



Delaware River Basin Commission

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MEETING SUMMARY

For Meeting of the Regulated Flow Advisory Committee

Remote Meeting on March 23, 2022

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A meeting of the DRBC Regulated Flow Advisory Committee (RFAC) was held remotely via Zoom on Wednesday, March 23, 2022. The meeting agenda included an introduction to Dwarf Wedgemussels in the Delaware River Basin, a status update on several studies relating to flow management as defined by the Flexible Flow Management Program (FFMP) 2017, a presentation on the Delaware Aqueduct Repair scheduled to occur in October 2022, presentation on the aqueduct shutdown noting safety concerns about operation of the New York City Delaware River Basin reservoirs prior to and during the shutdown period. A public comment session followed the presentations. It was recommended that comments should be directed to the presenters, whose contact information was provided. Additional comments were to be emailed to Amy Shallcross (Amy.Shallcross@drbc.gov).

Brenan Tarrier presided over the meeting. Committee business, discussion and decisions are summarized below:

Committee Business:

Brenan Tarrier introduced himself and the members of the committee. After reviewing the agenda for the meeting, the minutes of the two previous RFAC meetings of October 7, 2020, and December 15, 2021, were approved unanimously.

Presentation on Dwarf Wedgemussels in the Delaware River Basin

Jeff Cole from the United States Geological Survey (USGS) gave a presentation on the Dwarf Wedgemussel (DWM). The DWM carries the important function in the basin of water filtration, substrate stability and food source for fish. DWM is an endangered species (both state and federal) as the population has declined in recent decades. The aim is to recover populations, in the Upper Delaware and throughout the range, and remove the animal from the endangered species list. The known locations of the DWM were displayed on a map, which pointed out several locations in the Delaware River Basin (DRB). There are between 7 and 34 combined river miles in the DRB where DWM are known to exist, with specific locations in the mainstem Delaware, in the upper basin, the Neversink River, the Flat Brook River, and the Paulins Kill. Compared to other river basins, the DRB contains a high number. The latest quantitative and qualitative studies as recent as 2017 have estimated that the population is between approximately 8,000 and 26,000 animals. Jeff noted that although the gap between qualitative and quantitative studies in the past 20 years was longer, the USGS has been back to the DWM sites several times to check on the presence of DWM. This summer, they plan to re-evaluate the DWM site at Callicoon.

Freshwater mussels (including the DWM) require fish hosts for their life cycles. There were 32 fish species tested and the slimy sculpin led to the best transformation from larvae to adult. The Striped Bass and the Tessellated Darter also led to good transformation. The USGS is considering testing Shad, Herring, and American Eel for their ability to be a host fish. An interesting distinction is that the host fish used by the DWM changes depending on the river system, which suggests the importance of having specific studies on DWM in the DRB.

The DWM has several habitat needs. The DWM is sensitive to water quality metrics such as a calcium level above 27 mg/L, a specific conductance greater than 250 mg/L, and the presence of chlorine, copper, and ammonia. Note that these metrics were evaluated individually, and that multiple stressors at once could have a compounding affect that leads to less tolerance to any of the water quality metrics mentioned above. In terms of ecological flows, the DWM prefers moderate velocity water, fine sediment, deep and non-turbulent water, and stable/persistent habitats. The DWM exhibits a strange dewatering behavior, where they tend to dewater themselves. Unfortunately, the dewatering is lethal after 30 minutes and the DWM do not try to get back to the water. The DWM is sensitive to water temperature, preferring cooler temperatures which are required for basic life cycles. The water temperature is important throughout the year depending on what part of the life cycle the DWM is in. The host fishes for the DWM are also cooler water temperature species, and groundwater inputs are important to consider due to the impact on the water temperature. Jeff noted that flow and temperature are linked, as well as groundwater. The DWM also prefers a low level of development in the areas surrounding the river, as well as an open canopy. Dams are not conducive to the DWM due to their ability to alter flow regimes, increase scour and disturb habitat, increasing the chance that the host fish may decouple from the DWM in terms of location. This means that the locations of the host fish in the rivers will not be collocated with the location of where DWM can survive and reproduce. Flooding which also increases scouring and disturbs habitat is another risk to DWM development and life cycle.

The presentation concluded by reiterating the fact that the upper DRB has the second largest population of DWM and the need to protect the animals is high. Flow management is critical to the protection of the DWM, and climate change is likely to challenge the population. The USGS and the United States Fish and Wildlife Service (USFWS) are open to future collaboration with RFAC.

Questions were asked after the presentation. Jeff clarified that although the data for the Delaware River is several years old, they have been back to perform checks on the sites and found animals in the environment. A question was asked about the temperature at which the DWM begin to gape. The DWM is more sensitive to temperature compared to other mussel species, and begin to gape at 15 to 20 degrees C. Their critical thermal maximum (CTM) is 32 degrees C. Someone asked if the USGS was aware that flow augmentation due to the Delaware Aqueduct Shutdown may impact the flow regimes this summer along the mainstem, and if that will impact the study planned for the summer near Callicoon. Jeff noted that the team will be targeting the optimal flow conditions and the study will be dependent upon those conditions. Brenan asked why the DWM are not observed north into the Susquehanna. Jeff noted that there has never been any known presence of DWM in the Susquehanna, and that historic records point this out as well. A question about the Mongaup Settlement impacts on the Callicoon stretch of the DWM was asked. Jeff noted that some of the settlements were to look out at the Callicoon location and limit large releases when the releases would cause Callicoon to drop below sufficient levels to maintain habitat for the DWM. Someone asked if DWM are prevalent in the Hudson, and Jeff did not have the answer to that at the time. Dan Plumer asked what the process would be for making recommendations to RFAC concerning the DWM. Jeff noted that this would be done through the FFMP, and Amy Shallcross (DRBC) noted this presentation to RFAC is the first step in the process of taking up the USFWS on their offer to provide protection for the DWM in the upper basin.

A brief update on the FFMP 2017 Studies

Kendra Russell, the Delaware River Master, provided an update on the studies being conducted under FFMP 2017. The studies are in two parts, separated into the first and second five years of a ten-year agreement. During the first five years, three major issues are being studied including Salinity impacts due to potential detachment (scope provided to RFAC, and technical update at next meeting), Increasing NJ diversion while in drought (scope under development) and increasing/optimizing storage available for the lower basin (scope under development). Additionally, there is a study to be done on the Excess Release Quantity, for which a scope of work is under development. Kelly Anderson requested to view the technical update on the salinity study prior to the next meeting, and Kendra plans to take this request back to the interagency team.

Update on the Delaware Aqueduct Repair and impacts to the DRB Reservoirs in New York

Jennifer Garigliano, chief of staff for the NYCDEP Bureau of Water Supply, provided an update regarding the repair of the Delaware Aqueduct. Jennifer began by reviewing the NYC Water Supply System, which is comprised of the Croton, Catskill, and Delaware systems. They have 19 reservoirs and 3 controlled lakes. 1.1 Billion Gallons (BG) of water are used per day from these systems which provides half of the population of New York State with water. The Delaware Aqueduct repair is the largest and most complex repair project to be done in the history of the NYC water supply system. The cost of the project is 1 billion dollars, and the goal is to fix or eliminate the ongoing leaks. The plan is to build and connect a new 2.5 mile bypass tunnel below the Hudson River, and is expected to be complete in 2023. The aqueduct is expected to be shutdown beginning in October of 2022 in order to complete the project. The Aqueduct itself is 85 miles long, and connects Rondout Reservoir to Hillview Reservoir. It is the longest tunnel in the world, and provides 50 to 60 percent of drinking water to NYC. It was last drained in 1957 and is a critical system component. In 1990 and 1992, two leaks were discovered: one in the Roundout Reservoir to West Branch Reservoir (located in the Croton System) segment of the tunnel, and the other in Wawarsing, NY. The two leaks total approximately 20 Million Gallons (MG) per day. The largest leak is from the Newburgh section of the river. It was a difficult section of the aqueduct to construct due to the limestone in that location. The steel lining used to secure the tunnel did not extend far enough and the leak is occurring at the location where the steel lining currently ends.

Extensive and thorough investigation was done using ROVs and AUVs to take pictures and determine the source of the leaks. The team identified several potential solutions and decided the best way was to build a bypass around the leaks. The bypass tunnel has been bored and is lined with concrete. In order to make the final connection to the Delaware Aqueduct, the aqueduct needs to be shutdown. This shutdown is expected to be performed this fall. Once the final connections are made on either side of the leaks, the existing aqueduct will be plugged. NYC is not planning to repair the existing aqueduct, and it will be abandoned in place. NYC has heard several concerns, and notes that there are many competing interests in the DRB. Jennifer reminded everyone that water supply is the largest concern for NYC, and they are doing their best to meet wants, needs, and desires of other stakeholders concerning habitat protection, flood mitigation, recreation, and salinity management. Jennifer noted that the project was subject to NY State's public process, and that NYC did an Environmental Impact Statement which was completed in September of 2019. Jennifer pointed to chapter 10, and specifically section 10.3 for RFAC to review the analysis impact to Delaware Water Supply.

The aqueduct will be shut down for 5-8 months to complete the project. While the aqueduct is shut down, NYC will use water from the Catskill and Croton systems to supply water for NYC. Typically, NYC strives to balance the water use of the three systems (Delaware, Catskill, and Croton), but before, during, and after the shutdown, the water operations will differ from normal. Before the shutdown, the city plans to preferentially use the Delaware System to provide drinking water to NYC and allow the Croton and Catskill systems to fill. This will bring the Delaware reservoirs lower, but not low enough to put the reservoirs into drought status. This newly created void would provide room for inflow in the NYC Delaware reservoirs while the aqueduct is shutdown. The Catskill and Croton systems will come close to empty (usable storage) during the shutdown as NYC preferentially uses them for water supply. After the shutdown, the Delaware River system will be used preferentially again, to allow the Catskill and Croton systems to refill.

NYC has performed models using OST to determine the levels reservoirs need to be drawn down to in order to limit spills in the Delaware River System during the shutdown. Jennifer noted that while the model provides useful information, it is the management team which makes the final decision on how to operate the reservoirs. Prior to the shutdown, the reservoirs will be approximately 5 feet below typical operations. Jennifer noted that if it is a wet year, the reservoirs will likely spill, but the goal is to maintain the Conditional Seasonal Storage Objectives (CSSOs). Some of the concerns that the reservoirs will be too full during the shutdown are difficult to consider, as there is no way to predict the weather out that far. The suggestion to NYC to install siphons in the Delaware River reservoirs are not being taken, that analysis was done as part of the Environmental Impact Statement (EIS), and it was determined they were not needed. Jennifer noted that they are installing three siphons at Rondout, because it will be the only way to get water out of the reservoir once the aqueduct is shut down. The siphons will be removed once the project is completed.

Garth Pettinger presented his concerns related to the shutdown of the Delaware Aqueduct

Garth began by making clear that a successful repair would benefit everyone. Garth cited the Environmental Impact Statement (EIS), and called into question the section on using the current FFMP and CSSO voids to control the releases. His concern is that with inability to divert water during the shutdown, the reservoirs will fill rapidly. Garth explained that significantly larger drawdowns for Pepacton and the Neversink are required to maintain the flood mitigation voids during the shutdown. This is because the inflow may exceed the release capability of the reservoirs. The solution Garth proposes is to draw down enough water considering the excess inflow and a three percent contingency, in order to maintain a 15 percent void through March 31, to absorb the typically high April inflows. A conservative approach for the Neversink, would be to maintain a 20 percent void through March 31. Garth provided specific calculations and numbers for each of the NYC Delaware River reservoirs.

Garth pointed out that the high release rates required to create the initial voids may conflict with the FFMP release rates. Garth suggested that a special Delaware Aqueduct water management program be put in place for the duration of the shutdown. His other concerns were that the EIS indicates that in the event of a drought, the repair would be postponed to 2023, but does not include a contingency for a wet year. Garth also asked that more public outreach be done to advise and caution the public on the higher than normal release rates expected.

Questions on the Delaware Aqueduct Shutdown

A question was raised on the impact of the shutdown on floodwater downriver. Jennifer clarified that the NYC reservoirs were built for the purpose of water supply and not flood control. She also mentioned that even when the reservoirs are full, they help to attenuate flooding impacts. The goal is to draw down the reservoirs as far as possible and still refill by next spring.

Steve Domber asked for clarification on the legends of the graphs that Jennifer showed previously, and also asked Garth when the excess releases to create voids need to start should his proposal be considered. Garth said the excess releases should take place from June 1 to Oct 1.

Public Comment

During the public comment session, members of the public expressed concern related to the Delaware Aqueduct shutdown. Peter Kolesar asked if the risks had been discussed with the Decree Parties. Jennifer assured that the decree parties were briefed, and they have committed to giving period updates on the status of the reservoir levels as the shutdown approaches. On the question of siphons, Jen explained that the team of scientists on the project had determined that they were not necessary. A member of the public, Karl Schmidt, asked how the statistics compared to data from the floods of 2004, 2005 and 2006 in the upper basin. Jen did not do a direct comparison to those floods, and Garth explained that his calculations are based on an average year to show what could be expected. Jeff Skelding thanked Jen for her work and reiterated that there may not be a lot of awareness of the shutdown and cascading effects on the flow regime among the upper basin. He commented that he is hopeful there is more public outreach, and Jen said that a communications plan is in draft.

Attendees*

Name
Jennifer Garigliano, NYCDEP
Brenan Tarrier, NYSDEC (acting chair)
Joe Miri, NJDEP
Steve Domber, NJDEP
Hoss Liaghat, PADEP
Laura Bitner, USACE
Kendra Russell, USGS
Kelly Anderson, PWD
Patty Murray, DNRC
Jeff Cole, USGS
John Wiley, USFWS
Garth Pettinger, Trout Unlimited
Amy Shallcross, DRBC
Kristen Bowman Kavanagh, DRBC

*The meeting was held as a ZOOM webinar and attendee information was not recorded. Only RFAC members, presenters and staff are listed.