoirs to downstream river reaches using RiverWare™ software (University of Colorado - CADSWES). Several physical process and methods are represented in URGWOM such as: reservoirs, reach routing, evaporation, flood control, seepage and loss methods, diversion, return flow, riparian evapotranspiration, water accounting and rules and regulations of the Rio Grande compact. The general URGWOM conceptualization includes four different modeling modes: forecasting, operation, accounting, and planning. In addition to the RiverWare™ models other basin models and data tools were developed to perform specific local analysis such as hydraulic models (FLO-2D, RMA-2), San Acacia reach SW/GW model, Aquatic Habitat Model, Riparian Vegetation Surveys, Wetland Surveys, and Wildlife Data.

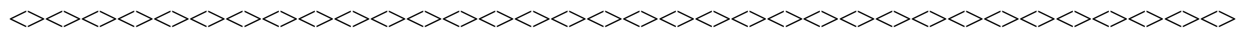
Several operational alternatives were developed and simulated using URGWOM. Alternatives include different combinations of upstream storage regimes, channel capacities, delivery schedules and diversions and the use of the LFC channel at San Acacia. Evaluation of the alternatives were performed over a synthetic 40-year sequence of historic climactic conditions assembled to represent a range of future and plausible hydrologic conditions. Alternatives were evaluated against several criteria such as water storage and delivery, interstate compacts, flood control and safe dam operations, ecosystem, and water quality. The EIS Alternatives look at different/agreed upon combinations of storage regimes, channel capacities, delivery schedules and diversions that were evaluated over a 40-year sequence of historic climactic conditions assembled to represent a range of future and plausible hydrologic conditions. The hydrology is stochastic and contains periods of drought, normal, and wet periods. URGWOM Planning Model analysis indicated that alternative with the highest operation flexibilities provides the most benefits for systemwide operation.

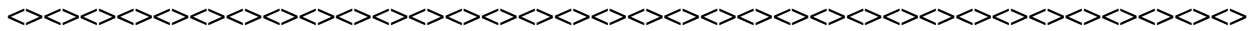




Abiquiu Reservoir is currently authorized to store native Rio Grande water in the authorized SJ-C water space when such space is not needed. The EIS recognized that such storage is subject to other requirements such as a state engineer permit, a Corps deviation from normal operations, and unanimous concurrence of the deviation by the Compact Commission. Chapter Four of the URGWOPS EIS – Impacts of Water Operations Alternatives - describes the alternatives studied in detail and shows that there is the potential of storing up to 180,000 AF of native water. A frequency analysis of conservation storage in Abiquiu Reservoir conducted over the 40-year planning period for all action alternatives indicates that the opportunity to store conservation water would occur in about 21 of 40 years, and opportunities to store more than 100,000 AF would occur about 35 percent of the time. Native conservation storage was identified as water that could possibly be stored and used for the benefit of endangered species, ecosystem management, Compact deliveries, or other uses. However, the specifics regarding the release, year-to-year carryover, and other use of this water remain to be defined by specific agreements for storage in Abiquiu. In developing impact analyses for other resources, technical teams made different assumptions about how much of the native water stored in Abiquiu would be available and how it would be released.

We anticipate that, based on the Record of Decision for the URGWOPS EIS, the Corps will take the federal lead in pursuing a process for native storage in Abiquiu Reservoir. This process will likely include an EIS, with the URGWOPS EIS being the baseline document.





**Texas Perspective - Texas View on Managing the Rio Grande Reservoirs**

*Presented by*

Herman Settemeyer, Engineer Advisor, State of Texas

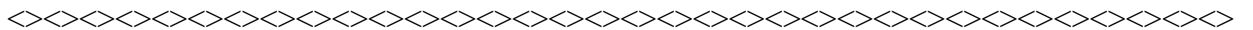
*Speaker Biography:*

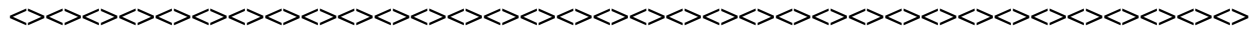
Herman R. Settemeyer has over 30 years of state service with the TCEQ and its predecessor agencies. He began his career with the Texas Water Rights Commission in 1975 in the Water Rights Adjudication program. Herman has also worked in the Water Rights Permitting, Water Rights Enforcement, Watermaster, and Interstate Compacts programs. Currently, he employed as a Technical Specialist for the Water Supply Division were, among other duties, he serves as Engineer Advisor to each of Texas' five Interstate Compact Commissions. He also serves as Work Coordinator for the TCEQ Floodplain Management Program, and Project Engineer for the ongoing Rio Grande above Fort Quitman water rights adjudication.

Herman has Bachelor of Science degree in Agricultural Engineering from Texas A&M University and a Master of Science degree in Agricultural Engineering from the University of Wyoming. He is married and has three daughters.

*Abstract:*

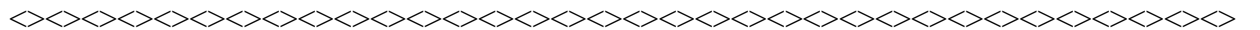
- I. Laws of the Rio Grande
  - A. 1906 and 1944 Treaty's with Mexico
  - B. Rio Grande Compact
  - C. Congressional authorizations
  - D. State water laws
  
- II. Waters within the Basin
  - A. Rio Grande flows
  - B. Imported waters
    - 1. Closed Basin Project - Colorado
    - 2. Trans-mountain water - Colorado
    - 3. San Juan-Chama Project - New Mexico
  
- III. Rio Grande Compact implications
  - A. Compact apportions native flows between Colorado, New Mexico and Texas
  - B. Provides an opportunity for development of waters from outside the basin
  - C. Provides an opportunity to construct reservoirs after approval of the Compact
  - D. Provides checks to ensure native water deliveries are not impacted
  - E. Compact provisions related to post-compact reservoirs
    - 1. Article VII Rio Grande Compact - 400kaf restriction
    - 2. Article VIII Rio Grande Compact - Release from reservoirs when in debt
  
- IV. Major reservoirs of the Rio Grande
  - A. Rio Grande and Platora Reservoirs - Colorado

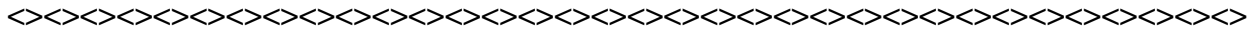




- 1. Rio Grande Reservoir pre-compact
  - 2. Platora Reservoir post-compact
  - B. Heron, El Vado, Abiquiu, Cochiti Reservoirs - Upper Rio Grande - New Mexico
    - 1. All authorized by federal legislation
    - 2. All post-compact reservoirs
    - 3. Heron Reservoir - Stores the imported San Juan - Chama Project Water
    - 4. El Vado - Water supplies for the Middle Rio Grande
    - 5. Abiquiu and Cochiti Reservoirs - Primarily flood control
  - C. Elephant Butte and Caballo Reservoirs - Lower Rio Grande - New Mexico
    - 1. Primarily store water for the Rio Grande Project - Texas and New Mexico
    - 2. Caballo also provides for flood control
  - D. Amistad and Falcon Reservoirs – Texas - Water supply for Texas and Mexico
- V. Reservoir operations
- A. Operations must be in compliance with the Rio Grande Compact
  - B. Operations must be in compliance with federal authorizations
  - C. Water use must be in compliance with federal authorizations and state water laws
- VI. Is there flexibility?
- A. Rio Grande Compact Commission can approve certain deviations
    - Examples: PL-86-645
    - Relinquishments of Credit Water
  - B. Changes to federal authorizations require Congressional action
- VII. Can there be more flexibility?
- A. Coordination/cooperation between the States and Federal Agencies
    - Coordinated releases of water from upstream to downstream
    - Formal operating plan for Elephant Butte Reservoir
  - B. How the provisions of the Rio Grande Compact are interpreted
    - Example: Definition of “Project Storage” ...storage below Elephant Butte...
    - “Usable Water” ...release in accordance with irrigation demands...
  - C. Is there any flexibility in these definitions?
    - Can we store “Projects Storage” upstream?
    - Can we release water from Elephant Butte year round?
- VIII. Conclusions
- A. Changing water demands will require more flexibility
    - Municipal needs, environmental needs, variations in water supply
  - B. Changes must be within the terms of the Rio Grande Compact
    - No State supports changing the Rio Grande Compact
  - C. We’ve found ways to address issues before - I think we can and will continue
  - D. Texas will require that its Compact entitlement be delivered - but is open to flexible options which do not impact our water supplies

- IX. Questions





**Municipal Plans and Issues**

*Presented by*

John Stomp, P.E., Albuquerque Bernalillo County Water Utility Authority

*Speaker Biography:*

John Stomp, III was born and raised in Albuquerque and graduated with at Bachelors and Masters of Science degrees in Civil Engineering from the University of New Mexico. Mr. Stomp is the Water Resources Manager for the City working as an agent to the Albuquerque Bernalillo County Water Utility Authority. The Water Authority provides water and wastewater services to more than 475,000 residents in the metropolitan area.

Mr. Stomp’s responsibilities as Water Resources Manager include water conservation, water resources, ground water protection and arsenic investigations. His primary responsibility is to implement the City Council adopted Water Resources Management Strategy to provide a safe and sustainable water supply for the City. The strategy includes transitioning from sole reliance on ground water to renewable surface water supplies, namely the City’s San Juan-Chama water. The project includes the construction of more than \$ 375 million in facilities consisting of a new surface diversion, water treatment plant and distribution pipelines. He is also responsible for evaluating issues related to compliance with the new drinking water standard for arsenic.

Mr. Stomp has more than 17 years of experience dealing with water and wastewater issues in New Mexico and throughout the southwestern U.S.

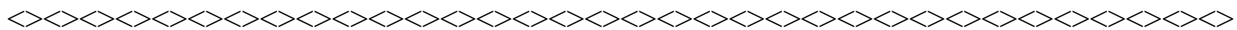
**Note:** John Stomp is unable to attend the Symposium. His presentation will be made by Andrew Lieuwen, whose biographical sketch follows:

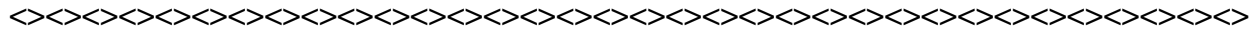
Andrew Lieuwen received a Bachelor of Arts degree in Geography from the University of New Mexico in 1978, a Master of Science degree in Resource Geography from Oregon State University in 1982, and a Ph.D. in Water Resources from the University of Arizona in 1989. His water management career includes 3 years with the St. Johns River Water Management District in Florida and 11 years with the New Mexico Office of the State Engineer. He is currently the Water Rights Manager for the Albuquerque Water Utility Department.

*Abstract:*

The presentation will focus on some of the short and long-term needs for storage in Abiquiu Reservoir. The presentation is for discussion purposes only and does not reflect the position of the Albuquerque Bernalillo County Water Utility Authority.

The Authority has a contract with the U.S. Army Corps of Engineers for 170,900 acre-feet of storage in Abiquiu. However, the Authority has lease agreements with property owners surrounding the reservoir for storage of water to elevation 6220 MSL which is equivalent to the





Congressionally Authorized amount of 200,000 acre-feet. Currently, the Authority has about 140,000 acre-feet in storage.

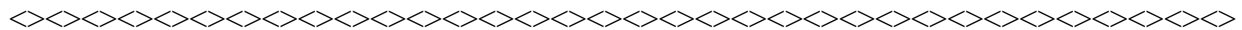
Under the State Engineer’s permit No. 4830, the Authority is required to have a minimum of 130,000 acre-feet of water in storage in Abiquiu prior to bringing the Drinking Water Project (DWP) online. The \$375 million DWP is under construction and will begin operations in 2008. In the next ten to fifteen years, the Authority will be using the San Juan-Chama water in Abiquiu to offset the residual pumping effects on the Rio Grande. The Authority’s return flows, native water rights, San Juan-Chama water stored in Abiquiu and water owed to the Authority from the Middle Rio Grande Conservancy District and the Bureau of Reclamation, will be used to payback the residual effects which are currently estimated to take about fifteen years. During the operation of the DWP, the Authority will use a minimum of 50,000 acre-feet of space as an operating pool.

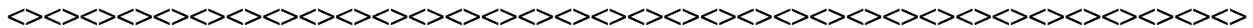
The Authority has existing short-term leases with the Rio Chama Acequia Association, City of Santa Fe and the Bureau of Reclamation for storing San Juan-Chama water in Abiquiu. In addition, the Authority signed a historic agreement with the Plaintiffs from the Silvery Minnow litigation to provide up to 30,000 acre-feet of storage space for environmental purposes. We also have an agreement with MRGCD for 50,000 acre-feet. The latter two agreements still require some State Engineer and Environmental permitting.

The Authority will continue to use space in Abiquiu in perpetuity. The space that is not needed by the Authority in a given year could be leased from the Authority for other purposes. In the long-term, the Authority will pursue native water storage in Abiquiu for a variety of reasons. Native water storage, however, presents numerous State, environmental and Compact compliance issues that it may take years to implement.

**Water Banking Concept**

The Authority signed an agreement with the City of Santa Fe recently to provide short-term storage of San Juan-Chama water. The agreement provides that Santa Fe provide 10% deposit of water into the Authority’s water account as payment for using the space. This type of water banking is something that we will be pursuing and expanding in the future. Providing space to others benefits the Authority and the entities storing water and also provides an additional, although minor, source of water for the Authority.





**Municipal Plans and Issues**

*Presented by*

Kyle Harwood, Esq., City of Santa Fe

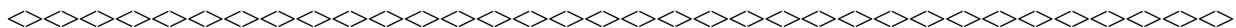
*Speaker Biography:*

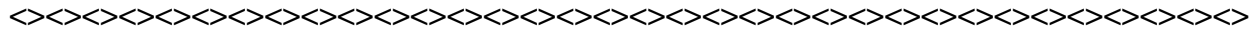
Mr. Harwood received a Bachelor of Science (1993) in Natural Resource Policy from Cornell University, a Masters of Water Resource Administration (1996) and a Juris Doctor (1999) from the University of New Mexico. He has served as an environmental health scientist (Bernalillo County), a clerk to the Federal District Court (Aamodt litigation), an international water policy consultant (Tasmania, Australia) and has represented municipalities, schools and individuals in private practice. He is now an Assistant City Attorney with primary responsibilities in land and water issues, representing the Sangre de Cristo Water Division, the Wastewater Management Division and the Planning and Land Use Division of the City of Santa Fe.

*Abstract:*

The City of Santa Fe is actively involved in water resources management and planning, state and federal regulation and intergovernmental coordination of several Rio Grande reservoirs. The legal issues related to the acquisition and management of the City’s water right portfolio and the contractual arrangements for the use of storage space within Rio Grande reservoirs are crucial components of the Sangre de Cristo Water Division’s operational plan.

The McClure and Nichols reservoirs on the Santa Fe River in the Sangre de Cristo mountains can provide up to 40% of the City’s water supply under normal precipitation conditions. The storage and use of the watershed’s yield is impacted by both the Rio Grande Compact and an interconnected set of OSE regulated permits for storage and diversion and ISC regulated Rio Grande accounting. Furthermore, the anticipated completion of the Buckman Direct Diversion (BDD) facility on the Rio Grande in 2009 requires the City to prepare detailed plans for future diversion and regulatory accounting, water right acquisition and management and prudent wet water storage of supplies in the Rio Chama and Rio Grande system of reservoirs. City staff is completing a Long Range Water Supply Plan that evaluates the constraints and opportunities for Rio Grande reservoir management in light of current and planned water resource facilities, drought and normal year supply and demand, and changing local, state and federal water resource policies and politics.









**Lunch Speaker – Everett Chavez, Chair, Six Middle Rio Grande Pueblos Water Coalition**

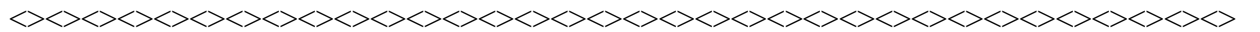
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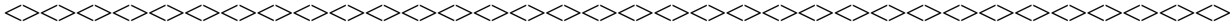
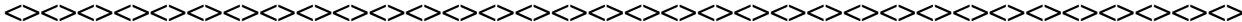
**Everett F. Chavez**, recently completed his second term as Governor of Santo Domingo Pueblo, and prior to his two terms as Governor also served as the national Executive Director for the American Indian Science & Engineering Society (aka AISES). Everett is a graduate of Chicago's DeVry Institute of Technology and the University of New Mexico in Electronics and Electrical Engineering, respectively.

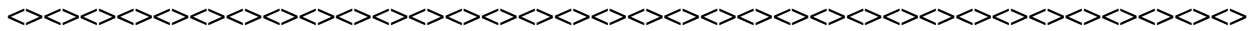
Professionally, Everett has worked for IBM, Digital Equipment Corporation, Tooh Dineh Industries as a Hardware Integration Engineer, Test Engineer, and a Process Engineer, respectively. He has also worked for the All Indian Pueblo Council, the Inter Tribal Council of Arizona, and the Santa Fe Indian School in various technical and managerial positions. Since 1996, as Director of the Pueblo Office of Environmental Protection, Everett has been directly involved with tribal capacity-building initiatives in the areas of Environmental Protection, Water Quality issues, and since 2003, in Water Rights Protection as the Chairman of the Coalition of the Six Middle Rio Grande Pueblos.

With more than 30 years of combined work experience, Everett brings a broad range of knowledge and experience from the tribal, corporate, and federal non-profit sectors.

On a more personal note, Everett strongly believes that our greatest resource is our people, young and old, and that we must develop our tribal human resources in parallel to all other tribal resource development efforts. By educating ourselves, tribal people can meet the technical and social challenges of the future with vigor, but also further ensure that cultural considerations and wisdom are contained in all tribal decisions. Everett considers it an absolute honor to now work on behalf of Pueblo people, and being able to give back to his tribal community.







**Interactive Modeling to Support Regional Water Planning: A Case Study  
on the Rio Grande**

*Presented by*

Vince Tidwell, Sandia National Labs

*Speaker Biography:*

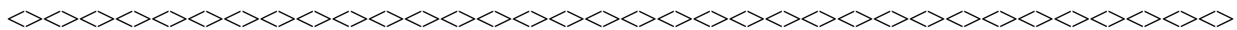
Vincent Tidwell received a Ph.D. in hydrology from New Mexico Institute of Mining and Technology in 1999. Dr. Tidwell is currently employed as a Principal Member of the Technical Staff at Sandia National Laboratories and has 15 years experience conducting and managing research on basic and applied projects in water resource management, nuclear and hazardous waste storage/remediation, and petroleum recovery. His areas of expertise include resource management modeling, community-based decision analysis, water monitoring, surface water hydrology, field and laboratory experimentation, and stochastic methods.

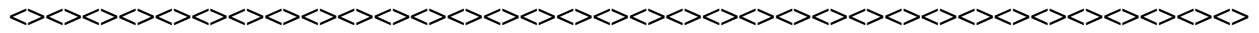
*Abstract:*

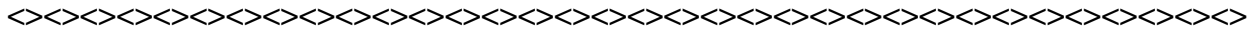
The tenuous balance between water supply and demand is influenced by a complex set of physical and social processes. The feedback and time delays inherent among these disparate processes make it difficult to identify both publicly and politically acceptable solutions to water resource management issues. For this reason computer-based models are often necessary to understand and explain this complexity. However, there is a growing need to make these models accessible to decision-makers and the public to promote their involvement in the planning process.

System dynamics provides a unique mathematical framework for integrating the physical and social processes important to watershed planning, and for providing an interactive decision environment for engaging the public. In efforts to develop broad confidence and consensus in such tools, model development is pursued in close collaboration between the modelers, regional water managers, stakeholders, decision makers, and the public. The resulting product is a decision tool built from the collective knowledge and effort of a wide and disparate range of people. The models operate on a laptop computer and can be used to demonstrate key variables and processes associated with water supply/demand, tradeoffs among allocation and conservation strategies, associated consequences of alternative water use strategies, and environmental impacts. They operate in real-time with a user-friendly interface that includes slider bars, buttons and switches for changing key input variables, and real-time output graphs and tables showing results. These features allow a wide range of users to experiment with alternative water use strategies and learn from the results.

Sandia National Laboratories has been engaged in a number of such projects on the Middle Rio Grande, Gila and Mimbres Basins in southwestern New Mexico, Barton Springs Aquifer in Texas, and the Willamette Basin in Oregon. Presentation and demonstration of associated decision support tools and processes within the context of the Rio Grande will be made.







**Historic El Vado Operations**

*Presented by*

Viola Sanchez, PhD student, Civil Engineering, UNM

*Speaker Biography:*

Viola Sanchez grew up in Belen, New Mexico. A 1977 graduate of Belen High School, she attended the University of New Mexico as a Presidential Scholar and received a B.S. degree in 1983 in civil engineering. While an undergraduate, she participated in the cooperative education work program, where she worked for several organizations, including the U.S. Bureau of Reclamation. Upon graduation from UNM, Viola was awarded a National Science Foundation Fellowship and attended MIT where she graduated with a master’s degree in civil engineering in 1986. She then returned to UNM to work on a Ph.D. in civil engineering. Except for two years working for a defense contractor and some time spent teaching at UNM while a full time doctoral student, Viola has spent her career in various capacities with the U.S. Bureau of Reclamation. She has now gone back to UNM on a part-time basis to complete her Ph.D. in civil engineering. Her dissertation will be on El Vado Reservoir storage for the six Middle Rio Grande Pueblos.

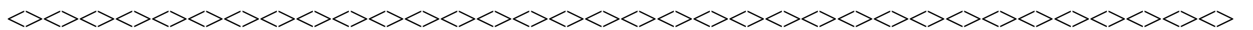
In her spare time, Viola enjoys bicycle riding, backpacking, cross-country skiing, and planting a small garden. She has played guitar, drums, and bass for various church groups and participates in Bible studies. She loves cats and always has at least one.

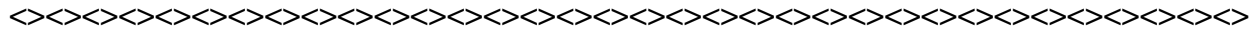
*Abstract:*

Prior to construction of El Vado Reservoir, water supplies in the middle Rio Grande valley were erratic. Generally, large flows during spring runoff could not be completely diverted to benefit farmers. Low flows in the summer and fall meant that farmers did not have enough irrigation water during this time. El Vado Reservoir was built by the Middle Rio Grande Conservancy District (MRGCD) in the 1930's to capture excess flows, especially during spring runoff, and store them for release when the flow of the Rio Grande was insufficient for farmers’ needs. Studies completed prior to construction of El Vado show great potential in minimizing, but not eliminating, shortages of water in the middle Rio Grande valley.

El Vado is classified as a post-compact reservoir for purposes of Rio Grande Compact (Compact) accounting because it was constructed after 1929. Post-compact reservoir operations are subject to release restrictions in Articles VI and VIII and storage restrictions in Article VII of the Compact.

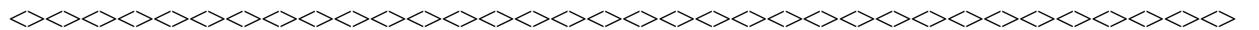
From 1935-1950, the operation of El Vado was not under serious scrutiny. New Mexico’s debit status to Texas under the Compact mostly grew during this time. Usable water in Rio Grande project storage at Elephant Butte and Caballo decreased. Eventually the point was reached where Articles VI, VII, and VIII restrictions dictated that no storage or release of water in El Vado was to take place in 1951 for the benefit of MRGCD. However, in 1951, the six middle

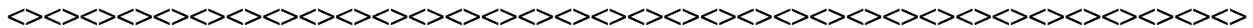




Rio Grande Pueblos (Pueblos), members of MRGCD who are served by El Vado, demanded that El Vado continue to be operated for their benefit without regard to Compact restrictions because, according to Article XVI of the Compact, their rights are not to be impaired by the Compact.

Operation of El Vado for the Pueblos without regard to Compact restrictions has continued since at least 1951. It has always been a highly controversial practice, generating a U.S. Supreme Court case in the 1950's, Texas v. New Mexico No. 9, Original. Today, the controversy continues because the nature and extent of the Pueblos' right to storage in El Vado has never been definitively determined. This paper will examine the history of how El Vado Reservoir was operated from 1935 to 1981. The focus will be on El Vado operations on behalf of the Pueblos in the face of various periods of Compact restrictions.





**Challenges to Optimization**

*Presented by*

Norm Gaume, Water Resources Management Consultant

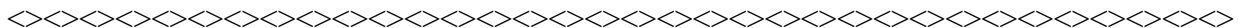
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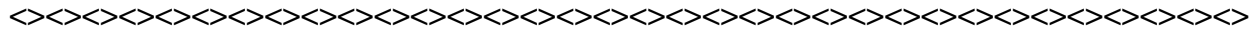
Norm Gaume is a native New Mexican, a registered engineer, and sole proprietor of a water resources and water utility management consulting business since April 2003. He was Director of the New Mexico Interstate Stream Commission from 1997 through 2002. Under his leadership, the Commission’s problem-solving engagements, multidisciplinary professional staff, and budgets were increased five-fold to address New Mexico’s burgeoning issues of interstate stream compact and Endangered Species Act compliance. He served during this tenure as the New Mexico engineer-advisor for the Rio Grande and other compacts. Prior to that he worked 19 years for the City of Albuquerque, including seven years as the first Director of the Water Resources Division where he initiated and managed technical water resources investigations and planning and policy development programs that culminated in adoption and funding of the Albuquerque Water Resources Management Strategy for direct diversion of San Juan-Chama water. Mr. Gaume holds Bachelor and Master of Science degrees in Electrical and Civil Engineering, respectively, both from New Mexico State University. He has received national awards for public sector utility management. Mr. Gaume’s favorite activity is running class III and IV rivers in his open slalom racing canoe and rafting big western rivers.

*Abstract:*

The Rio Grande was fully appropriated a century ago. Development of Rio Grande surface water in New Mexico is exclusively via federal projects. Surface water development was completed, except for the San-Juan Chama Project, about 60 years ago. Water is a public resource owned by the public, while rights to the use of water are private property. Societal values have matured and changed. Our populations have increased many-fold. We rely on non-sustainable groundwater extraction of diminishing resources with delayed effects on the Rio Grande. But our water resources development and management is fragmented. Our water resources management methods, although becoming more sophisticated, don’t even require comprehensive measurement and accountability of use, much less comprehensive management.

Al Utton warmly and repeatedly encouraged us to realize that in order to live within our finite water supplies, we must stretch and we must switch. Much must be and will be done in order to stretch our publicly-owned water resources and our federally-owned but Balkanized water resources development projects while respecting private water rights while switching uses to support our ways of life, our economy, our values, and our human requirements. In fact, much is being done. We are in a period of rapid evolution driven by drought, enlightened realization that change is imperative, progressive initiative from many players, and litigation regarding compliance with federal environmental law.





Major benefits could be achieved from the optimization and flexible systematic management and operation of federal reservoirs. As an example, today, entities need to store available imported surface water as a buffer against continued drought, empty space exists in federal reservoirs constructed with public funds, yet that space remains empty and unavailable, despite federal policy that says it should be available. Unified systematic operation and management of all the reservoirs on the Rio Grande, not to convert the ownership of water but to optimize its use and availability to meet multiple needs and requirements, can bring benefits that exceed costs. We need to make this happen.

