

COOPERATIVE WATER MONITORING AND ASSESSMENT IN FLORIDA

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Overview: In cooperation with the US Geological Survey (USGS), the Interstate Council on Water Policy (ICWP) organized this Cooperative Water Program (CWP) Roundtable for stakeholders in Florida. This roundtable was the seventh 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 staff about the purpose, history and capabilities of the CWP and some of the challenges facing it. Cooperator representatives presented excellent descriptions of the scientific contribution that the CWP data collection and interpretive investigations have made in the fulfillment of local water resource responsibilities. The Hach Company, Sutron Corporation, and YSI/SonTek displayed new equipment and software capabilities and provided financial support to assure the registration would be affordable for everyone who wanted to participate.

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

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 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.

Leroy Pearman, the USGS Data Chief for their Orlando office, welcomed everyone on behalf of the USGS Florida Integrated Science Center (FISC) and introduced Barry Rosen, the FISC Director. Barry described the [FISC](#) and the characteristics that distinguish it from the Water Science Centers established by USGS in other states. The FISC operates major offices in Orlando, Gainesville, Fort Lauderdale, Saint Petersburg, and Tallahassee and funding for their water programs comprises the largest part of its budget, with a little more than \$25M for FY-08; by comparison, their geology programs budget was about \$12M and their biology programs budget was about \$8M. The mission of the FISC is tied to all six of the major science themes identified in the USGS 10-year [Science Strategy \(2007\)](#); these include:

- Ecosystems and the Prediction of Ecosystem Changes;
- Climate Variability and Change;
- Energy Minerals;
- Hazards, Risk and Resilience Assessment;
- Environment and Wildlife in Human Health (e.g., avian influenza); and
- Water Census of the United States.

Barry described the integration of their water expertise with ecosystem research and climate dynamics in the Picayune Strand Restoration Project (initial cost estimate was \$365M) is directed towards the maintenance of effective drainage for communities that were built years ago on reclaimed swampland, while sustaining habitat for the endangered manatee. The USGS objective is to provide an understanding

of surface and ground water systems to enhance the design for restoration hydrology that the Corps of Engineers is developing/refining. Barry indicated that their next big project will be in the Gulf of Mexico.

Overview of the USGS Monitoring Program in Florida: Leroy Pearman provided a comprehensive [overview of the basic data programs](#) supported by the FISC. USGS employs a Water Data Chief in four of its principle offices and, overall, they support 2200 surface water, ground water and water quality monitoring locations; 75% of the sites are operated in cooperation with the Florida Water Management Districts (WMDs). The FISC operates the largest acoustic data system in the US, which is needed to monitor and understand the functions of complex springs and tidily affected sites. From a statewide perspective, the USGS water programs have recently emphasized the following projects and priorities;

- Merging four large water databases into a single source for improved access by water users;
- Lake Okeechobee Watershed Project;
- Tidal interaction in bays and lagoons;
- Upgrading the data collection platforms(DCPs); and
- Improving the completion rate for data evaluation and interpretive studies.

The Orlando office manages the largest program (approximately \$4.6M); it operates about 220 surface water sites, of which 155 have continuous flow monitoring capabilities; it also operates about 580 groundwater sites, including 42 with continuous monitoring capabilities. The Fort Lauderdale/Fort Myers office has a budget of about \$4.5M and operates about 170 surface water sites, including 83 with continuous flow monitoring. It also operates about 455 groundwater monitoring sites, including 253 with continuous monitoring capabilities, and 51 continuous water quality monitoring sites. This office also supports a \$2 million Coastal Hydrology Program. The Tampa office has a \$4.3 million basic data program and operates 187 surface water sites, including 116 continuous flow monitoring stations. It also operates 563 groundwater sites, including 110 continuous groundwater monitoring stations, and 61 continuous water quality monitoring sites. The Tallahassee office manages a \$1.6M program that supports about 80 surface water sites, including 74 with continuous monitoring capability, 2 continuous ground water monitoring stations and 6 continuous water quality monitoring sites.

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 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)

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 and private companies, as well as the USGS (about 700 are currently underway), 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 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.

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 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 (FY-2009), the President's budget request included \$23.8M for the NSIP and Congressional committees are looking at opportunities to provide a little more.

COOPERATIVE MONITORING NETWORKS IN FLORIDA

Saint John's River Water Management District: Tom Mirti (Division Director for Hydrologic Data Services) reviewed a series of maps showing the various monitoring networks operated by the District, including lake levels, water control structures, springs, surface discharge, rain gauges and wells. The SJRWMD has a \$1.3M agreement with USGS for data collection, which they consider to be the "backbone" of their hydrologic monitoring capabilities. Tom described the sophisticated rainfall monitoring network and data interpretation models developed by the District, and its' extensive investment in telemetry; of the 1000 sites they operate, about 400 are already on telemetry and their objective is that no gauge should be inoperative or experiencing problems for more than 72 hours. The District plans to complete the implementation of their telemetry within three years, to activate two new repeaters, and to convert about 140 data sites to telemetry (plus any new sites requested by projects).

Southwest Florida Water Management District: Granville Kinsman (Hydrologic Data Section Manager) described the responsibilities of their \$2M [data program](#), from the design and installation of new sites, to the installation of more cost-effective technologies, the collection, analysis and reporting of data, and the coordination of funding for cooperative data programs. His office works closely with the SWFWMD's permitting and compliance staff and supports many specific decisions by their executive staff and governing board. The District does not collect its own flow data, but relies 100% on USGS. Surface water is their greatest source of supply; it is also the most threatened. They operate 629 surface water sites, including 389 lake level and 115 wetlands sites. Since the SWFWMD relies so heavily on surface waters, they have increased their attention to the establishment and maintenance of minimum flow levels and lake level studies; this has caused a substantial shift from ground water measurement and increased reliance upon the USGS.

Their highest priority projects include water supply and drought planning, management of the outfall and treatment of waters from Lake Hancock (including the management of enhanced wetlands), providing continuous, reliable data for the efficient management of their control structures, and the migration from NGVD29 to NAVD88. This migration has required an extensive effort to re-survey many existing sites, which the District hopes to complete by 2011. There is an increasing commitment to meeting the established minimum flow levels (more information on this later), which will require conversion of USGS data to the NAVD88 format, as well as statewide coordination of ET monitoring programs.

South Florida Water Management District: Cherry James (Director of SCADA and Instrument Management) described the District's reliance on remote control structure (pumps, generators and gated operations) through their SCADA [system](#). Their operation relies more heavily on USGS hydrology data, so that the district staff are available to maintain their microwave and radio frequency networks with full, 24/7 reliability. The SFWMD currently operates 400 sites with 2000 sensors and anticipate the need for 770 sites and 4000 sensors at full implementation. This will effectively triple the staff workload, requiring the District to update its equipment to reduce programming and maintenance requirements.

Florida DEP Springs Initiative: Garry Maddox is a geologist working in the Florida Department of Environmental Protection's Ground Water Protection Section, where he administers the water quality and discharge monitoring efforts for the [Florida Springs Initiative](#). As a result of increasing concern over degradation of Florida springs since the 1950s, mostly based on anecdotal data relating to decreasing discharge and increasing nitrates and algae, Florida organized a Task Force eight years ago which recommended a strategy that included: research and monitoring, public outreach, land use management, and law enforcement components.

Gary described the research and monitoring component, which includes assessment of the interactions between ground water and surface water and the relation between water quantity and quality. Since the Task Force reported its recommendations, DEP has investigated conduit flow, studied the effect of karst features and performed dye studies to quantify the relation between specific surface and ground water resources (especially in the context of "sinking streams"). They have also conducted extensive water quality measurement to assess seasonal, annual and long-term trends.

The FLDEP springs monitoring network includes 58 sites monitoring water quality and 30 sites monitoring discharge (of which 22 are operated in collaboration with USGS under the CWP). They have increased their reliance on USGS in recent years in order to assure collection of all the desired data. It is likely to take many years to resolve their questions about the effect that changes in discharge and water quality have on Florida ecosystems and water supplies; the quarterly discharge data from 2001-06 are not sufficient and very few sites have long-term records. Where long-term records do exist (e.g., Rainbow Springs and Volusia Blue Springs, where consistent data have been collected for over 50 years), they appear to indicate approximately 5-10% reduction of discharge since the early 1960s. Similar records for

the Silver Spring (in Marion County) suggest as much as a 25% reduction of discharge. Gary indicated a need to verify these trends with additional data collection and an intention to rely on USGS for that data.

US Army Corps of Engineers: John Zediak (Chief of the Corps' Water Management Section in Jacksonville) described the extensive use of data from the USGS and Water Management Districts in determining [operational adjustments for federal reservoirs](#) and in presenting the consequences for public consideration. Reservoir and other control structures operated by the Corps are managed using real time data from the specific facilities and surrounding locations. John emphasized the public scrutiny these operating decisions receive, especially for facilities affecting interstate waters. In order to promote public understanding of these decisions, the Corps uses its internet websites to display current water levels and discharge measurements along with a variety of historical indicators. These include average, a high and low lake levels, and projected maximum minimum and average levels. The Corps collects some of its own data but relies extensively on USGS and others.

Challenge for Sustaining Network Continuity: Dave Brown (Associate Director, FISC) discussed the persistent risk that budget pressures are likely to cause agencies to discontinue or compromise their data collection efforts. In a time when every agency's budget is under greater pressure, most of us have discovered that getting a "flat budget" for next year actually means you are going to lose data collection and interpretation capacity due to increased operating cost.

It is understandable that each agency has its own purpose and need for the data we are collecting and making available to others, but we (working together) need to maintain a focus on the larger picture, in which long-term records, accurate measurements, proper sampling procedures, *etc.*, aren't lost in the hustle to get whatever specific measurements we need for today. For example, John Zediak just described the Corps' reliance on real-time data for reservoir operations and, if we don't work together for the "continuity" of our data networks, we might not sustain the investment in the QA/QC that produces a dataset with solid scientific integrity. Another example could be taken from Granville Kinsman's explanation of the reasons that surface water measurements are becoming so much more important to the SWFWMD; he made this very understandable, but a need like that could lead us to draw support away from ground water monitoring. Gary Maddox showed us how long it could take to understand the management and protection of Florida's springs while we collect the long-term measurement records needed to understand complex systems.

Meetings like this are a good start, but we should assure there is sufficient planning and adequate coordination if we want to be [confident that we aren't leaving \(or creating\) gaps](#) in the record that will interfere with our decision making ability in future years. Many of Cooperators have increased their ability to collect and verify water data, and the records they are producing add considerable value to the larger "network." Their success and the persistent need that all of our agencies experience to figure out better ways to get the information we need now also requires that we pay attention to the bigger picture, in which coverage, consistency, quality and accessibility contribute to our ability to answer the questions and manage the resources that our society will expect from us tomorrow.

SCIENCE IN SUPPORT OF FLORIDA WATER MANAGEMENT DECISIONS

Overview of USGS Interpretive Study Projects in Florida: Sharing the stage with Bob Renken, Gary Mahon opened this presentation by summarizing three [statewide projects](#) that the FISC is undertaking. Gary is the Data Chief in the FISC Tallahassee Office. The first project that he described involves the statewide assessment of water uses, which USGS has conducted since the mid-1980s with funding provided by the Florida DEP and data provided by all five of the Florida WMDs. They update the water use compilation every five years and the most recent report includes data through 2005. The water use assessment includes groundwater from five major aquifers in addition to surface water supplies. Agricultural irrigation and public supply consistently represent the largest uses (power generation, commercial/industrial and recreational irrigation are relatively minor). Their analysis includes a regional

comparison of gross per capita consumption; the highest rate consistently occurs in South Florida (approximately 179 GPD) and the lowest rate consistently occurs in southwest Florida (approximately 138 GPD).

The second interpretive study that Gary described involves the collaborative statewide assessment of evapotranspiration (ET). Working with all five WMDs, the USGS has developed a model-based method for deriving potential ET that uses meteorological measurements with data from the GOES satellite to produce a statewide map that enables irrigators and other water resource managers to visualize the monthly patterns with approximately 2km spatial resolution.

The flood frequency assessment needs to be updated with data from the last 20 years, and Gary reported on their progress. USGS will relate basin characteristics to peak flow observations and determine statistically significant changes in peak flow patterns using multiple linear regression analysis.

Gary also described a variety of regional studies undertaken in collaboration with Cooperators for northern and central Florida. These involve:

- water availability and the potential development of alternative sources to meet anticipated population growth;
- groundwater resources and the potential effects of mining and salt water intrusion;
- land uses that affect water availability and quality, including the application of pesticides and fertilizers; and
- the effect that increasing nutrient loads may have in coastal ecosystems and springs.

Gary indicated that many water managers need a better understanding of the interaction between lakes and ground water supplies, and discussed the situation at Lake Panasoffkee in west-central Florida as an example where complex limestone aquifers and complex land uses make it very difficult to determine an appropriate water budget. He described the study of nutrients related to agricultural production in the Chipola River Basin and the prediction of their transit through the Floridan Aquifer into the Apalachicola.

Bob Renken is the Data Chief for the FISC office in Fort Lauderdale. He give us an overview of their \$12M program and described specific efforts they are making on behalf of SFWMD, Miami-Dade and other major Cooperators in [four major program categories](#):

- simulation and quantification of physical processes;
- system and aquifer characterization;
- water quality (which is growing increasingly important); and
- hydrologic surveillance and monitoring (which accounts for about 40% of their efforts).

One characteristic that distinguishes the Fort Lauderdale office is its contribution in writing computer modeling code. He described USGS modeling efforts in collaboration with North Broward County to simulate saltwater intrusion patterns, quantify natural and anthropogenic stresses with the goal of developing water management strategies. He also described research efforts to quantify the fate and transport of wastewater injections into the Floridan Boulder Zone and the effect of wellfield withdrawals on the regional flow and canal system operations for Miami-Dade. They are also applying hydrodynamic surface and groundwater modeling to assist Biscayne Bay in the understanding of heat and salinity transport in relation to habitat parameters that influence manatee migration.

With regard to their aquifer and hydrologic system characterization program, Bob described several examples illustrating their hydrogeologic capabilities and their expertise in physical interactions between groundwater and surface water. They are working with Broward County to assess the feasibility of aquifer storage and recovery (ASR) and the development of water supply from the Upper Floridan Aquifer. SFWMD is working with USGS in the application of sequence stratigraphy to delineate distribution of porosity and permeability in the Biscayne and Upper Floridan aquifers. They are also

excited by the opportunity to apply several new technologies, like the fiber optic distributed temperature sensor.

Water quality projects have become an increasing concern for many Cooperators, such as Miami-Dade County, due to the interest in a proposed goal of 100% reuse. Current projects involve detection and control of emerging contaminants (including wastewater compounds, antibiotics, hormones and other pharmaceuticals). They are also reassessing salt water encroachment and conducting research regarding microbial ecology and the influence of native and blended groundwater.

Cooperator Projects and Issues –Water Supply Planning: Elizabeth Thomas is the Senior Project Manager in SJRWMD’s Division of Water Supply Management. She described a management approach called “[Total Water Management](#),” which most of the WMDs are developing. This approach is designed around the concept of resource stewardship for the greatest good of society and our environment and involves an interdependent set of issues (technical, financial, regulatory, institutional and managerial) in their full range of water programs (water supply, wastewater and storm water).

SJRWMD has been working closely with the South Florida and Southwest Florida WMDs on a comprehensive ground water plan with a set of guiding principles for the Central Florida Coordination Area that address significant increases in demand, limited groundwater, the need to improve groundwater monitoring and prediction capabilities, the need to incorporate alternative sources of supply, and the need to assure equitable distribution of remaining groundwater supplies. In essence, the plan assures local water providers with an adequate ground water supply through 2013 and provides significant incentives for them to develop their own alternative supplies to meet future demands beyond the 2013 level. In order to make these plans and incentives work, St. Johns River and the other WMDs are relying heavily upon USGS for water data and the interpretive science and models to use them.

Cooperator Projects and Issues –Climate Change: Michael Zygnerski is a Natural Resource Specialist in Broward’s County’s Natural Resources Planning and Management Division. He described a complex [modeling project](#) that Broward County has undertaken with USGS in order to understand and manage the development of their water supplies to meet increasing population projections without increasing the risk of saltwater intrusion. He focused primarily on their Pompano Project, designed to simulate historical saltwater intrusion, quantify the effects of numerous stressors, and provide a useful tool for future water management. One strategy the County has already adopted is to locate new wells further inland. This seems to be working well, but County officials want a better understanding of the influence that rainfall variations, sea level rise, canal operations, and well field pumping have (alone and in combination). They are incorporating data from USGS monitoring wells operated in collaboration with the County and several other CWP Cooperators. USGS has applied sophisticated calibration techniques that have enabled them to evaluate and adjust numerous model parameters more efficiently. So far, they have determined that increases and decreases in major boundary canals did not have as much effect as changes in the entire canal system. They have also determined that changes in well field withdrawals are likely to have the most significant effect on movement of the salt front, especially changes of 25% more or less.

Cooperator Projects and Issues –Kissimmee River Restoration: Steve Bousquin is the Science Supervisor for the South Florida WMD Kissimmee Division; he provided an overview of the [Kissimmee River Project](#) that SFWMD is undertaking in collaboration with USGS to restore ecological functions in the southern portion of their district. Initially a free flowing stream, the Kissimmee was modified substantially in response to severe storm flooding and public outcry in the 1940s. The flood control canal and other improvements were completed in the early 1970s, about the time that restoration projects were initiated. Their assessment of hydrologic changes has focused principally on changes in water chemistry, habitat and food chain. Restoration is proceeding in four implementation phase and USGS data have been essential in producing a hydrograph that is considered to be representative of natural conditions and can be used to guide future hydrologic operations. Working with USGS has helped the District engage its

division teams in the development of these guidance tools. They are currently adapting an “interpolation tool” that has been effective in the Everglades, hoping to apply it throughout the SFWMD for both surface and groundwater management.

Cooperator Projects and Issues –Ecological Flows: – Adam Munson is the Senior Environmental Scientist for the Southwest Florida WMD Minimum Flows and Levels Program. He described the history of statewide issues which led to the establishment of Florida’s minimum flows and levels law and the process they use in [determining minimum flow levels](#). The SFWMD relies upon USGS as the best available source of historical measurements of hydrology and water quality. An extensive review enabled the District to identify and distinguish climatic influences from the anthropogenic influences evident in the historical record. The SFWMD adopted its methodology based on a policy determination to limit habitat losses to 15%. Using wetted perimeter measurements in combination with a hydrologic model and a biologic model, they estimate the amount of physical habitat available under the various flow and lake level conditions. From these model computations, the District has established seasonally specific flow and lake level protection thresholds for key sites within the Peace River watershed. The consistency and credibility of USGS data has been essential in establishing sufficient public confidence for implementation of these regulatory thresholds.

South Florida Watershed Journal: Robert Sobczak – a hydrologist with the National Park Service – closed this session with a highly entertaining glimpse of the many data presentation formats he has developed for an [online digest](#) of hydrologically and climatic data of special interest to people in south Florida. Be sure to check out <http://sfwj.blogspot.com>!

Break-Out Group Discussion of Opportunities & Priorities: 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 groups worked independently for about 90 minutes, one lead by Elizabeth Thomas (SJRWMD) and the other by Adam Munson (SFWMD) to respond to three questions and prioritize the results. Those questions and the combined [results](#) are available, and **the highest ranking recommendations** were as follows:

What actions should the USGS consider to improve the CWP?

- Implement NAVD ‘88
- Shorten turnaround for data delivery and study reporting;
- Increase regular communication with Cooperators (improve accounting transparency), show how they’re getting their money’s worth; request Cooperator comments on draft FISC Science Communication Strategy; schedule regular meetings in WMD offices for information exchange;
- Improve “marketing/outreach” of monitoring and science capabilities for Cooperators’ managers and governing boards; hold regional meetings annually with all stakeholders, including all who use the data and science; help policy makers be more aware when USGS is (or could be) contributing to decision making abilities; make study results easier for the public to find and to understand/apply; sponsor public meetings to present monitoring and interpretive study results;
- Increase availability of USGS training to Cooperators, formalize programs and promotion of training schedules
- Increase CWP finding to match Cooperators’ investments 50:50
- Fund data collection, not studies

What action should the Cooperators consider to improve the CWP?

- Invite USGS-FISC leadership for periodic meetings, information exchange and introduction to Cooperator leadership; involve USGS more directly and in planning and designing projects, studies, etc;
- Help leaders within Cooperator organizations to recognize and appreciate the value of USGS contributions to their projects, studies, operational decisions, etc; acknowledge USGS as source of data and science when presenting issues/decisions to the public, policy makers, etc;
- Become more active for support of funding; energize statewide organizations, develop grassroots effort
- Encourage blog writers to highlight recent USGS studies and projects

How can we coordinate monitoring efforts to increase the value of all the data for use in interpretive studies and program decisions?

- Support existing efforts, e.g., FL Water Resource Monitoring Council, where stakeholders could agree on minimum standards, metadata –before integration; meet periodically to review/refine and promote plans, progress & needs (e.g., the Oceans Council “GAMES,” ACF bi-weekly teleconference);
- Invite Cooperators to USGS coordination meetings to share and review data collection plans
- Establish data portal where all data can be accessed (e.g. “FREAC”); establish a data warehouse (e.g., Storet, Sofia, DBHydro);need to get funding to support reasonable level of quality and consistency; identify and promote a single agency (state or federal?) to gather and distribute data and study results; super site – multi-parameter, prioritization
- Require data “contribution” from local projects in exchange for funding;
- Establish an electronic bulletin board for new monitoring projects, studies, etc;

Before the meeting adjourned, Barry Rosen responded to some of the break-out meeting results; Barry, 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 the Florida Integrated Science Center or from the Interstate Council on Water Policy.

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