ACWI Workgroup on USGS Monitoring Challenges In a Shrinking Budget Environment Teleconference
25 March 2013

Attendees:

Peter Evans, ICWP
Jerad Bales, USGS
Eric Evenson, USGS
Donna Myers, USGS
Jim Kolva, USGS
Bill Cunningham, USGS
Robert Mason, USGS
Bill Wilber, USGS
John Hoffmann, USGS
Kevin Dennehy, USGS
Mike Yurewicz, USGS
Pixie Hamilton, USGS
Wendy Norton, USGS
Ben Pratt, SRBC
Bill Lukas, DOI
Bob Schreiber, ASCE
Brandon Kernen, ASDWA
Chris Reimer, NGWA
Darrell Osterhoudt, ASDWA
Dave Carlton, ASFPM
John Wells, ACWI-SWRR
Judy Campbell Bird, ACWI-NLT
Mary Musick, GWPC
Robert Goldstein, EPRI
Sue Lowry, ICWP
Tony Willardson, WSWC

Jerad Bales gave an introduction, focusing on the way the USGS data networks fit into overall research activities.

Robert Mason reviewed streamgaging processes, summarizing the material he presented to the group on December 10, 2012. His slides are available here: http://acwi.gov/monitoring-challenges_wkg/minutes/ACWI_sw_methods_dev-final.pdf. He noted that much of our "field work" is actually done in the office, rather than in the field; this work involves quality assurance / quality control, and updating rating curves that correlate water stage to flow. He reviewed the use of ADCP technology for calculating index velocity. He also reviewed experiments that have been done to determine the feasibility of using non-contact measurement methods such as radar, and discussed evaluations that have been done of various other remote sensing technologies, as well as the use of computational modeling to assist in inferring flow velocity and depth from remotely sensed data.

Bill Cunningham reviewed research and methods development for groundwater monitoring. His slides are available here: http://acwi.gov/monitoring-challenges_wkg/minutes/Cunningham_GW_Methods.032513.pdf. The focus is on water levels, hydrogeophysics, and modeling. He reviewed material from his earlier presentation on non-contact water-level measurement (sonic and radar). Through our many partnerships, we continue to look for ways to increase cost-effectiveness of our data collection (value engineer studies, field computer applications, etc.). We also are able to image the water table using various geophysical techniques, though these methods can be imprecise. Within the field of hydrogeophysics, our work focuses on various temperature methods for determining groundwater/surface-water exchange, and developing the software necessary to process these data and calculations. Groundwater modeling resources include MODFLOW and its various modules, GSFLOW, and a variety of other packages (see the USGS fact sheet on these resources, available at http://pubs.usgs.gov/fs/2009/3105).

Donna Myers reviewed new technologies and methods to support monitoring and assessment of water quality. The slides for this presentation are available here: http://acwi.gov/monitoring-challenges_wkg/minutes/myers_ACWI_march25-2013.pdf. USGS techniques and methods have been in the forefront of the science and have changed critical aspects of the fields of water-quality monitoring and laboratory-analysis. The National Water Quality Laboratory (NWQL) at the Denver Federal Center does about 85% of all UGSS water-quality and chemical analyses. The NWQL has made significant strides

in cost-reduction for some constituents, due to the development of new and more accurate analysis methods, and due to time-savings realized through the use of new techniques. Development of new methods has also helped to reduce the toxic materials (such as mercury) that previously needed to be used for some special water-quality analysis. In addition, USGS has developed the capacity to respond rapidly during extreme hydrologic events such as floods, to determine the impact of these events on water-quality conditions. Work is underway to develop a protocol for installing and maintaining optical sensors that will provide real-time nitrate measurements; this will help USGS, CUAHSI, and many other organizations that collect real-time water-quality data. New statistical techniques and models allow us to extend our knowledge to unsampled locations and times (next generation SPARROW). The water quality portal and web services will help us make better use of our data by making it easier to use the data many times, for many different purposes. Information on the new UGS-approved BioData database is available here: https://aquatic.biodata.usgs.gov/aboutUs.action. Emerging challenges include climate-related issues such as wildfire and drought, and energy-related issues related to oil and gas development.

Jerad Bales presented an overview of USGS water research (a process of steps used to collect and analyze information to increase our understanding of an issue). The slides for this presentation are available here: http://acwi.gov/monitoring-challenges_wkg/minutes/Bales_research_in_the_water_ma_of_usgs.pdf. Even during the 1950s, the Federal government understood the value of science, and during this time, USGS began to develop its National Research Program in the hydrologic sciences. The Federal government's emphasis on basic (or fundamental) research has decreased over the decades, but USGS tries to ensure that all our research (basic and applied) is mission driven. Some of our research is funded directly by Congress, and some is funded indirectly through the other budget line items. Most of our water researchers are located in the Water Science Centers, rather than in our Headquarters research unit. USGS water research has been or is being conducted for various purposes:

- To enhance the value of streamgaging;
- To better understand floods;
- To better understand droughts by analyzing 7 decades of data, including annual trends;
- To better understand water availability over the centuries, using tree rings to reconstruct 800 years of historic record;
- To better forecast future water availability, using global circulation models and watershed-scale models; and
- To understand hydrologic processes, using environmental tracers that help us infer groundwater age.

Questions, Answers, Discussion:

Question – I'm always impressed by the breadth and depth of USGS research, but I feel like I miss most of it because I don't have time to browse the website and look at reports. How can this work be made more visible to people who have interest in it?

Answer – We wish you would answer that ***for*** us because we struggle with that all the time. We used to participate in technical meetings where we shared the information, but those opportunities are limited now. The Cooperative Water Program and some of our other programs are starting to host webinars in which they present research results. But I would welcome input from this committee on ways in which we can improve our sharing our research.

Question – Do you have a report where you annually publish a summary of the totality of USGS research?

Answer – Not anymore.

Question – Maybe we need to do a better job of circulating information on webinars?

Comment – Something we do here in Texas is to work with our local USGS office each quarter to share information about the projects the State is doing and the projects the USGS is doing.

Q – You were talking about how a number of modeling nerds are identified through the WSCs, but it sounded like the work is coordinated through Reston. How do you prioritize the investment of dollars and expertise in deciding which research or models to fund?

A – Reston is the gatekeeper, with respect to MODFLOW and other groundwater modeling. But because work is done in the NRP and in the WSCs, and in collaboration with academia and industry, we have found that we need a single gatekeeper to track what's being done.

Q – Is this true also for surface water and water quality?

A – In surface water, modeling is more dependent on other agencies, and certainly the NRP has a very strong watershed and hydrodynamic modeling process. Maintenance costs are a big part of the decision in what to fund and what not to fund; but we also need to consider our own agency mission thrust (water census, right now) and the needs of our stakeholders in the States and at other Federal agencies.

Q – You talked about improvements that have been made and cost efficiencies that you have already achieved. As a stakeholder who has observed O&M costs rising over the last several years, I'm wondering where these efficiencies show up?

A – We have seen a slowdown in the rate of O&M increase over the past few years. We also have changed our reporting from infrequent to hourly. The kind of problem we've been dealing with for several years is that are dependent on the rating development. The new technologies we're looking at are an effort to substitute inference for continuous measurements that are now needed to determine the rating.

Q – Is there some type of metric you're working against in evaluating new technologies? I assume the purpose of the new technologies is to do a little more with less, or to do the same work with less money; so is there a metric you're using to determine whether a new technology will actually reduce costs? Or are you using metrics that deal with accuracy of data, rather than cost?

A – When we moved to a fully real-time streamflow system about 10 years ago, we didn't do it to reduce costs. In fact, in some respects it increased our costs because now we have be responsive on an hourly basis instead of on an every-6-weeks basis. One objective of looking at new technology is to meet customer needs for more up-to-date information. Another objective is safety; streamgaging is dangerous, and we wanted to get our technicians out of the water. Cost efficiency is certainly an important objective, but it's not our only driver. Also, the methods we have now allow us to make better measurements at the extremes (high and low flow) than we were previously able to do. Especially in the

area of water quality, there are also continuous improvements in analysis methods, and we have to keep up with those incremental improvements, or we risk falling behind the state-of-the-science. These improvements don't come every day, but we have to keep our eyes open or we risk missing something that could be a significant improvement (such as a test that used to take 20 hours but which new techniques can reduce to 2 hours).

In the last 20 or 25 years, water organizations have shrunk by about 50 percent, including USGS. But we have not reduced the number of streamgages we operate. So we are obviously seeing some efficiencies.

Peter Evans noted that we need to look at the four tools we're developing:

- Options for identifying stakeholder priorities – can we develop a useful assessment?
- Innovative techniques – how can we develop recommendations?
- Innovative/alternative funding options – how can we develop recommendations?
- "List of ideas" – how should we add to the list? Screen the most beneficial ideas? Characterize and consider the best ideas? Present advice and recommendations? Develop an "independent report"?
- Summarize next steps and update our meeting plan/schedule.

Sue Lowry went over the document provided before the call: "How can we assess stakeholder priorities for USGS water data and science program investments in a "shrinking" Federal budget? This document (http://acwi.gov/monitoring-challenges_wkg/minutes/AssessmentToolProposal.pdf) would be a good starting point for assessing stakeholder community priorities for the investment of 2015 USGS funds in water data and science.

In the context of making recommendations, do we want to use the strategic directions document as a starting point, to sketch out our priorities for the types of recommendations we want to make? Does anyone have a better idea, or a way to improve this idea?

People generally agreed that this is a good plan because the strategic directions document is broad and will allow us some flexibility. Peter Evans noted that when Eric Evenson briefed us on the strategic directions document, he said that the document was developed with the idea that there are no funding restraints; the next step in the strategic planning process is to set priorities, to aid in making the choices that are required in the "real" world where dollars are scarce.

Some people have expressed concern in the last few days about the little time we have left to finish our task, and the fact that we will need external help (outside ACWI) to gather data on stakeholder needs and priorities.

Please remember that our single biggest stakeholder is the Congress. I don't want this group to lose sight of the fact that we rely on a multitude of partners but we also have a Federal mission.

We did include other Federal agencies in our list of stakeholders, but we didn't include Congress. That's helpful, and obviously we can't poll the Congress, but we need to keep their priorities in mind.

As somebody mentioned earlier, there's no way that we can have an engaging connection with all the crucial stakeholder groups during the next 2 months. We had hoped to get participation from people on this workgroup to help in formulating the questions we want to ask and getting answers back from each

group that's interested in giving us feedback. This isn't a scientific approach and may not be statistically sound, but it's the best we can do with the time we have.

We can use the national associations, to help with this process (ASCE, AWWA, etc.).

When NRC reviewed NAWQA recently, they went through a discussion-based process whereby they looked at the objectives and goals for the various activities, and they gave us a qualitative assessment rather than a straight numerically based survey.

Each constituency we reach out to will naturally place high priority on whatever work relates to its own vested interests. How can we weigh those various interests against each other?

Bob Schreiber presented his idea for assembling an "innovative techniques discussion group." This might include participation by some students, some people from the groundwater and surface-water sectors of USGS, and others, to help identify those innovative techniques (those presented today, and others) that show the most promise. We could even pull in some private sector interests (especially vendors and developers of hydrologic instruments).

We need to recognize that we may actually need to talk about "doing less with less" rather than "doing more with less." It may be that most efficient use of our resources (especially if we are looking at a 10% or 20% cut), will necessitate that we cut our work. We can't let people think that we can continue to be more with less forever. There has to be a breaking point, when funding reductions will unavoidably result in a reduction in the amount of work we can produce.

There are two topics being discussed, and they're being confused. One is the importance of each research area, and the other one is prioritizing which area we could cut if our funding were reduced. These two areas are not necessarily the same, and we need to ensure that we make that distinction.

One thing we haven't talked about is "what additional steps can be taken to ***reduce*** costs?"

Maybe we want to ask people what their priorities would be under several different budget cut scenarios (5%, 10%, etc.). We could also ask what we would be losing by cutting those particular items, because we need to know what the ***result*** of these cuts would be. I'm afraid that a general survey of stakeholders isn't going to help us identify the ***impact on the stakeholders*** if we were to reduce or eliminate certain activities.

Would this process be undertaken at the WSC level, in collaboration with their stakeholders?

Yes. And then the work would be reviewed at the national level to make sure it fits in with national priorities. What's important to stakeholders is very different, from one region of the country to another, so a regional aggregation of the information and priorities provided by stakeholders would be useful too.

Most of all, we need several different avenues for collecting information, so we don't have all our eggs in one basket.

We won't have time today to talk about funding options, as Anne Castle requested in her letter, so we'll devote some time to that issue on the next call.

In the meantime, it would be worthwhile to have all the members of this workgroup answer the questions we want to ask the stakeholders. That may give us an idea of whether we're asking the right questions, and it may help us see which direction the whole effort is going to go. If anyone on the workgroup can represent more than one sector, or more than one geographic area, that would be ideal.

We should adjourn for today, since we've been talking for 2 full hours already. Our next call is scheduled for April 8.