Florida Water Climate Alliance Webinar Summary:
Perspectives on Saltwater Intrusion
January 18, 2022

Introduction:

The Florida Water Climate Alliance (FloridaWCA) is a stakeholder-scientist partnership committed to the co-development of locally relevant and actionable climate science to support informed decision-making in water resource management, planning and supply operations in Florida. The January 18th webinar, hosted by FloridaWCA and UF Water Institute, focused on saltwater intrusion from various perspectives including planning, resilience, adaptation, and prevention. Over 200 participants joined the webinar and came from varied backgrounds and agencies including water utilities, Water Management Districts, government agencies, non-governmental organizations, universities and consulting firms. Nearly half of the attendees were new to FloridaWCA workshops/webinars, demonstrating the growing interest in the group and usefulness of the webinar format. The next webinar will take place in April 2022 and will provide in-depth presentations on the FloridaWCA NASA ROSES project.

To access a recording of the January 18, 2022 webinar as well as presenter slides, click here.

Presentations:

1. NASA ROSES Project: Seasonal Winter Forecasts for Florida

Dr. Vasu Misra (FSU) provided detailed 2021-22 winter season forecasts for Florida's Water Management Districts and FloridaWCA partner utilities, Tampa Bay Water and Peace River Manasota Regional Water Supply Authority (PRMRSA), using CLIFF dynamically downscaled, ensemble forecasts (see article in Weather and Forecasting journal for forecast methodology). This winter season is predicted to have near normal rainfall but warmer than normal temperatures, leading to elevated evapotranspiration and decreased recharge and runoff flows. Last year's CLIFF detailed winter season forecasts were fairly accurate with only one region in seven having a forecast that differed from observed values.

2. NASA ROSES Project: Decision-Making in Water Resource Management

Dr. Tracy Irani (UF) provided updates on her study on decision making in water resource management. Due to low response rate of the online survey sent to water managers, her team will conduct interviews via Zoom to collect data this spring. She encouraged utilities and water resource managers to participate in interviews if requested. Results are anticipated this summer with a publication later this year.

3. Decision Making Under Uncertainty: A Water Supply Infrastructure Planning Tool

Dr. Tirusew Asefa, P.E. (Tampa Bay Water), presented an approach for decision making under uncertain future water supply and demand. A modeling tool to forecast water demand and supply including their variability was developed. Modeling results can be used to select optimal resilient water supply projects and determine their timing of implementation in the face of an uncertain future. A financial model is coupled with demand-supply reliability model to optimize unit rates of water supply delivery costs, meeting utility financial covenants, and balancing infrastructure costs. A simplified modeling approach can be used for small and mid-sized utilities to incorporate uncertainty in demand and supply by using stochastic analysis to look at future rainfall projections and other climate change impacts.

4. Intake Structure Siting Evaluation on the Lower Peace River Using Differing Sea Level Rise Scenarios (PR^3) Project

Daniel Roberts (PRMRWSA) presented on a study to model the effects of four sea level rise (SLR) scenarios (2.4", 3.96", 9.12" and 36") on two different proposed river water intake pumping stations located on the Peace River. The proposed project would augment existing reservoir and ASR well storage, and double capacity to meet future water supply needs. Four intake sites located successively further upstream were assessed to maximize days that water quality met withdrawal requirements during different SLR scenarios. The SUMDAT model results indicated that systemwide reliability was minimally impacted (no effect until 36" SLR scenario) by the upstream intake location, while increasing the size of the reservoir (6bg vs 9bg) was found to significantly increase reliability. Minimal impact of intake location was due to the fact that poor water quality typically occurs during low river flows, which is when PRMRWSA is not allowed to withdrawal water anyway due to flow-based permitting constraints.

5. South Florida's Approach to Monitoring and Reducing Saltwater Intrusion Potential

Mark Elsner, P.E. (South Florida Water Management District, SFWMD), gave a presentation on saltwater intrusion monitoring, mapping, modeling, planning, and reduction efforts in south FL. Existing fresh groundwater supplies have been maximized, and to meet future increases in demand due to population growth, alternative supplies will be necessary. The Biscayne Aquifer is vulnerable to saltwater intrusion and thus many coastal utilities have developed alternative well fields further inland. Some facilities are using brackish groundwater as an alternative source, which requires extensive treatment and injection of brine into deep wells below the aquifer. Wastewater reuse is also being optimized where available. Water use permitting requires that applicants demonstrate the withdrawal will not increase saltwater intrusion and include a monitoring plan. Saltwater interface mapping is conducted every 5 years and is used to inform permitting and water supply planning. Regional groundwater modeling is also used to evaluate resources and assess regional trends. Regional water supply plans are updated every 5 years.

6. Sea Level Rise, Saltwater Intrusion and Mangrove Migration: Initiating an Ecosystem Restoration Project

Dr. Gina Ralph (USACE) presented on the BBSEER-Regional Sediment Management (RSM) Project that is assessing the beneficial use of dredged material from federal channels in restoration projects. Thin Layer Placement (TLP) is being used to deposit dredged sediments on marsh areas to increase elevation and enhance hydraulic connection management, which can improve ecological resilience to sea level rise. **Dr. Fred Sklar** (SFWMD) presented on the Everglades Mangrove Migration Assessment Study (EMMA), which is linked to the BBSEER-RSM Project. Increases in SLR and saltwater intrusion have caused marsh peat collapse in the Everglades, leading to loss of ecosystem services and biodiversity. EMMA is a pilot study to increase sediment accretion rates by using TLP and phosphorus in key areas to facilitate mangrove migration. Movement between peat and marl systems with TLP is possible.

7. Maryland's Plan to Adapt to Saltwater Intrusion and Salinization

Jason Dubow, CC-P (Maryland Dept. of Planning), presented on Maryland's plan to adapt to saltwater intrusion and salinization. Saltwater intrusion is impacting aquifers, surface water and wetlands, coastal forests, agriculture, and infrastructure in Maryland. A collaboration of state agencies, universities, and the Maryland Geological Survey worked on developing state-level planning, concerns, and area-specific responses to intrusion. Key sections of the plan included: drivers of salinization; threats, concerns, and impacts; research recommendations; and adaptation recommendations. Goals were divided into short-, medium-, and long-term projects with an updated plan every 5 years. The Maryland planning effort can serve as a template for other states working on climate change, with an opportunity to communicate and build from their successes.