THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

100 CAMBRIDGE STREET, BOSTON MA 02114

Meeting Minutes for January 13, 2022

Meeting conducted remotely via Zoom meeting platform, 1:00 p.m.

Minutes approved March 10, 2022

Members in Attendance:

Vandana Rao	Designee, Executive Office of Energy and Environmental Affairs (EEA)
Linda Balzotti	Designee, Department of Housing and Community Development (DHCD)
Duane LeVangie	Designee, Department of Environmental Protection (MassDEP)
Anne Carroll	Designee, Department of Conservation and Recreation (DCR)
Kate Bentsen	Designee, Department of Fish and Game (DFG)
Hotze Wijnja	Designee, Department of Agricultural Resources (DAR)
Thomas Cambareri	Public Member
Vincent Ragucci	Public Member
Kenneth Weismantel	Public Member

Members Absent

Todd Callaghan	Designee, Massachusetts Office of Coastal Zone Management (CZM)
Samantha Woods	Public Member

Others in Attendance:

Aaron Weieneth	AECOM
Alison Field-Juma	OARS
Amanda Kohn	Sustainability Director, Concord, MA
Andrea Donlon	Connecticut River Conservancy
Andreae Downs	WAC
Barbara Warren	Salem Sound Coastwatch and MassBays Partnership
Becca George	DHCD
Cece Gerstenbacher	MVPC
Chelsea Zakas	City of Beverly Planning Department
Dan Barstow	Lake Boon
David Hilgeman	MassDEP
Denise Pires	EEA
Elise Tarnauskas	Springfield Water and Sewer Commission
Eric Hutchins	NOAA Restoration Center, Gloucester, MA
Erin Graham	DCR/OWR
Gardner Bent	U.S. Geological Survey
Gerald Clarke	Dover Board of Health
Ghazal Shabestanipour	Tufts University, PhD Candidate
Gregory Stewart	USGS New England Water Science Center
Jen D'Urso	MassDEP
Jennifer Pederson	Massachusetts Water Works Association
John Macone	Merrimack River Watershed Council
John Scannell	DCR, Division of Water Supply Protection
Jon-Eric White	Private Citizen
Julie Wood	Charles River Watershed Association

Justine Kent-Uritam	Water Committee, Town of Dover
Kara Sliwoski	DCR/OWR
Katharine Lange	Mass Rivers Alliance
Katie Ronan	MWRA
Lexi Dewey	WSCAC
Linjun Yao	MassDEP
Lisa Rhodes	MassDEP Wetlands Program Chief
Margot Mansfield	EEA
Marilyn McCrory	DCR/OWR
Melissa Simoncini	Concord
Nicole Belk	National Weather Service
Pallavi Mande	Tamraparni.org
Pamela Lombard	USGS
Paul Kirshen	UMass Boston
Paula Terres	Private Citizen
Peter Phippen	MassBays National Estuary Partnership, Upper North Shore Region
Read Porter	EEA
Rebecca Quinones	MassWildlife
Sara Amish	Harvard
Sara Cohen	DCR/OWR
Sarah Bower	Mass Rivers Alliance
Scott Olson	USGS
Scott Steinschneider	Cornell University
Thomas Maguire	MassDEP Wetlands Program
Tim Stagnitta	Rhode Island Water Resources Board
Vanessa Curran	DCR/OWR
Viki Zoltay	DCR/OWR
Wayne Castonguay	Ipswich River Watershed Association

Rao called the meeting to order at 1:06 p.m.

Agenda Item #1: Welcome and Introductions

Rao welcomed the attendees. She announced that the meeting was being recorded and all votes would be taken by roll call. She invited those who wish to speak during the meeting to indicate this in the chat window. A roll call of members in attendance was taken.

Agenda Item #2: Executive Director's Report

Rao announced that WRC staff are currently reviewing the Auburn Water District's request for an interbasin transfer of water. She announced dates for virtual public hearings in the donor and receiving basins (January 20 and 26, 2022), explaining that the Interbasin Transfer Act requires the commission to obtain public comment on the impacts of proposed projects.

Rao announced that the regulations on Notification Requirements to Promote Public Awareness of Sewage Pollution (314 CMR 16.00) were promulgated on January 7, 2022. She thanked the commission and all who were involved in the process of drafting and commenting on these regulations. Rao announced that EEA's Drinking Water Supply Protection Grant Program is accepting applications for funding to protect land around wells and reservoirs. Grants of up to $300,000 are available, and applications are due March 18, 2022 (more information at https://www.mass.gov/how-to/apply-to-the-drinking-water-supply-protection-grant-program).

Rao invited announcements from commission members. Weismantel requested that the commission consider a policy review, under the Interbasin Transfer Act, on the question of what constitutes a reasonable cost for treatment if a transfer is being sought because of PFAS contamination of local water supply sources. Rao acknowledged that PFAS contamination may prompt more communities to seek out-of-basin sources of water. She explained that applicants for an interbasin transfer must demonstrate that there are no viable in-basin sources. She added that the commission may want to look into the economic reasons for sources not being viable.

Bentsen announced a grant to replace culverts to meet stream crossing standards, with responses due in mid-February. She provided a link: https://www.mass.gov/how-to/culvert-replacement-municipal-assistance-grant-program. Pederson requested that the list of eligible entities be expanded so that independent authorities can also apply.

Agenda Item #3: Update: Hydrologic Conditions

Rao introduced Erin Graham of DCR to provide an update on hydrologic conditions for December 2021. Graham reported that December temperatures were above normal, with both the Boston and Worcester climate sites being in the top twenty-four warmest Decembers. Precipitation was below normal in the Northeast, Southeast, Cape Cod, and Islands drought regions. Streamflow and groundwater were in the above-normal to normal range. Lakes and impoundments were mostly normal to above normal. Snowfall was below normal, with the northwest part of the state seeing more significant snowfall. The monthly and seasonal drought outlook shows no signal for drought development.

Rao explained that while the snow deficit is a concern, the fact that drought index severity levels are triggered in the one-month lookback for just one drought index – i.e., precipitation – is not sufficient to trigger a drought call. She added that staff will continue to closely monitor all of the drought indices.

Cambareri noted that the hydrologic conditions report is fundamental to the commission's purpose and requested a different format for the presentation to allow more information to be provided about each index. Wijnja asked if the report could be e-mailed before each meeting. Rao explained that if quality control of the data is completed in time, the report can be sent to commission members before the meeting. She said staff would look into alternative formats for presentation of the hydrologic conditions report to address comments by commission members.

Agenda Item #4: Vote: Meeting Minutes, October 2021

Rao invited a motion to approve the meeting minutes for October 14, 2021. There was some discussion about whether a member who was not present at a meeting can vote on minutes of the meeting. Porter indicated that members are not prohibited from voting on minutes of a meeting where they were not in attendance, but the member can also abstain if they are not comfortable voting on the minutes. He offered to confirm this finding.

VOTE	A motion was made by Weismantel with a second by Ragucci to approve the meeting minutes for October 14, 2021. The roll-call vote to approve was eight in favor and one abstaining (Balzotti).

Agenda Item #5: Presentation: Massachusetts Drought Dashboard

Rao noted that, with funding from EEA, WRC staff have been working with staff at the Northeast Regional Climate Center at Cornell University to develop a drought dashboard. She explained that the dashboard will automate many calculations that were previously done manually, saving time and allowing data to be shared in real time with the public.

Zoltay showed how to find the dashboard at https://www.mass.gov/info-details/massachusetts-drought-resources and provided a demonstration of the dashboard, its features, and how to navigate the site. She noted that users can find data on five of the six drought indices used in the Massachusetts Drought Management Plan. A similar format – featuring a map, summary table, and data on individual stations – is used for each index, with some differences for the lakes and impoundments index. She noted that the dashboard provides both monthly and weekly updates, and that weekly calculations have become more important with the occurrence of flash droughts. For the accumulated precipitation deficits graph, she noted that daily updates are also provided.

She showed NOAA and USGS products that can also be accessed through the dashboard, such as precipitation, temperature, and drought outlooks; a graph of streamflow percentiles; and a map of snow water equivalent data.

Comments, questions, and responses:

- Pederson asked what the designation "weekly" means for the Standardized Precipitation Index data. Zoltay noted text above the map and explained that there are rolling 30-day, 60-day, or 90-day, etc., calculations for weekly updates, depending on the lookback period selected.
- Pederson asked who will be responsible for maintaining the dashboard. Rao explained that EEA has a contract with Cornell University to maintain and update the site.
- Wijnja asked when data for the Evapotranspiration Index will be available. Rao explained that WRC staff are working with Cornell University to identify a product to replace the index currently used in the Massachusetts Drought Management Plan. Details will be presented first to the Drought Management Task Force, followed by a recommendation to the Water Resources Commission. She added that the new index should be available before the next growing season.
- In response to questions from Maguire, Zoltay confirmed that "accumulated precipitation departure from normal" is expressed in inches and that this is based on NOAA's 30-year average. She noted that the graph provides data for one station in each drought region.

Rao invited feedback on the Drought Dashboard and noted that efforts to refine the site are ongoing.

Agenda Item #6: Presentation: Future Climate Projections Across Massachusetts Using Statistical Modeling

Rao acknowledged team members from EEA agencies, the U.S. Geological Survey, Tufts University, and Cornell University who have been working on this project for the last couple of years. She explained that researchers know that precipitation is changing but do not have good precipitation projections at smaller scales for Massachusetts. She added that this project aimed

to bring the latest research from other areas and new methodology to Massachusetts and the Northeast.

Rao explained that this is a two-phase project, with the first phase being an exploration of climate scenarios and development of a model using precipitation projections to project streamflows. She explained that the research team picked one pilot watershed, the Squannacook subbasin, to test the modeling effort in different settings with varying human influences and develop a methodology. In phase two, the methodology would be applied statewide. She introduced Scott Steinschneider from Cornell University to discuss the climate aspects of the project, adding that the hydrological aspects will be discussed at the March WRC meeting.

Steinschneider explained why global climate models are ill-suited to quantifying climatic and hydrologic risk at the local level, adding that the chain of interlinked models scientists use to make projections generally underestimate extreme events. To illustrate the challenges with quantifying future climate risk, he gave an example of a bias in a global climate model that might be interpreted to indicate an increase in precipitation in Massachusetts, adding that this signal of change from baseline could be an artifact of this bias. He noted the amount of complexity built into climate projections should be tailored to the purpose for which the data will be used.

He then described the first of two products of the project, a set of updated Intensity-Duration-Frequency (IDF) curves under climate change across Massachusetts. He explained that these curves are used to determine the precipitation depth for a particular duration of rainfall (for example, a 24-hour event) and recurrence interval (for example, a 100-year recurrence). He added that IDF curves are commonly used in developing design standards for stormwater management. They have been developed by the National Oceanic and Atmospheric Administration and are being updated across the United States in NOAA Atlas 14.

He explained that warm air can hold more water vapor, and there is a theoretical rate at which that happens – for example, air will hold seven percent more moisture per degree Celsius of warming. He explained studies the team did to confirm whether extreme precipitation increases with certain amounts of warming in the record and what the scaling rate is for the Northeast for each season. He concluded that the scaling rate in the summer, when the largest extremes occur, is around seven percent, and that this is a reasonable rate to use in updating IDF curves.

In response to a question from Clarke, Steinschneider explained that though the compounding rate changes with temperature, it can be considered constant within the temperature ranges of interest here. Cohen asked if the findings suggest that the effect is reversed in the winter and spring, when scaling values are in the negative range. Steinschneider replied that any effect in the cooler seasons is within the “noise” of the statistical analyses.

Steinschneider explained that further analyses produced a set of warming projections for each HUC-8 river basin in the state and that these allow production of new IDF curves. He summarized by noting that the team has updated, across the state, future precipitation in inches for different recurrence intervals, thus updating design storms to account for climate change.

Steinschneider then described Project No. 2, development of a stochastic weather generator for climate projections across Massachusetts. He explained that the stochastic weather generator is a statistical model that simulates, through time, large-scale atmospheric circulation patterns that

influence the Northeast. Based on these "weather regimes," the model simulates precipitation and temperature for a given location. These are then used to produce climate boundary forcing conditions that reflect climate changes that the weather generator can simulate in the future.

He reiterated that this effort targets changes in temperature and scaling of precipitation with temperature. He explained that the weather generator is used to generate a set of statistics for each warming scenario. He added that the next step brings in future temperature changes suggested by the global climate models. The weather generator then pulls statistics for the range of warming scenarios at a particular time in the future for a given region. He concluded by noting that simulations from the weather generator, under baseline conditions, match reasonably well with the statistics in the observed record.

Field-Juma asked about variations in actual rainfall in a watershed and whether those can be used to look at subwatershed impacts. Steinschneider explained the spatial resolution of the model, adding that the weather generator is modeling climate at multiple locations within a given river basin. He cautioned, however, that a different set of tools would be needed to isolate changes at a subbasin scale.

Rao invited the Cornell University and USGS team to describe the products they will be producing. Steinschneider explained that the Cornell team will produce tables of change for a variety of statistics for every HUC-8 watershed across the state, and USGS will produce a visualization tool to help users see data spatially on a map. In addition, the team updated rasters of design events in NOAA Atlas 14 with climate-change informed values. He also noted peer-reviewed publications resulting from this effort.

Rao noted the value of peer review in research the state uses for policy and decision-making. She added that the project's biweekly team meetings have also included experts who provide feedback on the team's approach and that USGS also engages in a technical review process for its publications. She added that this level of scrutiny gives the team confidence in the results.

In response to a question from Weieneth, Rao said that products from Phase One of the project should be available in two to four months, and funding is being sought for Phase Two, which will expand the hydrological modeling approach statewide. Rao concluded by noting the importance of this work in helping planners and designers understand the potential vulnerabilities of infrastructure in the future.

Rao invited a motion to adjourn. Weismantel made the motion, with a second by LeVangie. The roll-call vote to adjourn was unanimous of those present. The meeting adjourned at 3:11 p.m.

Documents or Exhibits Used at Meeting:

1. WRC Meeting Minutes: October 14, 2021
2. Notice of Public Hearings for Auburn Water District's ITA Application
3. Interbasin Transfer Act project status report, January 5, 2022
4. Hydrologic Conditions in Massachusetts, December 2021 (available at https://www.mass.gov/info-details/monthly-hydrologic-conditions
5. Link to Massachusetts Drought Dashboard; https://www.mass.gov/info-details/massachusetts-drought-resources

Compiled by: mjm

Agendas, minutes, and other documents are available on the web site of the Water Resources Commission at https://www.mass.gov/water-resources-commission-meetings. *All other meeting documents are available by request to WRC staff at 251 Causeway Street, 8th floor, Boston, MA 02114.*