

## ACWI Workgroup on USGS Monitoring Challenges in a Shrinking Budget Environment

### Teleconference

26 Aug 2013

#### Attendees:

Peter Evans, ICWP	Dave Carlton, ASFPM	Tony Willardson, WSWC
Wendy Norton, USGS	Ben Pratt, SRBC	Bob Schreiber, ASCE
Judy Campbell Bird, ACWI-NLC	Doug McLaughlin, NCASI	Brandon Kernen, ASDWA
Mike Norris, USGS	Mike Yurewicz, USGS	Steve Heiskary, NALMS
Marie Garsjo, ACWI-SOS	Mary Musick, GWPC	John Wells, ACWI-SWRR
Chris Reimer, NGWA	Pixie Hamilton, USGS	Fred Bloetscher, AWWA
Dwane Young, EPA	Darrell Osterhoudt, ASDWA	

#### Action Items:

- Action items are embedded in the mark-up of the draft report, which is appended to these minutes.

#### Introductions and Agenda Review

- Peter Evans met with Jerad Bales on August 15 and with Anne Castle and Lori Caramanian on August 21. Notes from these meetings (including questions and suggestions from Anne and Lori) are embedded in the draft appended to these minutes (this draft was shared with the workgroup on August 23). They were very pleased with the active participation of everyone and are pleased with the direction our report is going.
- Jerad Bales will be convening a webinar in December regarding the issue of streamgage funding; we're not sure how this connects with the efforts of this workgroup. Wendy and Peter will investigate. There is also a gap analysis underway at USGS that the workgroup discussed briefly, but it's still underway and not much information is available at this point.

#### Review of Draft Outline for Workgroup Report & Ideas Provided from the Workgroup

- Discussion items and proposed revisions are embedded in the draft report that appears on the following pages.
- We need to revise words about "managing the Nation's groundwater resources." Words like this appear in several places throughout the document. Maybe we need to distinguish between federal water management and national water management. Some people may read "the nation's water resources" as "federally managed water resources." Let's be specific about what we mean. If this wording will upset people even though USGS doesn't manage anything, then we need to change it. **Peter Evans and Pixie Hamilton** will re-review the document with this in mind. We can say "water management across the country" instead of "national water management."

- Doug McLaughlin will send Peter some written input later today, since he had to leave the call early. Others also have volunteered to rewrite sections of the report, as noted in the appended marked-up copy.
- Peter Evans will try to send the workgroup a revised draft by September 6.

#### **Plans for Next Meetings**

- Next meetings schedule (Sept 9 & 23).

#### **Adjourn**

Next meeting September 9 at 1:00 p.m. Eastern Time

DRAFT



## RECOMMENDATIONS OF THE AD HOC WORKGROUP TO ASSURE STRONG WATER DATA AND SCIENCE IN A CONSTRAINED/SHRINKING BUDGET

AUGUST 214, 2013 DRAFT

Comment [PHE1]: Updated with comments from Aug21 meeting with Interior & USGS

The U.S. Geological Survey (USGS) has dealt with budget limitations for some time. In an age where more science is needed for better decision-making, the challenge has been to find funds to develop and apply our water science to serve a wide variety of purposes more efficiently. Long-term water quantity and quality data collection, especially in critical watersheds, aquifers, and water-short areas, is crucial for the economic strength of the Nation.

Management and protection of water resources in the United States require coordination on many levels. The USGS capability to develop data and analyses enables the Nation to make challenging decisions for the allocation, protection, and treatment of water and to maximize economic opportunities, environmental quality and public safety in a changing world. Water is a multi-jurisdictional issue critical to the long-term sustainability of ecosystems, communities, and economies. As such, it is a federal responsibility, in conjunction with many partners, for the USGS to lead the Nation in collecting long-term data, synthesizing the data, and providing projections of future conditions and needs.

Budget decisions should support the USGS water resources mission to provide the reliable, impartial, and timely information needed to understand and manage the Nation's water resources, and to actively promote the use of this information by decision-makers to:

- Minimize the loss of life and property as a result of water-related natural hazards such as floods, droughts, and land movement;
- Effectively manage groundwater and surface-water resources for domestic, agricultural, commercial, industrial, recreational, and ecological uses;
- Protect and enhance water resources for human health, aquatic health, and environmental quality; and
- Contribute to wise physical and economic development of the Nation's resources for the benefit of present and future generations.

**The Task at Hand.** In July 2012, the Advisory Committee on Water Information (ACWI) formed an *ad hoc* Workgroup to assure strong water data and science in an environment of constrained or shrinking budgets; ACWI asked the Workgroup to provide advice and recommendations to the Department of the Interior (DOI) and the USGS on approaches and options that might help sustain and enhance water monitoring and related science in the face of Federal funding constraints in the coming years. Ideally, these options should have minimum

adverse impacts on the USGS mission and on the many other public and private programs, projects, policies, and plans that depend upon USGS leadership and participation.

(PLACEHOLDER: we are in the process of drafting a short synopsis of the AS/WS Nov6 letter, the scope and timeframe, and a synopsis of our meeting presentations, discussions, participation.)

**Federal Funding is Warranted by Federal Responsibilities and National Benefits.** ~~Congress has made clear that federal responsibilities and national benefits require the enhancement or development of a national streamflow information program and a systematic groundwater monitoring program for each major aquifer system in the United States<sup>†</sup>.~~ The Workgroup is cognizant of the specific federal responsibilities and national benefits that warrant federal funding.

*Federal responsibility* is based on many factors, including negotiation and compliance with international water treaties, interstate water compacts and tribal water agreements, the implementation, evaluation and improvement of federally funded programs (for example, establishing and enforcing regulatory standards under the Clean Water Act and Safe Drinking Water Act; consultations and recovery plans under the Endangered Species Act; federal land management plans; design and operation of reservoirs, flood levees and other infrastructure; WaterSMART planning grants and Title XVI projects; development and monitoring of effective federal policies concerning agriculture and energy development; and plans for restoring and managing major ecosystems, including the Everglades, Chesapeake Bay, Long Island Sound, Great Lakes, Sacramento-San Joaquin Bay-Delta, Puget Sound, Colorado River, Mississippi River, and Gulf of Mexico).

*National benefits* result from USGS leadership as a federal science agency in initiatives that transcend specific regional or local levels. These include, for example, monitoring, modeling, and assessment required to forecast flooding; providing safe and sustainable water supply; protecting and restoring ecosystems; understanding the sustainability of intergovernmental water allocation agreements; investing in the Nation’s water infrastructure; enhancing the value of data collected by others; supporting energy development; and generally helping officials, leaders, and the public understand and utilize the science associated with climate, flooding, droughts, sea level rise, water pollution, endangered species, and ecosystems. ~~The efforts by many other federal and non-federal agencies, universities and businesses to collect water data and to provide analytical, interpretive and forecasting tools are greatly enhanced by the reliable, high quality foundation maintained by USGS.~~ National benefits are also derived from open public deliberation and from the opportunities for education and innovation created by USGS scientists working directly with water managers to meet local, state, regional, and national needs.

Finally, America’s water resources support hundreds of billions of dollars in agricultural production and commerce, provide safe drinking water for millions of Americans, supply essential habitat for fish and wildlife, affect public safety, and provide a variety of other

**Comment [W2]:** Instead of deleting this, perhaps we can broaden it to include water quality and the full suite of programs we’re interested in. Cite the Secure Water Act as ONE RECENT EXAMPLE, to clarify that the citation isn’t meant to be inclusive. Is the Organic Act specific enough to include here? Probably not, but we could add a water quality reference.

**Comment [W3]:** Put this long list of legislation in a sidebar box instead of in the body of the document? There is also a long list of examples in item #7 on page 9. We could also add the Water Resources Research Act to this list.

**Comment [W4]:** Improved? Value-added? “Enhanced” is a loaded word for organizations that define it as “more than what is needed.” Maybe consider rewording this.

**Comment [W5]:** The group liked this sentence, but we may want to move this whole paragraph up to the beginning of the document.

**Comment [W6]:** Turn the sentence around to make it active. “The USGS provides ...” Get to the reason these other entities need to know about water. **John Wells and Tony Willardson volunteered** to redraft this sentence and the one at the very beginning of the document.

<sup>†</sup> Public Law 111-11, Sections 9507(a) and (b).

important benefits, including recreation, irrigation, power generation, and manufacturing<sup>2</sup>. Each of these benefits has national economic implications, and USGS leadership in water science is essential in the national effort to maximize sustainable economic development.

## GUIDING PRINCIPLES

To fulfill its mission, the Workgroup identified the following set of six principles to guide decisions affecting the USGS water program budget. The goal is to ensure that such decisions safeguard the ability of the USGS to provide the reliable, impartial, and timely information needed by other federal agencies, non-federal agencies, businesses, universities, and the general public to understand and manage the Nation's water resources. The Workgroup believes that these six principles, when applied as a package, will help USGS and DOI leaders make budget decisions that will not impair this overarching goal:

- Water Data and Science Should Inform Decisions,
- Water Science Should Address the Whole Water Cycle,
- Water Science Requires Continuity of Water Data,
- Reducing Uncertainty and Risk Should be Weighed Against Costs and Benefits,
- Research Should Strengthen Water Science, and
- Collaboration Should Leverage Ideas and Resources.

**WATER DATA AND SCIENCE SHOULD INFORM DECISIONS:** Water data is the foundation of water science, and water science<sup>3</sup> is the basis for sustainable water management<sup>4</sup>. The USGS must continue to provide the timely, high quality, and unbiased water data and science necessary for informed decision making.

America needs the USGS to lead its water science efforts. The USGS must continue providing essential "backbone" elements of the Nation's water data collection and delivery system and serve as an objective science expert for other federal agencies and for interstate, state, tribal, and local agencies with responsibility for public health and for managing water and related resources throughout the United States.

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<sup>2</sup> The evidence of these benefits to the Nation is described in many places, and most recently in the [Principles and Requirements for Federal Investments in Water Resources](#) adopted by the President's Council on Environmental Quality in March 2013. [Reference Appendix X?](#)

<sup>3</sup> The term "water science" is used in this report to refer to analysis, interpretation, research, and application of water monitoring needed to support water management; this support is provided in the form of maps, models and other decision support products. The term "water data" is used in this report to refer to water data collection, management, and delivery.

<sup>4</sup> The term "water management" is used in this report to include the full spectrum of protection and utilization activities to support all existing and future needs.

**WATER SCIENCE SHOULD ADDRESS THE WHOLE WATER CYCLE:** The elements of the water cycle are inextricably linked. The Nation must understand the entirety of the water cycle, including both quantity and quality, if it is to manage, use, and protect its water resources intelligently. The USGS must continue serving a leadership role in developing and supporting the necessary science.

The Nation's water data network must be able to clearly characterize each element of the water cycle if the Nation is to understand the hydrologic system and manage water sustainably. Research has repeatedly shown that these components must be considered together for effective water resources management. The Nation depends on the USGS to anchor the collection and assessment of water cycle information and support the development of interpretive and forecasting tools that depend on good measurements.

**WATER SCIENCE REQUIRES CONTINUITY OF WATER DATA:** Understanding the Nation's water resources and the threats to them requires a sustained commitment to research, data collection, and assessment across short and long spatial and temporal scales. The USGS provides a national perspective and expertise, without regulatory or resource management responsibilities, and applies the consistent methods necessary to meet these demands and to lead America's water science community.

Understanding relationships, trends, and variations over the long term is a prerequisite for predicting effects on water resources and providing the information that is crucial to land and water managers. Long-term monitoring is needed to distinguish short-term variation from long-term drivers, such as land use and climate variability. Existing long-term records provide important information on trends of water quality and water availability that are used for future projections. Continuing the development of these irreplaceable records will provide valuable information about the impacts of current and future water withdrawals and use, climate impacts, and land use changes.

The USGS application of consistent monitoring methods across hydrogeologic and ecological regions at various appropriate scales provides important and comparable information on quality trends, impaired waters, water use, ecosystem impacts and management alternatives.

**CONSIDER RISK BEFORE CUTTING ANYTHING THAT INCREASES UNCERTAINTY:** Understanding water resources requires an understanding of the uncertainty that is inherent in measurement, analysis, and assessment. The USGS should invest resources to reduce uncertainty where risks are high and the cost of reducing that uncertainty is reasonable. The goal is to balance the desired level of confidence in understanding water resource management and protection options with the cost to attain it. For example, with the added uncertainty created by cutting back on the frequency of monitoring flow in a stream, comes added risk from estimating flood or low flows incorrectly. The challenge is to avoid monitoring cuts where the increased uncertainty in understanding stream flow is likely to have large consequences in designing measures to reduce flooding, provide water supply, or protect water quality. In turn, extra spending to keep uncertainty low where the risk to investments in people and ecosystems would also be low makes little sense in a shrinking budget.

**RESEARCH SHOULD STRENGTHEN WATER SCIENCE:** Research defines, develops, and refreshes the Nation’s understanding of water resources and the programs designed to manage these resources. Research conducted by the USGS provides an essential feedback mechanism to help optimize data collection and science.

Research that supports the national scientific mission, including applied research that directly supports the operational parts of USGS water science, has the greatest long term benefit. In the short term, the greatest emphasis should be placed on research with the strongest relation to the most immediate water management challenges, provided the interruption of promising in-progress basic research can be minimized.

**COLLABORATION SHOULD LEVERAGE IDEAS AND RESOURCES:** Collaboration builds partnerships and enhances opportunities for collecting data and understanding water science, draws attention and resources to immediate management challenges, builds support for water management activities, and leverages private, local, state and federal dollars, ideas, experience, and capabilities.

Collaboration is needed to support integrated science in concert with partners in other disciplines, mission areas, and agencies. Collaboration is a natural outcome of the goal of being responsive to a wide range of decision-makers. Important science activities in which integration occurs are ecology, energy, public health, and natural hazards.

## **RECOMMENDATIONS**

The USGS reputation for delivering solid, unbiased information and science is its greatest asset. This reputation for reliability is grounded in decades of high quality performance. In considering ways to address the challenges of monitoring in a shrinking budget environment, every caution should be taken to avoid actions that put this reputation, or the record of performance that underlies it, at risk. Within these constraints, the Workgroup has identified recommendations that may be useful, if the current shrinking budget concerns make this necessary, while preserving the USGS capability to carry out its vital mission. These recommendations, like the guiding principles identified above, are not necessarily listed in order of priority.

- 1) **Sustain the national monitoring network** for surface water, groundwater and water quality and extend coverage to address any significant gaps in the network which interfere with the fulfillment of federal responsibilities or the maintenance of national benefits. This includes capturing efficiencies already planned in national monitoring network operations, which can be achieved in line with the guiding principles identified above.

To the extent that USGS operation of high priority monitoring sites becomes threatened as the result of funding decisions by other federal agencies, USGS should sustain those operations through collaboration with other reliable partnerships or at its expense. USGS should continue identifying those high priority monitoring sites in collaboration with other agencies and stakeholders.

- 2) **Sustain funding to continue cost-shared investigations, studies and research**, to the extent that identified, national or regional needs will be served. **Defer less critical grants, interpretive investigations, analytical studies and research** (new projects first, but ongoing efforts if necessary; including any monitoring that is needed primarily for these projects), to the extent necessary to sustain the USGS monitoring network and in a manner that will minimize both immediate and long-term adverse consequences for water resource management decisions. The USGS Senior Staff are best positioned to evaluate which grants, studies, analyses and research can be deferred with the least adverse impact to water management decisions.
- 3) **Continue providing incentives for projects and programs that build partnerships and leverage additional resources for water data and science.** A flexible approach should be designed to support these partnerships and where possible, increase the funding support from partners that directly benefit from USGS activities. **[might want NGWMN as example in side bar]**
- 4) **The USGS should lead a national initiative to characterize and promote better understanding of the uncertainty inherent in all water monitoring and science applications, with the goal of providing a scientific framework for improving the national (and other) investments in our monitoring networks and their strategic design. Evaluate and, if necessary, refine standards for USGS calibration and data management practices; this can be done by understanding the level of accuracy needed for different data uses and the level of uncertainty that is tolerable with each of those uses. Evaluate the use of data and the level of accuracy needed as the basis to evaluate and refine the USGS standards for calibration and data management practices. [side bar example: it may be possible to reduce the effort invested in updating the rating curves for certain streamgages, but the consequential effect on the estimation of flow at unaged sites or the validation of remote sensing data should be clearly understood first]**
- 5) Anticipate and support an increased role for other agencies, universities, **businesses, utilities,** monitoring councils, *etc.*, who **which/that** may have the opportunity and capability to collect, manage and contribute useful water data. USGS should evaluate the situations in which other agencies have taken responsibility for significant elements of the USGS monitoring network and summarize the successful and unsuccessful aspects of the recent experience; if possible, the analysis should identify the circumstances that increase the likelihood of successful collaboration. USGS provides **standards and training for data collection and management**, and the water data available nationwide will be greatly enhanced if those standards are more frequently discussed and compared with the practices of other experts.
- 6) **Redesign the NSIP** for the “budget constrained world” and to anchor other monitoring efforts (including LANDSAT) by USGS, other federal agencies and others, while meeting **the same 5 national needs for water science and take better advantage of remote sensing and other new technologies. [Peter, Marie, Bob & Sue are working on an expansion/clarification] [One suggested rewrite offered during the meeting, which facilitates combining this recommendation with #10: Ensure that funding for NSIP (and NGWMN and water-quality monitoring?) stabilizes monitoring and continues to anchor other monitoring efforts in a budget constrained world.]**

**Comment [PHE7]:** Connect to USGS Strategic Directions document?

**Comment [PHE8]:** Separate recommendation? Or clarify?

**Comment [W9]:** Some people seem confused by this sentence – Peter clarified: “we want USGS to evaluate the use of data in light of the level of accuracy needed for different applications; that application would be the basis for refining USGS practices for calibration and data management.” Other people think the sentence makes sense and should lead off this paragraph.

**Comment [PHE10]:** Does the private sector have a significant role here?

**Comment [PHE11]:** LANDSAT seems a long way off, but prioritizing the tiers of streamgages in the NSIP could be useful; OMB analysts are interested in national science priorities and those supported through CWP

**Comment [W12]:** OMB seems to want a prioritization of the streamgages, but we’re not sure whose needs the priorities should address – national needs? Does this preclude inclusion of Coop gages?

Maybe if a gage meets 3 of the 5 national needs identified by NSIP, it belongs in the top tier (1000+ gages meet more than 1 of these national needs)? Do we have ANY gages that are **fully** funded by NSIP? Prioritizing gages may be problematic because it causes additional complexity managing the network on the ground and can result in a loss of flexibility in forging funding partnerships.

Do we want to write a recommendation that USGS should identify the highest priority gages and fund them entirely through NSIP, so that they’re not vulnerable to partners’ budget cuts? Most of the gages (about 2000 out of 3000) that meet the NSIP design are not funded by NSIP, but rather by partners, so we need to be careful with any recommendations we write in this vein.

Do not confuse NSIP with the national streamgaging network --- they are not

**Comment [W13]:** Is this recommendation consistent with the rest of our recommendations? There is a proposal to drop it entirely and work instead on #10. Peter Evans will work with USGS network experts to decide what to do with this recommendation.

7) Encourage the USGS Water Science Centers (“WSCs”) to collaborate on monitoring site maintenance responsibilities (among the WSCs and with other agencies) to reduce travel and maintenance expenses.

8) The WSCs should convene regular meetings with the state agencies responsible for water monitoring and prepare reports to the Associate Director for Water regarding the distribution of monitoring responsibilities, what the shared priorities are, and where there are significant **opportunities to increase efficiency and reliability** in case of further budget cuts. [Bob is working on a rewrite]

9) Use the 2004 Government Accountability Office report (Better Coordination of Data Collection Efforts Needed to Support Key Decisions, GAO-04-382) as the basis for **designating USGS as the lead federal agency** to coordinate data collection, processing and delivery and to promote consistency among data collection and management protocols nationwide. **The water data portal** concept developed for groundwater and water quality data would fit nicely into this role and should be extended to surface water measurements, although it requires new or reallocated funding. [are there more recent citations we can use instead of GAO-04-382? The OMB memo establishing ACWI sort of designates USGS by default, but that memo is even older (1992). Can we use CIDA examples?] [addressing comment PHE14: IWRSS doesn't include USGS. We don't mention NOAA and the Corps here either and we probably should.]

10) Maintain a clear **design strategy for each of the three monitoring networks**, along with a statement explaining how they support each other. Include network maps and implementation progress assessment in an annual update. Without a clear, strategic design, it appears that USGS operates disparate networks based on various plans and authorities, and it is more difficult to assure that USGS is making the most strategic investment of the available resources. [possible sidebar example: the Groundwater Resources Program and NAWQA could develop recommendations for monitoring groundwater quality, building off of the concepts in the updated national groundwater monitoring framework document on monitoring parameters and frequency]

[possible sidebar example: USGS staff should assess the benefits (including cost efficiencies, potential for encouraging collaboration, appropriate circumstances for use of each) of the **USGS-EPA model** and the **NGWMN portal model** and recommend further opportunities to extend these benefits]

[possible sidebar example: in a constrained budget environment, there could be a trade-off between the size of the monitoring networks and the **level-of-effort going into quality assurance**. In the near-term, we are persuaded that the actual measurements that USGS collects are so sparse (relative to the national and regional context) that quality should not be compromised. However, if the monitoring network design strategies and implementation are clear and strong, the consequences reducing the calibration frequency by 20-30% at some of the monitoring sites should be assessed in terms of the uncertainties of the resulting measurements, estimates and models, and the implication for various types of decisions]

**Comment [W14]:** We may not want to say “lead federal agency.” “Primary coordinating agency” perhaps? Let’s remove the idea of designating USGS as the leader and focus instead on the interdependence among the agencies. We could just recommend that USGS take a lead role in this, rather than recommending that USGS be officially designated as the lead agency. Perhaps this recommendation is really directed at SWAQ or CEQ, rather than at USGS?

**Comment [PHE15]:** We suggest the USGS is already serving this leadership role; is there effective value in this designation? Who would make it? Should the recommendation point to IWRSS and inclusion of EPA, USDA & FEMA as next steps?

**Comment [W16]:** Should this be higher on the list – perhaps even #1 -- since setting a design strategy is the first thing necessary.

**Comment [PHE17]:** Good start on the streamgage network, where would we start for WQ and GW?

**Comment [PHE18]:** Is this possible? Interior would like this!

11) Establish a **Research, Development and Innovation Subcommittee (RDIS)** of the ACWI to identify and propose initiatives that produce innovations that can be used to reduce costs and maintain adequate data quality for stream gage and groundwater level monitoring through: 1) use of new technologies; 2) enhancement in monitoring processes; 3) increasing efficiencies in approaches to work; and 4) improvements in personnel management. The assessment of the opportunity for innovation may have historically been hindered by the lack of applicable innovations that could be beneficial to short-term budget priorities. RDIS will complete its work under the context that identifying short-term innovation opportunities to address the anticipated reductions in water monitoring networks is ideal but may not be achievable. Nevertheless, its work must initiate now and continue to be ongoing to support the monitoring networks maintained federal agencies as fiscal uncertainty will continue to persist into the future. RDIS should evaluate innovation opportunities in the context of economic, technical benefits and cost. Recommendations made by RDIS relative to monitoring innovations shall either improve existing methods of managing water monitoring networks by reducing costs or by producing higher quality data for the same cost. (more detailed description in Appendix \_\_\_)

**Comment [PHE19]:** Interior really like this, but wants recognition that in costs money; if monitoring networks and “working science” are top priority, where des collaborative strategy for research investments fit into the ranking?

12) **Find sustainable sources of funding** from alternate sources, such as long-term impact fees, to support surface- and groundwater monitoring and assessment by the USGS and its partners. States should be given the opportunity to share in those revenue streams generated through state-administered federal permits.

Understanding water resources to the extent and at the level required to support smart decisions in communities across the nation requires sustained and expanded long-term sources of funding. While competition for resources is a natural part of the political process and, in general, healthy, it places water data and science at a special disadvantage. This occurs because: a) understanding water takes a long-term effort at data collection and assessment; b) people assume we know enough to act responsibly, even when we do not; c) decision makers tend to work off of base levels of funding, but these support only a small fraction of the monitoring and assessment activities needed to undergird priority investments by the nation; and d) regular sources of funding fall way short of meeting the nation's needs, in general, but especially in today's shrinking budget environment.

The challenge is, therefore, to secure alternate, supplemental sources of funding to ensure that water data and science actually are available to inform decisions, keep the risk of misunderstanding trends at acceptable levels, and meet the needs of partners in a shrinking budget environment.

[There is variation among the WSCs in how they decide to allocate their matching funds within the Cooperative Water Program. Do we want a graphic that shows the overlap between the national needs and the federal interests?]

## **THE ACWI WORKGROUP**

The participants (PLACEHOLDER FOR A DESCRIPTION)

The information and deliberation process (PLACEHOLDER FOR A DESCRIPTION)

## FINDINGS AND CONCLUSIONS

### Benefits

1. USGS collection, analysis and dissemination of water data provides the nation with information essential to its wise growth and development.

2. While the benefits of this service may be hard to quantify, the returns on the nation's investment in USGS monitoring and research are considered a significant factor in the capture of what has been estimated to be billions of dollars in water's value to the nation's commerce, drinking water, habitat, and public safety.

3. The USGS role in long-term water quantity and quality data collection, especially in critical watersheds, aquifers and water-short areas where water is essential for development, is crucial for the economic strength of the nation.

4. Management and protection of water resources in the United States requires coordination on many levels. The USGS capability to develop data and analyses enables the nation to make some of the most challenging decisions for the allocation, protection and treatment of water to maximize economic opportunities and public safety in a changing world.

5. Providing reliable, impartial and timely information to understand the Nation's water resources is essential if the nation is to minimize loss of life and property, wisely manage ground-water and surface-water resources, protect and enhance water resources, and develop the Nation's resources for the benefit of present and future generations. The USGS is the nation's leader for carrying out this mission.

6. National benefits result from federal agency leadership in initiatives that transcend specific regional or local levels, including, for example, the monitoring, modeling and assessment required to forecast flooding; to provide safe and sustainable water supply; to protect and restore ecosystems; to understand the sustainability of intergovernmental water allocation agreements; to invest in the nation's water infrastructure; to enhance the value of data collected by others; and, in general, to help all officials, leaders and the general public understand and utilize the complex science associated with flooding, droughts, sea level rise, water pollution, endangered species, ecosystems and recreation. National benefits also develop through open public deliberation and by the opportunities for innovation created by USGS scientists working directly with water managers to meet local, state, regional and national needs.

### Authority

7. Congress has made clear that federal responsibilities and national benefits require the enhancement or development of a national stream flow information program and a systematic groundwater monitoring program for each major aquifer system in the United States. (Public Law 111-11, Sections 9507(a) and (b)) Federal responsibility is based on many factors, including negotiation and compliance with international water treaties, interstate water compacts and tribal water settlement agreements, the development and enforcement of federal regulatory standards, and the science needed to support federally funded programs (e.g., establishing and enforcing

**Comment [W20]:** Should this be a separate section, or should it be part of the executive summary? Do we need to include it? Should it be shortened so it can be stuffed into a text box? Should it be a whole separate document, like a fact sheet?

Let's discuss during the Sept 9 meeting. **John Wells** volunteered to take a stab at shortening this section (later), *if we decide to keep it*. But first we need to focus on finishing the recommendations section.

regulatory standards under the Clean Water Act and Safe Drinking Water Act, FWS and NMFS consultations and recovery plans under the Endangered Species Act; USFS, BLM & NPS resource management plans; Water SMART planning grants & Title XVI projects; development and monitoring of effective federal policies concerning agriculture and energy development; and the plans for restoring and managing major ecosystems, including the Everglades, Chesapeake Bay, Long Island Sound, Great Lakes, Sacramento-San Joaquin Bay-Delta, Puget Sound, Colorado River, Mississippi River and Gulf of Mexico).

### **Imperatives**

8. America needs USGS to lead its water science efforts. USGS must continue providing essential “backbone” elements of the nation’s water data collection and delivery system and serve as an objective expert for other federal agencies and for interstate, state, tribal, and local agencies with responsibility for public health and managing water and related resources throughout the United States.

9. The nation’s water data system must clearly characterize each element of the water cycle to describe the hydrologic system and for water management to be sustainable. The nation depends on USGS to anchor the collection and assessment of water cycle information.

10. USGS has the national perspective and expertise, unaffected by regulatory or resource management responsibilities, necessary to address the nation's water data and science needs and to lead America’s water science community.

### **Cautions**

11. USGS should not spend resources to reduce uncertainty for its own sake, but rather target resources specifically where risks are high and reduction of uncertainty is cost effective.

12. Research drives and supports the national scientific mission, including applied research that directly supports the operational parts of USGS water science, and basic research that propels the scientific mission forward. Greater emphasis must be placed on research for which results may be more tangible, provided the interruption of promising in-progress basic research can be avoided.

13. USGS water data and science functions provide information essential to other national areas of priority, including ecology, energy, public health and natural hazards.

14. The USGS reputation for delivering solid, unbiased information and science is its greatest asset. Its reputation for reliability is grounded in decades of high quality performance. In considering ways to address the monitoring challenges of a shrinking budget environment, every caution should be taken to avoid actions that put at risk this reputation, or the record of performance that underlies it.