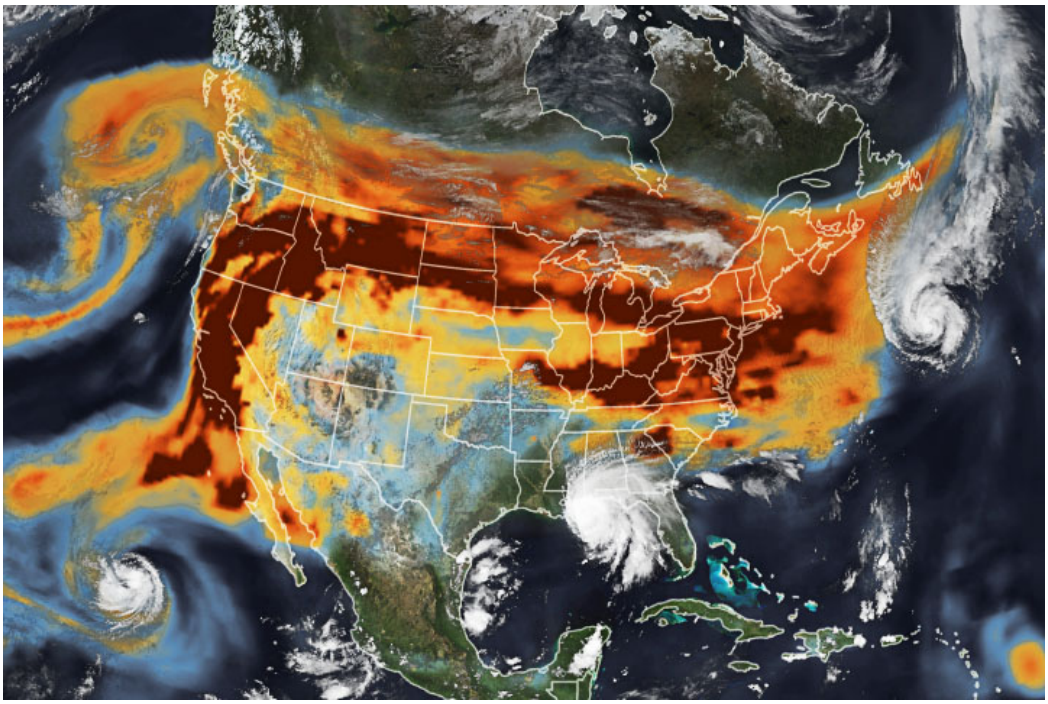
2020 WATER UTILITY CLIMATE ALLIANCE ANNUAL REPORT



Black carbon density and hurricanes in September 2020 (NASA)

Summary of Activities

This report documents the Water Utility Climate Alliance's 2020 Work Plan progress and provides a list of next steps.

2020 Water Utility Climate Alliance Annual Report

MESSAGE FROM THE CHAIR

October 2020

As we near the end of Central Arizona Project's first year in the role of Chair, I am proud to share that WUCA has once again demonstrated why it is a leader on climate change in the water sector. In an unpredictable and difficult year for utilities across the country, WUCA advanced projects in 2020 that explored pertinent and timely topics in climate resilience. WUCA also demonstrated its own resilience as staff continued to conduct this valuable and important work despite all the public and personal challenges we faced this year.

The staff appreciate the continued support of our GMs for WUCA during this unconventional year, and we are excited to present our 2020 accomplishments and discuss our plans for 2021 at this year's GM Business Meeting.

Mohammed Mahmoud, PhD
Chair, WUCA
Senior Policy Analyst, Central Arizona Project

SUMMARY OF ACTIVITIES

INTRODUCTION

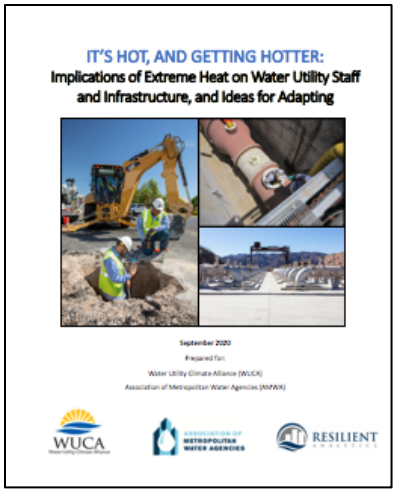
Each year the Water Utility Climate Alliance (WUCA) develops a list of projects that will help meet priorities outlined in its 2017-2021 Strategic Plan. A project scope, description, and budget is developed and projects are ranked by WUCA staff and leadership based on how well they address: (1) the Alliance's current priorities; (2) value added to individual WUCA utilities; and (3) staff time available to execute the project. This forms the annual work plan and budget presented to WUCA executives each year at the General Managers' business meeting. All projects are implemented and executed using a committee process made up of three or more WUCA staff contributors, with one staff member taking the lead to manage each project. This report documents WUCA's 2020 work plan accomplishments and the next steps for key projects.

2020 ACCOMPLISHMENTS

Heat Impacts on Infrastructure and Personnel

Committee: Keely Brooks (SNWA) and Erica Brown (AMWA) – Project Managers, Mohammed Mahmoud, Laurna Kaatz, Rick Marsicek, Taylor Winchell, Jennifer McCarthy, Kavita Heyn, James Rufo-Hill, Tirusew Asefa, Ivana Kajtezovic

Warming, which is considered more certain than changes in precipitation, could negatively impact the health of water utilities' most important asset – its personnel – and it could also shorten the lifespan of critical infrastructure. In response, WUCA and the Association of Metropolitan Water Agencies sponsored a study in the Spring of 2019 to evaluate extreme heat impacts at five water utilities representing a range of climates and geographies, to identify potential personnel and infrastructure impacts and adaptations. The five case study utilities were: Portland Water Bureau, Denver Water, Southern Nevada Water Authority, Oklahoma City Utilities, and Miami-Dade Water and Sewer Department.



2020 Accomplishments

All five case study evaluations compared projected impacts from extreme heat in 2030, 2050 and 2070 (using 20-year climate information averages centered on these dates), compared to a 1990 to 2009 baseline. The assessments were completed in 2020 and each case study utility was provided with a separate report, analysis, and recommendations. While all utilities looked at health and safety impacts on outdoor personnel and potential adaptations, the utilities differed in which infrastructure and facilities they considered.

The range of infrastructure impacts evaluated varied by case study and included:

- Changes in building cooling requirements;
- Reduced motor and motor control center (MCC) lifespans;
- Degraded roof systems; and
- Degraded parking lots.

In addition to the individual case study reports, a summary report of key findings was developed and is available on the WUCA website at https://www.wucaonline.org/publications/.

WUCA Network

Committee: Mohammed Mahmoud (CAP) – Project Manager, Alan Cohn, Julia Rockwell, Dani Purnell

WUCA continued its engagement with the WUCA Network participants through informational communication on WUCA activities (e.g. climate resilience trainings) and invitations to attend quarterly climate adaptation speaker presentations jointly held with the WUCA Learning From Each Other (LFEO) webinars. The WUCA Network continues to grow with 20 different partner organizations participating; including the Honolulu Board of Water Supply, City of Ann Arbor, Salt Lake Department of Public Utilities, DC Water, East Bay Municipal Utility District, Valley Water (formerly Santa Clara Valley Water District), Northeast Ohio Regional Sewer District, Los Angeles Department of Water and Power, Aurora Water, City of Sacramento, Atlanta Regional Commission, Metropolitan Water Reclamation District of Greater Chicago, Landis Sewerage Authority, Aqua America, City of Santa Cruz, City of Tampa, Boston Water and Sewer, City of Houston, Clackamas County, and City of Hillsboro, Oregon.

GMs are invited to recommend other potential water utility peers and partners to join the WUCA Network.

Strategic Plan

Committee: Kavita Heyn (PWB) – Project Manager, Keely Brooks, Edward Campbell, Alan Cohn, Heather Dalrymple, Taylor Winchell

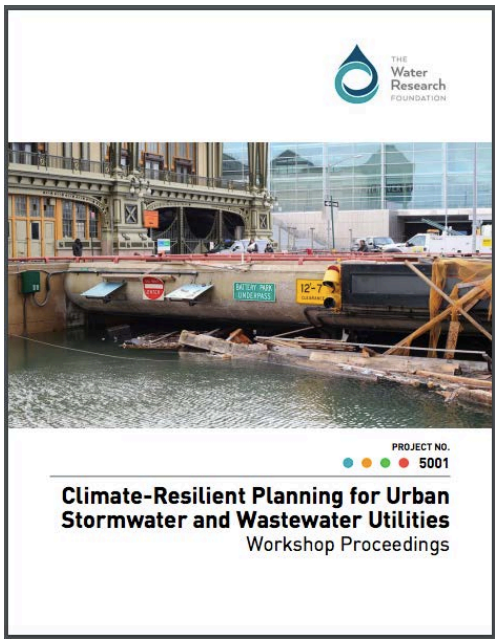
WUCA's current five-year strategic plan will conclude at the end of 2021. At this time of global change and challenge, WUCA is committed to re-evaluating its purpose, mission, vision, and goals to ensure the Alliance can continue to meet the climate adaptation, resilience, and mitigation needs of its members. WUCA has therefore begun the process of updating the Strategic Plan for the 2022 to 2027 timeframe, with a goal of completing the plan in mid-2021 to inform the following year's work plan. AMWA was selected as the external project facilitator and will lead WUCA through the planning process.

Phase 1 of the process is already underway and will be completed in early Spring 2021. It began with a series of "Blue Sky" virtual facilitated sessions with members considering whether the current WUCA mission and vision still serve the Alliance well, or whether they need to be updated. Phase 1 will also develop the 2022-2027 goals by way of a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. This will include brainstorming sessions and a landscape analysis with external stakeholders to solicit insights on WUCA's role in and contribution to the climate adaption and mitigation communities. Phase 1 will culminate with the final updated mission, vision, and set of goals, recognizing that some of these high-level aspects may not change significantly. GMs will have the opportunity to review these elements in Spring 2021. Phase 2 will then begin in Spring 2021 and will develop new objectives to achieve the Strategic Plan goals. These detailed objectives are likely to change significantly as they are used to inform annual WUCA work plan development. GMs will have the opportunity to review and approve the final Strategic Plan at the 2021 GM Business Meeting.

Scaling and Application of Climate Projections to Stormwater and Wastewater Resilience Planning

Committee: Alan Cohn (NYC DEP) – Project Manager, Julia Rockwell, Laurna Kaatz, Rachel Chisholm, James Rufo-Hill, Julia Brasch, Tsega Anbessie

In February 2020, the Water Research Foundation released workshop proceedings from the July 2019 workshop convened by WUCA, NYC DEP, NOAA's Mid-Atlantic Regional Integrated Sciences and Assessments program, and the RAND Corporation. A supplemental project paper, *An Action Agenda for the Water Sector to Advance Methods for Achieving Integrated Climate Resilience*, was also published in July 2020. It expands on the workshop-recommended next steps and proposes an action agenda to further advance existing best practices, field test new approaches, and research critical needs, while engaging the climate science community.



The initial workshop identified three lines of effort to further advance research and best practices for climate-resilient stormwater and wastewater planning and design:

1. Continue encouraging exploration of new approaches and sharing lessons learned and experience gained among large utilities. Additional partnerships with other organizations will be highly beneficial in bringing fresh perspectives to these conversations.

2. Share lessons learned from the workshop through additional workshops and other convening opportunities with other water, engineering, and planning organizations. These convenings should also target small- to mid-sized stormwater and wastewater utilities.

3. Identify funding opportunities suitable to addressing the research needs noted in the workshop. The aim here would be to continue to engage current funders, reach out to government and philanthropic funding, and explore new pooled funding models to advance the research agenda.

In the supplemental paper, the team expands further on these lines of effort to develop an action agenda for collaborative research, analysis, and field testing. The actions are intended to build on the success of several WUCA initiatives that have sought to understand how climate science can be scaled to utility decision making.

Ecosystem Services: Climate Adaptation Survey

Committee: Rolf Gersonde (SPU) – Project Manager, David Behar, Heather Dalrymple,, Dani Purnell, Marisa Flores Gonzalez, Taylor Winchell, Keely Brooks, Alan Cohn, Ellen Natesan

This project is the first phase of investigating how climate change affects ecosystem services on which water utilities rely in delivering their core mission. Water utilities across North America recognize that natural ecosystems provide essential services to produce source water and manage drainage and stormwater. As climate change begins to affect ecosystems around the globe, ecological functions such as water cycle regulation and ecosystem productivity are affected by drought and changing disturbance regimes. These changes can affect the core services water utilities provide and need to be better understood, so that utilities can adapt their ecosystem management in a changing climate.

This survey was designed by WUCA staff and Earth Economics to learn how utilities understand and use ecosystem services in their operations, how climate change is expected to affect ecosystems in their ability to provide ecosystem services, and how utilities plan to adapt their ecosystem management in a changing climate. The survey was distributed to WUCA members, AMWA, and the Green Infrastructure Leadership Exchange to solicit responses from a range of organizations and potential uses of ecosystems. The results of the survey, expected in November 2020, will identify knowledge gaps and provide WUCA with priorities for further research and assessment in the next phase of the project.

Learning From Each Other

Committee: Alan Cohn (NYC DEP) – Project Manager, Mohammed Mahmoud, Tirusew Asefa, Taylor Winchell

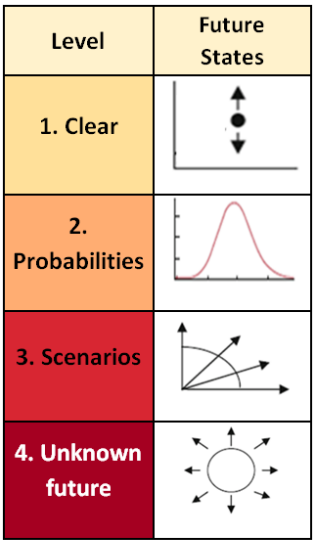
As part of WUCA's ongoing Learning From Each Other sessions in 2020, invited speakers presented topics ranging from the use of climate data in modeling and managing water systems, to potential legal obligations and liabilities for incorporating climate adaptation measures.

David Rosenberg from Utah State University presented a system to classify uncertainties, starting with a narrow range of future values to deep uncertainty. He provided examples of uncertainty levels and implications and suggestions to model and manage them.

Scott Steinschneider from Cornell University discussed strategies to better bridge bottom-up and top-down approaches to water systems planning under climate change, including advances in stochastic weather generation for climate vulnerability assessments based on patterns of regional atmospheric flow.

WUCA's own Tirusew Asefa highlighted the work of the applied climate change research program at Tampa Bay Water, which has been in place for more than a decade. Along the way, Tampa Bay Water went through several twists and turns in producing actionable science, but has ultimately produced three Ph.D. students and two Post-doctoral associates, and above all, a trusted partnership between scientists, stakeholders, and practitioners with the unifying goal of producing actionable science.

Next, Erik Pytlak from the Bonneville Power Administration presented the results of a joint climate change research project with the Army Corps of Engineers, Bureau of Reclamation, University of Washington, and Oregon State University, the modeling approached used, and lessons learned.



Classifying uncertainties (adapted from Walker et al., 2013; van Dorsser et al., 2018)

Finally, Deanna Moran and Elena Mihaly from the Conservation Law Foundation discussed the potential legal implications of failing to adapt to climate risk. As the frequency and destructiveness of climate change-related extreme events increases, there has been a correlating uptick in climate change lawsuits seeking to hold actors accountable for the damage. Their presentation discussed evolving case law and the main theories of legal liability that could come into play if design professionals (e.g. engineers and architects) fail to adequately undertake climate adaptation measures.

Greenhouse Gas Mitigation: Phase 1

Committee: Taylor Winchell (DW) – Project Manager, Kavita Heyn, Keely Brooks, Heather Dalrymple, Alan Cohn, Laurna Kaatz, Goldamer Herbon

In recognizing greenhouse gas (GHG) mitigation as an adaptation strategy, WUCA began discussing options for a GHG mitigation project in the Spring of 2020 as an emerging opportunity. This project was not initially part of the 2020 work plan, but developed out of interest from WUCA staff, and the ability to dedicate staff time. In initial brainstorming, it was clear that WUCA members first wanted a better understanding of the current GHG mitigation approaches of all WUCA utilities.

With this insight, the mitigation workgroup designed a survey to gather information from WUCA members on their organization's GHG mitigation and carbon emissions reduction goals, policies, successes, challenges, and opportunities, as well as to provide guidance for designing the next phase of the GHG mitigation project. This survey approach aligned directly with the "Knowledge Transfer" goal of WUCA's strategic plan.

The survey was completed during the summer, and the results were distributed to all member utilities in September for internal distribution amongst WUCA utility adaptation and sustainability staff, as well as with utility executives.

The survey also helped to identify "Phase 2" of the GHG mitigation project, which will produce a set of case studies that demonstrate progressive and successful examples of GHG mitigation at water supply utilities, including the institutional processes that encouraged or allowed the projects to happen. Phase 2 will be completed in 2021.

Midyear Planning Meeting

Committee: Mohammed Mahmoud and Kavita Heyn (CAP and PWB) – Project Managers, AMWA

WUCA staff met virtually this year on May 6 for WUCA's 2020 Midyear Staff Meeting. To focus on current and emerging WUCA coalition planning topics, the midyear staff meeting was preceded with a monthly WUCA conference call that provided a full debrief on the status of all WUCA projects. Besides receiving a fiscal update on the budget status of active WUCA projects, the emphasis of this meeting was on preliminary discussion of projects for the 2021 WUCA work plan, logistical planning for the 2020 WUCA GM meeting, and preparation on the process for developing the next WUCA strategic plan.

Climate Resilience Training

Committee: Laurna Kaatz (DW) – Project Manager, Mohammed Mahmoud, Keely Brooks, Abby Sullivan

Two trainings were planned for 2020 but were postponed due to the general preference for in-person events. Instead, WUCA worked with the EPA and NOAA to begin transitioning training materials into a virtual platform to allow for broader accessibility of the training. The first phase of this process will be completed in 2020 and hosted on NOAA's website. The next step is to develop activities and learning modules to ensure participants are engaged and complete each lesson. When complete, WUCA's virtual training will lay the foundation for a water utility climate adaptation certification program.

Business Function Mapping

Committee: Laurna Kaatz (DW) – Project Manager, David Behar, Alan Cohn, Alexis Dufour, Keely Brooks, Tirusew Asefa, Taylor Winchell, Erica Brown

To better understand mechanisms to mainstream climate resilience through critical business functions, Denver Water (DW) and San Francisco Public Utilities Commission (SFPUC) are participating in Phase 2 of the *Mapping Climate Risks and Opportunities to Critical Water Utility Business Functions* project to test and enhance the *Water Utility Business Risk and Opportunity Framework and Guidebook* through interactive,

virtual, tabletop exercises (TTX). The goal of the TTXs are to help water utility staff understand their business functions exposure and sensitivity to a changing climate.

DW's TTX focused on finance, treatment, distribution, and watershed management. Participants identified nearly 70 solutions, which are now being incorporated into a climate mainstreaming action plan and schedule. SFPUC's TTX will be completed on November 5 with a focus on Business Services, Health and Safety, and Watershed Management. Feedback from both TTXs will be used to enhance and refine the Framework.

Sea Level Rise

Committee: Abby Sullivan (PWD) – Project Manager, Ivana Kajtezovic, Alan Cohn, Miranda Cashman, Julia Rockwell, James Rufo-Hill, Ann Grodnik-Nagle

In 2019, the WUCA Sea Level Rise (SLR) Committee was formed to foster discussion and information-sharing on adaptation best practices and sea level rise science and to advance adaptation to SLR and its associated impacts (e.g. extreme events, saltwater intrusion). The SLR Committee is comprised of self-selected coastal WUCA utilities that are preparing their systems and operations for rising seas and includes staff from the New York City Department of Environmental Protection, the Philadelphia Water Department, Tampa Bay Water, Metropolitan Water District of Southern California, San Diego Water Authority, Portland Water, Seattle Public Utilities, and San Francisco Public Utilities Commission.

In 2020, the Committee put out an RFP and selected EcoAdapt consulting services to assist in the Committee's first project: development of a Field Guide to SLR Adaptation. The goal of this project is to document and explore leading practices in sea level rise adaptation for water utilities. The SLR Field Guide is intended to serve as a road map to help utilities advance their sea level rise adaptation efforts and to explore the challenges and implementation barriers unique to the water sector. The Field Guide will provide technical guidance to help users understand local vulnerabilities and risks and will specifically address the challenges of "assessment to adaptation", focusing on proactive implementation. Project tasks completed in 2020 include conducting interviews, surveys, and a literature review to inform the structure and scope of the Field Guide. Development of the Field Guide will also include convening a workshop in 2021 to bring together WUCA members, utility decision-makers, and municipal decision-makers with subject matter experts. The project will conclude in 2021 with a published document that will be disseminated as a report and as a digital resource online.

Leading Practices

Committee: Laurna Kaatz (DW) – Project Manager, Abby Sullivan, Keely Brooks, David Behar, Mohammed Mahmoud, Tirusew Asefa, Jennifer McCarthy, Seevani Bista, Alan Cohn, Heather Dalrymple, Marisa Flores Gonzalez, Julia Rockwell

Leading Practices added new WUCA examples to support identified leading practices and revised the draft report to incorporate figures, pictures, text boxes, and additional functionality to efficiently navigate the

report. Peer review of the report is taking place in October and November and is focused on two types of reviews: technical and practical. The technical review is obtaining feedback from climate adaptation professionals from our first peer-review event at the National Adaptation Forum. The practical review is seeking feedback on the usefulness from water management peers. The peer review process is also serving to promote the project and engage important partners as these practices begin to be shared with the larger adaptation community. Next steps with the project include designing an easy-to-use webpage and creating a process to regularly revise current practices and add new examples and practices as WUCA experiences evolve.

CONCLUSION

In 2021, WUCA will expand on the progress of this year's projects, address new areas of interest, and continue to adapt to the new status quo created by the COVID-19 pandemic and its concurrent challenges. WUCA's projects will support the priorities of its membership, and the water sector as a whole, by producing and sharing research and products of actionable value. Despite the obstacles we faced this year, WUCA will maintain its current strategic objectives and determine how it may need to adapt these objectives for consideration in WUCA's next strategic plan.