

Upper Missouri River Basin States CWP Cooperator's Roundtable Summary

August 26-27, 2008

The Historic Plains Hotel, Cheyenne, WY



Summary: In cooperation with the Missouri River Association of States & Tribes, the Interstate Council on Water Policy and the US Geological Survey organized the first Cooperative Water Program (CWP) Cooperator's Roundtable for the five Upper Missouri River Basin States in Cheyenne, WY. This roundtable was the fourth in a series of regional stakeholder meetings, the purpose of which is to extend information about the USGS streamgaging and cooperative water science programs and create an opportunity for stakeholders to help strengthen those programs.

The program included presentations by USGS staff on the purposes, history and capabilities of the CWP and some of the challenges facing it. Several Cooperator representatives presented excellent descriptions of the scientific contribution that the CWP data collection and interpretive investigations have made and the benefits they bring to state and local water management. The reception and exploration of the Curt Gowdy State Park were very enjoyable and the meeting concluded with a discussion (and ranking) of ideas for building a stronger Cooperative Water Program with USGS.

Welcome and Program Overview: Peter Evans, Director of the ICWP, welcomed the 50+ participants and drew their attention to the contents of the [meeting book](#), described the program

and emphasized the value of the break-out sessions at the end of the meeting. He also described the growing number of organizations and states that have endorsed letters to the Secretary of the Interior and Congress urging full implementation of the National Streamflow Information Program (NSIP) and restoration of the CWP capacity to match Cooperators' investment dollar-for-dollar.

David Pope welcomed the participants on behalf of the MoRAST and described their mission and recent activities. Bob Swanson, Director of the USGS Nebraska Water Science Center, spoke briefly about the important difference the CWP brings to the Water Science Centers (WSCs) based on the fact that it is directed state-by-state to meet the Cooperators' needs. Bob also introduced many of the USGS leaders that were in attendance, including:

Overview of the Cooperative Water Program from the National Perspective: Ward Staubitz is the National Coordinator of the CWP. His [presentation](#) described the scope and purpose of the oldest and largest USGS program for water data collection. The CWP developed over the past 112 years around a 50:50 cost share relationship between USGS and the water resource agencies in state, tribal and local government, representing a shared commitment to monitor the highest priority sites. Over the past 25 years, the number of cooperating agencies has more than doubled, with about 1,504 participating in 2007 and a combined budget of about \$225M from the following sources:

- federal funds for the CWP (\$64.3M);
- state, tribal and local agency funds (\$161M)

The CWP continues to build national water databases, integrating data from over 15,000 sites throughout the country and making them accessible through the National Water Information System (NWIS) and its internet site (which responds to 25-30 million requests for data every month). These data support many interpretive studies (about 700 are currently underway) and models used by other public agencies and private companies, as well as the USGS, for flood frequency analysis, reservoir design and operations, watershed modeling, aquifer characterization, conjunctive use of surface and ground water, limiting the intrusion of saltwater in aquifers, restoring habitat, protecting water quality and many other purposes.

The CWP has served an important role in establishing national protocols and standards for data quality and consistency and in keeping USGS scientists abreast of the changing needs and priorities of water resource management at all levels of government and in the business community.

Overview of the National Streamflow Information Program from the National Perspective:

Mike Norris is the National Coordinator of the NSIP. His [presentation](#) showed the progress that USGS streamgaging programs have made, indicating that about 90% of the active streamgaging stations are now providing real-time data. Mike also discussed the shifting priorities and variation in some of the Cooperators' budgets during the 1990s that caused sufficient concern over the nationwide loss of long-record gages that Congress authorized USGS to implement its design for a National Streamflow Information Program (NSIP) in 2001. Based upon an assessment by the USGS, the NSIP was designed to stabilize a base network of streamgages at

critical points with a reliable commitment of federal funds to assure sufficient data will be available for the following purposes:

- meeting legal and treaty obligations on interstate and international waters (to monitor legal requirements for deliveries of water at state and national borders);
- flow forecasting (sites needed for validation and improvement of forecasts where the NWS and other federal agencies carry out flood or water supply forecasts);
- measuring river basin outflows (for calculating regional water balances for principal watersheds);
- monitoring sentinel watersheds (for determining long-term trends in streamflow across the nation); and
- measuring flow for water quality purposes (for characterizing the quality of surface waters)

Of the 7,551 active gages operated by USGS within the CWP and NSIP, approximately 3,244 (43%) meet one or more of those five national needs. However, federal funds appropriated for the NSIP in 2006 were sufficient to provide full support for only 352 stations and partial support for another 266 stations, as illustrated on page 96 of the [meeting book](#); this means that more than 2,600 of the 3,244 NSIP gages (i.e., more than 80%) are supported with a combination of funds from Cooperators, the USGS CWP and other federal agencies. Approximately 176 of those 7,551 active streamgages were at risk of discontinuation, adding to the set of more than 780 discontinued since 2001 (shown on another map included in the meeting book).

New issues, public interest and new technologies have increased the demand for streamflow information. Unfortunately, the capability of our combined streamgage network to meet the five national goals has declined in recent years as a result of an increasing instability in the network due to the way the streamgaging programs are funded.

Full implementation of the NSIP is estimated to cost \$117M; this would provide for the reactivation of about 970 discontinued streamgages, installation of about 435 new streamgages, “flood hardening” the existing streamgages to assure their continuity through at least a 100-yr flood event and providing real-time data transmission at all NSIP streamgages. Future operation and maintenance of the full NSIP network of about 4,780 streamgages is estimated to cost approximately \$108M/year. For next year, the President requested \$23.8M and the Congress is looking to give it a little more.

Cooperative Monitoring Network in the Upper Missouri River Basin States: Steve Robinson (Supervisory Hydrologist in the USGS North Dakota Water Science Center) opened this set of presentations with an overview of the [surface water monitoring network](#) in the 7 states (CO, KS, MT, NE, ND, SD & WY). Unlike other monitoring networks that record measurements for specific needs, Steve emphasized that the USGS network is intended to support multiple uses (including flood protection, water supply planning, allocation management, environmental assessment, and water quality protection) and to provide the basis to evaluate new issues and needs as they appear in the future.

The total number of new Cooperators continues to grow, but not as fast as 5 years ago, and the local government Cooperators are carrying an increasing share of the cost (along with USGS), while other federal agencies are supporting a smaller portion of the programs. A total of 700

streamgages are currently maintained by the USGS and the regional budget is approximately \$15.8M. Steve identified 21 streamgages with long records (≥ 30 years) that have been discontinued during the past 9 years due to funding limitations within this region. Four of the seven states maintain substantial networks of their own, mostly for the management of protected uses and for flood warning.

Steve also described improvements in the equipment used to collect surface water measurements and the efficiencies they provide.

Ground Water –Gregg Steele (Ground Water Specialist with the USGS Nebraska WSC) described the 11 principal aquifers in the Upper Missouri River basin and the patterns in uses and water level change. These variations among the states, and in the character of the Cooperators in each state, demonstrated the adaptive nature of the CWP to the needs in each state. He also discussed gravity measurements and other advancing technologies that may be useful in identifying ground water resource patterns.

Water Quality –Andy Ziegler (Hydrologic Investigations Chief for the USGS Kansas WSC) described the water-quality network and both continuous and discrete measurements throughout the Upper Missouri River Basin. Different USGS programs organized to collect water-quality measurements were described in relation to the Upper Missouri and its Cooperators. For example, USGS and Cooperators are expanding more consistent monitoring networks in CO, WY and ND driven by broad-scale requirements (e.g., setting TMDLs), while the monitoring and interpretation that USGS is supporting with Cooperators in SD, NE and KS is producing data sets that are designed to meet specific local information needs. Nearly all USGS water-quality programs in the Upper Missouri are funded through the CWP. Examples presented illustrate the innovation possible through the CWP data collection and interpretative studies. Andy also discussed a National Real-time Water-Quality Monitoring network to complement the National network proposed by the National Water Quality Monitoring Council.

Sustaining Network Continuity –David Pope (Executive Director of the MoRAST) gave voice to concerns about the “instability” or loss of reliability that creeps into our national and regional data sets when long-term records are lost. To the extent that the cost of the USGS streamgaging networks prevent us from monitoring enough sites and enough parameters, agencies will logically consider investing in separate networks that will divert funding and expertise from our shared network, and create the risk of losing data continuity and compatibility and the greater value of being able to interpolate and model at the larger, regional scale. He clarified that this is not an issue that the MoRAST has really discussed, but that David wanted to address based upon his own experience.

David acknowledged that there is great value in agencies having the autonomy to do what we each need with the resources we can secure. Increasing cost of operations combined with static federal funding will only continue the pattern of increasing burden on non-federal agencies OR discontinued stations OR developing independent, disconnected networks. Technology improvements that bring enhanced efficiencies are helping, but we aren't keeping up. One of the consequences has been some state and local agencies deciding they need to establish their own monitoring networks to meet their own specific needs.

He suggested that we also need to keep in mind the larger picture and the value of the consistent data collected in accordance with widely-accepted standards for quality. There may be standards we should adhere to and training should be provided beyond USGS.

We have a wonderful system in this country and we should take pride in the national achievements we have worked together with USGS to establish. Perhaps we also need to look at opportunities to enhance any independent programs as we continue reexamining the cost-effective alternatives we develop to get more information with the funding we do have.

A good discussion followed. Enhancing communication of this dilemma to congressional leaders was suggested; so was the option of creating a protocol or a set of standards for all agencies to collect their data in ways that will be more compatible with USGS data. It was also suggested that allowing collection of different data at different CWP gages, according to the need and funding available, might help stretch the available funding further. We also considered the probability that some, in Congress or within the OMB and Interior Department, may interpret the Cooperators' willingness to increase their share of the CWP funding as a fair sign that the federal share can safely be reduced without disastrous consequences.

CLIMATE CHANGE –**Veva Deheza, Water Conservation and Drought Planning Chief, Colorado Water Conservation Board:** Veva Deheza described Colorado's challenge in developing a first water plan that considers climate change, beginning with a scientific assessment of the hydrologic implications and an analysis of water rights and interstate compact commitments. Consistent, state-wide trends have been difficult to identify, but "downscaling" from global models suggest that Colorado will experience temperature increases of 2.5 – 4 degrees by 2025 -2050 and that the proportion of precipitation falling as rain, rather than snow, will continue increasing. The combination of such temperature increases with the related changes in evapotranspiration and soil moisture result in hydrologic projections showing a decline in runoff for most of Colorado's river basins by the middle of this century. However, the CWCB has already identified the need for improved data collection and improved prediction and impact assessment capabilities.

She also described the standard arrangements that CWCB has for coordinating data and science needs with USGS and the new funding CWCB has committed to this effort. The Front Range Climate Change Vulnerability Study and the Colorado River Water Availability Study were described as examples of the investigations that CWCB is coordinating with considerable support from USGS. The Front Range study will provide many communities and irrigation districts with streamflow forecasts that illustrate various climate change scenarios, enabling them to evaluate their own water supply vulnerability. The Colorado River study will examine water supply shortage scenarios in the context of an interstate compact call. Both of these investigations attract a high level of interest (and scrutiny) within the water community due to the resource management complications that many other agencies have not examined yet with such specificity. The results of these efforts will be considered during a Governor's Conference on Managing Drought & Climate Change next fall.

ENERGY PRODUCTION –**John Wagner, Administrator, Wyoming DEQ Water Quality Division:** John Wagner described the variety of water quality, hydrologic and biologic questions that Wyoming coordinates with USGS, using the changes in water chemistry, temperature and

turbidity they have observed in the Greater Poudre Basin due to discharges at about 400 sites where coal bed methane is developed. Energy development in northeastern Wyoming got a quick start and, as a result, the state faces a complicated challenge in assessing the impacts and conservation strategies because there wasn't an opportunity to measure and understand pre-development conditions. In that context, the state relies on USGS for the depth and sophistication the agency can commit to the assessment. There are times, however, when the state needs quicker answers and relies on several consulting firms with appropriate scientific capabilities instead.

DROUGHT, WATER SUPPLY & INSTREAM FLOW DECISIONS –Ron Cacek,

Manager, North Plate Natural Resources District: Ron Cacek described the challenge that Nebraska faces in the development of water laws that integrate consideration of surface and ground water management needs with water quality protection. The NRD has a long history of cooperation with USGS in which a series of cooperative investigations has led to the development of a groundwater optimization model and the initiation of heliobourne electromagnetic surveys.

The North Platte Valley Ground Water Optimization Model has been developed to incorporate geophysical surveys and irrigation canal characterizations to assess canal leakage and its relation to the recharge of highly-valued ground water supplies. The NRD has opposed the lining of the canals but is eager to enhance their understanding of the canal deliveries and ground water recharge in the context of competing needs (consumptive and ecological) within the State of Nebraska and with users in neighboring states.

TRIBAL WATER –Clifton Skye, Tribal Relations Manager, US Forest Service: Mr. Skye described the characteristics that distinguish Tribes from States and require distinct management consideration in the management of tribal water resources. He described a 2004 cooperative agreement that the United Sioux Tribes negotiated with the USGS and other federal agencies to address water resource and related science concerns as a model for understanding tribal resources and assisting their communities in water management decisions. Mr. Skye and Chairman Brings Plenty of the Cheyenne River Sioux Tribe (who was unfortunately unable to participate in this presentation) have recently asked Congress to restore \$7M within the BLM budget for streamgaging on tribal lands. They appreciate the common purposes identified by previous speakers and invite others who are interested to initiate cooperative projects with the tribal agencies.

ENDANGERED SPECIES RECOVERY PLANNING & ECOLOGICAL FLOWS –Sue

Lowry, Interstate Streams Division Administrator, Wyoming State Engineer's Office: Sue Lowry provided an overview of the range of ecological needs that water agencies have been confronting, including the habitat requirements of migratory birds and fish, and the success that the MoRAST has seen as a result of decisions to include fisheries and wildlife biologists in the design of interstate water management programs. She described the variety of physical habitat manipulations that several interstate programs are implementing in addition to the flow protection under various state water laws. Ms. Lowry also discussed the value that better models, GIS and forecasting tools will have as we accept that historical flows may not be reliable planning guides without integration of climate change adjustments.

AQUIFER STORAGE & RECOVERY –Jerry Blain, Superintendent of Production & Pumping, City of Wichita Water Utilities: Jerry Blain recounted the City of Wichita’s history of water development and alternatives they explored before focusing on the development of new supplies from the Equus Beds. Existing uses of this aquifer are diverse (about 60% irrigation, 30% municipal and 10% industrial) and growing and the water level had been drawn down substantially (by approximately 65 billion gallons in 1994, almost as much as the rest of the City’s’ surface water supply). To complicate matters, this aquifer was also showing elevated levels of chlorides due to leaching of brine deposits left from the development of local oil and gas resources during the 1930s and by the increasing salinity of flows in the Arkansas River. As a result, the City decided on an aquifer recharge and recovery project.

The City decided to develop an Aquifer Storage & Recovery project, taking peak flows (when they occur) to recharge the aquifer. The water quality concerns combined with a wide-spread perception that all the available water was being used made the City’s proposal very controversial. As a result, the independent reputation of the USGS became crucial to being able to make use of the only new source of water supply that Wichita was able to find. Construction of the first phase was completed in 2006 and development of the second phase (which involves the capture, treatment and storage of another 30MGD from the Little Arkansas River) is expected to require an investment of more than \$1M annually until 2015.

It hasn’t been easy, but Jerry thanked USGS for serving such an important role in the City’s effort to preserve and protect a water resource and to develop a water supply opportunity that will be vital to the residents and businesses throughout the region.

HIGH PLAINS AQUIFER –Jim Goeke, Research Hydrogeologist, Conservation & Survey Division, University of Nebraska at Lincoln: Jim Goeke described a ground water research program that Nebraska has coordinated with USGS starting in 1940 and the role the resulting studies and models are serving as the state improves its water management laws.

Statewide coverage of monitoring wells progressed over many years and USGS helped introduce new technologies along the way; the advent of down-hole geophysics logging in the 1940s and 50s is a good example. The state began organizing Natural Resource Districts in 1972 and USGS published a regional assessment of ground water use and availability covering eight states in 1984. That assessment presented intriguing estimates of the “drainable water in storage” and water depletions on a state-by-state basis. During the 1990s, there was a rigorous debate over the affect those depletions might have on surface flows, which the state finally resolved by formalizing an integrated program for the management of surface and ground water in 2004.

Through the Cooperative Water Program, a Cooperative Hydrology Study (“COHYST”) applied USGS ground water models to assess these depletive impacts on surface flows and the state mapped areas as “over appropriated” and “fully appropriated” based a scientific projection of the number of decades a well could be pumped before depletion of baseflows would reach specified percentages.

Mr. Goeke also described the next geophysical innovation they are working with USGS to apply to these ground water resources: “heliobourne electromagnetic surveys.” By monitoring different

electromagnetic frequencies, and comparing the results with down-hole geophysical measurements at nearby monitoring wells, these aerial surveys seem to be very useful in indicating the location, depth and thickness of saturated gravel deposits. He closed his presentation with reference to USGS Circular 1308, entitled *Water Budgets: Foundations for Effective Water-Resources and Environmental Management* and the need to extend our collective capability for making use of water data to produce information and knowledge that the public and decision makers will find relevant and reliable.

Break-Out Group Discussion of Opportunities & Priorities: The participants divided into two groups to explore opportunities for both the USGS and the Cooperators to improve the CWP. The two groups met for about an hour, one lead by Tracy Streeter (Kansas Water Office) and the other by Garland Erbele (South Dakota Department of Environment & Natural Resources) to respond to two questions and prioritize the results. Those questions and the combined results are available, but and **the highest ranking recommendations were:**

What action should the Cooperators consider to improve the CWP?

- Advocate for CWP & NSIP funding increases Bring USGS staff/message to the news media Get congressional hearings set on basic data collection; be more strategic in our efforts
- Stay more actively involved in the interpretive studies as they progress
- Engage USGS more often, even informally, to explore issues & options – enhance the interpretation of USGS data in context of management decisions, improve the anticipation of issues & data needs, whether it leads to interpretive studies or not
- Be more aware of USGS data collection and processing protocols to increase consistency); need USGS guidance on extent- of-compliance (3 USGS + 4 Cooperator = 7 Votes)
- Organize regular statewide Cooperator forums to bring current and new funding partners to the table, increase shared understanding of capabilities, needs and opportunities and to identify and explore opportunities to improve CWP efficiency

What can the USGS do to improve the CWP?

- “Market” the USGS products and the value of data collection to Congress, demonstrating the importance of CWP funding needs and request more federal funding for both the CWP and NSIP; expand awareness beyond the water managers
- Offer more expert availability to Cooperators in program and issue exploration to improve the anticipation of data needs and increase probability that baseline will be available in early stages of decision making
- Expand and utilize CWP flexibility to lower cost and collect more data related to specific Cooperator’s needs; examine (in an open discussion with the Cooperators) the viability of “different data qualities” and allowing non-USGS staff to collect data and maintain gages in accord with USGS standards so that ht e data can be published the same as USGS data –also water quality analyses

Establish competitive grant program to help Cooperators extend data collection and meet USGS standards, (similar to the Cooperative Mapping Program; offer 50:50 cost share)
Better delivery of data and study results (from provisional to final) on schedule (3 USGS = 4 Cooperator = 7 Votes)
Maintain/expand research role (5 USGS + 2 Cooperator = 7 Votes)
Continue adding to and improving the NWIS –web capabilities & products
Provide better explanation of the study and data collection cost and progress
Keep flexibility & decisions at Water Science Center level for studies/data mix

What should USGS & Cooperators do to enhance data compatibility across networks?

Establish a water data portal –to help identify other useful sources of data

Before the meeting adjourned, Matt Larsen responded to some of the break-out meeting results; Matt, Ward Staubitz and Mike Norris expressed their appreciation for the time and energy that the Cooperators and USGS staff put into the presentations, the discussion and recommendations.

The meeting materials, including the presentation slides, are available to anyone who is interested from any of the six Water Science Centers, from the Missouri River Basin Association of States & Tribes or from the Interstate Council on Water Policy.

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