

Rulemaking to Implement a Flexible Flow
Management Program for the New York City
Delaware Basin Reservoirs

Proposed: December 3, 2007
Withdrawn: December 10, 2008

Response to General Comment Subjects



January 21, 2009

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OVERVIEW OF PROCESS AND ASSESSMENT OF COMMENTS

On December 3, 2007, the Delaware River Basin Commission (“Commission” or “DRBC”) proposed amendments to its Water Code and Comprehensive Plan. These amendments were intended to codify the Flexible Flow Management Program (FFMP) Agreement dated September 27, 2007, which was developed by the parties to the 1954 Supreme Court Decree in *New Jersey v. New York* – the states of Delaware, New Jersey, and New York, the Commonwealth of Pennsylvania and the City of New York (Decree Parties). The comment period was open from December 3, 2007 through March 3, 2008, but comments received earlier regarding the FFMP were also considered. During the 2007-2008 comment period, four public information sessions and four public hearings were conducted and the Commission received approximately 1,900 comments (including a petition signed by over 10,000 people) on the FFMP and the proposed amendments to the Water Code and the Comprehensive Plan. This document was prepared to respond to public comments on the proposed changes to the Water Code and the Comprehensive Plan.

After consideration of the comments and consultation with the Decree Parties, the Commission has decided to withdraw the amendments to the Water Code and the Comprehensive Plan proposed on December 3, 2007 and to develop new proposed amendments to the existing Water Code and Comprehensive Plan. The proposed amendments to the Water Code and the Comprehensive Plan will be developed for public notice and comment by or in the summer of 2009 or as soon thereafter as practicable to allow for the consideration of the following:

- The Flood Analysis Model, currently being developed for the Commission by the combined efforts of the United States Geological Survey, United States Army Corps of Engineers Hydrologic Engineering Center, and the National Oceanic and Atmospheric Administration - National Weather Service;
- The OASIS Model, currently being updated with data through September 2006;
- The results of ongoing studies of the Dwarf Wedge Mussels and their habitat requirements currently being conducted for the United States Fish and Wildlife Service;
- The experience gained with the FFMP operation including investigation of alternative parameters and scenarios and their risks and sustainability; and,
- The comments received on the proposed amendments to the Water Code and Comprehensive Plan during the public comment period which ended on March 3, 2008.

It is envisioned that the proposed amendments to the Water Code and the Comprehensive Plan will provide standards for operation of the NYC Delaware Basin Reservoirs and be less prescriptive than the previous proposal that contained detailed operational

requirements. It is also contemplated that the proposed amendments will allow for flexible, timely adjustments to address real time conditions and/or to incorporate recommendations resulting from new information, including the annual review of FFMP implementation, modeling simulations and other sources. Such adjustments may include modifications to the release schedules that may be necessary to respond to the immediate climatic, river flow and temperature conditions and maintenance requirements for which modifications need to occur within a short time frame and on a timelier basis.

The anticipated regulations will provide for full public notice and comment with respect to any major modifications of the reservoir operating program. The reservoir operators should have flexibility to make future timely adjustments that include modifications to the release schedules in response to needs of key biological species, reflect climatic conditions, river flow and temperature conditions, short-term operating changes to accommodate maintenance and repair needs, etc. However, major modifications would benefit from public input and discussion.

The FFMP agreement, as amended (see below), will continue to be implemented on a temporary basis by the Decree Parties in cooperation with the United States Geological Survey, while DRBC develops the new proposed amendments to the Water Code and Comprehensive Plan and conducts the notice and comment and rulemaking process.

SUMMARY OF DECREE PARTY MODIFICATIONS AND ADJUSTMENTS TO THE SEPTEMBER 27, 2007 FFMP DURING THE FIRST YEAR OF IMPLEMENTATION

Since the signing of the FFMP on September 27, 2007, several temporary modifications to the releases from the NYC Delaware Basin reservoirs have been required to reflect two maintenance and investigative shutdowns of the NYC water tunnel, a wet December - February period resulting in high winter reservoir storage levels, and unseasonably high water temperatures in the Upper Delaware River at Lordville due to a short heat wave in June. The temporary modifications were made in accordance with the various provisions of the FFMP and with the unanimous consent of the Decree Parties. Several of the changes were made in response to public comment. The temporary modifications under the FFMP were:

Temporary modifications

1. **February, 2008.** In accordance with Sections 16 and 17 of the FFMP, NYC initiated increases to the FFMP releases from the NYC Delaware Basin reservoirs for the period from February 16 through March 6 to mitigate the potential for spillage during the shutdown of the Roundout West Branch Tunnel (tunnel). The shutdown was necessary to allow investigative and other minor maintenance work to be performed on the dewatering shaft of the tunnel. The tunnel shutdown resulted in no water being diverted from the NYC Delaware Basin reservoirs into Roundout Reservoir or the NYC water supply system. At the end of the tunnel

shutdown the releases reverted to those contained in Section 6 - Table 3A of the FFMP, the Schedule of Releases (cfs) with 35 mgd available.

2. **April, 2008.** The Decree Parties unanimously agreed to provide for a Temporary Wet Spring Release Program from April 15 to April 30, 2008 to reduce the potential for spills in the event of forecasted wet weather. Under the program, 1.32 billion gallons (BG) (2,047 cfs-days) were released. As stipulated in the Decree Party agreement, this quantity was deducted from the 17,125 cfs-days of the Interim Excess Release Quantity (IERQ) available for the 2008-2009 release season.
3. **June 9, 2008.** Due to unseasonably high air temperatures in early June 2008, the Decree Parties used provisions in Section 4.d of the FFMP to permit releases from the IERQ to mitigate the potential thermal stresses to the fishery from the heat wave. The June 9th agreement provided for an additional release from the IERQ of 595 cfs-days from Cannonsville Reservoir between June 9 and June 11, 2008 for emergency protection of the fishery from thermal stress.
4. **July 10, 2008.** As a result of concerns about potential future occurrences of unseasonably high air temperatures, in accordance with Section 4.d of the FFMP, the Decree Parties unanimously agreed to create a 1,540 cfs-days Extraordinary Needs Bank from the IERQ. The water would be used to increase releases from the NYC Delaware Basin reservoirs to aid thermal relief downstream to Lordville, as needed, between July 1, 2008 and September 15, 2008. The agreement also provided for reduction of the Montague flow objective from 1,850 cfs to 1,830 cfs to provide water for the Extraordinary Needs Bank. Fortunately, the Extraordinary Needs Bank was ultimately not needed and the 1,540 cfs-days reverted to the IERQ on September 15, 2008.
5. **October 1, 2008.** In accordance with Sections 16 and 17 of the FFMP, the Decree Parties unanimously agreed to a Temporary Release Program to increase reservoir releases during the 2008 Rondout West Branch Tunnel Shutdown, when New York City's diversions from the Delaware Basin were suspended. In order to reduce storage and mitigate the potential for spills, the program provides for releases in excess of those that would otherwise be made from the three NYC Delaware Basin reservoirs in accordance with the FFMP for the period from October 1, 2008 to May 1, 2009. The program adjusts both the Combined Reservoir Storage Curve (Figure 1) for L1 and the Individual Storage Curves (Figure 2), which determine the L1a, L1b, and L1c releases, resulting in temporary increases to the release rates. The release program went into effect on October 1, 2008 in preparation for the tunnel shutdown and will continue until May 1, 2009, well after the shutdown period has ceased. The shutdown is necessary to conduct investigative and other maintenance work on the dewatering shaft of the tunnel. After May 1, 2009, operations will return to those specified in Section 6 of the FFMP.

**CHANGES INCORPORATED IN THE REVISED FFMP AGREEMENT
DECEMBER 10, 2009**

Based upon the experience gained during the first year of FFMP operation and comments received during the public comment period on the proposed amendments to the Water Code and the Comprehensive Plan, the Decree Parties unanimously agreed to the following changes to the September 27, 2007 FFMP.

- a. Tables 3A-D of the FFMP have been revised to subdivide the months of May and September into two additional release periods and provide for increased reservoir releases for fisheries habitat protection needs in late May and early September. In addition, marginal adjustments have been made to the releases for other periods.

- b. Sections 16 and 17 of the FFMP have been revised to clarify the terms of the agreement that provide for the temporary suspension or modification of one or more of its provisions during emergencies, maintenance and repair operations or to address short-term needs or unanticipated effects of the FFMP. When considering such temporary suspensions or modifications, the Decree Parties and DRBC may estimate probabilities and risks associated with the temporary suspensions or modifications. Any modification other than to the scheduled releases, as provided in Section 17, shall be subject to the unanimous approval of the Decree Parties. In the absence of unanimous approval of a modified release schedule required for necessary maintenance and repair, the City, in cooperation with the NYSDEC, will make releases to the best of its ability for the duration of the maintenance or repair work. However, modifications to releases not to exceed seven consecutive days for purposes of maintenance and repair of immediate necessity or to avoid unreasonable sub-daily fluctuations in releases shall not require Decree Party approval, but shall be made by NYC in cooperation with the NYSDEC. In all cases, NYC Delaware Basin reservoir releases shall be sufficient to meet the Montague flow target objective in effect at the time, and in the absence of Decree Party approval, all releases shall be done by NYC in cooperation with NYSDEC.

The Decree Party's FFMP agreement can be viewed on the Delaware River Master's web site at <http://water.usgs.gov/osw/odrm/>.

**SUMMARY AND DISCUSSION OF COMMENTS RECEIVED DURING THE
PUBLIC COMMENT PERIOD**

The Commission received approximately 1,900 comments (including a petition signed by over 10,000 people) on the proposed amendments to the Water Code and Comprehensive Plan to codify the FFMP. The major comments received involved:

- fisheries and ecological resources;
- endangered species;
- recreation;
- flood impacts and mitigation;
- dam safety;
- water supply and salinity;
- technical concerns about the models, metrics, assumptions and criteria used in framing the FFMP and proposed amendments to the Water Code; and
- legal issues relative to the 1954 Supreme Court Decree, the Good Faith Agreement, the Water Code and the relative authorities and responsibilities of the Commission, the States and the Decree Parties.

A summary of the comments and a response for each of the major issues follows.

Ecological Resources, Estuary and Recreation

Comments contained requests for better protection of the fishery, additional consideration of endangered species issues, movement towards a more natural flow regime and higher flows for recreation. Concern was expressed that the FFMP and Water Code amendments did not go far enough to protect wild trout, American Shad, dwarf wedgemussels, oysters and other species. While some supported the idea of the FFMP, many strongly argued that modifications to the program were needed to ensure better protection of ecological resources.

The Flexible Flow Management Program (FFMP) was developed by the Decree Parties with Commission participation to better manage the water resources of the basin for multiple objectives, including protection of the river's ecology, support of recreational uses, and water supply. The FFMP was prepared after extensive discussions and interactions with the public, fishery interests, and DRBC's Regulated Flow Advisory Committee (RFAC) and its Subcommittee on Ecological Flows (SEF). The Commission continues to believe that the FFMP, unanimously agreed to by the Decree Parties on September 27, 2007, represents a positive step toward increasing the protection of ecological resources and improving management of the water resources of the Basin through an adaptive process.

The New York City Delaware Basin reservoirs were designed and constructed solely for water supply purposes with limited consideration of ecological impacts as was standard practice at the time. Releases for fisheries were not addressed by the Supreme Court Decree. However, over the years, the Decree Parties have evaluated and negotiated release programs for maintaining the fishery in the reservoir tailwaters, and the streams immediately below the three reservoirs. The release rates established by the FFMP were developed in consultation with NYSDEC Division of Fish, Wildlife and Marine Resources and the Subcommittee on Ecological Flows of the Commission's Regulated Flow Advisory Committee.

While new proposed amendments to the Commission's Water Code and Comprehensive Plan are prepared, the Commission and the Decree Parties will continue to work with state and federal natural resource management agencies and other interested parties to develop programs intended to enhance protection of river ecology and support recreational uses below the three NYC Delaware Basin reservoirs. RFAC and SEF will continue to provide input into the program development effort. The Science and Technical Advisory Committee of the Delaware Estuary Program will participate in deliberations of the SEF on the subject of freshwater inflows required to maintain the ecosystems of the estuary. The Pennsylvania Fish and Boat Commission (PFBC) has indicated that it will furnish additional analyses and information to the Decree Parties and the Commission regarding fishery and recreational needs. Of course, the reports and studies expected to be completed during the next several months will be used in program development. Among the study results anticipated early in 2009 are the results of a multi-year study by the United States Fish and Wildlife Service regarding the flow needs of the dwarf wedgemussel, a federally listed endangered species.

Flood Mitigation

Commenters requested adjustments to the Water Code to provide for increased flood mitigation and many recommended that the Water Code contain a flood mitigation section similar to the drought mitigation section of the Code. Many commenters expressed the opinion that safety voids in the NYC Delaware Basin reservoirs must be a part of the plan and want such voids to be permanently maintained in the reservoirs to serve as flood control storage. Other commenters assert that these reservoirs should not be used for flood control.

The Commission continues to believe that floods experienced in 2004, 2005 and 2006 were primarily the result of extreme weather events. For example, the April 2005 event was the result of back-to-back storms, both of which produced between two to five inches of rain throughout the basin and which melted between five to ten inches of water equivalent stored in the snow pack. The June 2006 storm event produced rainfall amounts between six to fifteen inches within the basin. Alteration of reservoir operations may have a benefit, especially immediately below the three NYC Delaware Basin reservoirs, but catastrophic flooding and damages would likely have occurred regardless of the status of reservoir storage. Although the FFMP addresses flooding to a limited extent, the maintenance of permanent reservoir voids was not included in either the FFMP or the proposed amendments to the Water Code and Comprehensive Plan. The NYC Delaware Basin reservoirs were designed and constructed for water supply and were not designed to maintain a flood control void space or to release large quantities of stored water in anticipation of forecasted storm events.

In the Fall of 2006 at the request of the four Basin State Governors, DRBC convened an Interstate Flood Mitigation Task Force, which identified 45 action items to improve flood mitigation in the basin. The items focus on six priority areas: reservoir operations, structural and non-structural measures, stormwater management, floodplain mapping, floodplain regulations, and flood warning. Many of the Task Force recommendations are currently being pursued, but funding sources have not yet been identified for all of them.

Although to some, altering reservoir operations seems the most expeditious flood mitigation measure, the extent to which the reservoirs mitigate flooding has not yet been determined, and the risks of any significant modification to public water supplies for NYC, Philadelphia, New Jersey, and a multitude of industrial and other users must also be evaluated before such measures are taken.

To better understand the potential impacts of reservoir operations on flooding, in July 2007, the four Basin State Governors provided funding for the Commission to contract with the United States Geological Survey (USGS), the Army Corps of Engineers Hydrologic Engineering Center (USACE HEC), and the National Weather Service (NWS), to develop the Delaware River Basin-specific Flood Analysis Model for the storms of 2004, 2005 and 2006. The Federal agencies also provided substantial resources to develop the model. The Flood Analysis Model will provide a previously unavailable scientifically-based tool to assess proposed operational schemes of up to 15 major Delaware Basin reservoirs that might be used to mitigate flooding in the basin. The Flood Analysis Model results will be considered in the subsequent iterations of the FFMP and the amendments to the Water Code and Comprehensive Plan.

Although the Flood Analysis Model for the portion of the Delaware basin above Trenton is currently scheduled to be available to the public at the end of April 2009, several months more will be required to fully assess the impacts of reservoir operations on all flow management objectives, including, but not limited to, protection of fisheries, ecosystem needs, flooding and water supply. In the development of new proposed amendments to the Water Code and the Comprehensive Plan for management of the NYC Delaware Basin reservoirs, the Commission will continue to work with the Decree Parties to look for flood mitigation opportunities and attenuation benefits without jeopardizing a safe, reliable source of water supply for NYC and downstream water users.

Water Supply and Salinity

The Philadelphia Water Department and other downstream water suppliers and water users expressed their concerns about detachment of the Montague flow objective from the 7-day average location of the 250 mg/L chloride concentration during basin-wide drought emergency operations and the ability of the Lower Basin reservoirs to meet the Trenton flow target. Others expressed concern about the partial restoration of New Jersey's diversion.

The Commission's policy is still to coordinate use of basin reservoirs, including NYC's Delaware Basin reservoirs, to repel salinity. The unanimous agreement of the Decree Parties to detach the location of the salt front (vernier) from the Montague flow objective expires on May 31, 2011 along with the entire FFMP agreement. The risk of higher salinity water impacting lower basin water supplies, such as the Philadelphia Water Department intakes, increases only during extreme low-flow events under drought emergency operations. The Decree Parties recognized that there is only a low probability of having such a multi-year extreme drought event during the period ending in May 2011.

During the term of the FFMP, water for the maintenance of the Trenton flow target to repel salinity will come from the Interim Excess Release Quantity (IERQ) when available, and from the lower basin reservoirs. It was agreed that this issue will be a priority of the Reassessment Study conducted in accordance with Section 15 of the FFMP. The Reassessment Study will consider, among other issues, the impacts of New Jersey's partially restored drought diversions (20 mgd increase) and the detachment of the salt front location from the Montague flow objective to determine whether effective salinity repulsion can be achieved on a long-term basis solely through use of the IERQ and releases from the lower basin reservoirs. In addition, the Philadelphia Water Department intends to perform a separate modeling evaluation of salinity impacts related to FFMP operations, the results of which will be submitted to the Decree Parties for their consideration. Notably, both the FFMP and the current Water Code contain "emergency provisions" that can be invoked to respond to an unforeseen event.

Dam Safety

Many commenters expressed concern about the safety of the NYC Delaware Basin reservoir dams as well as other dams within the basin.

Section 1.2 of the Delaware River Basin Compact (Compact) authorizes the Commission "to preserve and utilize the functions, powers and duties of the existing offices and agencies of government" to "the fullest extent it finds feasible and advantageous." Section 11.2 of the Compact provides for "avoiding conflicts of jurisdiction" between federal and state regulatory programs. Because the Commission's member states have regulatory programs in place to ensure dam safety, the Commission does not believe that adopting an additional set of such regulations would be consistent with the Compact or would be an effective use of limited government resources.

The following agencies are responsible for dam safety, inspections and enforcement. For information about dam safety by the states and the Army Corps of Engineers, contact these agencies:

[New York State](#): the New York State Department of Environmental Conservation (NYSDEC), Division of Water, Bureau of Flood Protection and Dam Safety.

[Pennsylvania](#): The Pennsylvania Department of Environmental Protection (PADEP), Bureau of Waterways Engineering.

[New Jersey](#): The New Jersey Department of Environmental Protection (NJDEP), Bureau of Dam Safety and Flood Control.

[Delaware](#): Delaware Natural Resources and Environmental Conservation (DNREC), Division of Soil & Water Conservation, Drainage and Stormwater Section

[Federal](#): U.S. Army Corps of Engineers Philadelphia District

Several comments were received that mistakenly equated dam spilling with dam overtopping. Earthen dams are designed with concrete or masonry service spillways that are specifically designed as a safety measure to conduct water from the reservoirs when they are full to prevent overtopping of the dams. Such spilling does not erode the structural integrity of a dam. The dams are equipped with additional emergency spillway capacity that prevents water from overtopping the crest and/or earthen embankments of the dam. As a further safety factor, dams are designed for the maximum probable flood and have additional freeboard above the “full capacity” at which spilling occurs.

Modeling

Many comments concerned the assumptions and accuracy of the OASIS and DSS models used to formulate the FFMP and to predict the impacts of different alternatives of the FFMP and proposed Water Code amendment.

The Operational Analysis and Simulation of Integrated Systems Model (OASIS) is a water resources planning tool used to determine the relative impacts of reservoir operations on water supply and associated issues. OASIS is currently being updated to include the last seven years of hydrologic data, and its assumptions and parameters are being reviewed by the Decree Parties and the Commission. The DSS model was based on a currently accepted physical habitat assessment methodology and data collected by the USGS from eleven sites. Flows derived from OASIS model runs were used in conjunction with the DSS, and the results were reviewed by SEF.

To assist in decision making, the models are used to compare the effects of different operating regimes on reservoir levels and downstream habitat. Although models can be used to evaluate a wide range of alternatives, the results depend upon constraints determined in advance by decision makers. The FFMP and the amendments to the Water Code and Comprehensive Plan were developed under the assumption that either an 800 mgd continuous daily demand or a 765 mgd continuous daily demand would be withdrawn by New York City until drought conditions required curtailments to both the Montague flow and New York City’s diversion. The 765 mgd diversion for water supply was determined by a trial of a maximum daily diversion of 800 mgd less 35 mgd allocated for protection of the fishery

Legal Authorities

Commenters expressed a variety of viewpoints on the Commission's authorities and responsibilities under the Compact and the 1954 Supreme Court Decree, as well as under state and federal laws, including the Endangered Species Act (ESA) and National Environmental Policy Act of 1969 (NEPA).

For a detailed explanation of the Commission's authorities and responsibilities under the Delaware River Basin Compact (Compact), as well as in relation to the 1954 Supreme Court Decree (Decree), please refer to the Commission's website, <http://www.state.nj.us/drbc/FFMP/index.htm>. The Compact empowers the Commission "to allocate the waters of the basin to and among the states signatory to th[e] compact and to and among their respective political subdivisions, and to impose conditions, obligations and release requirements related thereto." This authority is subject, however, to the significant limitation that the Commission may not "impair, diminish or otherwise adversely affect the diversions, compensating releases, rights, conditions, obligations and provisions for the administration thereof" established by the Supreme Court decree in *New Jersey v. New York*, 347 U.S. 995 (1954), without the unanimous consent of the Decree Parties (Compact § 3.3). Thus, the Delaware River Basin Compact restricts the DRBC's authority to mandate releases from the City's Delaware Basin reservoirs in excess of those established by the Decree, without the unanimous consent of the Decree Parties, including New York City. The single exception is that in the case of an emergency "resulting from a drought or catastrophe", the Commission may "by the unanimous consent of its members . . . authorize and direct an increase or decrease in any allocation or diversion permitted or releases required by the decree, in such manner and for such limited time as may be necessary to meet such emergency condition."

Over the years the Commission, with the unanimous consent of the Decree Parties, approved dockets and changes to the Water Code and the Comprehensive Plan, including temporary revisions to the reservoir releases program, for purposes that included among others, fisheries protection and spill mitigation. Some of the docket revisions also modified on a temporary basis reservoir operating conditions that had been placed in the Water Code. The latest of the temporary operating conditions established by Revisions 2 through 9 of Docket D-77-20 CP expired on September 30, 2007.

With respect to the ESA, Section 9 of the FFMP provides that the Decree Parties and DRBC "agree to review and evaluate available data during the implementation of this FFMP and will consider any modifications that may be necessary to avoid taking, harming, or adverse effects on Dwarf Wedgemussels." At present there is uncertainty as to the habitat needs of the dwarf wedgemussel. As a result of communications among the United States Fish and Wildlife Service, the DRBC and various federal agencies, including U.S. Army Corps of Engineers, the agencies have initiated the studies needed to recommend water management regimes that will protect existing wedgemussel populations and identify measures to implement the Dwarf Wedgemussel Recovery Plan. In particular, a study was commenced in the spring of 2005 funded through the DRBC by PPL Holtwood, LLC as a result of the Lake Wallenpaupack Hydropower Project re-licensing agreement, with matching funds provided by the U.S. Army Corps of

Engineers. Upon completion of this and other studies, changes may be made to the FFMP and Water Code and Comprehensive Plan to implement the study recommendations.

NEPA applies to federal agencies and federal actions. The DRBC is a federal interstate compact agency, and in the view of today's Commission, it is not a federal agency for purposes of NEPA. Among other reasons, the Commissioners base this view on the fact that DRBC action requires a majority vote of the five Commissioners, four of whom are state governors. Although the Commander of the North Atlantic Division of the U.S. Army Corps of Engineers represents the federal government on the Commission, as one of five members, he or she does not control DRBC decisions. The Compact explicitly provides that DRBC employees are not federal employees. *See Compact, § 15.1(n).*