

**DELAWARE RIVER BASIN COMMISSION
REGULATED FLOW ADVISORY COMMITTEE
September 20, 2012**

MEETING SUMMARY

The September 20, 2012 Regulated Flow Advisory Committee (RFAC) meeting began at approximately 10:00 AM at the Delaware River Basin Commission (DRBC) offices in West Trenton, New Jersey. Ms. Stefanie Baxter of the Delaware Geological Survey chaired the meeting. She introduced Marie Stewart, who is the new Deputy Delaware River Master. Introductions were made around the room and via telephone for those not attending in person.

Approval of Meeting Summaries

The February 16, 2012 and April 17, 2012 meeting summaries were approved as drafted.

Hydrologic Conditions report

Amy Shallcross reported on current hydrologic conditions. She said rainfall in 2011 totaled more than 70" in the upper portion of the basin and almost 56" in the lower portion of the basin. Early in 2012 there were rainfall deficits throughout the basin; there was some recovery as the remnants of Hurricane Irene passed over the basin. Streamflows on the main stem Delaware River and smaller rivers are at or above normal levels. Ground water levels are in the normal range in most of the basin, except for four county monitoring wells in PA, which are below normal levels. Combined storage in NYC Delaware Basin reservoirs is currently at 183 BG, which is about 68% of capacity and below the median for this time of year. Storage in lower basin reservoirs is close to target levels for this time of year. After Hurricane Irene's rainfall, storage in Beltzville and Blue Marsh reservoirs exceeded normal pool levels. Both reservoirs are currently releasing at higher-than-normal rates to bring levels down to the normal pool. This contrasts with the dry conditions experienced in August, when these reservoirs had to release water to augment river flows; a total volume of about 1,100 cfs-days (about 0.7 BG) was released. The salt front location is currently at river mile 75, while the normal location for September is river mile 79.

Brief Update on NYC West of Hudson Hydroelectric Project

Thom Murphy reported on the status of this project, which is currently going through the FERC permitting process. FERC has requested that NYC conduct additional studies, including a dwarf wedge mussel survey, updated information concerning bald eagles in the area, and a feasibility study of running electrical distribution lines underground. FERC has issued scoping document #2, which includes an assessment of the impacts that temporary siphons would have on the aquatic resources during construction. Scoping document #2 also lays out the following schedule: November 2012, ready-for-environmental-analysis notice; January 2013, deadline for filing comments; March 2013, applicants reply to comments; May 2013, draft environmental analysis due; June 2013, comments on draft due. In response to a question, Thom noted that the dwarf wedge mussel survey is in addition to the survey being conducted by the US Fish and Wildlife Service. The survey requested by FERC is focused on the tailwaters of the NYC reservoirs.

Update on USGS Water Census Project

Bob Tudor reported on the status of the Water Census project, being carried out by the USGS. He said DRBC is trying to leverage federal resources to advance studies of water supply availability

in the basin. DRBC is currently collaborating with the Army Corps of Engineers and pursuing collaboration with NOAA, as part of their Integrated Water Resources Science and Services (IWRSS) initiative. The Water Census is a national initiative and USGS is to report to Congress on the status of water supply availability. The Delaware Basin is one of three focus area studies in the Water Census. The work plan for the Delaware study is focused on three main issue categories: (1) acquisition, management, and integration of water-use and water-supply data; (2) development of ecological flow science; and (3) development of hydrologic watershed model to evaluate stressors such as growth of population centers, effects of land use change, and effects of climate variability and climate change on water resources of the basin.

Bob gave an overview of progress to date on the Delaware Study, based on a coordination meeting between DRBC and USGS held on August 29, 2012. He said there are some 30+ USGS staff working on this Focus Area Study, with a total budget of \$1.5M over three years; USGS has dedicated additional resources for specific research projects on topics that overlap with those of the Delaware study (e.g., ecological flows). Bob described specific tasks being carried out in the three main issue categories and said there are plans for a stakeholder WebEx conference call on November 27, 2012. Peter Kolesar said in his view the work plan was overly ambitious for a budget of \$1.5M and asked if such concerns had been raised by others. Bob Tudor said he understood that the scope of work was ambitious, but USGS is planning to leverage a lot of talent within the organization to meet some of the perceived gaps in the field of water management planning for the future. Stefanie Baxter said a lot of the technical information is posted on the USGS Water Census website.

Implementation of the Current FFMP (Public Input/Issues)

Stefanie Baxter presented this item as an opportunity for the public to share any issues or concerns with the implementation of the current FFMP. She will report back to the Decree Party principals at a conference call scheduled for next week. Garth Pettinger stated that Trout Unlimited's positions and concerns were well known, having been brought up at previous RFAC meetings; he said the main issue with OST is that the public is still dealing with a "black box."

Lee Hartman raised the issue of thermal releases, noting that this past summer was one of the hottest on record. Having adequate levels of storage in the NYC reservoirs, requests for thermal releases were made. While the first request was granted, subsequent ones were not; no reaction or explanation was given. Mark Hartle said on August 2nd water temperatures at the Lordville gage exceeded 75°; he consulted with NYS DEC colleagues and made a recommendation for thermal releases. Stefanie said her understanding was that the request was discussed by the PA and NY principals, who decided it did not merit consideration by all five principals. Lee Hartman said there was no follow up or explanation for the decision made. Peter Kolesar said transparency applies also to communicating decisions. Group discussion followed. Many agreed that a protocol has to be in place to communicate these decisions to the public on a timely manner.

Bob Bachman said he perceived a more general problem, where the NYC hydrologists use OST to calculate how much water is available, but they do not have the expertise or the information as to how those decisions impact the trout fishery and the cold water ecosystem. He said when people like Mark Hartle (PA FBC) and Fred Henson (NYS DEC), make a recommendation for thermal releases is because their assessment indicates that the ecosystem is undergoing harm. They deserve a response from the principals; if recommendations are turned down, a reason should be given. Bob said he was wondering if anybody was listening to these requests. Hoss Liaghat said he found out that PA FBC and NYS DEC evaluate thermal stress, harm, and need for releases using different criteria. While PA FBC would request thermal releases after one day with

water temperature over 75° at Lordville, NYS DEC would wait until three days in a row exceeding 75°. Hoss said in this particular case the request was turned down because the three-day threshold was not met. After this event, staff from both agencies has been asked to develop a common set of guidance on this issue that can aid decisions in future events.

He said work to develop this guidance is currently in progress. Bob Bachman said this was an excellent explanation, since it was put in terms that anybody can understand. He noted that 75° is the LD50 (lethal dose; 50%) for brown trout; this means that taking a group of brown trout from comfortable temperatures and bringing them up to 75° will cause 50% of those fish to die within 48 hours. Bob said this has been documented over and over. For this reason he argued that the lethal temperature where 50% of the fish are going to die should not be used as a guidance to trigger a thermal release. He said if the water set aside for thermal releases was available, it should be used when needed.

Alessandra Bernasconi stated that from a flood advocacy point of view, language and policies in the FFMP language are geared in favor of trout protection rather than flood prevention. She said this language has not changed despite weather situations that have occurred while the FFMP has been in effect. She noted that until recently there was concern about possible drought conditions in the basin; however, substantial rainfall eliminated the drought scenario soon after. She argued against buying into a constant drought scenario, given that weather patterns have changed dramatically and are becoming less predictable.

Lee Hartman asked if there was a protocol to ramp down directed releases. He pointed to a recent episode when there was a sudden drop from 1,000 cfs to 325 cfs, which was not ramped down. He said this was a yo-yo jump big enough to hurt aquatic life. Marie Stewart said a few factors can cause a significant change in directed releases, including a switch in release tables and a change in PPL hydropower releases. Thom Murphy said NYC will ramp release rate changes (table switch) to avoid yo-yoing, taking up to seven days to do it. This ramping is also desirable from the point of view of reservoir operations: cutting back quickly brings reservoir levels up, sometimes back to the previous release table, triggering higher release rates (more yo-yoing). Thom said such ramping applies to regular releases but not to directed releases. He said ramping of directed releases is not addressed in the current FFMP agreement. Marie Stewart confirmed that directed releases have no such ramping protocol; instead releases are designed and made on a daily basis.

Bob Bachman asked Marie Stewart if she had the authority to cut back when large changes in directed releases are about to happen. He thought somebody has to have this discretion. Thom Murphy said NYC does not have discretion: if it is a directed release, NYC will release as directed. Peter Kolesar stated that the data for the last year shows a number of spikes and quick drops despite the intentions to bring things down slowly. He said the ecology does not care whether the cause is a release table switch or a season switch or a directed release. There should be someone in charge of the river who can make a change more slowly; this will use a modest amount of water that NYC will not miss and will have zero impact below Montague. No one is hurt by operating in a more sensible fashion. Peter said stakeholders have been asking for a long time for this issue to be resolved, but it appears that no one organization will mitigate the situation. Brennan Tarrier said the decree party work group has looked into possible options and found out that this is more complicated than what Peter Kolesar has suggested. The amount of water required for such a procedure over a year can be significant. Brennan said the work group has worked on this in the past and will be working on it in the future.

Gail Pedrick said her home in New Hope, PA tends to flood. She said the concern of many flood victims is that the FFMP only provides a 10% void during part of the year, while floods occur

year-round. That is why she and others have asked for a 20% storage void year-round. She had put together a Delaware River Basin Bill of Rights to address these issues. She read four paragraphs out of seventeen and circulated copies.

Dan Plummer commented on what he said were four shortcomings of the FFMP: the unreliability of the PPL release forecasts, the unsatisfactory thermal release program, and the poor communication with stakeholders. To these he added addressing the yo-yo effect of directed releases, which he said was a missing element of the current FFMP.

Erik Silldorff said most of the comments so far have been critical of the current FFMP. However, he has been talking with other biologists who think that the current FFMP has the benefit of providing relatively stable and predictable flows. Releases from the NYC reservoirs have been in relatively high tables, so that Cannonsville releases maintained cold water temperatures. There were a few events where PA FBC and NYS DEC looked at releasing more water to try and suppress high water temperatures; generally speaking, relatively high flows and stable flows were maintained in the river. Even during the relatively dry July and August, not much yo-yoing occurred, because the release tables were high enough to reduce the need for River Master directed releases. He acknowledged that if releases had been set at lower release tables the conclusions would be different.

Plans to Align the DRB Water Code with the FFMP

Bob Tudor noted that the DRB Water Code is out of sync with the FFMP. He said the recent decision by the commissioners to codify the FFMP would make it a legal amendment to the 1954 Supreme Court Decree. Bob recalled that DRBC attempted to codify the first FFMP agreement of September 2007; the proposed rules were very prescriptive, following the terms of the FFMP agreement. There was a public comment period, and the comments were mostly negative: many asked DRBC not to codify a program that they were not happy with. Bob said the commissioners realized that modifications of the original agreement were being made on a year-by-year mode, and decided to wait and see how this evolved before trying to institutionalize the FFMP framework. Ideally the process would reach a point where there is a broader level of comfort with how the FFMP addresses the different objectives, the water supply, the ecological flows, and the flood mitigation discharge requirements.

Bob said that based on recent discussions with the commissioners and the decree party principals, they are thinking that if the next iteration of the FFMP is going to be a multi-year agreement (3- or 5-yr term), it would be time for DRBC to craft a draft Water Code change. The process would include public notice, public participation, and public comments, as is customary with DRBC rulemaking. When agreement is reached on the main elements of the next FFMP agreement, DRBC would be in a position to draft Water Code changes that codify the FFMP. Bob said the concept is to do so in a less prescriptive way than with the first FFMP agreement. The Water Code may establish goals and objectives and set thresholds below which changes could be made without changing the Water Code; if the desired changes exceed the thresholds, a formal Water Code change would be needed.

Update on Status of the DRBC/NYC OASIS PST model

Hernán Quinodoz reported on the status of the OASIS PST model. In February, DRBC received a copy of the prototype model that the City and their consultants (Hazen and Sawyer) had developed, based on the OST model (an OASIS model of the complete NYC water supply system of reservoirs). This prototype was created by cutting away all non-Delaware Basin model

components; it is similar in scope to the existing DRB OASIS model. The main difference between the two models is the program of reservoir releases being modeled. The prototype model uses the current FFMP to determine releases from the NYC reservoirs, based on the OST calculation of forecast available water. The DRB OASIS model (reference model) uses the original (2007) FFMP with fixed release tables.

Another significant difference is how each model is used. OST is used to support daily operations, based on forecasts and historical probabilities over a period of months. The prototype model, on the other hand, is used for planning; hence, it has been labeled Planning Support Tool or PST. In planning mode the PST model is driven by the long-term historical record; typical applications of PST are analyses of “what if” scenarios and evaluations of alternative release programs. PST cannot predict what may happen next month or what the releases will be if a drought starts next month. For such short-term predictions, OST is the tool to use. There are OST components that deal with real-time information that are not part of PST, because they are not needed for the purpose that PST is built for.

DRBC staff started a review of the new prototype model while performing modeling and analyses for the decree parties in March and April. In July, NYC DEP approached DRBC and offered to support and expedite the model review. Hernán said NYC’s stated objective was to ensure the OST and PST models are in sync and both follow all the applicable regulations in the DRB Water Code related to water management. In August, a contract was signed between DRBC and NYC to carry out the project. In this contract NYC provides dedicated financial support for the project, DRBC brings additional staff resources and a direct collaboration of staff from the two agencies is set up to carry out the project quickly. The project timeline has the following milestones: (1) by November 30, DRBC completes the technical review and proposed modifications that might be needed; (2) by December 31, complete testing and comparison to the NYC OST model (test whether the models produce similar outputs when using the same inputs); (3) by January 31, 2013 have the final version of the model ready for review by the Decree Parties on a workshop; and (4) after January 31, have a review process with the Decree Parties. Two other milestones are programmed for after January 31, but without a firm date. The first is approval of the model release by the Decree Party Principals; the second is the creation and release of the new model version to the public.

Hernán said the goal of this project for the DRB PST model is to have a have a model that all parties can be confident in with regard to Water Code regulations. The goal for the NYC OST model is to incorporate any necessary revisions developed for the DRB PST model (this task will be carried out by NYC staff). This will ensure that the models are in sync and will produce similar results.

Peter Kolesar said he was disappointed to hear about the glacial pace of progress on making this model available, given that everything depends on this model. He said none of the questions asked and issues discussed this morning (rationalizing the Water Code, understanding FFMP/OST operations; thermal stress issues; yo-yoing issues) can be explored without this model. He asked if the decree parties and stakeholders were going to be making decisions about the next FFMP without a model that they could depend on. Hernán noted that the review process for a completely new model is more involved and takes more time, and that DRBC staff has been making progress since receiving the model. He said various issues have been identified and fixes are being tested. Hernán said completing this project in a few months is a relatively fast schedule. Thom Murphy said the goal is to get the model to the point when it can be released for everyone to use. He said considering that OST is still under development, we are making very good progress.

Update on Decree Parties Work towards Next FFMP Agreement

Stefanie Baxter gave an update on the Decree Parties' work towards the next FFMP agreement. She said the principals are having monthly conference calls and quarterly face-to-face meetings. They have asked the work group to develop some short-term tasks and also long-term core initiatives. Short-term tasks include: continuation of NJ diversion increment, CSSO discharge mitigation options, revised snow pack procedure as part of OST operations, and thermal mitigation guidelines to guide case-by-case decision making. Principals have asked the work group to analyze these issues and provide options to them, but have made no final decisions yet. However, they are not planning on having automatic thermal releases. Principals would like to memorialize some long-term core initiatives in the next FFMP, so that they would transcend changes of administrations. The set of core initiatives need to be agreed upon; they could include water conservation strategies and water supply and storage evaluation. Principals desire to establish a water-supply baseline for the Delaware River Basin (availability, use, and allocation), and are interested in exploring water supply augmentation, once a baseline is established.

Peter Kolesar asked what memorializing means. Stefanie Baxter responded that some issues are of long-term nature and do not need to be renegotiated with every FFMP agreement; memorializing means including them in the FFMP as a special category. Thom Murphy said this would be useful as new decree party principals periodically come on board. Joe Miri said the challenge will be making commitments that go beyond the actual term of the agreement.

Presentation: The Delaware in Conflict

Garth Pettinger, representing the NY Chapter of Trout Unlimited, gave a presentation focused on management implications of the Croton system coming back on line in the near future. He said this will bring an opportunity to make a significant change to the NYC water supply system and to restore equitable apportionment to the management of the Delaware system.

Garth presented a table of reservoir releases for Cannonsville, Pepacton and Neversink that he called the Equitable Apportionment Plan (EAP). He said the releases proposed in the table are feasible only if the Croton system is contributing to the total NYC water supply. He analyzed how the proposed EAP would have performed over the summer of 2012, when many high-temperature records were broken. Although the EAP has higher releases, especially in July and August, the comparison shows that neither the FFMP nor the EAP would have mitigated high temperatures on the mainstem Delaware River at Lordville. The EAP diverts less Delaware water to NYC (505-540 mgd during normal – L2 – operations); the difference is made up by the Croton system, expected to come online in 2013. A copy of the presentation is posted online on the RFAC page of the DRBC website. Garth concluded that more than enough water is available in the system when the Croton system comes on line in 2013. He argued that the down-basin states would then have the opportunity to finally dispense with the 800-mgd diversion accommodation and at the same time protect their future interests.

Stefanie Baxter asked about water quality in the Croton System. Garth replied that quality is very poor, but it will become good quality after the Croton Treatment Plant comes on line. In response to a question about the storage void element of the FFMP, Garth said the same seasonal storage objective is kept in the EAP. Someone asked if similar calculations had been done without the Croton System to see how much more reservoir storage would have been drawn down. Garth answered affirmatively and said such calculations show that the EAP is not viable without the Croton system in place. Since the EAP is designed to balance the system when Croton water is available, taking Croton out would disproportionately drain the Delaware system.

Brenan TARRIER said when considering the activation of the Croton System, it is necessary to keep in mind that east of Hudson fisheries are covered by minimum releases based on storage levels for all 19 NYC reservoirs east of Hudson. He said these releases will be affected by the increased consumption when the Croton plant comes on line. Therefore Croton water is not going to be free water. It is going to have an effect on east of Hudson fisheries, which have generally been at their higher release levels because of lack of consumption (diversions). However, releases from these reservoirs are managed in stages, much like the Delaware. Thus if greater diversion came out of those reservoirs and put them into lower storage space, existing regulations would allow for lower releases to sustain the fisheries. Brenan said NYS DEC is also obligated to protect those resources.

Joe Miri observed that this was the first time he heard NYS and NYC use the East of Hudson fisheries as a reason for not using Croton. Brenan said this was not a reason for not using Croton, only that tradeoffs would have to be considered. Joe Miri said this presentation illustrates the relationship and the connection between the Hudson Basin and the Delaware Basin. He said this EAP proposal and this problem of the Hudson system fisheries seem to indicate that this issue should be discussed now instead of ignoring that the Croton is coming on line soon. He added that, as NJ has been saying all along, what you do in the Hudson Basin affects the Delaware Basin and vice versa – this highlights the need for the Decree Parties to look at both basins in their modeling, discussions, and decisions.

Set Next Meeting Date

The next RFAC meeting will be on Thursday, December 6, 2012 at 10:00 a.m.

Opportunity for Public Comments

In response to a question, Bob Tudor confirmed that the current expectation is that the next FFMP will be implemented for a minimum of 3 and a maximum of 5 years. Someone asked what would be the protocol for making changes to the FFMP during that period. Bob said nothing precludes the Decree Parties from considering changes in response to new information or changing conditions. Thom Murphy said the principals have that authority now; if something new comes along and they decide it needs to be changed or added, they can do that at any time if they can reach unanimous agreement.

REGULATED FLOW ADVISORY COMMITTEE (RFAC)

September 20, 2012

ATTENDANCE LIST

NAME	AFFILIATION
ANDERSON, Kelly	Philadelphia Water Dept.
BACHMAN, Bob	PA Fish and Boat Commission (PAFBC)
BAXTER, Stefanie	DE Geological Survey
BEIDLER, Kim	Coalition for Delaware River Watershed
BERNASCONI, Alessandra	Delaware River Conservancy
COLLIER, Carol	DRBC
DOMBER, Steven	NJ Dept. of Environmental Protection (NJDEP), NJ Geological Survey
FRAZIER, Dean	Delaware Co., NY
HARTLE, Mark	PAFBC
HARTMAN, Lee	Trout Unlimited
HENSON, Fred (via phone)	NYS Dept. of Environmental Conservation (NYSDEC)
HESSON, Molly	Philadelphia Water Dept.
KOLESAR, Peter	Columbia University
LEWIS, Cliff	
LEWIS-COKER, Christine	US Army Corps of Engineers (USACE)
LIAGHAT, Hoss	PA Dept. of Environmental Protection (PADEP)
LOVELL, Stewart	DE Dept. of Natural Resources and Environmental Control (DE DNREC)
MIRI, Joe	NJDEP
MOLZAHN, Robert	Water Resources Association of the Delaware River Basin
MURALIDHAR, D.	NYC Dept. of Environmental Protection (NYCDEP)
MURPHY, Thomas	NYCDEP
OLIVIO, Dana	NYCDEP
PAULACHOK, Gary (via phone)	US Geological Survey (USGS)
PEDRICK, Gail	Aquatic Conservation Unlimited
PETTINGER, Garth	NYS Trout Unlimited, Delaware Committee

NAME	AFFILIATION
PHILLIPS, Jan	Consultant
PLUMMER, Dan (via phone)	Friends of the Upper Delaware River (FUDR)
QUINODOZ, Hernán	DRBC
RESTI, Sherri (via phone)	FUDR
SCANNAPIECO, Alycia	Resident – flood concerns
SHALLCROSS, Amy	DRBC
SILLDORFF, Erik	DRBC
STEVENS, Glen	USACE
STEWART, Marie	USGS
TARRIER, Brenan (via phone)	NYSDEC
THARP, Diane (via phone)	NorDel Conservancy
TUDOR, Bob	DRBC
ZIGON-RICHARDSON, Valerie	DRBC