NAME: A Binational Climate Research Program

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The proverb, “Rain does not fall on one roof alone” may best describe the philosophy behind the upcoming North American Monsoon Experiment (NAME). Summer rains are a vital component of the hydrology of semi-arid regions of North America. In western Mexico, summer rains comprise up to 80 percent of the annual rainfall and a near equal portion of annual streamflow. The NAME research program seeks to improve understanding and prediction of summer precipitation through an international effort.

Partnerships have been forged among U.S. federal agencies, including the National Oceanic and Atmospheric Administration (NOAA), National Aeronautics and Space Administration (NASA), and the National Science Foundation (including SAHRA), and Mexican agencies such as the Comisión Nacional del Agua (CNA), Servicio Meteorológica Nacional (SMN) and Instituto Mexicano de Tecnología del Agua (IMTA).

During the summer of 2004, climate scientists, hydrologists, and weather forecasters from the partnering agencies and numerous U.S. and Mexican universities will take to the field for an Enhanced Observation Period (EOP). The field program, which will last from July 1 to August 15, aims to improve understanding and prediction of regional atmospheric circulations, surface-atmosphere exchanges, and precipitation processes in the evolution of the summer monsoon.

Particular interest will focus on characterizing the periodic surges of moisture that invade the low deserts of the Southwest from the Gulf of California and often result in widespread precipitation. To accomplish this, several instrument platforms will be deployed into the NAME Tier I region (see map). The instrument network includes operational and research weather radars, atmospheric wind profilers, augmented weather balloon launches, rain gauges, automated weather stations, research aircraft, ocean buoys, and an oceanographic research vessel in the Gulf of California. Together, these instruments represent a very rich observing system for a critical region, one that has traditionally been termed “data-sparse.”

Data Available Online

All data are being assimilated at the National Centers for Environmental Prediction within NOAA. Researchers and the public will be able to follow activities of the field campaign through regular updates on field operations, observations, and forecasts posted on the Internet at www.joss.ucar.edu/name/. Much of the data, including those obtained from weather balloons, radar reflectivity and estimated rain rates, atmospheric wind profilers, and satellite imagery, will be available in near-real time.

Cross-Border Forecasting Partnership

Weather forecasting during the NAME EOP will be conducted cooperatively by the National Weather Service in the United States and the SMN in Mexico. A partnership between these agencies was established during the summer of 2003, when exchanges between Tucson and Mexico City allowed operational weather forecasters to learn about each others’ procedures and establish common forecasting objectives. During the 2004 EOP, a primary responsibility of the research forecasters will be to identify specific weather features to be studied intensively by research aircraft and supplemental weather balloons. These short duration events will provide information about the structure and
movement of transient weather phenomena across the region.

**Hydrometeorological Activities**

Another research emphasis of NAME is the study of hydrometeorological processes over the remote, complex terrain of the Sierra Madre Occidental in western Mexico. A network of manual and automatic rain gauges is being deployed in conjunction with ground-based Doppler radars to better characterize topographic relationships in spatially and temporally variable precipitation. Streamflow data from several headwater catchments are also being collected to analyze rainfall-runoff relationships on the basin scale.

The NASA-funded NAME soil moisture field campaign will investigate the performance of remotely sensed soil moisture under the sparse desert canopy. Two domains will be studied, one in southeastern Arizona and one in northeastern Sonora, Mexico. Simultaneous measurements from handheld instruments, research aircraft, and over-passing satellites will be taken to characterize evolving soil moisture states following monsoon rainfall events.

The NAME Hydrometeorological Working Group (NHWG) was formed to improve connections between NAME climate research and regional water resources research. NHWG is building binational partnerships to address research issues related to rainfall-runoff processes and the integrated management of water resources. Group discussions are directed toward discovering common ground between information needs of water users and NAME research products.

**The Neighborhood if Not the House**

Information gained from the NAME program is expected to provide critical validation data from a true semi-arid environment for the next generation of weather, climate, and hydrological prediction models. While we may be some time away from saying exactly on whose house it will rain next, NAME research should help us at least identify the right neighborhood. Newfound partnerships should then help ensure that no one in the neighborhood goes thirsty.

For technical information about NAME, visit www.joss.ucar.edu/name/. For information about NHWG, contact Dave Gochis at gochis@rap.ucar.edu or visit www.joss.ucar.edu/name/hyromet/.
Drilling in the Salton Seafloor

Kelly Robertson – Gregg Drilling and Testing

The Salton Sea, once a flourishing recreational area and habitat for endangered wildlife, has become a desolate lake dying from enemies such as salt, fertilizer, water shortages, and the sun. The Salton Sea was created in 1905 when silt accumulation blocked the Colorado River’s flow to the Gulf of California and diverted it into the Salton Sink. The resulting lake was five times larger than at present and attracted over 400 species of birds. Sport fish were introduced and the lake flourished. However, silt deposits eventually blocked flows into the lake, and the water level began to decrease due to evaporation in the hot desert.

At 227 feet below sea level, the Salton Sea is a sump for agricultural drainage from farms throughout the Imperial and Coachella valleys. Ongoing lake evaporation has concentrated the minerals and salts such that the sea is now 25 percent saltier than the Pacific Ocean. Algae feed on the nutrients, but large blooms deplete water oxygen levels, causing massive fish kills.

In September 2003, representatives of Southern California’s four largest water agencies agreed to transfer 65 million gallons of water from the Imperial Irrigation District to the San Diego County Water Authority. The 75-year Quantification Settlement Agreement (QSA) was formally approved on Oct. 9, 2003 (see page 11) and will most likely further reduce the inflow of water to the sea. To address this loss, the agreement provides up to $300 million for restoring the Salton Sea and the lower Colorado River.

Is There Hope?

Yes! The Salton Sea Authority, a coalition of Riverside and Imperial county governments and water districts, decided in January 2003 to work to improve water quality and preserve the habitat. The coalition’s plans revolve around creating a dike or dam to separate the lake into northern and southern sections. A massive desalination plant would reduce the salt content in the north lake, providing a recreational area and marine lake environment. The southern section could be turned into shallow wetlands for water birds and other wildlife. The plan would include establishing a wildlife preserve. Initial cost estimates are almost $2 billion due to the high price of desalination. To help alleviate the cost, some of the desalinated water could be sold to California residents at $470 per acre-foot – half the cost of desalinated ocean water, but 60 percent more expensive than transferring water from the valley without any restoration efforts for the sea. Enough water for one to two million people could be provided by this project, creating a beneficial situation for both water agencies and environmental conservationists. Opponents argue that the plan is too centered on reducing the sea’s salinity and stabilizing its elevation instead of addressing other water quality issues such as high concentrations of fertilizers.

Feasibility Studies Underway

In June 2003, Congress gave $10 million to the Salton Sea Authority for feasibility studies and design efforts. Environmental engineering firms Tetra Tech and URS
Corporation were chosen to conduct investigations, which initially focus on the strength and stability of the seabed and on possible building materials to use in construction. Gregg Drilling and Testing of Signal Hill, California was contracted to perform the over-water drilling operation.

Drillers used a jack-up boat with a deck load capacity of 25,000 pounds as a stable platform upon which they mounted their drilling rig. The benefit of such a boat is that it is easily maneuvered to different locations across the lake and can be raised above the water surface to avoid disturbance by large waves. The boat was used to successfully drill and test sub-bottom soil in water up to 50 feet deep. A total of 28 locations were tested and sampled using standard penetration tests, cone penetration tests (CPTs), and Shelby tube samplers.

The boreholes and CPTs ranged from 30 to 50 feet in depth, with one borehole extending to 200 feet below mudline. CPTs conducted in 15 locations provided a continuous soil behavior type profile of the sub-bottom environment. The data were obtained by pushing a cone penetrometer, attached to a data acquisition system, into the subsurface using a hydraulic ram. The penetrometer contains electronic sensors to measure tip resistance and sleeve friction, while a small filter behind the tip measures pore water pressure. The CPT provides a rapid, reliable, and economical means of determining soil stratigraphy, relative density, strength, and hydrogeologic information without generating soil cuttings. Geologists and engineers looked for strong, stable soils in the planned construction area capable of supporting large structures, and around the lake for possible fill materials for the proposed earthen structures (to reduce material importing costs). If the sub-bottom sediments are found to be soft fine-grained soils, extensive excavation and backfilling will be required to support construction of a dam.

Drilling and testing was completed in just over four weeks. Samples have been sent to a URS geotechnical laboratory for further study; results are not yet available. The data and information collected will provide valuable information for Salton Sea restoration designers and planners.

For more information, contact Pat Keating at Gregg Drilling & Testing, Inc. at 562-427-6899 or visit www.greggdrilling.com.

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Defendants have requested reconsideration of the Tenth Circuit’s opinion. Since the language in these contracts is similar to or identical to language found in numerous reclamation contracts throughout the western United States, virtually every western state has also joined in asking the Tenth Circuit to reconsider. Meanwhile, legislation has been introduced in the U.S. House of Representatives and Senate to restrict the alleged federal discretion to give precedence to the needs of the minnow over those of human beings. Finally, the Tenth Circuit has asked the parties to brief the question of whether the whole matter is now moot.

Stay tuned.
Fish or People: Who Has Priority in the Rio Grande?

Fred Abramowitz, Esq. – Abramowitz & Franks

The Rio Grande silvery minnow is a small fish, just 1 ½ to 2 inches in length, but it resides at the center of a large controversy. Once one of the more abundant species in the Rio Grande in New Mexico, it has disappeared from nearly 95 percent of its historic range. What remains of the population is confined to the lower 60 miles of the Rio Grande in New Mexico, in one of the hottest and most arid regions of the state. In 1994 the silvery minnow was listed as endangered under the Endangered Species Act, and since that time, nearly one-half million acre feet of water have been voluntarily released to help keep that parched stretch of river flowing for the minnow. The last two years have been one of record drought in the Southwest, however, making it nearly impossible to keep the southern reaches of the Rio Grande wet. Last year, with water rights holders no longer willing to voluntarily sell their water, the plight of the minnow became a critical issue.

Two federal projects overshadow the Rio Grande in New Mexico: the Middle Rio Grande Project (MRGP) and the San Juan-Chama Project (SJCP). The MRGP, located in the middle Rio Grande valley, overhauled the irrigation, flood control, and drainage facilities of the Middle Rio Grande Conservancy District (MRGCD) and the six middle Rio Grande Pueblos.

To the north, the SJCP diverts water allocated to New Mexico under the Colorado River Compact from the Colorado River, through the Azatea Tunnel, across the continental divide into the Rio Grande watershed, where it is stored in Heron Reservoir, north of the MRGCD and just south of the Colorado border. When the SJCP was authorized in 1962 (more than a decade before passage of the Endangered Species Act), its purpose was plain: to provide a secure future source of water for the growing areas of the middle Rio Grande valley, for both farmers and cities.

The MRGCD, the cities of Albuquerque and Santa Fe, and other water users have long-term or perpetual repayment contracts with the federal government for the water stored in Heron. The contracts the parties entered into pursuant to the SJCP provide for the sharing of shortages and also stipulate that the federal government is not liable if unable to deliver project water to its contractors because of “drought or other causes.” Although the Southwest has indeed been in a drought, so far there has been sufficient water stored in Heron to meet contracted obligations.

The Endangered Species Act mandates that the federal government not exercise its discretion in such a way as to harm an endangered species. The question thus arose: When the federal government delivers on its SJCP contracts, do the drought and shortage-sharing provisions of the contracts grant the federal government the discretion to short or stop deliveries of water to farmers and cities in order to protect the minnow?

In November 1999, several environmental organizations filed suit against the federal government alleging, among other things, that the United States does have such discretion, and that the U.S. Bureau of Reclamation failed to consider abrogating its San Juan-Chama contracts and restricting delivery to middle Rio Grande valley farmers as a “discretionary” action for the minnow. The defendants, the United States of America, the state of New Mexico, and the various water users who rely on water from Heron Reservoir, argued in opposition that neither the contracts themselves nor the underlying authorizations of the project legislation give the federal government discretion to breach their contracts. Following a tortuous and prolonged battle through the courts, on June 12, 2003, in Rio Grande Silvery Minnow v. Keys, a divided Tenth Circuit held for the minnow over the water users. The Court ruled that the U.S. Bureau of Reclamation must, if necessary, take water contracted to project water users and instead use it for the minnow. The majority also held that the Bureau must also restrict deliveries to farmers in the middle valley if the needs of the minnow mandate it.

While subsequent precipitation in 2003 made the seizure of water unnecessary, the court decision set the stage for a future confrontation similar to that of the Klamath River, where the needs of an endangered species directly conflict with the needs of people along the river. A significant difference, however, is that some of the groups adversely affected by the Tenth Circuit’s
Corporation were chosen to conduct investigations, which initially focus on the strength and stability of the seabed and on possible building materials to use in construction. Gregg Drilling and Testing of Signal Hill, California was contracted to perform the over-water drilling operation. Drillers used a jack-up boat with a deck load capacity of 25,000 pounds as a stable platform upon which they mounted their drilling rig. The benefit of such a boat is that it is easily maneuvered to different locations across the lake and can be raised above the water surface to avoid disturbance by large waves. The boat was used to successfully drill and test sub-bottom soil in water up to 50 feet deep. A total of 28 locations were tested and sampled using standard penetration tests, cone penetration tests (CPTs), and Shelby tube samplers.

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definition are the Puebloan tribes along the middle Rio Grande, meaning that the federal government’s duty to the minnow may conflict with the federal government’s duty to Native Americans, its trustees.

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