

ACWI Workgroup on USGS Monitoring Challenges in a Shrinking Budget Environment

Teleconference

9 Sept 2013

Attendees:

Peter Evans, ICWP	Eric Evenson, USGS	Brandon Kernen, ASDWA
Wendy Norton, USGS	Pixie Hamilton, USGS	Carol Lewis, USGS
Ben Pratt, SRBC	Fred Bloetscher, AWWA	Tony Willardson, WSWC
Bob Schreiber, ASCE	Doug McLaughlin, NCASI	Mary Musick, GWPC
Judy Campbell Bird, ACWI-NLC	Sheri Alcalde, USGS	

Action Items:

- [Pixie Hamilton and Eric Evenson will help Peter Evans redraft Recommendation 4, based on comments.](#)
- Has USGS ever done a study to figure out what the marginal benefit/cost change is, based on reducing the level of accuracy and increasing the level of uncertainty? Do we know how much cheaper it would be to operate gages that would operate at a lower level of accuracy, with fewer verifications of the rating curve, etc.? We think the Office of Surface Water has done evaluations like this, but nobody on the phone knows for sure. [Pixie Hamilton is looking up the answer to this and will supply the info to Peter Evans.](#)
- USGS is looking at the possibility of tapping into funds provided voluntarily by the recreational community, so this could be one of the examples mentioned. [Peter Evans will follow up with Pixie Hamilton on this.](#)
- Is there anything in the way NASA funds their space flights and satellites that could provide ideas for USGS? [Wendy will ask Office of Surface Water if they know about any NASA procedures for getting partners' monies, and Bob Schreiber will ask his NASA-connected colleagues if they have any useful information for us.](#)

Introductions and Agenda Review

- Today we will focus on the Recommendations section and the "Findings and Conclusions" section.

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

Discussion of Recommendation 4 –

- This is one of our most important recommendations. Basically USGS needs to understand the level of uncertainty, communicate it effectively to the various data users and decision makers, and be able to use that understanding in prioritizing its funding allocations.
- What's the marginal cost increase/decrease associated with decreasing/increasing the uncertainty in measurements?

- We can ask customers (starting with the ones who contribute funding to network operations) "how are you going to use the data?" and that will help to some degree in determining the level of uncertainty that can be tolerated. However, we don't necessarily know who all the customers for our data are, or how those that are less directly involved with the WSCs are going to use the data.
- In the Coop Program, there are about 800 paying customer organizations that use the data from the networks for many different purposes. Determining a common threshold of tolerable uncertainty will be difficult, given this fact.
- Maybe this workgroup can define the process that USGS can use for polling customers about the uses they have for our data? Or acknowledge that USGS already has a process in place?
- First we need to figure out how much uncertainty we have in the measurements that are collected now. Then we need to ask what it will cost to reduce the current level of uncertainty in various types of data (e.g., peak flows or low flows), and use that information to support an informed discussion with stakeholders to decide if that increment of confidence is worth the cost). That would allow us to determine whether it's cost effective to shift resources from one area of the budget to another, in order to reduce uncertainty at sites where that might not be needed. Similar consideration to the potential savings achievable from collecting data with a larger measure of uncertainty, allowing USGS to shift resources to the operation of more monitoring sites.
- At some time in the future, we may have a user who demands higher quality data than we are collecting now; but does this possibility mean that **all** our data must be collected to the very highest standard? Can we afford that?
- Maybe we should provide a minimal level of monitoring, and if a user wants data collected to a higher standard with less uncertainty, that user can pay extra for the additional effort/accuracy.
- [Pixie and Eric agreed to help Peter redraft Recommendation 4, based on the comments above.](#)

Discussion of Recommendation 6 & 7 –

- Can we combine 6 and 7 into a single recommendation? Number 6 talks about USGS prioritizing streamgages alone, whereas the Number 7 says that evaluation should be done in consultation with stakeholders. So the consensus seems to be that these two recommendations shouldn't be combined.
- The streamgaging network is operated uniformly across the country, regardless of whether it's an NSIP gage, a Cooperative Program gage, or an OFA-funded gage. If we decide that NSIP gages must be run to the highest scientific level, then we lose that uniformity. But we (USGS with its stakeholders) should make a conscious, informed decision about this issue, and not just continue collecting data the way we have always done, by default.
- A good first step is to understand "what is the quality of our data collection *now*?"
- Has USGS ever done a study to figure out what the marginal benefit/cost change is, based on reducing the level of accuracy and increasing the level of uncertainty? Do we know how much cheaper it would be to operate gages that would operate at a lower level of accuracy, with fewer verifications of the rating curve, etc.? We think the Office of Surface Water has done evaluations like this, but nobody on the phone knows for sure. [Pixie is looking up the answer to this and will supply the info to Peter.](#)
- Note: if we do look at operating gages to different levels of accuracy depending on the use of the data, we can't evaluate the issue program-by-program; there would have to be a different approach used, because of the way the networks' funding crosses programs and agencies.

- Operating gages to different levels of accuracy also has implications for trend analysis because it has the potential to remove a large number of gages from the pool of data available for comparison.
- Does USGS turn away cooperatively funded gages? Yes, we do. They go through a prioritization process, and some are rejected because they just don't fit into the scheme of national priorities, even if cooperators provide significant funds.

Discussion of Recommendation Number 9 –

- Don't we already do this? Yes, but WSCs don't report the response to these 3 questions to the Associate Director for Water on the specific issues listed here, or at least, not in a formalized way. This recommendation asks for a more specific process to help top level managers figure out how to increase efficiency and reduce costs through collaboration in case of further budget cuts.
- Can we combine 8 and 9? (No, that's a different issue because 8 is all internal to USGS, whereas 9 involves stakeholders.) Can we combine 5 and 9? (We could if we add other Federal agencies into the mix on number 9.)

Discussion of Recommendation Number 10 & 12 –

- Does the WQ portal include other sources outside of NWIS and STORET? We don't think so, but we're not sure. Wendy offered to research this question
- Number 10 and 12 – add an affirmative statement about how these efforts will provide a future benefit that may far outweigh the initial small monetary investment.
- Number 12 – the recommendation to ACWI may suggest a new function for an existing subcommittee, or a whole new subcommittee if that seems more appropriate. ACWI would need to decide whether they want to revise the Terms of Reference for an existing subcommittee, to accommodate this recommendation.
- Number 12 – this can be shortened, and some of it can be placed in a pull-box.

Discussion of Recommendation Number 13 – maybe the Workgroup report can say "we had these ideas but were not able to thoroughly research this one in order to provide a concrete recommendation. It will take considerably more time and research into the legal issues before we can make a recommendation on this particular matter."

- USGS is looking at the possibility of tapping into funds provided voluntarily by the recreational community, so this could be one of the examples mentioned. [Peter will follow up with Pixie on this.](#)
- Another possibility is to have something like a library card, rather than providing USGS publications online for free. There might be a minimal fee for the reports, and people would need to have a library card and pay in order to read the whole report.
- Is there anything in the way NASA funds their space flights and satellites that could provide ideas for USGS? [Wendy will ask Office of Surface Water if they know about any NASA](#)

procedures for getting partners' monies, and Bob Schreiber will ask his NASA-connected colleagues if they have any useful information for us.

Adjourn

Next meeting September 23 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

SEPTEMBER 6, 2013 **DRAFT**

The U.S. Geological Survey (USGS) plays an indispensable role in helping the nation maintain a reliable, high quality foundation of water information and science. This foundation supports water research, planning, management and investment by federal, regional, state, tribal and local agencies, as well as by universities and businesses. The USGS role and the foundation it supports have been put at risk by today's shrinking budget environment. 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.

Comment [PHE1]: Is this reference to "the Nation" objectionable? I checked 74 uses of the work and highlighted the most likely concerns (below)

Comment [PHE2]: Do you agree that "Nation's water resources" seems acceptable here?

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 water science program to inform water resource management in the United States¹. 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**.

National benefits result from USGS leadership as a federal science agency in initiatives that transcend specific state, regional or local boundaries. 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; 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. 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 important benefits, including recreation, irrigation, power generation, and manufacturing². 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.

Comment [PHE3]: Workgroup suggested "pullbox" to illustrate the range of important programs and projects, including 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

Comment [PHE4]: Isn't ag production included in commerce? Irrigation is included in the list that follows.

¹ Public Law 111-11, Sections 9507(a) and (b) are among the most recent indications for this Congressional mandate.

² 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.

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 science³ is the basis for sustainable water management⁴. 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.

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.

³ 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.

⁴ 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.

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

Comment [PHE5]: Do you agree that reference to the Nation's understanding seems OK here, too?

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) Evaluate the use of data and the **level of accuracy needed** in the most significant applications as the basis to evaluate and appropriate USGS standards for calibration and data management. The USGS should **characterize and promote a better understanding of the uncertainty** inherent in all water monitoring and science applications, with the goal of providing a scientific framework for optimizing the national (and other) investments in our monitoring networks and their strategic design.⁵
- 5) Anticipate and support an increased role for other agencies, universities, businesses, monitoring councils, *etc.*, who 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) Evaluate the current distribution of NSIP funding over the entire stream gage network, in lieu of a fully funded NSIP, and redistribute funds to maximize **sustainability-stability** of the gage network and ultimately provide the “backbone” network central to the NSIP objective. To the greatest extent possible, partially funded gages should be minimized in favor of fully funded NSIP gages. **Prioritization of those gages to be fully NSIP funded should be completed by USGS alone and consistent with the 5 criteria set forth to establish an NSIP gage.** In prioritizing an eligible gage, consideration should be given to the number of criteria the gage meets as well as the population the gage serves.
- 7) Distribute funding of the National **Groundwater-Ground Water Monitoring** Network to maximize its **sustainability-stability** toward ultimately providing the “backbone” quantity and quality network central to the framework design, **which was developed with significant stakeholder interaction via the ACWI Subcommittee on Ground Water (SOGW).** **If Until full funding cannot-can** be achieved, partial funding should be allocated by the management organization described in the framework design, **[add footnote here]** which is founded on key Network design principles of stakeholder involvement and partnering of the USGS with data-owners/providers.
- 8) 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.

Comment [PHE6]: pullbox suggestion: 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 ungaged sites or the validation of remote sensing data should be clearly understood first

Comment [PHE7]: 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?

Comment [wen8]: The word "alone" may not be appropriate, since the networks have so many funding partners. However, this word was added to ensure that the process retains scientific integrity and isn't influenced by lobbying from partner agencies.

Comment [PHE9]: Bob Schreiber suggests that we create an overarching list-item for #6 & new #7, with NSIP as sub-item “a”, and then GW and WQ networks covered by sub-items “b” and “c”.

Ben Pratt suggested that current funding mechanisms for monitoring networks should be optimized in the interest of establishing a dependable long-term data collection network that supports the National interest. In so doing, he suggests that CWP dollars be “extended” and stakeholder burden reduced.

Workgroup discussion is needed

⁵ Provide reference/link to the final USGS Strategic Directions document

- 9) The WSCs should convene regular meetings with ~~the other federal and~~ 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]~~
- 10) ~~Extend (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. Before implementing the portal concept more widely, we need to understand what the uncertainties and tradeoffs are that would lead other organizations to want to contribute to this portal. [do we need to name CIDA here as the implementing organizational unit of USGS?]
- 11) 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.
- 12) Establish a new **Subcommittee for Research, Development and Innovation (SRDI)** of the ACWI to identify and propose innovations that can 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. SRDI 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-SRDI~~ should evaluate innovation opportunities in the context of economic, technical benefits and cost. Recommendations made by ~~RDIS-SRDI~~ 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 __)
- 13) **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)

Comment [PHE10]: Interior wants this!

Comment [PHE11]: pullbar 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

another 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

Yet another pullbar 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 [PHE12]: Workgroup discussion is still needed

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.

Comment [PHE13]: Workgroup discussion is still needed

THE ACWI WORKGROUP

The participants (PLACEHOLDER FOR A DESCRIPTION)

The information and deliberation process (PLACEHOLDER FOR A DESCRIPTION)

FINDINGS AND CONCLUSIONS

Comment [PHE14]: Does the Workgroup agree with USGS SrStaff that this is needed?

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

Comment [PHE15]: Should we substitute Congress, the states and other governmental authorities?

Comment [PHE16]: Here is a reference to the Nation's water we can work on!

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 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.

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