

A Cooperative Approach to Water Quality Management

The Delaware River Experience

By Richard C. Albert and Elizabeth A. Johnson

Water quality management in any National Park System unit is a complex endeavor involving unique situations and a myriad of players. The two NPS units along the Delaware River: the Upper Delaware Scenic and Recreational River (UPDE) and the Delaware Water Gap National Recreation Area (DEWA) which includes the Middle Delaware Scenic and Recreational River, are no exceptions.

Separated by eight miles of the river, these two units are contained in three states (New Jersey, New York and Pennsylvania), two U.S. Environmental Protection Agency regions, nine counties and numerous municipalities. Both units are within commuting distance of the greater New York City area and rapid development is occurring adjacent to their boundaries. The excellent water quality, which is the basis for extensive river recreation, is threatened by direct and indirect discharge of treated wastewater into the scenic river reaches, and non-point sources.

This article describes the evolution of a cooperative water quality management program that is attempting to address the problems and issues inherent in the NPS units along the Delaware River. The partner in this endeavor is the Delaware River Basin Commission (DRBC), a four state-federal compact agency with broad water quality responsibilities. Cooperation with other entities in the NPS/DRBC program also is described.

Water Quality Monitoring

The cooperative monitoring program is an outgrowth of a DRBC program that began collecting water quality and biological data in 1969, and NPS concern for water quality within its two units. In 1981 DRBC conducted a water quality survey for input to the first draft Upper Delaware Scenic and Recreational River Management Plan and recommended that UPDE implement a water quality screening program instead of the limited fixed station monitoring then being proposed. The screen program was not implemented at that time.

Meanwhile, DEWA had instituted a beach monitoring program at several beach areas and was becoming concerned when occasionally high fecal coliform values were obtained. In 1982, therefore, DRBC conducted for the NPS an extensive water quality survey in the recreation area. This was the start of a DEWA and DRBC cooperative relationship which has continued to grow. In 1983 the two agencies cooperated in a study of a campground complex and developed a proposed joint NPS-DRBC water quality screening program for implementation in the recreation area on a trial basis. During the 1984 recreation season, 27 tributaries and 9 river locations were sampled weekly or bi-weekly. Evaluation of the program showed it to be effective.

The success of the 1984 trial program led to expansion of the program in 1985 to include the UPDE and the eight miles of intervening river. During the 1985 recreation season, baseline data were acquired on 88 tributaries and river locations. A sampling frequency of weekly to biweekly was maintained with the result that a total of 550 station-visits were made by NPS (DEWA and UPDE) and DRBC personnel. In 1986, 406 station-visits were made to 93 sampling sites and, in 1987, 340 station-visits were made to over 70 locations. The decline in station-visits reflects some reorientation of the program to priority areas and to special studies such as the 1987 sediment toxics survey, which sampled 17 locations.

The latter was funded jointly by the Mid-Atlantic Region and DRBC.

The philosophy of the water quality screening approach program is to conduct extensive areawide sampling with few parameters but frequent sampling and many sampling sites. Eight primary parameters are used to obtain water quality "fingerprints": fecal coliform, fecal streptococcus, dissolved oxygen, pH, conductivity, water temperature, rainfall, and benthic organisms. Numerous water quality problems have been identified by this method and a baseline suitable for evaluating trends has been obtained.

Cooperation with other monitoring agencies is obtained in four primary ways:

1. through normal day-to-day interactions between agency staff;
2. through the publication of annual reports of findings, which solicit state follow up surveys where problems are noted;
3. by providing assistance to other programs when requested; and,
4. through the periodic conduct of water quality workshops.

A water quality workshop in 1988 was attended by approximately 50 persons representing federal, state, and local governmental agencies and citizen organizations that operate in the scenic rivers area. The purpose was to learn what is being done in the region and how the different organizations could help one another. The NPS-DRBC program has obtained good cooperation from other agencies by designing a program that augments their existing monitoring efforts and offers services that are useful to them (e.g., the annual reports, periodic workshops and the 1987 toxics survey).

Scenic Rivers Water Resources Management Planning

While serving a useful function, water quality monitoring does not prevent water quality problems from occurring. In the Delaware River NPS units, particularly



St. Anthony Falls hydraulic lab sieve, used to collect sediment samples for toxics analyses. This sample in the Upper Delaware Scenic and Recreational River was very high in arsenic.

DEWA at this time, potential pollution from sources outside of park boundaries is a critical issue. For example, a new treatment plant recently began discharging into the 8-mile section of river between the Upper and Middle Delaware Scenic and Recreational Rivers. More recently, DEWA received the first two of potentially many requests for right-of-way permits to cross NPS land in order to discharge significant quantities of wastewater into the Middle Delaware Scenic and Recreational River. The increase in development also raises concern for non-point sources. A joint NPS-DRBC scenic rivers planning effort for DEWA has, therefore, been initi-



Future water quality problems could jeopardize scenes like this.

ated to address both current and future water quality issues and possible management changes.

In order to develop the DEWA water quality management plan, a formal Memorandum of Understanding was signed by the DRBC and the NPS (DEWA and Water Resources Division). Major input to the planning process will be obtained from the local, county, state and federal agencies operating in the three-state area draining to DEWA. State and federal participation will be accomplished through use of the DRBC Water Quality Advisory Committee and personal contacts.

The objectives of the joint planning effort are predicated on the fact that (1) the Middle Delaware Scenic and Recreational River could be classified by the states and DRBC as an "Outstanding National Resource Waters" as defined by U.S. EPA anti-degradation policies, (2) its National Wild and Scenic Rivers designation mandates special concern for water quality protection, (3) existing water quality is generally higher than required by existing standards, and (4) the recreational use of the river requires high levels of water quality. If existing water quality standards, programs and anti-degradation policies do not adequately protect existing or future water quality, potential management recommendations will be developed by the planning process and recommended for implementation by the various water quality agencies, including DRBC.

In order to focus the water quality management planning effort, descriptive land use themes have been detailed on mylar overlays to USGS 7.5 min quadrangles. These themes include existing property lines, watersheds, proposed and active development, open areas, wetlands, public lands, and zoning for townships adjacent to the park. A DBase III program is being developed to describe attributes of these themes. The attributes will include numbers of structures, land use (commercial, residential, etc.), population densities, and types of water and sewer. These will be used to analyze the amount of development (and pollution) that will or is occurring in a particular watershed in order to pinpoint potential problems for existing and future conditions. These spatial data will become part of a geographic information system currently being established at DEWA. The GIS will be used with water quality assessments (including the development of a predictive model) and assessments of the existing management functions of various levels of government in order to develop recommendations. It is assumed that policies, recommendations, and potential water quality standards that are developed by the DEWA planning effort may be applicable to the UPDE as well.

Summary Conclusions

The NPS Delaware River units are involved with the



Field test being conducted on Delaware River water by a Delaware River Basin Commission staff member.

Delaware River Basin Commission in a cooperative program that is becoming increasingly sophisticated. This program is mutually beneficial and cost-efficient. The cooperation has been successful because: (1) each agency is accorded equal partnership status; (2) common objectives are recognized; (3) a spirit of cooperation exists among all agency participants; (4) the program has been allowed to evolve naturally in response to resources and concerns; and (5) the program is designed to complement the programs of other agencies.

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Additional Reading

Albert, R.C. "Effective Low-Cost Areawide Water Quality Monitoring." In *Lake and Reservoir Management*, Volume II. North American Lake Management Society, 1986.

Delaware River Basin Commission. Report No. 10 Upper Delaware Summer Limnological Program. Prepared in cooperation with the National Park Service. Includes findings of 1987 baseline and toxics sampling and the DRBC-NPS Memorandum of Understanding for development of the DEWA water resources plan. 1988.