

New England Cooperators' Roundtable for the USGS Cooperative Water Program

Tuesday, November 9-10, 2010

Chelmsford, MA

Co-sponsored by the



Overview: In cooperation with the New England Interstate Pollution Control Commission (NEIWPCC) and the US Geological Survey (USGS), the Interstate Council on Water Policy (ICWP) organized this Cooperative Water Program (CWP) Roundtable for stakeholders in Connecticut, Maine, Massachusetts, New Hampshire, and Vermont. This conference was the ninth in a series of regional stakeholder meetings designed to provide information about the USGS water data and science programs and create an opportunity for stakeholders to help strengthen those programs.

The program included presentations by USGS program leaders and scientists about the purpose, history and capabilities of the CWP and some of the challenges facing it. The capacity for data collection and interpretive studies is limited and adapted to regional needs.

Approximately fifty conferees (about ½ of them were cost-share partners in the CWP) worked together for a total of about 6 hours. The Cooperator representatives provided examples of their reliance on CWP data and investigations in meeting local and regional water planning and management responsibilities.

The [program](#), [meeting book](#), and PowerPoint presentation files are available from the ICWP website.

Welcome and Program Overview: Susan Sullivan, Deputy Director of the NEIWPCC, 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. She also described the growing number of organizations and states that have endorsed recent letters to the Secretary of the Interior and to Members of Congress urging full implementation of the National Streamflow Information Program (NSIP) and restoration of the CWP capacity to match Cooperators' investment dollar-for-dollar.

Dave Russ, Regional Executive for the USGS New England Region also welcomed the participants and provided an [overview](#) of the USGS Science Strategy that guides their investments in and coordination of environmental science for the Interior Department for water, wildlife and land resources.

Overview of the CWP from the National Perspective: Ward Staubitz is the National Coordinator of the Cooperative Water Program (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 115 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 1,600 participating in 2007 and a combined budget of about \$225M from the following sources:

- federal funds for the CWP (\$65.4M);
- state, tribal and local agency funds (\$159M)

Nationwide, the CWP continues to build 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 and models used by other public agencies, consulting experts and private enterprise, as well as the USGS (about 700 are currently underway nationwide), for:

- water availability studies;
- 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 other vital 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. The Cooperators' participation is as important for assuring that USGS scientists are constantly engaged at the leading edge of resource management challenges as it is for their cost share contributions.

The value proposition that has sustained the CWP is that the USGS will collect the "full science package" of data (with great QA/QC) at each site the Cooperators select and publish the data in a very accessible website if, in exchange, the Cooperators pay ½ the cost. Ward illustrated the extent to which individual Cooperator's funding decisions and those of the Congress have resulted in a significant departure from the traditional 50:50 cost-share balance to the extent that the non-federal Cooperators' cost share is near 70%.

Of the 7,825 active gages operated by USGS in 2009 (the CWP and NSIP combined), approximately 274 (%) of those active streamgages were at risk of discontinuation, adding to the set of more than 891 already shut down since 2001 (as illustrated on page 76 of the [meeting book](#)).

Overview of the NSIP from the National Perspective: Mike Norris is the National Coordinator of the National Streamflow Information Program (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 asked the USGS to design a National Streamflow Information Program (NSIP) in 1998. Based on 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 (flow measurements needed for validation and improvement of forecasts where the National Weather Service 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 7,825 active gages operated by USGS in 2009 within the CWP and NSIP, approximately 3,465 (44%) meet one or more of those five national needs. However, federal funds appropriated for the NSIP in 2010 were sufficient to provide full support for only 388 stations and partial support for another 975 stations, as illustrated on page 77 of the [meeting book](#); this means that more than 2,100 of the 3,465 NSIP gages (i.e., more than 60%) are supported with a combination of funds from Cooperators, the USGS CWP and other federal agencies. Approximately

New issues, public interest and new technologies have increased the demand for streamflow information. Unfortunately, the capability of our combined streamgauge 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 (FY-2011), the President’s budget request included \$27.1M for the NSIP and Congressional committees are looking at opportunities to provide a little more.

USGS MONITORING NETWORKS IN THE NEW ENGLAND REGION

Surface Water: Greg Stewart, Data Chief in the USGS Maine Water Science Center, provided an overview of the [surface water networks](#) within the six state region, showing the vast majority of surface water stations provide real time data and the mix of streamflow, stream stage and precipitation monitoring stations in the region. Greg described their data collection strategies, quality assurance measures and new technologies, including the satellite transmission upgrades, the use of acoustic Doppler and radar technologies. He also reviewed the website functions that provide easy access to the database interpretive displays.

Lynette Miller, Director of Special Projects for the Maine Emergency Management Agency, joined Greg to describe the Cooperators’ involvement. She discussed the meetings that USGS convenes to engage the Cooperators in the development of priorities and interpretive presentations that are best suited to the regional needs and capabilities. She also discussed some of the budget lessons they have learned for maintaining a strong cost-share contribution.

Ground Water: Gardner Bent is a hydrologist in the USGS Massachusetts-Rhode Island Water Science Center. He characterized the [regional monitoring of groundwater](#), opening his presentation by illustrating the importance of groundwater as a source of water supply for rural domestic uses, for agricultural production and in the maintenance of stream flows and lake levels. The New England region has a network of over 250 groundwater monitoring wells, more than 50 of which are equipped to deliver real-time data and over 100 of which have records going back at least 50 years. This is a very strong network, compared with other parts of the US. Common uses of the groundwater data range from routine monthly condition assessments to drought monitoring and the design of residential septic systems.

Paul Blain, the Senior Hydrologist with Massachusetts Department of Environmental Protection, reviewed three of their [programs that depend on USGS groundwater data](#): the Water Management Program, the Drought Management Program and the “Title 5” septic system design requirements. The most interesting discussion focused on the ability to assure the collection of sufficient groundwater data to support the state regulatory computations for permitting residential septic systems.

Water Quality: Jonathan Morrison, Water Quality Specialist in the USGS Connecticut Water Science Center, picked up the regional overview where Gardner and Paul left off, shifting to the [regional monitoring of water quality](#). Jonathan outlined some of the more important uses of water quality monitoring data in Connecticut, where most of the New England region sampling stations are concentrated. He described the role of the National Water Quality Laboratory in Denver and some of the analytical methods they have established. The NWQL’s iso-kinetic sampling methods enable USGS to monitor contaminants in the parts/billion to parts/trillion range! He showed examples from the NWIS website of data presentations that facilitate comparison of multiple parameters for interpretation of natural system functions and identification of contaminant sources.

Betsey Wingfield, Director of Connecticut DEP's Bureau of Water Protection and Land Reuse, described many of the ways that USGS data and expertise support a wide array of [water quality protection efforts in Connecticut](#). These begin with the establishment of baseline and reference conditions and the assessment of water quality trends, and extend to the development of regulatory standards and the evaluation of state program implementation. She described several watershed studies related to nutrient loading from various sources and the complex estimation of nutrient impacts for various watersheds in relation to their contribution to anoxic conditions in the Long Island Sound. She closed with a description of the state efforts to establish instream flow protection levels based on the ecological functions and the benefit of high quality data through StreamStats to support these public decisions.

STATE & INTERSTATE MONITORING NETWORKS

Kerry Strout described three of the projects that the [New England Interstate Water Pollution Control Commission](#) has completed and their use of USGS data and expertise; she is their Monitoring & Wetlands Coordinator. The first project was an assessment of "biological condition gradients" for wadeable streams at the state and regional levels. Those results were used to compare the health of New England streams with national assessments. They were also used to support regulatory and resource management programs for wetlands, riparian and fishery conservation. Based upon their comparison with national assessments, the states have identified physical habitat complexity lakeshore disturbance and shoreline habitat. Their next priority is to bring data collected by many state and local agencies that may help establish the baseline needed to assess and respond to climate change impacts.

INTERPRETIVE STUDIES & STRATEGIC ISSUES

Ecological Flows: Stacy Archfield, a Research Hydrologist with the USGS Massachusetts-Rhode Island Water Science Center, described the collaborative development an [instream flow estimator](#) with Massachusetts water, environmental protection and recreation agencies and The Nature Conservancy. The Massachusetts Sustainable Yield Estimator ("SYE") model uses a flow duration curve and the streamgage data from a selected site to estimate the unregulated streamflow at an ungaged site. Combining this function with the state records for known diversions and consumptive use of surface water provides a powerful screening capacity that can be used in evaluating future availability of water for many different uses.

Kathy Baskin joined Stacy in this presentation; she is the Director of Water Policy for the Massachusetts Executive Office of Energy & Environmental Affairs (her slides are included in [instream flow estimator](#)). She described initial applications of the "SYE" in establishing limits for hydrologic alteration based on aquatic habit degradation, evaluating other causes of habitat degradation and develop options for improving streamflow and habitat.

Watershed Assessments: Dave Bjerklie, a hydrologist with the USGS Connecticut Water Science Center, and Marc Taylor, Chairman of the River Network and former Chairman of the Pomperaug River Watershed Coalition, described the development and calibration of the [Precipitation Runoff Modeling System Model](#). They described USGS analysis of precipitation and runoff relationships in this watershed in a GIS framework so that it can derive potential hydrologic impacts from "full build out" according to the current land use plans. Once this could be validated at their HUC-12 scale, they used it to simulate the other 511 HUC-12s in the region and are simulating a daily watershed balance (surface and ground water, and runoff from snowmelt vs rainfall)! This modeling system has been used in the local council of governments. The Town of Southbury used it to compare conservation easement priorities with parcels available in groundwater recharge areas that contribute most to base flow in their streams.

Marc provided a nice insight into the benefits of collaborating with USGS from the perspective of a non-profit watershed organization. Bringing the community of that cared about the watershed's future was much easier with the USGS providing objectivity and scientific competence. Their watershed group lead an effort to gain financial support from the Connecticut's General Assembly and a subsequent effort to

that the Interior Department appreciated the value of this cost-shared project. The “side effects” that Marc recommends to Non-Profit Watershed Groups (Everywhere!) is a fruitful scientific collaboration in support of sustainable watersheds.

Water Use: Marilee Horn, a hydrologist with the USGS New Hampshire-Vermont Water Science Center, lead the presentation of their [water use assessment](#) for New Hampshire with help from Brandon Kernen, the Hydrology & Conservation Program Supervisor for the New Hampshire Department of Environmental Services. Water uses continue to change in NH, as in every state, and this assessment supports the state permitting of water uses and planning to accommodate future allocation and protection. USGS modeling results for a coastal region in southern New Hampshire were presented in a powerful “spider graphic” showing the quantity of water withdrawn, used/consumed, and treated/returned within each watershed. The state and 44 towns provided the project goals: to identify current water uses, how much water use is protected to the year 2025, and how much water is available in any particular community. Data from water supply and treatment utilities, the National Census, Dun & Bradstreet and other sources are incorporated in the estimation of water demand, withdrawal, consumptive use and return flow. It is revealing regional patterns and trends in return flow and per capita water demand, for example, that helpful in permitting new and ongoing uses of water.

Groundwater Quality: Joseph Ayotte, a hydrologist with the USGS New Hampshire-Vermont Water Science Center presented the results of a NAWQA investigation of arsenic in groundwater for a region in southeastern New Hampshire, there approximately 2/3 of the state’s population is concentrated. While the occurrence of arsenic was known, the source was not clear (even after several earlier studies by other parties). Using data from public water supply wells, they were able to demonstrate a correlation between measured concentrations with the bedrock geology and that 40,000 citizens may be drinking groundwater in excess of the revised MCL.

Brandon Kernen added a state perspective on involving the USGS and the value of straight science for informing the public and our leaders.

Climate Change: Joan Trial, a Senior Biologist with Maine’s Division of Marine Resources, and Robert Dudley, a hydrologist with the USGS Maine Water Science Center, presented an overview of [salmon habitat hydrology correlations](#). The Atlantic Salmon is protected under the ESA and their investigation suggests this is the southern edge of their habitat. They also demonstrate that recruitment of a year class is better in some years and the trend is away from those conditions.

Break-Out Group Discussion of Opportunities & Priorities: Following the briefings and discussion, the participants divided into two groups of about 25 each to explore opportunities for both the USGS and the Cooperators to improve the CWP. The two groups worked independently to respond to three questions and prioritize the results. Those questions and the combined [results](#) are available to download, and **the highest ranking recommendations** were as follows:

What can the USGS do to improve the CWP?

- Increase funding to NSIP & WSCs
- Regional approach to climate change and other studies, spokesman for all regional offices
- Maintain excellence –science & service, enhance interpretive presentation
- Market USGS more effectively –strategic look at communication products & strategies for CWP & NSIP, design for use by a wide variety of audiences
- Coordination with other USGS programs (e.g., NAWQA), EPA & other federal agencies –funds to support different issues

- Acknowledge Cooperators & enhance information sharing –list serves, regional contact databases, webinars

What can the Cooperators do to improve the CWP?

- Need to communicate end results & collaboration with USGS more effectively, so that congressional, OMB and state legislative contacts understand value to the region
- Annual “summit” with federal agencies to plan & prioritize future investigations, agree on cost/benefit & monitoring priorities, enhance regional coordination and identify training needs – tied to budget cycle
- Find outside funding –TNC, TU, other friends
- More coordination during investigations, co-author reports with USGS

Should USGS explore the feasibility and potential benefits of taking a more regional/multi-state approach to monitoring networks and hydrologic investigations through the CWP?

- Regional approach could bring enhanced issue identification, project design & additional funding/expertise together from WSCs, OFAs and Cooperators into investigation of shared concerns
- Don’t lose focus on local/specific issues in order to serve national or regional concerns –make sure sufficient capacity aligns with Cooperators’ needs
- Need to get Water Census & other national programs involved with field offices

The meeting materials, including the presentation slides, are available to anyone who is interested from:

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