DELAWARE RIVER BASIN COMMISSION
REGULATED FLOW ADVISORY COMMITTEE
October 5, 2011

MEETING SUMMARY

The October 5, 2011 Regulated Flow Advisory Committee (RFAC) meeting began at approximately 10:00 a.m. at the Delaware River Basin Commission (DRBC) offices in West Trenton. Ms. Stefanie Baxter of the Delaware Geological Survey chaired the meeting. Introductions were made around the room and via telephone for those attending on a conference call.

Review of minutes from the May 5, 2011 RFAC meeting

Stefanie Baxter solicited comments on the draft minutes from the May 5 RFAC meeting. Glenn Erikson commented that he felt that two statements made by Thom Murphy of NYC DEP were not accurately reflected in the minutes. The first comment was related to the Upper Delaware fisheries. Glenn said he understood that NYC DEP was not prepared or did not want to see the fisheries improve because of concerns over the future releases to maintain those flows. Thom Murphy disagreed, stating that NYC DEP has concerns about the future and wants any improvement to be sustainable. He stated that he did not say that NYC DEP does not want fisheries to improve. Thom said sustainability is being able to provide releases for the fisheries when future NYC water demand form the Delaware Basin may reach 800 mgd; there has be planning now to consider additional sources of water to provide future fisheries releases. Glenn Erikson asked if NYC DEP finds acceptable the idea of improving the fisheries today. Thom Murphy replied affirmatively and said the current releases program (FFMP) is built upon providing for fisheries and spill mitigation needs. Glenn said the current FFMP provides less water for the East Branch Delaware River than the Revision 7 program. Thom indicated that the allocation of releases among the three tributaries below the NYC reservoirs is based on recommendations from fisheries experts from NYS DEC and PA FBC. Glenn Erikson said his second comment was about NYC DEP sharing the OST model with interested parties. While the minutes say that Thom Murphy is not currently authorized to release the model, Glenn understood that NYC DEP is not going to release it. Thom said both statements were correct; Glenn requested that this be reflected in the May 5 minutes. Stefanie Baxter said the minutes will be amended to reflect the clarification offered by Thom Murphy. The last sentence on page 2 of the draft minutes will be corrected to read: “He said he was not authorized and NYC DEP has no plans to give access to the model or to give the model away.” The minutes were approved as amended.

Hydrologic conditions report

Amy Shallcross reported on current hydrologic conditions in the basin. She noted that 2011 has been a very wet year; in the upper basin year-to-date precipitation has been 25 inches greater than normal, with a similar amount upstream of Trenton and 12 inches greater than normal in Delaware; since July there have been 12 inches more precipitation than normal. Within the last 60 days the basin has received between 20-35 inches of rain, depending on location. In New Jersey, 31 inches of rain fell in 40 days in Stockton, and a water-supply canal breached its banks. September flows on the Delaware River at Montague and Trenton were about 10 times higher than normal. Streamflows at most USGS gages in the basin are currently at very high levels. Reservoir storage is also at very high levels. In New York, Neversink and Pepacton are still spilling. In the lower basin, Beltzville is at 107% of the target elevation, and Blue Marsh is right

at target elevation. Bob Tudor said there has been so much freshwater flow coming down the tidal river that is actually influencing the salinity dynamics and tidal dynamics of the Delaware Estuary and Bay; some stratification is extending down into DRBC Water Quality Zones 5 and 6, which is very unusual.

Amy said this very wet period had created conditions for flash flooding, which in some places would currently require only 1-2 inches of rain. She reviewed conditions prior to, during and after Hurricane Irene and Tropical Storm Lee. Hurricane Irene brought 3-12 inches of rain to parts of the basin. Total rainfall amounts for Irene and Lee (08/24 – 09/09/11) for the Delaware Basin ranged between 6-18 inches. Flooding from Tropical Storm Lee was not as severe as during Hurricane Irene. Most of the mainstem Delaware River went into flood stage; some locations along the Schuylkill River went into major flood stage and Blue Marsh reservoir spilled. The three NYC reservoirs were near the 90% target storage levels before the storms; after Hurricane Irene both Pepacton and Neversink were over 103% and Cannonsville was at about 99%. After Tropical Storm Lee all three reservoirs were spilling.

Discussion followed with questions from the audience on operations of the NYC Delaware Basin reservoirs under the current Flexible Flow Management Program (FFMP). Some questions focused on the feasibility of achieving a 10% storage void when the storage target (Conditional Storage Objective or CSO) is at 90%. Other questions dealt with the amount of rain necessary to spill the NYC reservoirs, under given storage levels. Gary Paulachok stated that a single event like Irene would have caused only minor flooding, but when another event occurred only days apart, it produced major flooding. He noted that the 1955 flood (the flood of record in many locations) was also the result of back-to-back storms; the same occurred with one of the three floods recorded in 2004-2006. In response to questions, Gary noted that the average August rainfall in the upper basin was about 3 times the normal amount. He said the limited release capacity of the three NYC reservoirs make it impossible to evacuate water more quickly to maintain a storage void. Bob Tudor commented on waterfront flooding that occurred in Bristol, Pennsylvania, which is located on the tidal Delaware River. Even though there was more freshwater coming down the Delaware River, flooding was caused by the concurrence of astronomical high tides and sustained winds blowing upriver.

Brief report on Decree Party work group progress

Stefanie Baxter reported on progress made by the Decree Party work group. She noted that in May the Decree Party Principals directed the work group to postpone working on the next FFMP agreement until January 2012, and continue working on tasks that the workgroup has been working on for quite some time. These tasks include ERQ/IERQ quantification, OST orientation and workshop for state technical staff, and a work plan for the multi-year reassessment study that has been discussed at RFAC in the past. The work group has made great progress on all three tasks and will be reporting back to the Principals in November-December. Bob Tudor said the Principals are thinking in terms of taking the current OST framework and continuing to enhance it from a flood, ecological, and water-supply perspective to try and optimize the system further. He added that the Principals are also thinking that the next iteration of the FFMP being perhaps five years in duration – three initial years and with two opportunities for 1 year extension.

Peter Kolesar asked how the ERQ/IERQ issue could be handled apart from the FFMP/OST, since the ERQ/IERQ is part and parcel of the water release policies. He asked how is that separated out and what is being done with it. Gary Paulachok stated that the ERQ is the Excess Release Quantity defined by the 1954 Supreme Court Decree; the Decree actually provided a formula for computation of the amount of water and gave specific direction on how that water should be

released during the period June 15-March 15. In the first FFMP agreement the ERQ was replaced with another quantity called the IERQ or Interim Excess Release Quantity. The IERQ used the same formula given in the Decree but expanded the available uses for that water. For example, water might have been made available from part of that IERQ quantity for thermal releases, and part of it could be available for flow augmentation at Trenton, if the Trenton flow falls below 3,000 cfs.

Gary said the issue before the workgroup right now is to come up with a number for the IERQ that the Decree Parties can agree to. There are two components to the IERQ: one is the safe yield of the entire NYC water supply system that is available without pumping (the Decree gave a figure of 1,665 mgd based on the 1930's drought, which became outdated after the 1960's drought) and the other is NYC's forecasted water consumption (including outside communities which NYC is obligated to supply water to). The Principals directed the work group not to modify the formula given in the Supreme Court Decree, but to focus on evaluating its individual components. The work group is looking at recent water consumption in NYC and NYC DEP is in the process of completing a safe yield evaluation. The work group will receive a briefing on that evaluation and eventual safe yield figures in early November.

Peter Kolesar said his research indicates that making IERQ releases according to the IERQ recipe is relatively inefficient for the fisheries. Instead, it is more beneficial to release it according to the release schedule based on fisheries needs; it is better to let the release curves and tables set the fisheries releases. Gary Paulachok stated that the current FFMP has modified release tables that reflect a contribution of about 6,045 cfs-days from the IERQ; this has been in effect since 2008. Gary said the original ERQ protocol was to raise the Montague target by June 15 until that quantity of water (ERQ) ran out; typically this would increase the summer time Montague target to 1,850 cfs instead of 1,750 cfs, releasing that water whether it was needed or not. Instead, the current program is based on data and input from fisheries managers, who proposed that a better way to use that water would be to increase summer conservation releases. Mark Hartle noted that analyses done in the Joint Fisheries White Paper for FFMP-OST considered where you get the most fish habitat for a given amount of water: the main finding was that Cannonsville releases produce the most benefit in terms of habitat.

Mary Ellen Noble asked for a list of the Principals and work group members. Stefanie Baxter said Delaware has an interim principal at the moment, Peter McLaughlin, Jr., who will be replaced on November 1 by the new Delaware State Geologist, Dr. David Wunsch; the other principals are Paul Rush for NYC, Mark Klotz for NYS, John Hines for PA, and John Plonski for NJ. Stefanie listed work group members as follows: Stefanie Baxter, Stewart Lovell, and Bill Cocke from DE; Tom Murphy from NYC DEP; Hoss Liaghat and Mark Hartle from PA; Molly Hesson from Philadelphia Water Dept.; Brenan Tarrier, Fred Henson and Angus Eaton from NYS; Steve Domber, Tom Brand, Joe Miri, and Karl Muessig from NJ; Amy Shallcross, Bob Tudor, Hernán Quinodoz, and Bill Muszynski for DRBC; and Gary Paulachok for USGS. Gary noted that some of the work group members listed may come in at any given time, depending on the topics being discussed.

Brief report on SEF activities

Mark Hartle, current chair of the Subcommittee on Ecological Flows (SEF), gave a brief report on SEF activities. The main topic reported was a SEF meeting on June 29, held at the PPL Environmental Learning Center in Lake Wallenpaupack. There was a full agenda for the meeting, with several presentations. Mark presented an overview of elements of the FFMP/OST program that has been in effect since June 1. Peter Kolesar provided commentary on the need for

transparency and sharing models and information, reflecting in many ways what was stated in the May 5 RFAC meeting minutes. Peter noted that the habitat tool used to evaluate the effects of flows on habitat is based on OASIS outputs; he said now with OST being the driving force for the releases program, there is a disconnect between the outputs of OST and the inputs needed for the Delaware decision support system. Mike Bennett, PPL Project Manager for Lake Wallenpaupack, gave an informative presentation on Lake Wallenpaupack operations, which are geared to peaking power generation during weekdays. Gary Paulachok gave a presentation on how Lake Wallenpaupack operations affect the directed releases from NYC reservoirs to meet Montague flow target. Gary Paulachok also presented some analyses that he has done looking at options for Montague flow averaging. Mike Bennett also gave a presentation on the Lackawaxen River temperature regulation program, which was developed as part of PPL's 2005 FERC relicensing process. They are using a new model that was developed for this project, but still is a work in progress; the goal is to maintain temperatures below 75°, with temperatures under extreme conditions reaching up to 77°. There were two presentations on dwarf wedge mussels (DWM) given by Kelly Malony and Heather Galbraith from the USGS Northern Appalachian Research Lab in Wellsboro, Pennsylvania. They reported on laboratory experiments to test DWMs ability to move under various environmental conditions: shallow or deep water, cool or warm water, and slow or fast water flow. DWMs seem to prefer cooler water and slow water flows. They indicated that these results were preliminary and that Bill Lellis, who is the principal investigator, would be preparing a more comprehensive report; Mark said this report could be given at a future SEF or RFAC meeting.

Another issue discussed at the SEF meeting was possible ways to reorganize SEF to be able to address various issues of interest. There was consensus among SEF members that having specific topics addressed by subgroups would be more efficient. Mark said the whole SEF group can consider basin-wide issues, while subjects like salinity and the effects on oysters would be better addressed by a subgroup. Some proposed that subgroups have a regional focus, such as upper basin vs. lower basin, but no decision was made at the meeting. If SEF subgroups are organized by a few interested members, there will be an invitation for others to join if they wish.

Mark Hartle also reported on another topic of interest to SEF members, updating the Delaware Decision Support System (DSS) used to evaluate instream habitat in the Upper Delaware River and major tributaries. This issue was discussed in detail at the August 2010 SEF meeting, when staff from USGS, Fort Collins Science Center gave a presentation on the Yakima River decision support system. This product was developed later than the Delaware DSS and therefore runs on a more robust computational platform than Excel (the Delaware DSS runs in Excel). The Yakima DSS incorporates graphical representation of 2-D modeling for habitat under different conditions; SEF members would like to incorporate this feature into the Delaware DSS. Bill Lellis of USGS has a project that will include upgrades to the Delaware DSS to better evaluate DWM habitat. Mark Hartle said he asked staff from the Fort Collins Center to develop a proposal with cost estimates of what it would take to upgrade the Delaware DSS; he will report back to RFAC. If the proposal has several components and available funds are limited, SEF may have to choose the most important ones. Don Hamilton said some of those improvements to the DSS model might be a product of the USGS WaterSMART program that will be conducted over the next three years in the Delaware Basin.

Mary Ellen Noble mentioned the ecological flows project that DRBC has contracted with The Nature Conservancy (TNC) and asked if there will be any cross-fertilization with SEF. Bob Tudor responded that, based on the report given by Mark Hartle, there is good progress on the cold-water fisheries issues downstream of the reservoirs, and in terms of endangered species like DWM and maybe other species of aquatic value. Issues that DRBC has not yet been able to

pursue are warm-water fisheries further down the river and living resource end-points in the estuary. Bob said the warm-water fisheries issue could begin to be addressed by the contract with TNC, which will look at the mainstem Delaware River and tributaries; it would look at first-order and second-order streams and try to classify them. It is both cold-water and warm-water. The TNC project will include a stakeholder process where experts could have input; this will be an avenue for SEF members to contribute over the next year. Bob added that living resources in the estuary has been an interest of the Decree Party work group and would welcome SEF beginning to think thinking about scoping some of those issues. Mark Hartle said he was familiar with a project that TNC had completed on the Susquehanna River basin, and believes the Delaware Basin project would have many similarities.

Peter Kolesar said he would try and translate his previous statement about the disconnect between the FFMP/OST and the habitat model. In layman terms, this means that habitat modeling cannot be done without knowledge of and access to the rules operating on the river or the rules that are being considered for implementation over the next 5 years. Peter said this is not a structural disconnect, but a disconnect created by NYC's unwillingness to release data, which he found regrettable. To the extent that continues, habitat analysis will no longer be possible either by insiders or outsiders. Peter said those in the environmental community have to translate this situation into active verb sentences for RFAC and SEF members and the Principals. He said SEF has played a constructive role but without an active agenda. Even the discussion about updating the habitat model makes you question what you are investing in, because you currently cannot exercise the model without access to the NYC FFMP/OST model.

Glenn Erikson commented on what happened at Downsville, below Pepacton reservoir, during a recent flood. Neighbors were told to leave town around 2 a.m. because of forecasts that predicted flooding worse than the flood of record. Later forecasts indicated lesser impacts, but many people had already evacuated. Gary Paulachok noted that this particular storm was very difficult to forecast; emergency managers were getting two or three briefings a day to keep up with changing conditions. This storm was forecasted to have a narrow band of rainfall that could impact either the Susquehanna or the Delaware basin. In the end the Susquehanna got hit much worse than the Delaware. Glenn said he was concerned about the lack of information for the public to know in real-time what is going on. Needed information includes how much water is in the reservoirs, how much water is coming out of the reservoir, and flows in various tributaries and rivers. He mentioned a gage in Margaretville that provides real-time information but is not available to the public to assess their flood risk.

Summary of USGS WaterSMART/Water Census initiative

Bob Tudor gave a summary of the USGS WaterSMART/Water Census initiative and recent stakeholder meetings. The US Department of Interior is mandated by a federal law to conduct national water studies. The objective is to determine how much water is available, how much is used, and what is projected to be available in the future; are there areas in the US where there is not enough water and what should be done about it. These studies will be conducted under WaterSMART, an umbrella initiative designed and managed by the Secretary of the Interior, Ken Salazar (SMART stands for Sustain and Manage America's Resources for Tomorrow). The Interior Department agencies working on this program are the USGS (nationwide) and the Bureau of Reclamation (western states). The USGS is charged with moving forward on the Water Census initiative.

Bob said DRBC was successful in convincing the USGS to pick the Delaware River Basin as one of three pilot areas in the whole country to start this program and inform the national study. This

means that over the next three years 1.5 million dollars could be spent in the basin to help better manage the system. He said the Delaware River Basin was selected for the pilot because of being more data rich than other parts of the country, typically reporting on small-scale watersheds (at hydrologic unit codes HUC12) and with a relatively dense streamgage network with more than 100 years of data. This translates into the Delaware having a robust system to inform management decisions. The USGS indicated that the big drivers for selecting the Delaware River Basin for the pilot study include the two Supreme Court decisions, endangered species issues (DWM) and the current interest and the amount of ongoing work regarding ecological flow needs.

Bob reported on a stakeholder meeting held at Shawnee Inn over two days in September and attended by 70-80 people, most of them representing many of the agencies charged with water management in the basin. The objective was to begin to scope out the work for the Delaware pilot study, with $500,000 of available funds each year for the next three years. The USGS put together a preliminary scope of work prior to the meeting, based on responses to an email solicitation that asked for the top three water management issues. Based on the input received, three main priorities were identified. The first priority issue was water use and water information, including estimation of hydrologic budgets and streams statistics for un-gaged sites (needed for ecological flow endpoints). The second priority issue had to do with using computer models, having transparent models, being able to assess alternative scenarios and alternative futures, and picking which ones make sense to meet local objectives. DRBC has already invested in a few good models to support water management decisions, including the OASIS model for basin-wide reservoir operations, a rainfall-runoff and flood routing model, and an estuary salinity model. However, each of these models deals with part of the whole system. The question was raised of whether there was a way to connect these models in a coherent way to support the assessment of alternative futures. Stakeholders have indicated that they want to be able to factor future water demands, impacts of land use, impacts of climate change and sea level rise. The third priority issue had to do with factoring ecological flow needs in making decisions, making sure there is enough water for fisheries and other living resources in the future. The idea is to inform not only flow management policies but also regulatory policies that deal with how much water can be taken out of the system while still leaving enough for wildlife needs. Bob said the USGS project team plans to have a final scope of work over the next month, which will be available for public review. Bob said the presentations given at the two-day stakeholder meeting in September are available on the internet on a SharePoint website; information on how to access this site will be provided by DRBC to all those on the RFAC email distribution list. Bob noted that the pilot study may provide some of the information that the Decree Party work group was planning to include in the scope of work for the reassessment study.

Stefanie Baxter asked how much input from other stakeholders was contemplated. Gary Paulachok said there is a link on the SharePoint website for comments and discussion. Elaine Reichart said she attended the stakeholder meeting and understood that the plan was to hold periodic meetings at various milestones, to keep the public apprised of progress. She added that she has not heard anything since the meeting. Bob Tudor said he would relay Elaine's question. Mary Ellen Noble asked for more details on the priority issue focused on modeling needs. Bob responded that the idea was not to build a new model but try to patch together the existing models to enhance the capacity to analyze alternative scenarios. Gary Paulachok noted that the actual shape and outputs of the combined model are not yet defined.

FFMP/OST operations during Hurricane Irene and tropical Storm Lee

Thom Murphy reported on FFMP/OST operations of the NYC Delaware Basin reservoirs during Hurricane Irene and Tropical Storm Lee. He described conditions at these reservoirs prior to Hurricane Irene. On August 23, the conditional storage objective (CSO) curve was at 91.5%; actual storage was 83.9% at Cannonsville, 92.5% at Pepacton, and 90.8% at Neversink. Thom also described the changes in release rates during the hurricane, on August 27-28, in response to stage levels recorded at tailwaters gages. Post-hurricane, on August 29 the CSO curve was at 90.5%; actual storage was 91.6% at Cannonsville, 103.7% at Pepacton, and 102.1% at Neversink. On August 29, release rates were increased to the maximum allowable levels (L1a). Thom reported on precipitation recorded at each reservoir; Cannonsville saw 3.55 inches during Irene and 8.4 inches for the month of August; Pepacton saw 4.54 inches during Irene and 11.59 inches for the month of August; Neversink saw 4.8 inches during Irene and 15.35 inches for the month of August.

Prior to Tropical Storm Lee, on September 3 the Delaware reservoirs CSO curve was at 90% of storage; actual storage was 98.5% at Cannonsville, 105% at Pepacton, and 100.4% at Neversink. Releases were decreased at all three reservoirs on September 6 and 7, in response to conditions downstream. After the storm, actual storage was 110.2% at Cannonsville, 103% at Pepacton, and 101.4% at Neversink. Releases were increased again to maximum allowable levels on September 9 at Neversink, and on September 12 at both Pepacton and Cannonsville. Precipitation recorded at each reservoir was as follows: Cannonsville saw 5.3 inches during T.S. Lee and 8.95 inches for the month of September; Pepacton saw 5.39 inches during T.S. Lee and 9.04 inches for the month of September; Neversink saw 5.18 inches during T.S. Lee and 10.41 inches for the month of September. Thom showed provisional graphs of inflow and discharge for Pepacton and Neversink during the two storms. At Pepacton during Irene the peak inflow was estimated at 49,909 cfs and the peak discharge was 14,900 cfs (70% attenuation); during Lee the estimated peak inflow was 25,227 cfs and the peak discharge was 14,436 cfs (43% attenuation). There was a double bounce in discharge due to rain following the storm, with 25% attenuation at that point. Thom noted that all these figures are preliminary at this point. In response to questions, Thom indicated that the level of attenuation observed is the result of two storms and that higher attenuation levels would be observed with a single storm, under similar pre-storm conditions. Glenn Erikson commented that his organization will recommend increasing the capacity of evacuating water from these three reservoirs, with hydropower turbines and/or siphons installed on top of the dams. He stated that the increased release capacity would help maintain storage voids even after the first storm.

Public input on FFMP/OST implementation and transparency

Stefanie Baxter invited comments from the audience. Elaine Reichart asked if the regular DRBC rulemaking process would be followed for the next FFMP: publish a draft in the federal register, take public comments, etc. She said the general public needs to be included, not only those that can attend DRBC committee meetings. Bob Tudor explained that this is a two-step process, where first the Decree Parties negotiate a new flow management agreement, and then DRBC codifies it into its Water Code. DRBC did not codify the latest FFMP/OST because it was a one-year agreement; the expectation is to codify the next 3-year or 5-year agreement. DRBC will draft a rule, hold hearings, etc., but DRBC cannot codify anything until the five Decree Parties sign off on a new program. Bob said his expectation was that in January the Decree Parties should know the general direction for the next FFMP and could share that with the public, as well as changes that may be planned for the next program.

Glenn Erikson said his concern for the new program is the ability to do thermal releases to protect the fishery on the East Branch Delaware River, through a thermal bank or other mechanism. Stefanie noted that Mark Hartle will be working with SEF on this topic. Glenn asked that a presentation in layman terms be given at some point in the future on the logic and development of the operating drought curves for the NYC reservoirs. Mary Ellen Noble asked if detailed presentations to be given at RFAC could be provided to the public in advance of the meeting for review. She said the more information provided ahead of time, the better the feedback at the meeting. Bob Tudor and Gary Paulachok discussed the constraints of working through a Decree Party negotiation at two levels: the work group and the principals. Both indicated there is little information that can be shared before the parties reach agreement on a particular issue. Glenn Erickson asked if study groups could be set up for the public to participate in parallel discussions on the same issues. Stefanie Baxter said those interested could set up a study group to work to better define some of these ideas.

Someone asked if the flood mitigation advocates could have the same representation as the fisheries' interests, maybe something like the SEF committee. Bob Tudor noted that the fisheries people wrote a white paper to analyze all the issues, looking at how you could accommodate the fish without compromising other uses. He said the same model could be used by others to find out and propose how, for example, a 20% storage void could be put in place without compromising the other uses: drinking water use, industrial water use, and all others. Bob also suggested that those interested in flood mitigation attend the meetings of the DRBC Flood Advisory Committee (FAC) and ask that their issue be considered as a priority for next year. Stefanie Baxter concurred and said those interested in flood mitigation could and should participate on both committees (RFAC and FAC). Elaine Reichart asked if RFAC could meet more frequently. Stefanie responded that RFAC had met six times over the past twelve months, much more frequently that the required two meetings per year. Elaine Reichart circulated a one-page handout with operational data from the NYC Delaware Basin reservoirs for the August-September 2011 period. She argued that to understand the complete picture, diversions, spills, and releases have to be jointly considered. She pointed to a 23-day period with no diversions to NYC and said this impacted reservoir spills.

Peter Kolesar stated that he wanted to speak to the issue of transparency and openness. He acknowledged that over the last decade, there has been a remarkable openness of information provided by the DRBC and the Decree Parties, and in particular by NYC DEP. This openness of information extended to reservoir operations, streamflows, other numerical data, and publically available models – in particular the OASIS model and the database that goes with the OASIS model and the DSS habitat model. This openness has permitted certain outsiders and even insiders to do analyses and share results that have had a beneficial impact on the flow management programs adopted since. Peter said he and a group of colleagues were the first to introduce the FFMP concept; despite being told initially that the idea was infeasible, it was eventually accepted. His group made other proposals over time, which resulted in several incremental improvements to the original FFMP. They also provided input to the Joint Fisheries White paper that informed the current FFMP release rates. However, he argued that the same analyses are now made infeasible by the current black-box approach in which both data and models are held by NYC to be proprietary. He said RFAC members, the work group and DRBC are all in the same situation of not being able to model current FFMP operations.

Peter indicated that he has been making requests for additional data and modeling information to be released; he asked at RFAC and SEF meetings and in a formal way via a letter to NYC DEP sent in May. DEP responded that no additional information would be released. The problem, Peter said, is that the available information is inadequate to do any projections about how the

current FFMP/OST will perform in the long term (recent data only shows how it performed in a singularly wet year). He added that the discussion earlier this morning indicates that there is a tentative plan to move forward with a release policy that is essentially a variation of the FFMP/OST, without a database available to evaluate it and compare it to other alternatives He stated his strong feelings that this situation was unacceptable and needed to be corrected, both for the sake of the outside stakeholders and also on behalf of DRBC, RFAC and the Decree Parties themselves.

Mary Ellen Noble asked Thom Murphy if he could provide a response. Thom said OST was designed for NYC DEP and only works by plugging into their instrumentation like in-reservoir metering, something that is not available to those outside of NYC DEP. Peter Kolesar responded that he had provided a copy of his data request to Stefanie Baxter as RFAC chair and stated that the particulars of the request had nothing that would violate any proprietary or secret issues regarding NYC's water-supply system. Glenn Erikson said he understood the preference for keeping information secret because knowledge is power; however he could not understand why the other Decree Parties would be willing to accept NYC's preference.

Thom Murphy said NYC provides transparency by posting online the inputs and outputs of the monthly OST evaluations. He said the information includes the algorithm for the decision to select a release table and for calculating CSO releases, with plots of current reservoir storage and a possible range of future values. Peter Kolesar said the summer of 2006 was of interest to many in the fishing community because it was a particularly hot and dry summer. He asked Thom if he could tell today how the current FFMP/OST would behave in the summer of 2006 and compared to other programs, such as the proposal of the Joint Fishery White Paper, the Revision 7 program, the Revision 1 program, etc. Peter answered his own question, saying that none of those comparisons could be done because that data has never been released. Peter stated that a comparison of the FFMP policies over the 1960's drought of record could not be done either because the data has not been released. He said the information that NYC is posting online provides no basis to make a projection of how FFMP/OST will perform in the future.

Peter asked if DRBC staff could do the analyses that he is proposing. Hernán Quinodoz said he was not able to do those analyses either. He explained that the proprietary and real-time information was necessary for NYC to use the FFMP/OST model to drive their operations, but Peter Kolesar does not need this information. Instead, Peter is arguing for being able to do the long-term, historical period-of-record simulations that DRBC and others have been doing for many years. He said currently there is a missing piece to be able to run the DRBC OASIS model and simulate FFMP/OST operations: a description of how the calculation is made in OST today as to how much water is available and how to switch among release tables. Thom Murphy said the algorithm was posted online. Hernán responded that the online algorithm was incomplete; some missing details include the acceptable risk level used to forecast future inflows and what probability of refill is assumed for June 1. Without those details the algorithm works as a black box and others cannot replicate NYC's calculation. Hernán said the minimum information needed was a description of this algorithm. If that information was given to Peter on a piece of paper, he could go on and do the 80-year historical simulation with OASIS and run the DSS to make habitat evaluations. Stefanie Baxter said it was now very clear what pieces Peter Kolesar is missing to do his work, and indicated that this issue could be addressed at the OST training workshop that NYC will offer to Decree Party staff on November 2.

Jeff Zimmerman read a statement on behalf of FUDR (Friends of the Upper Delaware River), regarding the Thermal Relief Release Program from July 22-24, 2011. "First and foremost, Friends of the Upper Delaware River (FUDR) expresses its appreciation to the Decree Parties for

their rapid and very positive response to requests from the conservation community this past July. Due to extremely hot weather in the upper basin over an extended period in late July, various conservation groups beginning on July 20 requested additional releases to mitigate the thermal extremes that could otherwise have had devastating impacts on aquatic life in the upper mainstem of the Delaware River. We are very pleased to report that, because of the timely action initiated by the Decree Party representative from Pennsylvania, the water temperatures and flows in the upper mainstem from July 22 through July 26 at Lordville and Callicoon prevented conditions form reaching extremely stressful and possibly lethal conditions for fish and aquatic life in the river. When the thermal relief releases were authorized, daily temperature increases (without the additional releases) most likely would have reached 30°C at Lordville by July 24. There would have been disastrous impacts on the aquatic ecosystem and the trout population if the additional releases had not been made. Instead, the additional water releases started the afternoon of July 22 produced a drop in water temperatures of up to 12°C at Lordville from a predicted maximum of 30°C on July 23 to 18°C on July 25. The very effective thermal reduction produced by the additional releases clearly was made possible only by the programmed releases of 600 cfs from Cannonsville and almost this amount from Pepacton for many days prior to the heat wave. This produced conditions in the upper mainstem that covered most of the river bed and avoided exposed gravel bars, eliminating the need to first cool the gravel bars before reducing water temperatures by mixing in the additional cold water from the thermal relief releases. We believe there are several lessons to be learned from the releases and conditions this past summer. First, with consistent and reasonable releases over the summer months, sustainable water flow and temperature conditions can be maintained a much greater distance down the upper mainstem than in the past. Second, in the event that extended periods of high air temperatures threaten to produce water temperatures that would be harmful to trout and aquatic life, temperature reductions can be achieved with relatively modest increases in releases as long as flows prior to the high temperature event have been sufficient to cover most of the river bed to a reasonable depth. Third, from a process standpoint, we should take away the lesson that substantial summer releases, such as those that have been sustained this year, will most likely have to be augmented on occasion with short, but essential additional releases from an emergency back in order to make best use of the water available to meet downstream needs. Finally, and perhaps the most important lesson of all, is that the Decree Parties must be ready and able to adapt quickly and respond to changing conditions on a schedule that is responsive to the urgency of events. Timeliness has been a problem in the past, but this summer the process worked effectively. We hope this summer's experience will be the norm for the future rather than the exception."

Next meeting date

The next RFAC meeting will be on Wednesday, January 18, 2012 at DRBC offices in West Trenton, beginning at 10:00 a.m. (*Note: this meeting was later rescheduled for February 16, 2012*)

REGULATED FLOW ADVISORY COMMITTEE (RFAC)

October 5, 2011

ATTENDANCE LIST

NAME	AFFILIATION
ANDERSON, Kelly	Philadelphia Water Dept.
BACHMAN, Bob	PA Fish & Boat Commission
BAXTER, Stefanie	DE Geological Survey
BONOS, Mary	Aquatic Conservation Unlimited (ACU)
BOUSUM, Pete	Friends of the Upper Delaware River (FUDR)
DOMBER, Steven	NJ Dept. of Environmental Protection, NJ Geological Survey
ERIKSON, Glenn	Wild Trout Flyrodders
GALLAGHER, Sheila	Delaware Riverside Conservancy (DRC)
HAMILTON, Don (via phone)	National Park Service, Upper Delaware Scenic and Recreational River
HARTLE, Mark	PA Fish & Boat Commission
HARTMAN, Lee	Trout Unlimited
HESSON, Molly	Philadelphia Water Dept.
JACOBI, Sue	ACU
KOLESAR, Peter	Columbia University
LIAGHAT, Hoss	PA Dept. of Environmental Protection
LOVELL, Stewart	DE Dept. of Natural Resources and Environmental Control
MURALIDHAR, D.	Hazen and Sawyer
MURPHY, Thomas	NYC Dept. of Environmental Protection
NOBLE, Mary Ellen	Delaware Riverkeeper
PAULACHOK, Gary	US Geological Survey, Office of the Delaware River Master
PEDRICK, Gail	ACU
PETTINGER, Garth	NYS Trout Unlimited, Delaware Committee
PHILLIPS, Jan	Consultant
PLUMMER, Dan	FUDR
QUINODOZ, Hernán	DRBC
REICHART, Elaine	Aquatic Conservation Unlimited (ACU)

NAME	AFFILIATION
RESTI, Sherri	FUDR
SCANNAPIECO, Alycia	Resident – flood concerns
SHALLCROSS, Amy	DRBC
SILLDORFF, Erik	DRBC
STEVENS, Glen	US Army Corps of Engineers
TARRIER, Brenan (via phone)	NYS Dept. of Environmental Conservation
THARP, Diane	NorDel Conservancy
TUDOR, Bob	DRBC
WO, Jeromy	NorDel Conservancy
ZIGON-RICHARDSON, Valerie	DRBC
ZIMMERMAN, Jeff	FUDR et al.