

MEMORANDUM

TO: Commissioners

FROM: Carol R. Collier

DATE: September 26, 2007

RE: **WATER RESOURCES PLAN FOR THE DELAWARE RIVER BASIN ~ FY 2007 ACHIEVEMENTS**

September 2007 marks the third anniversary of the *Water Resources Plan for the Delaware River Basin* (Basin Plan). During the past year, DRBC and our partners have advanced the goals of the Plan through a number of activities. This memo briefly highlights some of the Plan-related achievements and works in progress. In addition, the Water Resources Program, which we update annually, includes ongoing efforts as well as projects planned for future years that will provide progress towards meeting the goals and objectives of the Basin Plan. Following are points of general accomplishment and specific progress within the five Key Result Areas (KRAs).

BASIN-WIDE IMPACT

- **National Water Quality Network:** The Delaware River Basin was selected as one of three pilot areas for the national network being developed for US Coastal waters and their tributaries. The Network will coordinate water monitoring across the nation to provide a comprehensive database and increase understanding on the health of water resources from mountains to ocean. By January 2008, current monitoring gaps in the Basin will be identified as part of Phase 1. Improvements to existing monitoring sites and the installation of new sites, sensors and data systems are expected in 2008 as part of Phase 2.
- **Interstate Flood Mitigation:** A set of 45 consensus recommendations for action was sent to the Basin state governors in mid-July, just nine months after an **Interstate Task Force** led by DRBC was convened in response to three major flood events in two years. The recommended actions, 14 of which are underway, are designed to implement a proactive, sustainable and systematic approach to flood damage reduction in the Basin. DRBC has the lead on a multi-agency effort to develop an interstate flood analysis model to evaluate the effects of alternative reservoir operating plans on downstream flood mitigation.
- **\$1 M Multi-Jurisdictional Use & Management Project:** The Army Corps of Engineers (Corps) Philadelphia District and DRBC have been working on the five water resource management issues covered in the scope of work for this mega project, including sustainable supply, flood mitigation, estuary inflow evaluation relevant to flow management, re-evaluation of approach to user supply costs, and public access to information. The majority of work plan tasks are scheduled for completion by December 2007. Progress is reported herein under the appropriate issue areas.

SUB-BASIN IMPACT

- **PCB TMDL:** DRBC prepared the Total Maximum Daily Load (TMDL) for polychlorinated biphenyls (PCBs) in Zone 6 of the Delaware River which was adopted by EPA Regions II and III in December 2006. The Zone 6 TMDL is built upon TMDLs developed for Zones 2-5 in 2003.
- **SPECIAL PROTECTION WATERS:** A draft Guidance Manual has been completed and revised Rule language drafted for publication in state and federal registers this fall. Temporary designation for the Lower Delaware will be extended until action on final Rule changes is scheduled in spring 2008. A model was developed to assess cumulative impacts of multiple discharges in the Brodhead Creek watershed on existing water quality at the Delaware Water Gap National Recreation Area boundary.
- **WATER SUPPLY:** DRBC is playing a pivotal role in the development of Pennsylvania's State Water Supply Plan including leadership for the Delaware Region and technical assistance

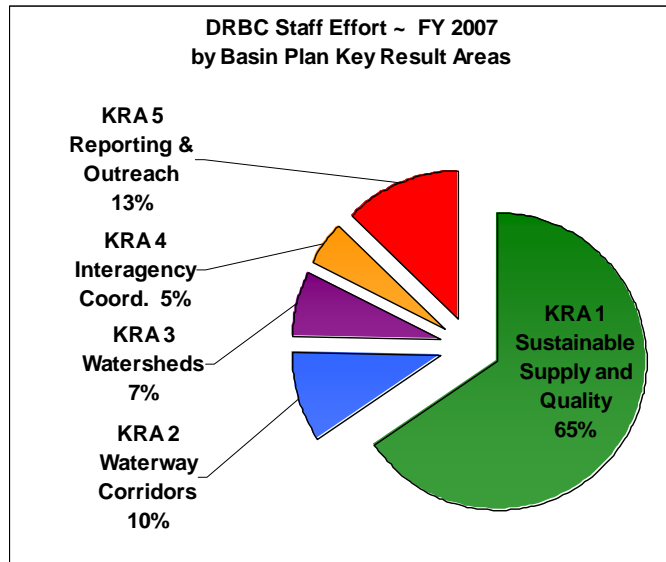
directed at better understanding water use in PA and analysis of watersheds for water supply adequacy.

- **FLOOD MITIGATION PLANNING:** DRBC is taking the lead to develop a Flood Mitigation Plan for 53 municipalities in four New Jersey Counties. Partners in the planning initiative include the New Jersey Department of Environmental Protection, the New Jersey Office of Emergency Management and county and municipal officials. The plan will be submitted for approval by FEMA by December 2007.
- **ENHANCING RECREATION:** The long-awaited recreation maps were completed this year. Covering nearly 250 miles of River from the East & West branches to the Philadelphia-Camden area, the waterproof, full color, ten-map set notes areas of caution, access locations and evaluations of river difficulty in accordance with national standards. Sets are available from DRBC and proceeds from the sales will benefit outreach, education and stewardship activities.

PROGRESS ON ACHIEVING THE DESIRED RESULTS OF THE BASIN PLAN

Last year the Commission adopted the structure of the Basin Plan in its time accounting process to complement the Annual Work Plan and six-year Water Resources Program. This realignment has improved our ability to track actual allocation of staff resources toward achieving the objectives and goals of the Basin Plan via the Water Resources Program and Annual Work Plans. Seventy percent of staff effort - almost 55,000 hours - were spent on work directly related to water resource management issues.

- 65% of time was expended on ensuring a sustainable supply of suitable quality water for all uses in the Basin
- 10% was used to investigate and manage flooding and its impacts. Additional flood-related work was reported as flow management and reservoir operation work under KRA 1, and as public outreach under KRA 5.
- 7% was reported for integrating water and land management in the Basin's watersheds
- 13% was expended in sharing information with partners and outreach activities.



- Although only 5% of the hours were identified specifically with KRA 4 - improving coordination and collaboration among institutions in the Basin - this desired outcome is frequently a result of other programmatic activities accounted for under Key Result Areas 1, 2, and 3.

Although an integrated approach to resource management presents a challenge to discrete accounting practice, staff is currently fine-tuning the collection of this data to improve consistency and accuracy. A report on milestones achieved in Key Result Areas follows.

WATER SUPPLY PLANNING & MANAGEMENT

DRBC is coordinating with the statewide water supply planning efforts in New Jersey, Pennsylvania and Delaware. DRBC staff is performing most of the water supply planning analyses for the Corps' Multi-Jurisdictional project, including a close look at existing supply, projected demand, and identification of potentially stressed watersheds in the Basin. The Corps and New Jersey products are expected in December. Highlights of activities and products include:

- Coordination among DRBC, PADEP and USGS for an **integrated water use data set**.
 - Application of the PA water supply screening tool in four PA watersheds.
 - **Supply availability and demand projections** calculated for 147 watershed units in the Basin.
 - **Identification of watersheds** expected to be in surplus or deficit by 2030.
 - Investigation of **supply enhancement options**; recommendations for long-term sustainability are expected by December 2007.
 - Evaluation of operation and maintenance and **improvement costs** and expected impacts on water supply user charges. A report is expected in December 2007.
 - Review of DRBC conservation program as part of an assessment of the potential to reduce demand. Revisions to Water Code Article 2 have been proposed designed to improve **water supply system efficiency** and reduce the estimated 150 million gallons of daily water system losses.
 - DRBC developed **water audit software** which is hosted in the AWWA website.
- Public meetings (3) were held on an initial Flexible Flow Management Plan (FFMP) proposal in March. The next draft of the plan will take into consideration the 449 public comments that were received.
 - **Flow Forecasting**: The 1-D salinity model linkage with OASIS has been completed, and staff has been trained in the use of the 3-D hydrodynamic model for chloride evaluation. Staff has provided extensive OASIS flow model support for Decree Party negotiations and SEF review of Decision Support System (DSS) results. Section 22 flow forecasting work is being modified to include temperature model improvements and enhancement of DSS. A new flow gauge at Lordsville NY is in use for additional fishery information.
 - **Reservoir Ops**: The Army Corps implemented a multipurpose management plan for F. E. Walter Reservoir incorporating releases for fishery needs in addition to white water releases for recreation. Staff participated in the annual inspection of Blue Marsh Reservoir.

WATER QUALITY

With water supply planning and flow management, water quality issues complete the integrated resource management result of KRA 1. Monitoring, assessment, and the development of water quality standards and policy are mainstay activities of the DRBC work plan.

- **Ten-year Water Quality Monitoring Strategy** was accepted by EPA and will be implemented through Section 106 work plans.
- The **periphyton pilot study** for the non-tidal river was completed in spring 2007. It reveals a system generally indicative of high water quality and high biological integrity. However, the upper river appears to be less rich and diverse, and less pollution tolerant, than the lower non-tidal river, and the lower river taxa are indicative of high nutrient concentrations. These results will inform the development of nutrient criteria.
- The final report on **Emerging Contaminants of Concern** was issued in February summarizing efforts to monitor emerging contaminants in the basin by DRBC, USEPA, USGS, the basin states, academics and stakeholders.

FLOW MANAGEMENT

FFMP negotiations have been vigorous and complicated this year fueled by public concerns over flooding and ecological flow needs, added to the complex meshing of drought, reservoir operations, and changing water supply needs. Decree parties are negotiating the scope of a comprehensive re-assessment. In addition to decree party support, DRBC has been involved in many activities and realized a number of important products.

- **Flow and transport models** have been refined to include threats to drinking water supplies identified in Source Water Protection studies.
- **Source Water Protection:** Coordination with State and regional SWAP efforts and EWS collaboration continues, as does coordination with the US Coast Guard and the Partnership for the Delaware Estuary for training, assessments and modeling for emergency spill response and contingency management. The Spill Response model is run nightly allowing model simulations of any spills that are reported.
- **PCBs:** Zone 6 TMDL was established in December 2006 by EPA. Twenty-five annual Pollution Minimization Plan reports for Zones 2-5 were received and 9 delinquent permittees notified.
- The second annual **Delaware Toxics Reduction Program** (DelTRiP) report, released in February, details ongoing PCB remediation efforts at 53 sites throughout the Basin. Representing a significant reduction from the 263 sites listed in the prior annual report, this new figure is the result of a comprehensive research effort which eliminated those sites where PCB remediation had been achieved and those with erroneous information about location or PCB contamination. Future annual reports will focus on these 53 sites, plus any additional sites that are found.
- Initial tributary screening surveys for **chronic toxicity assessment** in the lower non-tidal river were completed; sampling will continue through November.
- A strategy for **nutrient criteria** adoption to achieve fishable/swimmable goals was presented to the MAC and WQAC.
- **Special Protection Waters** – Staff have been engaged in preparing the Guidance Manual, negotiating implementation details with state staff, and drafting new Rule language for publication in state and federal registers this fall. Temporary designation for the Lower Delaware will be extended until action on final Rule changes is scheduled in spring 2008.
- **Cumulative impact assessment:** A model was developed for the Brodhead Creek watershed to assess cumulative impacts of multiple discharges on existing water quality at the boundary of the Delaware Water Gap National Recreation Area.

FLOOD MANAGEMENT & FLOOD WARNING

In addition to shepherding the Interstate Flood Mitigation Task Force and preparing the Action Plan, DRBC staff has been involved in several other efforts related to flooding. Considerable time has been expended responding to public and media questions resulting from the aftermath of the flood events themselves, the Task Force and FFMP negotiations.

- An **evaluation of stream gauge and precipitation networks** was completed to update to the 2002 Flood Warning Recommendations of the Flood Advisory Committee.
- A grant was awarded by FEMA and NJ State Police to develop a multi-jurisdictional flood mitigation plan for 53 municipalities in the Basin in portions of Mercer, Hunterdon, Warren, and Sussex Counties, NJ. A draft Plan will be submitted to NJOEM and FEMA by year's end.
- The **Flood warning notification system** was linked to the Advanced Hydrologic Prediction Service (AHPS). This automated system provides email notices on flood crests along the main stem Delaware River to registered users. The National Weather System is considering taking this nation-wide.
- DRBC is part of a multi-agency team including USACE-Hydrologic Engineering Center, USGS, and NOAA-National Weather Service to develop an **integrated flood analysis model** to evaluate the effects of various operating alternatives for downstream flood mitigation. The model will include simulations for 15 individual reservoirs and the reservoir system as a whole. Results of the application to a pilot watershed are expected by November.

AQUATIC LIFE AND HABITAT

- **Delaware Bay Oyster Revitalization** efforts continued for the 3rd year with a planting of 680,000 bushels of surfclam and ocean quahog to enhance oyster recruitment. This represents an increase of 36% over the previous year and an increase of 145% since the program's inception in 2005. The 2006 program accounted for more than 50% of total recruitment in the planted areas and increased recruitment bay-wide by about 25%. Shell plantings, transplanting of brood stock and a

lower than expected yearling mortality rate has resulted in an increase in oyster abundance for the first time since 2000. Matching funds from NJDEP, DRBC, DDNREC, Rutgers-Haskins Shellfish Lab, Partnership for the Delaware Estuary, Delaware River and Bay Authority, Bridgeton-Port Norris Empowerment Zone, and oyster industries in NJ and DE have provided a 1:2.74 local dollar-to-federal dollar match, exceeding the 1:3 ratio goal. **The project has a \$50:\$1 benefit to cost ratio.**

- **Dwarf Wedgemussel Habitat Study** is in phase 2. Field work to assess the distribution of habitat conditions under various flow patterns and thermal conditions in the Upper Delaware River study area is completed and preliminary interim findings are being prepared. The collection of bathymetric data necessary to describe habitats actually used by the dwarf wedgemussel is in progress.
- Collaborative work with Rutgers Haskins Shellfish Lab continues to identify data and modeling needs to assess impacts of infectious diseases on oysters.
- See also Periphyton Study under KRA 1, nutrient criteria development under KRA 1, and Pocono Creek Watershed project under KRA 3.

RECREATION

- Recreation maps for the Main stem of the River (north of the Tacony-Palmyra Bridge) and the East & West Delaware branches were completed this spring; 10,500 sets of ten weatherproof maps were printed and can be ordered for \$25 per set.

The integration of water and land use management frequently takes place at the watershed scale as DRBC works with local, regional and state program partners to improve conditions in specific watersheds. Progress in targeted watersheds includes:

- **Schuylkill River Watershed:** The Exelon Restoration Fund, initiated as a condition of DRBC docket D-69-210CP, provided over \$250,000 for restoration projects this year. Three projects were selected that focus on agricultural improvements, stream bank restoration, and abandoned mine drainage remediation. The projects will improve water quality in this crucial source water system. Earlier in the year, nearly \$200,000 in settlement fees were leveraged to achieve \$1 million of water quality, habitat and recreational improvements when DRBC and Exelon joined with federal, state and local government agencies and NGOs to mitigate damage from acid mine drainage in Schuylkill headwaters at the Mary D, Bell Colliery and Mackeysburg sites. DRBC organized the annual Schuylkill Action Network (SAN) workshop in October 2006 which focused on improving monitoring and assessment capacity in the Schuylkill watershed. DRBC continues to work with the EPA, Philadelphia Water Department, PA DEP, Delaware Estuary Program and the Schuylkill River Heritage Area to widen the impact of SAN and secure a source of funding to replace the EPA Watershed Initiative Grant which will expire in 2008.
- **Christina River Watershed:** The fourth and final year of the EPA Watershed Initiative grant achieved the completion of all field work. The project has applied more than \$1.5 million of direct and leveraged funding to water quality improvement projects. The extensive inventory of completed projects includes nutrient management control plans, miles of stream reforestation and bank restoration, numerous stormwater retrofits and the initiation of monitoring programs in Chester County PA and New Castle County DE. The watershed project was a collaborative effort of DNREC, PADEP, Chester County Conservation District, Chester County Water Resources Authority, University of Delaware, Delaware Nature Society, EPA and DRBC.
- **Pocono Creek Watershed:** The USGS Hydroecological Integrity Process (HIP) replaced the use of IFIM to establish flow standards for aquatic ecology in Pocono Creek. Fifteen ecologically-based hydrologic indices are being used to assess the degree of potential flow alteration due to projected development and water use in the watershed. This is a collaborative project with USGS, EPA-ORD, Monroe County, PADEP, PA Fish & Boat Commission, and Brodhead Watershed Association.
- **Upper Wissahickon Pilot SAMP/CARP:** A technical team and advisory committee have been assembled to guide the development of a management plan for this stressed watershed area. This project melds the requirements of the Coastal Zone program's Special Area Management Plan (SAMP) with the identification of a Critical Water Planning Area (CWPA) and the development of a Critical Area Resource Plan (CARP) under Pennsylvania's Act 220 Water Supply Plan development process. The identification of alternative strategies to mitigate the stress on water resources on the Upper Wissahickon will be accomplished by December 2007. Documents related to the CARP/SAMP can be viewed at www.planning.montcopa.org/Wissahickon. This project is a collaborative effort with PA DEP, Montgomery County, and the Pennsylvania Environmental Council (PEC).
- **Upper and Central Region watersheds:** DRBC is participating in the Park Service's effort to forecast growth patterns in four upper basin counties. A second collaborative effort is focused specifically on developing strategies to accommodate growth in the PA Pocono region while protecting forest and water resources.

KEY RESULT AREA 4 - COORDINATION & COOPERATION**5% OF WORK HOURS**

DRBC is the major forum for negotiations, coordination and collaborative efforts in the basin, and the apparent under-representation of KRA 4 work hours is one remnant of the collaborative and integrated approach to water resource management, many hours of which are accounted for as part of the programs and projects achieving results in KRAs 1, 2, 3, and 5. Some of the more notable programs and efforts that require substantial DRBC involvement and coordination include:

- \$1 M Multi-Jurisdictional Use & Management Project
- Interstate Flood Mitigation Task Force, public meetings, and collaborative documents development
- FFMP negotiation support: meetings and modeling
- TMDL Implementation
- PA State Water Plan: Statewide Committee, Delaware Regional Committee, Policy & Implementation Sub-committee, Critical Water Planning Area Subcommittee, Water Conservation Subcommittee, Wissahickon Watershed Critical Area Planning
- Delaware Estuary: Implementation Advisory Committee (IAC) and Science & Technical Advisory Committee (STAC); Oyster Revitalization
- Special Protection Waters and Scenic River-related efforts: SPW rule development; participation in the Upper Delaware Council and Lower Delaware Management Committee and Delaware River Greenway Partnership
- Watershed initiatives including the Schuylkill Action Network (SAN), the Christina, Pocono Creek, and Upper Wissahickon projects
- Collaborative water quality improvement projects in the Schuylkill watershed
- Standing interstate and national initiatives such as ASIWPCA, ICWP, AWRA, WEF, AWWA, Partnership for the Delaware Estuary, Fish & Wildlife Cooperative, Commission Advisory Committees, sub- and ad hoc committees
- Funding maintenance and restoration; Congressional outreach
- MOU development with EPA and states
- All collaborative monitoring, assessment, data management and mapping efforts

DRBC is involved directly and indirectly, passively and actively, in education and outreach activities that promote stewardship of water resources. In addition to participating in multiple events during the year, such as state Coast Days, Shad Festival, Riverfest, and Bay Days, Schuylkill & Lehigh Valley events, and the Sojourn, the staff also makes presentations at special conferences and prepares annual and special reports, sharing information learned from research and assessment activities. Internal data management efforts are classified under this KRA, since the ultimate goal is to maximize data sharing and public access. DRBC activities have local, national and international impacts. Highlights of 2007 include:

- Involvement in nearly a dozen **public and legislative meetings** about flooding and flood mitigation this year. The agency continues to be a lightning rod for public fear and anger over flood damages from severe storm events in the past two years. Staff has worked diligently to distribute accurate information via the website, documents, and public testimony.
- Meeting with 30 **visitors** from China and South Korea at DRBC. In April, the Executive Director participated in the *Second Yangtze River Forum* in Hunan Province, China.
- Working to develop a **specialized data management system** that will integrate water use, water charging, dockets, contact lists and mail log. A preliminary product is expected from the consultant by December.
- **Outdoor retrofit for water quality:** The first phase of the stormwater retrofit project is operational, collecting and partially treating stormwater previously shuttled directly into Reeds Run. When completed, the system will achieve the requirements for new development under NJ regulations and serve as a model for retrofitting old properties to meet current performance standards. A member of the assisting design team received an award for excellence from the NJ chapter of the American Society of Landscape Architects for this project.
- **River Garden:** The architectural and landscape design plans were completed this year for the Ruth Patrick River Garden. Named in honor of Dr. Ruth Patrick, a pioneer in the use of biological methods for waterway assessment and research on the Delaware River, the courtyard transformation will provide an inviting gathering place and an opportunity for visitors to learn about the Delaware River Basin.
- **Indoor retrofit for energy efficiency:** With the aid of a consultant, staff has worked to identify potential actions for increasing the energy efficiency of DRBC HQ office. Initial items under consideration are additional energy efficient bulbs, room occupancy sensors, and dimmer systems in selected offices that will take advantage of natural sunlight. NJ's Governor Corzine has mandated a reduction in greenhouse gas emissions to 1990 levels by 2020, approximately a 20 percent reduction, to be followed by a further reduction of emissions to 80 percent below 2006 levels by 2050. Additional efficiencies at DRBC are expected from upgrades to the HVAC system planned for the end of this fiscal year and investigations into potential for solar panels are underway.
- **State of the Basin Report:** In cooperation with basin state Water Resource Research Institutes, the Partnership for the Delaware Estuary, USGS, EPA and the National Park Service, relevant data sets were assembled. A preliminary assessment document, coordinated by the University of Delaware is being reviewed and summarized for Commissioner review. In addition to reporting on environmental conditions in the basin, the Report will summarize gaps and make recommendations for improving reporting and assessment.
- **DRBC.net:** Continues to be a popular site and a necessary means of getting accurate information to the interested public. Web usage, measured by total bytes of data transmitted, during **FY2007 increased by 112%** over FY 2006. An index to aid site navigation was added as well as overviews of important dockets and resolutions affecting reservoir operations, information on PCB pollution minimization plan resources and emerging contaminants. Improvements to the home page are underway. **All recent DRBC publications are made available through the internet.**