



THE JOHNSON FOUNDATION  
Wingspread Conference Center

## **WATER SYSTEMS, SERVICES, AND CLIMATE CHANGE**

### **Observations and Considerations drawn from the Conference on the Impact of Climate Change on Freshwater Systems and Services in the US**

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**Brooks B. Yeager**  
**Executive Vice President for Policy**  
**Clean Air--Cool Planet**  
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#### **Background**

The purpose of this paper is to offer some reflections on the potential for a high-level dialogue on issues in the U.S. water resource policy arena, and to put forward options for structuring such a dialogue in a way likely to have significant impact on the national debate over water resource policy. The discussion that formed the basis for these reflections, sponsored by the Johnson Foundation at Wingspread in March, 2009, brought together experts from many sides of the water community, all of whom made valuable contributions to the two-day conference. Although the paper summarizes various points made during the Wingspread discussion, the author must assume responsibility for the way the points are restated here.

The question “What is to be done?” is a useful lens in looking at the public policy challenges associated with the water resources sector, as it is in many other areas. One set of answers may be found by asking the related question “What’s broken?” and another by asking “What new challenges are emerging?”

The diverse group of experts brought together by the Johnson Foundation in March all agreed on one point – there’s a great deal to talk about, under these general headings, in the arena of water resources, climate change, and the U.S. water infrastructure.

Although the U.S. water services infrastructure is among the world’s best, water services in the U.S., and the aquatic ecosystems from which these services derive, are under great stress. This stress has many sources, including demographic pressure, uncontrolled growth, land-use patterns, drought, invasive species, obsolete municipal water systems, unsustainable levels of agricultural use, arcane water laws, governmental management failures, and more. It appeared to many of the participants that these stresses are already forcing rethinking and dialogue at various levels, and are likely to become even more urgent with every passing year.

## **Climate Change and the Water Resource Sector**

It was generally agreed that climate change represents a powerful emerging challenge which will exacerbate most, if not all, of the existing problems in the U.S. water sector, and which will also introduce a number of genuinely new issues. The new issues identified included impending changes in hydrologic patterns (i.e. the patterns of flow and the timing of delivery of water), coastal water infrastructure challenges associated with sea level rise, and the so-called ‘death of stationarity’ – the increasing irrelevance of historical and ‘normal’ baselines for water resource planning.

It was also clear that there are a number of potentially interesting overlaps, in a policy sense, between the issues conventionally associated with water resource policy and practice and the issues being brought forth by climate change. Among these intersectoral issues are the increasingly dynamic interrelationship between water policy and use and energy policy, the potential interaction between changes in water resource quality and quantity driven by climate change and public health, and a set of questions surrounding any effort to proactively address climate adaptation concerns, including what kind of information framework is needed to support local decision-making, and what the appropriate roles of different levels of government, including the federal level, would be.

**Observation #1: There’s no danger of not having enough to talk about. The danger is the opposite – there’s too much. An intervention in this area, to be useful, will have to be highly focused.**

The scientists present at Wingspread made a number of basic but useful points:

- the world and U.S. water cycles have been far more thoroughly altered by human action than has the carbon cycle or the atmosphere;
- the integrity of natural flows and remaining aquatic ecosystems is highly dependent on the pattern of human use of water;
- there is a real danger that the ‘adaptation’ of water infrastructure to support human uses in the context of climate change will further impair natural water systems.

The scientists, echoed by the practitioners, also made it clear that it is no longer possible to talk about managing U.S. water resources without incorporating climate change considerations. In the near-term (i.e. less than 30 years), we have to assume a certain amount of embedded climate change that will affect precipitation patterns, flows, evapotranspiration rates, and sea level. In the longer term, we need to know what the range of credible climate change scenarios will be, in order to understand whether our water resource problems will be manageable or not.

**Observation #2: It’s possible to talk about distinct water resource issues raised by climate change, but it’s no longer possible to talk about water resource policy without considering climate change.**

Following the science presentations, the general discussion covered many points of interest. These included experiences with, and possible design elements of an effective adaptation effort in the water sector, climate-related linkages between water use and other sectors, including transport (barge), agriculture, etc., emerging examples of success in

regional/watershed planning, such as the New York City model of reducing filtration costs through watershed protection, and the potential impact of technological development, including desalination. Also under discussion were regional implications of climate change in the water sector, including drought and oversubscription in the Colorado Basin, drought and planning failure in the Southeast, drought, water flow timing, and agriculture in California, the 'water-artificial' growth of Las Vegas, salt water intrusion in the California Bay-Delta, and possible extraneous demand for water from the Great Lakes.

**Observation #3: There is a growing discontinuity between the emerging challenges in the U.S. water resource arena and the political and managerial framework through which our society manages the water sector.**

This discussion produced a number of useful observations on the nature of the water policy issues now confronting American society. Most agreed that our current water policy framework neglects a number of well-understood solution pathways, such as pricing or trading water, and thus allowing the market to influence demand, which could be extremely helpful in addressing stresses on the system. The impediments to more effective water pricing include arcane state water laws, politically inflexible water compacts, etc. Similarly, it was pointed out that the steady obsolescence of the public water infrastructure of many American cities could be addressed, but that policy-makers have been unable to convene an effective investment strategy through which to do so. There appear to be growing number of problems, such as nutrient loading from the Mississippi River Basin to the Gulf of Mexico, that lack even a political framework in which they can be successfully resolved. At the same time, the argument was made that we have largely conquered the point-source pollution problem, and that there has been real progress in the area of local watershed monitoring and management. Overall, it became clear that, in some key respects, the challenges we face are moving faster than the political and management system through which we must address them.

The discussion moved to the consideration of some of the factors that affect the public's understanding of water issues and policy, and therefore may bound government's political ability to address new challenges. The question of what thresholds are most visible to the public was raised. The impact of unexpected drought clearly has the potential to seize the average person's attention, as does the issue of local water quality. However, many people take the water resource system for granted, and rendering our water use situation more visible should be a goal of any dialogue involving the water sector. Additionally, the public is more likely to respond to an effort to engage on water issues if the issues are presented in a framework which points towards solutions: we all want to know what we can do about it.

It was pointed out that there are success stories, such as the increasing examples of synergies between the conservation of natural waterways and wetlands and the reduction of capital requirements for community water systems, that the public would respond favorably to if they were made more visible.

**Observation #4: Climate change will not only exacerbate existing water stresses, it will also intensify the need for a more flexible, adaptive form of water management. In addition, climate change, as a highly visible policy problem, offers a lens through**

**which key systemic water resource challenges can be presented to the public and decision-makers.**

The ensuing discussion of political impediments to more flexible water management was also quite revealing. The point was made that, in an arena dominated by technical discussions which by their nature are largely obscure to the public and even to business leaders, it is necessary to frame any public discussion by reference to an aspirational goal that can be easily understood and which therefore can galvanize attention and commitment. A critical threat can awaken attention, but the ensuing conversation must point towards solutions in order to draw in leaders who will drive the conversation forward.

The assembled group gravitated towards one such formulation: that of the challenge of creating a more resilient U.S. water resource sector by a date certain – say 2025. It was felt that such a challenge could get the attention of policy-makers and leaders from the private sector, and would enable a declaration and/or an ongoing dialogue that stood a good chance of being influential as policy-makers move to deal with the emerging issues in the sector.

**Consideration #1: A dialogue among private sector leaders, NGO principals, and selected senior policy-makers, focused on the broad question of what steps would be required to build a more resilient U.S. water resource system by 2025, is needed, and, if strategically managed, could prove both timely and influential.**

Such an approach would have strengths, but also risks.

Strengths:

- Timeliness: water resource problems are multiplying. Every region of the country has some top-of-mind problem. Climate change is very much on people's minds, and many adaptation issues are already showing up in the water sector.
- Bold goal: the goal will pose a powerful question, and galvanize interest.
- Inclusivity: Despite regional differences in the way the water/climate problem presents itself, there are many shared issues, including water quality issues associated with combined storm and sewer systems, the need for more sophisticated water marketing, etc., which could be included in such a dialogue.
- Meaningful roles for participants: a broad goal such as resilience can provide meaningful roles, and 'something to do at home' for a diverse group of dialogue participants, including leaders from the business sector, the science and policy communities, and non-governmental organizations.

Risks:

- Scope: the topic may be too all-encompassing. It would be important to focus on specific elements or strategies that are considered critical to resilience.
- Definitional issues: what does 'resilience' mean in the water sector? Can it be defined with enough rigor to drive specific conclusions in key areas?
- Potentially excessive ambition: Is 'resilience' a realizable goal, from a political point of view?

- Political hot buttons: a dialogue centered on resilience in the national water resource system would find it difficult not to take on at least two, if not three, issues of high controversy – the role of agriculture, the need for, and possibility of amending or supplementing the Clean Water Act, and, related to that, the question of how to resolve the issue of wetlands. These are difficult issues, and though the wetlands issue could be left to one side, the agriculture issue will have to be taken on board in some manner.

**Consideration #2: A dialogue exploring the goal of making the U.S. water resource system more resilient would need to rely on selected pillars – elements embracing self-contained policy problems whose resolution is critical to the larger goal.**

A number of potential elements were raised in the Wingspread discussion. They include:

- the question of how to develop a national investment strategy for needed enhancements to municipal water infrastructure;
- the benefits of moving to a more market-oriented approach to water pricing and trading, and strategies for doing so;
- new challenges to water services posed by climate change, and how to address them;
- how to maximize synergies and avoid conflicts between natural water system conservation and water resource system adaptation;
- how to identify and clear away impediments to innovation in the water resource sector; and
- overlaps between water policy and energy policy as we move to a low-carbon economy.

**Consideration #3: If for any reason a broad dialogue on water sector resilience is considered infeasible, a dialogue on one or more of the elements above could still make a significant contribution.**

Each of the elements above could form the basis of worthwhile discussion and/or public policy intervention. Just as an example, the last point, regarding overlaps between water policy and energy policy in moving to a low-carbon economy, could address current patterns of water use in the energy sector, implications for water demand of new energy supply options, including, for instance, coal-bed methane, geothermal, and new nuclear plants, and conversely, the implications of water technologies such as desalination for energy use, as well as the management framework needed to develop coherent strategies across sectors.

**Conclusion**

The richness of the conversation at Wingspread, and the enthusiasm of the participants, reinforces the fact that an effort by The Johnson Foundation in this area would be timely, and would in all likelihood be able to mobilize prominent discussion partners, catalyze a meaningful set of interventions in water policy, and influence public debate on the issue. “It may be that the forces are aligned,” as several participants put it.