



WSCAC Meeting

Location: MWRA Facilities
Southborough, MA
March 10, 2020 – 10:00 am

Members in Bold in Attendance:

Michael Baram, WSCAC Chair (by phone)

Whitney Beals

William Copithorne, Town of Arlington

Steven Daunais, Tata & Howard

Andrea Donlon, CT River Conservancy (by phone)

Gerald Eves, Trout Unlimited (by phone)

Bill Fadden, OARS

Bill Kiley, BWSC

Paul Lauenstein, NepRWA

Martha Morgan, Nashua River Watershed

Martin Pillsbury, MAPC

Janet Rothrock, League of Women Voters

Bruce Spencer

Kurt Trampusch, Wayland Wells

Roger Wrubel, Mass Audubon (by phone)

Non-Members in Attendance:

Adrianna Cillo, BWSC (by phone)

Lexi Dewey, WSCAC

Andreae Downs, WAC

Steve Estes-Smargiassi, MWRA

James Guidod, MWRA AB

Daniel Moss (by phone)

Ace Peckham, WSCAC

Matt Walsh, MWRA Res Ops

Presentation

Lexi Dewey opened the meeting, and asked that attendees introduce themselves. Michael Baram, Andrea Donlon, Roger Wrubel, Jerry Eves, Adrianna Cillo and Daniel Moss called in to the conference call line, and introduced themselves as well.

Due to a lack of a quorum, Lexi noted that members present were unable to approve the February minutes. The Ware River Access Plan, discussed at the December 2019 WSCAC meeting has been delayed by the Commissioner. There will be a public meeting at the Quabbin High School on March 19th to discuss public concerns.

The Water Supply Protection Trust meeting, scheduled for March 11 has been canceled. The MWRA Advisory Board sent a letter to Secretary Heffernan of Administration and Finance requesting that DCR-DWSP be exempted from a DCR-wide hiring cap. WSCAC, the MWRA Board of Directors, and the Water Supply Protection Trust all sent similar letters. The Quabbin Watershed Advisory Committee is preparing one as well.

Information in the MWRA 2nd Quarter Orange Notebook will be addressed today by Steve Estes-Smargiassi in his upcoming presentation.

Matt Walsh, Reservoir Operations Project Engineer, began his presentation, available [here](#). He led with a slide showing precipitation by month (figures are a combination of Quabbin and Wachusett watersheds) over the course of 2019 and the first two months of 2020. January's precipitation in 2020

was lower than January 2019, but February 2020 had roughly the same amount as February 2019. The total amount of precipitation is approximately 1.5" lower than normal by this time of the year, as compared to a 35 year average. Yield is within the 35 year average. Steve noted that an average amount of rain in 2020 may still result in lower than average yields, because the 2019-2020 winter had very little snow. Yield in September of 2019 was negative, due to low rains and high evaporation rates. Paul asked for clarification on the definition of yield, and Matt and Steve responded that system yield is defined as the water produced by its sources, and is reported as the net change in water available for water supply and operating requirements, e.g. change in storage, generated by monitoring how much water is entering and leaving the reservoir. If the reservoir level goes up despite use, there's a positive yield.

Michael Baram asked how much of the Quabbin Reservoir water is unusable. Steve responded that the level of Drought 3 (which is triggered around 50%) is where MWRA becomes concerned. Once the reservoir is down to about 25%, the water quality is somewhat decreased. However, that would be a very unusual event (it has never happened), and Wachusett also provides a backup source if Quabbin levels begin to steeply drop.

Paul asked if there isn't any rain, would Quabbin have enough water for 5 years. Steve responded that the figure is rough and not one used for their predictive calculations. Given the driest years, precipitation still occurs, albeit at lower numbers.

Matt shared a slide that shows the Quabbin Reservoir's levels which include averages for the past three years, as well as a line indicating the long-term average and a line indicating levels that would be below normal. 2020 is shaping up to be above the long-term average.

Matt's next slide showed the Quabbin Reservoir's volume measured on the 1st of every month. Since late 2017, levels have been consistently higher than normal, and are currently around 95%. Steve remarked that this is in part due to a reduced demand for water.

Matt shared a graph that traces Quabbin's annual levels allowing viewers to compare year to year. He noted that Wachusett Reservoir is kept at an operating band of 390-395, with an ideal elevation of 390. Steve pointed out that while it seems like a good idea to keep the reservoirs high so as to hold water in storage, this increases the risk of downstream flooding after heavy precipitation. There is a constant balancing act of making sure the water levels are high enough to meet demand, and not so high that an influx of rain or melting snow could cause flooding downstream.

Paul mentioned Oroville Dam in California, where the main and emergency spillways were damaged. Steve responded that the MWRA paid close attention to that event, and has made sure to reduce the risk of a similar event here in Massachusetts. He also shared that the peak spilling at Oroville totaled half a Wachusett per day – the Oroville watershed is very big.

Lexi asked if there are there any predictions for rain this summer? Steve said that they're holding back extra water in the reservoir by use of a stoplog since they won't have extra snowmelt to count on. There's a slightly higher risk, since the reservoir is now higher and there's less control over where the water can go. The stoplog can't be removed until the water goes back down, but they're banking on a dryer spring. The stoplog offers less flexibility than a crestgate, but installing a crestgate at Quabbin is a very large and complicated project. The MWRA hopes to move forward with this project at some point, but aren't yet at a stage where it's feasible.

Matt showed figures detailing mandated releases to the Swift River and the Nashua River. This does not include the 6 mgd released to the McLaughlin hatchery. Kurt asked about the heavy snows several years ago, whether the snowpack affected the reservoir numbers significantly. Matt and Steve explained that while the snow was deep, it was very dry snow, so there wasn't an overabundance of water draining into the watershed. The weather stayed cool, so the thawing process took several months.

Matt noted that daily withdrawal continues to be lower than the 36-year average.

Matt shared a graph of the Sudbury and Foss Reservoirs, both of which are much smaller. They are known as emergency backup reservoirs. These reservoirs are typically "drawn down" in the winter, which means that their water levels are lowered in order to kill off invasive plants. Janet asked for clarification on this, and Steve explained that dropping the water levels down low enough will cause the roots of invasive plants to freeze, which causes them to die back. This year, however, the weather wasn't cold enough. The ground didn't freeze adequately to cause the level of die-off that they had hoped for. (This practice only works with the shallower reservoirs.) In response to questions, Steve explained that the Quabbin Reservoir is oligotrophic, or low-nutrient/unproductive, which why exotic aquatic vegetation is rarely present in the water. This is not true in the Wachusett Reservoir where there is an ongoing annual removal of invasive aquatic plants.

Kurt asked if any areas in the Sudbury and Foss system have sufficient conditions to produce large amounts of cyanobacteria and similar toxic forms. Steve noted that MWRA and DCR-DWSP monitor for bacteria. Chestnut Hill has been treated in the past with alum to address algae blooms. Copper sulfate can also be used but MWRA rarely uses this treatment in the reservoirs.

Steve started his presentation. His first slide showed Quabbin Reservoir levels from its inception in 1948. Taking water from the Ware River began in the late 1930s, because the Wachusett Reservoir was starting to run low and the Quabbin was not yet ready.

Janet asked about the graph's background, which has different colors to indicate the percentage of water remaining in the Quabbin. The regularly spaced spikes indicate the normal change in reservoir levels due to the changing seasons (the lowest levels, Drought Emergency Stages 2 and 3, don't have spikes simply because Steve doesn't expect to ever operate the reservoir at those low levels).

The slide shows the drought in the 1960s, which was a 1 in 400 – 1 in 1,000 year event, based on precipitation records and tree rings. This drought is the benchmark for all future drought management plans. He pointed out that some reservoirs are designed for only one year – it drains and fills throughout the year, but relies on sufficient rain to refill in the spring. These reservoirs face difficulties in a short steep drought.

MWRA reservoirs, on the other hand, are able to handle short droughts fairly easily, but long term multi-year droughts are cause for concern. In the 1980s, for example, MWRA customers were still using over 300+ million gallons a day, so a drought in 1989 caused the Quabbin levels to dip close to warning level.

The difficulty with gauging how much water to keep in the reservoirs is that there is no way to predict rainfall beyond a month or so.

Bill Fadden asked if the Drought Emergency levels existed in the drought in the 60s. Steve responded that there was a drought plan, but the current plan and levels were developed in the 1980s.

Steve then shared a second presentation, *Report on 2019 Water Use Trends and Reservoir Status*. The first slide shows how the total consumption by MWRA communities has decreased significantly since 1980, mostly due to water conservation tools (public education, leak repair, the shift to water-saving devices), as well as a shift in the users (e.g. metal processing plants shutting down). In 1980, total consumption was around 300 million gallons a day in contrast to an average year-round of 180.6 mgd in 2019.

Boston's total water use has decreased as well, despite the increase in population and construction. Steve shared a slide that showed the daily system demand, indicating that the highest use day over the summer was still below the 300 mgd that was average in the 1980s.

Steve is attentive to seasonal water use demand, so as to be prepared. Kurt asked about the partially-supplied communities that typically need water in the summer, and Steve said that these communities do not account for a large percentage increase.

The next slide showed the demand vs the safe yield. At this time, the figures are well below the safe yield limit of 300 mgd.

Janet asked about population increases. Steve responded that new appliances are more efficient, so people moving in are balanced out by new toilets and other water efficient devices becoming more widespread.

Andreae asked about green roofs. Steve said that the best green roofs tend to use succulents, and there aren't enough of them to have a significant impact.

Paul asked about the differences in numbers in the various charts. Steve noted that the total withdrawal includes water leaving the reservoir, not just what's sold to communities. The extra water goes to things other than household use (such as water released to the McLaughlin Fish Hatchery and mandated river releases to the Swift and the Nashua).

Kurt asked about the role of commercial and industrial facilities that use a lot of water, like Biogen or data centers. Steve said he hasn't seen many uses in this category. For example, biotech companies use very highly purified water, so they conserve and recycle it as much as possible.

Steve began discussing the document on climate concerns put together by WSCAC members Janet, Paul, and Roger. He commented that MWRA wants to be as efficient as possible regarding environmental and energy issues. Reductions in water use by necessity means reductions in energy use, as it relates to treating and moving less water. While Net Zero goals are good, they're complicated and difficult to attain. Some facilities (e.g. the new Wachusett Aqueduct pump station) are net zero in most respects, but the pumps are not. This is a common problem throughout the MWRA because water is heavy. Once the pumps are active, they use energy. The only way to get to zero is to offset the energy use.

Roger asked about how the pumps are run. Steve said that all the pumps are now electric, so the greener the grid, the greener MWRA is.

MWRA tracks their total energy use. About ¼ of their total energy use is created by MWRA, through solar, wind, and methane produced and utilized at Deer Island. The remaining use of fossil fuels is primarily electricity, diesel for generators and heating buildings (typically oil and natural gas). They revisit these uses when renovating, but cost efficiency is still a priority.

All backup power must be propane, diesel, or natural gas, because if the grid is down, MWRA needs to rely on fossil fuels. Additionally, if there's a storm, they need to switch to backup power (diesel generators) before a power outage. It takes 30-60 minutes to start services back up if they've been knocked off-line. Deer Island treats 350 mgd-1.2bgd. If the grid goes down, the wastewater is not processed and it can back up causing sewer overflows.

Battery backup looks good on paper, but is only efficient for smaller loads. MWRA is installing batteries in some smaller facilities now, but Deer Island generators are 20 megawatts, which is impossible for batteries at this time. There is no way to predict how long a battery would need to last (possibly days). MWRA is looking at ways to utilize batteries, and they may be able to do more in the next several years, but at this time, there is not a huge benefit.

There is currently an ongoing study at Deer Island which may result in a shift in how the facility uses methane. The methane currently produces heat and a smaller amount of electricity. A potential combined heat and power project would increase the amount of electricity generated from methane thus decreasing the cost of electricity purchased from the grid.

Kurt asked about floating solar collectors on the reservoirs. Steve said that it doesn't work for the MWRA for several reasons: Putting panels in the reservoir will increase bird activity, which will increase bird droppings, and will probably result in having to build a filtration plant for the water. Steve also noted that it makes much more sense to him to add canopy solar panels over parking lots rather than solar panels in the reservoir. Cost benefit is still important, so the solar canopy project is on hold (solar panels at the Carroll Water Treatment Plant were paid for by a government stimulus package).

Kurt asked about turbines in the water pipes, but Steve said there would be little to no reward for the addition in current infrastructure. A turbine is used at Loring Road, at Oakdale and there is a small one in use where the water goes into the McLaughlin Fish Hatchery pipe.

Bill Fadden asked about turbines at Wachusett and Quabbin, but Steve responded that there are challenges (the pipes are not in line from the reservoir to the river, and height variability is an issue) that makes it infeasible.

Paul commented that he remembered that MWRA turns on backup power at Deer Island during peak times so as to not strain the grid. Steve responded that this is correct, and it increases the MWRA carbon footprint, but in turn reduces the grid footprint.

Steve then discussed a few other steps that MWRA has been taking, including electric vehicles and lawn equipment. These are harder to coordinate than it might sound – if a worker only has enough charge to get back and forth to the office, then if there's an emergency at night, they still need to make sure their car charged. Alternatively, if the car isn't used often, charging isn't an issue, but it's not an efficient use of an energy-efficient vehicle if the car is only used three times a week.

Lighting at MWRA buildings has mostly been converted to LED now, which improves energy efficiency – the LEDs turn on very quickly, as opposed to the fluorescents previously in use.

MWRA has insulated water pipes, because there are often issues with condensation, and therefore a need for dehumidification (usually through air conditioning).

Kurt asked whether the MWRA has altered water rates over the last 20-30 years to encourage new customers. Steve said no, but they have changed the payback process of the entrance fee.

Steve noted that climate change and increased droughts may alter safe yield, so MWRA has been studying climate projections to be prepared. In the event of heavy rains, the dams are well-situated, and are being watched.

Paul asked about the risks of being short-staffed due to COVID-19, and Steve responded that the MWRA has a complete pandemic plan, which includes backups for important staffing roles. While less vital tasks, such as lawn care, may fall by the wayside, the public will continue to have access to clean potable water and wastewater will be processed.

Steve directed the meeting attendees to the Orange Notebook, 2nd Quarter (available [online](#)).

The meeting was adjourned.

WSCAC and WAC were scheduled to meet at the Waterworks Museum on April 21, 2020 at 10:30 am. However, the meeting will now be virtual. Details will follow in the next several weeks. Please [visit our website](#) for more information.