July 15, 2022

The following are comments submitted through the United States Global Change Research Program (USGCRP) online Review and Comment System on the USGCRP Draft Decadal Strategic Plan 2022-2031.

Response to the Full USGCRP Decadal Strategic Plan

The Association of Metropolitan Water Agencies (AMWA) and the Water Utility Climate Alliance (WUCA) welcome the opportunity to comment on the US Global Change Research Plan Draft Decadal Strategic Plan 2022-2031. AMWA represents the largest metropolitan, publicly owned drinking water systems in the nation, and collectively our members serve more than 100 million people. WUCA, which was formed in 2008 to provide leadership and collaboration on climate change issues affecting the country's water agencies, comprises twelve of the nation's largest water providers, supplying drinking water for more than 50 million people in the United States. All WUCA members also belong to AMWA. WUCA and AMWA support the mission of USGCRP to anticipate and respond to the risks of global climate change by providing accessible, usable knowledge. As local decisionmakers on water resources, water utilities have a critical need for the kinds of accessible data, research, and engagement opportunities outlined in the USGCRP strategic plan.

First, as critical infrastructure providers tasked with making decisions addressing climate change impacts, AMWA and WUCA appreciate USGCRP's commitment to providing accessible, usable knowledge to policymakers and other stakeholders. Our organizations support the development and integration of actionable climate science. We urge a commitment to not only gather the scientific data and research needed to inform climate adaptation and mitigation, but also to apply that research and information to the development of tools that are critical to interdisciplinary teams of decisionmakers. For the water sector, this work includes but is not limited to scenario-planning and an assessment of the current regulatory framework. It is necessary that USGCRP share important climate projection data in a form that interdisciplinary teams such as utility managers and financial officers can easily access and use to inform their own organizations' climate adaptation plans.

AMWA and WUCA also support the incorporation of targeted scientific assessments and tools for specific sectors into the strategic plan. We encourage USGCRP to develop targeted scientific assessments by sector, including the drinking, waste, and stormwater sector, and US geographic region. The development of scientific assessments and other tools targeted to the water sector would benefit AMWA and WUCA utilities by making climate science available at the most accessible, actionable level for water managers. Information on predicted climate projections would assist water utilities in understanding potential future scenarios for water supplies, as well as impacts to waste and stormwater infrastructure.

AMWA and WUCA utilities have been assessing climate impacts to water supplies and utility operations and emphasize the need for improved models. There is great variability in the model projections for the impacts of climate change in the future in a specific region. This variability depends on the climate model used, downscaling methods used, and on the difference between moving from global-scale model projections to local scale impacts. For example, several WUCA utilities have had to customize climate model data for their specific local water resource planning and decision-making purposes, instead of using off-the-shelf climate data, because of the limitations of raw climate data in projecting local scale physical dynamics and microclimates (see: WUCA's resource on using climate change information in utility vulnerability assessment, Actionable Science in Practice).

As stewards of the environment and providers of critically important human health and safety resources, AMWA and WUCA utilities take the global and climate change impacts seriously. Preparing for hazards and adapting to climate change is a particularly important issue for maintaining water system resilience. A strong federal initiative is needed to ensure global change research is able to support critical efforts related to drinking water, coastal flooding, wildfires, drought preparedness, climate change adaptation, and public health. These efforts are vital to the public utilities that protect and plan for the nation's water supplies.

AMWA and WUCA sincerely thank USGCRP and its agencies for the opportunity to engage and provide feedback on the Decadal Strategic Plan 2022 - 2031. We appreciate the commitment of USGCRP to understand the impacts of global change on resources and encourage a continuation of engagement regarding how to make climate data relevant for decision-makers in key sectors. If you have any questions, please contact Jessica Evans (evans@amwa.net), AMWA Government Affairs Associate, or Kavita Heyn (Kavita.heyn@portlandoregon.gov), WUCA Staff Chair.

Response to Pillar 1. Advancing Science: "advance scientific knowledge of interconnected natural and human systems and risks to society from global change"

In regards to the plan's section, "Advance scientific knowledge of interconnected natural and human systems to society from global change,"AMWA and WUCA support the commitment of USGCRP agencies to conduct research that will develop frameworks to facilitate connections between climate models and models of specific economic sectors (mentioned on page 10 lines 25-30 of the decadal strategic plan) and urge that the water sector and intertwining critical infrastructure sectors are included in these frameworks. The water sector and other critical infrastructure sectors would benefit greatly from models that help utilities plan for the impacts of extreme climate-related weather events, such as drought, heat waves, hurricanes, and more.

AMWA and WUCA are interested in the work of USGCRP on climate sensitivity and feedbacks (page 12, lines 2-20). Understanding how Earth's average temperature will respond to changes in GHG concentrations and feedbacks in the climate system will help inform the decisions of water

utilities creating long-term plans. Finally, it is important for AMWA and WUCA members to benefit from USGCRP's use of improved models, machine learning, and AI that will rapidly advance quantification of uncertainty.

In response to the plan section titled, "risks to coupled human-natural systems" (page 12, lines 38 - page 14), AMWA and WUCA appreciate the inclusion of water as part of the human system and agree with the statement that "advancing the science of coupled human-natural systems requires fully integrating the social and natural sciences at each phase the research process, from defining the problem to communicating results." As stated in our general comments, the accessible, clear communication of results for decisionmakers across disciplines is a priority for water utilities.

Regarding complex interconnected systems (page 13, lines 20 through page 13), AMWA and WUCA support the focus on transdisciplinary research and especially the use of model results and research outputs that can be used by a diverse audience. Decisionmakers in water utilities are inherently transdisciplinary, comprising backgrounds like climate scientist, public finance, communications, and community engagement, so a focus on transdisciplinary research and development of related tools is essential for water utilities.

Regarding the draft decadal strategic plan section on impacts, risks, and vulnerability, WUCA and AMWA support the research topics mentioned on page 14, lines 4 through 22 on dynamics of coupled human-natural systems, vulnerability, and risk and urge USGCRP agencies to focus on critical infrastructure sectors, including water, in these research topics, where possible. We support USGCRP's decision to research behavioral, societal, economic, and cultural aspects of global change. We especially support the research in the topics addressed on page 15 lines 26 through 45 and urge creating tools with critical infrastructure sectors in mind, particularly the water sector.

Finally, as utilities that face a network of tradeoffs in adaptation actions, we appreciate the commitment of USGCRP to research and develop frameworks on the benefits, trade-offs, path dependencies, and interactions among actions taken to manage risks from climate and global change mentioned on page 13 lines 14 through 16. It is important that utilities can understand the adaptation approaches that address climate impacts and what effects those approaches might have on their infrastructure, ecosystem effects, operations, energy intensity, user rates, or more. Utilities must balance the risk tradeoffs related to climate mitigation and adaptation strategies, recognizing that sometimes the tradeoff might result in a solution that is more energy intensive, increase rates, or have other impacts on infrastructure.

Response to Pillar 2. Informing Decisions: "provide accessible, usable information to inform decisions on mitigation, adaptation, and resilience"

WUCA and AMWA appreciate the decadal strategic plan item declaring that "a number of USGCRP agencies will provide services, including climate model projections and impact assessments at relevant scales to support state and local decision-making" (page 17, lines 7-9). These kinds of tools are essential to developing drinking water utilities' long-term plans in investment of infrastructure projects.

The decadal strategic plan discusses a new initiative in 2022 that "aims to make USGCRP and other relevant Federal data, tools, and information more findable, usable, and customizable, in combination with non-Federal and localized data, so that users can package information at low cost for their specific decision contexts" (page 18, lines 4-8). AMWA and WUCA would benefit from such an initiative and urge USGCRP to consider the publication of this information by sector (e.g., data, tools, and information for the water sector) and region in implementing the initiative.

Regarding scientific assessment, AMWA and WUCA support the use of more targeted assessment reports, as suggested on page 19, lines 1-5 of the decadal strategic plan, and encourage USGCRP to consider developing targeted assessments by sector and region. Additionally, we support the US-focused scenario effort that would complement the IPCC scenarios used in both IPCC and NCA reports mentioned on page 17, lines 7-10. This kind of supplemental research is critical for water agencies creating long-term strategic plans for multiple years-long planning scenarios. Having access to this localized data that includes changing sociodemographic changes will help utility staff make decisions that address the future needs of their service areas. As users of climate projection data, AMWA and WUCA recognize the importance of being engaged by federal agencies and appreciate continued engagement in the research design process.

AMWA and WUCA support USGCRP evaluation of the structure and scope of future national climate assessments (NCA) and consideration of adjustments mentioned on page 19, lines 12-16. Below are some of the following points AMWA and WUCA believe would be useful for water utilities to see in future iterations of the national scientific assessments:

- On the watershed scale, a focus on improved understanding of changes in precipitation patterns; frequency and duration of floods and droughts;
- Changes in frequency, magnitude, and duration of harmful algal blooms in surface waters;
- Impacts to the hydrologic cycle due to warming, across time and spatial scales, including discussions about why the impacts are happening and explicitly discussing the limitation in the predictive capabilities of the different types of translational methods for looking at potential future changes and trends;

- For the decision support section and discussion about future climate models and use by decisionmakers, information and discussion about model capabilities and limitations about key variables of interest to different sectors; and
- Caveats and more helpful about how localized climate impacts may be different that a local level than indication for a region.

Response to Pillar 3. Engaging the nation: "enhance the nation's ability to understand and respond to global change by expanding participation in the Federal research enterprise"

We support an open, inclusive, and transparent process for creating scientific knowledge that enhances the relevance and usability of information for decision-making mentioned on page 21, lines 5-10 in the plan. For example, WUCA agencies have partnered and co-produced research with the NOAA Regional Integrated Science Assessments (RISAs) and are very supportive of the stakeholder focus and priorities of this program to generate usable, actionable science.

Regarding engagement with external organizations (page 22, line 3), engagement with critical infrastructure sectors affected by global and climate change is necessary. We recommend that the decadal strategic plan include a provision to engage organizations in critical infrastructure sectors, including the water sector, on the decadal strategic plan's development and implementation. Specifically, we recommend measures to regularly communicate scientific research to and receive the feedback of key water sector (and other) stakeholders. USGCRP agencies could do this in several ways, such as:

- Targeted sector virtual engagements with interested stakeholder groups and associations and their members to hear about scientific needs or communicate the results of assessments or reports; or
- Initiatives to USGCRP agencies to conduct quarterly check-ins between representatives of sector associations and staff on key research goals and products.

Finally, regarding research design (page 23, lines 4-15), AMWA and WUCA encourage collaboration with key stakeholders in sectors impacted by climate change to identify the science needs of decisionmakers.