



**US Army Corps
of Engineers®**

North Atlantic Division

Water Control Management Annual Report

January 2003

North Atlantic Division

Water Control Management
Annual Report

January 2003

North Atlantic Division

Annual Water Control Management Report
Fiscal Year 2002

Table of Contents

1	Introduction.....	4
1.1	Background and Organization	4
1.2	Purpose of Report	4
1.3	Scope.....	4
1.4	Division and District Responsibilities	4
2	Hydrometeorologic Summary	5
2.1	Baltimore District.....	5
2.1.1	Flood Control	5
2.1.2	Low Flow Regulation	6
2.1.3	Water Supply	7
2.1.4	Recreation	8
2.1.5	Sedimentation	8
2.2	Norfolk District.....	8
2.2.1	Flood Control	8
2.2.2	Low Flow Regulation	9
2.3	New York District.....	9
2.4	Flood Control	9
2.5	Water Supply	9
2.6	Philadelphia District.....	11
2.6.1	Flood Control	11
2.6.2	Low Flow Regulation	11
2.6.3	Water Supply	11
2.6.4	Recreation	11
2.7	New England District.....	12
2.7.1	Flood Control	12
2.7.2	Low Flow Regulation	12

2.7.3	Water Supply	12
2.7.4	Recreation	13
3	Activities and Accomplishments	14
3.1	General Summary	14
3.2	Water Control Data System (WCDS).....	14
3.2.1	Baltimore District.....	14
3.2.2	Norfolk District.....	14
3.2.3	Philadelphia District.....	15
3.2.4	New England District.....	15
3.3	Status of Water Control Plans and Manuals	15
3.4	Deviations from Water Control Plans.....	16
3.5	Constraints on Water Control Plans.....	16
3.5.1	General.....	16
3.5.2	Baltimore District.....	16
3.5.3	Norfolk District.....	17
3.5.4	Philadelphia District.....	17
3.5.5	West Hill Dam	17
3.6	Changes to Water Control Plans	17
3.7	New Water Control Projects	18
3.8	Cooperative Hydrologic Programs	18
3.9	Environmental Initiatives.....	18
4	Current and Future Programs.....	19
4.1	General Summary	19
4.2	Water Control Data System – Corps Water Management System	19
4.2.1	Baltimore District.....	19
4.2.2	Norfolk District.....	19
4.2.3	Philadelphia District.....	19
4.2.4	New England District.....	20
4.3	Studies to be undertaken	20
4.4	Cooperative Program	20

List of Tables

Table 2-1: Damages Prevented by Water Control Projects by State	21
Table 2-2: Damages Prevented by Water Control Projects by Project	22
Table 2-3: White Water Releases at Corps Dams	24
Table 3-1: Water Control Manuals	25
Table 3-2: Water Control Deviations	29

North Atlantic Division

Annual Water Control Management Report Fiscal Year 2002

1 Introduction

1.1 Background and Organization

Water Control Management is the responsibility of the Water Resources Management Team, Engineering and Construction Division, Military and Technical Directorate.

1.2 Purpose of Report

This report was prepared in conformance with the requirements of ER 1110-2-240, dated 8 October 1982. This report is the twenty-first such Annual Division Water Control Management Report for the North Atlantic Division. This report summarizes the significant water control activities for the Division during the past fiscal year and outlines anticipated future activities.

1.3 Scope

This report provides a general Division-wide summary of North Atlantic Division Water Control Management Activities and Accomplishments for fiscal year 2002 and current and future water management programs. Additional detail on all topics is provided in Appendices A through E for the Baltimore, Norfolk, New York, Philadelphia, and New England Districts respectively.

1.4 Division and District Responsibilities

The Districts are responsible for the operation, maintenance and regulation of all Corps projects within their respective Civil Works Boundaries in accordance with governing Engineering Regulations and related guidance. As major river basins in the North Atlantic Division are totally within assigned District Civil Works boundaries, no inter-district coordination is required for the regulation of projects. Districts prepare and implement water control plans and manuals, and regulate Corps projects to meet all project purposes. The Division Office is responsible for the review and approval of water control plans and manuals and associated activities. Detailed responsibilities are provided in the North Atlantic Division Water Control Center Guidance Memorandum dated 28 September 1994.

2 Hydrometeorologic Summary

2.1 Baltimore District

2.1.1 Flood Control

District flood control projects provided benefits for three minor floods in fiscal year 2002.

26 – 28 March 2002: Rainfall of between 2 and 3 inches fell over most of the northern half of the district in a 12-hour period on 26 March 2002, the resulting runoff causing some very minor flooding in the Upper Susquehanna Basin in New York. Peak river levels exceeded flood stages by less than one foot. Operation of Whitney Point and East Sidney Dams reduced downstream stages by about 0.5 foot, using 3 and 15 percent of flood control storage respectively. The outlet gates at Sayers Dam were closed for 7 hours, resulting in use of about 15 percent of available flood control storage. Reservoir operation at Sayers Dam reduced stages on Bald Eagle Creek by 3.4 feet, preventing some minor flooding.

Baltimore District flood control projects prevented about \$4.9 million in damages during this event.

12 – 17 May 2002: Rainfall of between 2 and 3 inches fell over much of northern Pennsylvania on 12 – 13 May 2002, in advance of a slow moving warm front. Saturated ground conditions from heavy rainfall three days earlier resulted in higher than normal runoff for this event. Significant within bank rises occurred on many rivers in the area but flood stages were not exceeded. The outlet gates at Sayers Dam were closed for 30 hours, resulting in downstream stage reduction of 2.6 feet, which prevented some minor flooding. About 18 percent of flood control capacity at Sayers Dam was used during this event. The outlet gates at Stillwater Lake were closed for about 16 hours, resulting in the use of about 14 percent of flood control capacity. Operation of Stillwater Lake had no impact on this flood since downstream river levels remained below flood stage and would also have done so under natural conditions.

Baltimore District flood control projects prevented about \$4.5 million in damages during this event.

4 -12 June 2002. A series of storms impacted much of southern NY and northern PA from 4-6 Jun2002, producing locally heavy rainfall of 3 to 5 inches at many locations. The runoff caused some small stream flooding but no significant river flooding was observed. Flood control operations at Tioga-Hammond and Cowanesque Lakes prevented minor flooding on the Tioga River, and flood control operations at Sayers Dam prevented minor flooding on Bald Eagle Creek. The outlet gates at East Sidney Lake were closed for 18 hours but this had little impact on downstream stage reductions due to

the distribution of the rainfall. About 18 percent of the available flood storage was used at East Sidney, 13 percent used at Cowanesque and Sayers, and about 8 percent used at Tioga-Hammond.

The District's dams and LFP's prevented about \$5.8 million in damages during this event.

A summary of damages prevented by Baltimore District reservoirs is shown in Table 2-1 and Table 2-2.

2.1.2 Low Flow Regulation

The Pennsylvania Department of Environmental Protection (PADEP) declared a drought watch for most of the Pennsylvania counties in the Susquehanna River basin in August 2001. This drought watch continued into fiscal year 2002. The District implemented drought contingency plans in response to this declaration also continue into fiscal year 2002.

Minimum desired or required releases were being made from most District projects in early fiscal year 2002. Most District reservoirs, despite low inflows, maintained near normal pools during the first half of the fiscal year. Exceptions were East Sidney Lake, Raystown Lake and Sayers Dam.

East Sidney Lake was about 1.5' below its normal elevation at the beginning of the fiscal year and had fallen an additional 2 feet before there was some recovery in late November, just prior to starting the winter draw down at the beginning of December. Raystown Lake started the fiscal year about 2 feet below normal, and continued to fall until March when a record low lake level of 774.0 ft, or 12.0 ft below normal, was recorded on 2 March 2002. The minimum outflow was reduced to 200 cfs on 23 February 2002 to help assure that the lake would recover to its normal level by the start of the recreation season. See Table 3-2, Water Control Deviations. Inflows to Raystown Lake finally picked up in mid-March, enabling the lake to refill to its normal elevation on 19 April, and allowing minimum outflows of 480 cfs to be resumed. At Sayers Dam, the initial 5-ft winter draw down was spread out over about 6 weeks from late October to early December 2001 to help sustain downstream flows at a slightly higher level than normal during the drought.

Rainfall and resulting stream flows increased slightly from late Fall 2001 until early Spring 2002, however, they were not sufficient to replenish the surface and groundwater reserves of the numerous municipal water suppliers in the basin. As the fall and winter progressed, water supply conditions continued to deteriorate throughout much of the District, resulting in a steadily growing list of counties under a Drought Warning.

In mid-February, a Drought Emergency was declared for 24 south-central and southeast Pennsylvania counties as stream flow and groundwater levels approached, and in many cases fell below, the previous record low levels for this time of year. In April and May, additional counties in southern Pennsylvania and central Maryland were placed under a

Drought Emergency declaration.

Several large storms impacted much of the northern half of the Susquehanna River basin during May and June, providing some temporary relief from the drought conditions in this area and allowing some water supply restrictions to be lifted. Releases from District reservoirs were near or above normal during this time. As dry conditions returned to the District during the last quarter of the fiscal year, District drought Contingency Plans were re-implemented, and many District projects reduced outflows to minimum levels beginning as early as mid-July. Minimum project releases continued throughout much of August and September, but still helped to augment low flow conditions on many downstream rivers. Although most reservoirs experienced slowly draw downs during this time, lake elevations remained near normal levels through the end of the fiscal year. The only exception was at Raystown Lake, which fell about 2 ft during August and September due to its relatively high minimum flow requirement of 200 cfs. The release from Raystown Lake provided significant augmentation of flows downstream on the Juniata and lower Susquehanna Rivers, with only minor in-lake impacts reported. Stream flow levels on the mainstream Susquehanna River remained above the flow target at which the Susquehanna River Basin Commission (SRBC) requests releases from their contracted water supply storage in Cowanesque and Curwensville Lakes.

In the upper Potomac River basin, water quality storage was used in early summer, allowing releases from Jennings Randolph Lake and Savage River Dam to be maintained above minimum levels through the end of FY 02. The water supply releases that were requested from Jennings Randolph Lake, combined with concurrent releases from Savage River Dam, also provided significant benefits for low-flow conditions on the mainstream Potomac River from mid-August through September.

Drought conditions in the lower Susquehanna and Potomac River Basins, during the last half of the fiscal year, were much more severe than in the headwater areas, where the District's reservoir projects are located. Groundwater levels and local stream flows were at all-time record lows at a number of sites in August and September. Drought emergency declarations were in effect throughout the area and nearly all-municipal water suppliers were facing serious water shortages by the end of fiscal year 2002. Rainfall during the first quarter of fiscal year 2003 was well above normal throughout much of the District, which alleviated most of the serious water supply problems that had existed.

2.1.3 Water Supply

Severe drought conditions impacted the lower Potomac River Basin during the last quarter of fiscal year 2002, prompting the Interstate Commission on the Potomac River Basin (ICPRB) to request releases from contracted water supply storage in Jennings Randolph Lake. Releases were made for 32 days between 15 Aug and 23 Sep 2002, utilizing 15,897 acre-feet (38.8 percent) of the total available water supply storage. Above normal rainfall in October and November 2002 produced sufficient runoff to refill the water supply storage by 18 Nov 2002.

There were no requests by the SRBC for releases or withdrawals from the contracted water supply storage in Cowanesque or Curwensville Lake during FY 02.

During the last quarter of the fiscal year, numerous municipal water suppliers in the lower Potomac and Susquehanna River Basins were experiencing critical water supply shortages. District staff investigated methods of supplying "emergency" water on an as needed basis from "surplus" water at Corps' projects under the authority of Section 6 of the Flood Control Act of 1944. Runoff from heavy rains at the start of fiscal year 2003 alleviated most of the serious water supply problems that existed. The need for emergency water supply did not develop. District staff plans pursue use of Section 6 contracting for emergency water supply during future droughts.

2.1.4 Recreation

Baltimore District recreation areas logged 14.5 million visitor hours during fiscal year 2002, about 0.8 million hours more than in fiscal year 200. Raystown Lake accounted for just over 50 percent of the total, followed by F.J. Sayers Lake and Tioga-Hammond lakes with just over 10 percent. Almond Lake, Alvin R. Bush Dam, Cowanesque Lake, and Whitney Point Lake each accounted for about 5 percent of the total, and each of the remaining projects accounted for 1 to 2 percent of the total.

Scheduled whitewater releases were made on two weekends each in April and May 2002. Whitewater interests also benefited from scheduled releases on 6-8 Oct 2001 and 17-18 Aug 2002. See Table 2-3 Whitewater Releases at Corps Dams.

2.1.5 Sedimentation

The results of reservoir surveys conducted in prior years reveal that most projects have experienced some loss of storage capacity due to sedimentation. These losses affect storage space available for flood control, water supply, water quality, and government conservation purposes. Existing water supply storage agreements at Jennings Randolph Lake, Cowanesque Lake, and Curwensville Lake with non-Federal sponsors all contain a standard clause allowing for an "equitable redistribution" of storage space among project purposes when such purposes are affected by sedimentation. The clause, however, is unclear as to the precise method for redistributing storage.

2.2 Norfolk District

2.2.1 Flood Control

There was no major flooding in the James River Basin in fiscal year 2002. Small flood control releases were made from Gathright Dam in April and May 2002; however, no damages were prevented by these operations.

2.2.2 Low Flow Regulation

Regulation of Gathright Dam is directed toward maintaining Lake Moomaw at the maximum conservation pool (elevation 1582.0 ft., N.G.V.D.). Low flow augmentation releases are provided during periods of low flows for the improvement of downstream water quality. At the start of the fiscal year, Lake Moomaw was 9.8 feet below the maximum conservation pool. This was 3.3 feet above the average level of the reservoir for this date. The reservoir continued a steady decline through mid January 2002. The minimum reservoir elevation occurred 22-24 January 2002 at 1561.0 ft., N.G.V.D. At this level, approximately 21.8% of the low flow augmentation storage remained available. The reservoir returned to maximum conservation pool on 22 April. The reservoir remained near the maximum conservation pool through early June 2002 when a steady decline in the pool occurred due to low flow augmentation releases. These releases continued through late September. The pool elevation on 30 September 2002 was 1564.5 ft., N.G.V.D. At this level, approximately 33.5% of the low flow augmentation storage remained available.

No requests were received in WY 2002 to provide additional low-flow augmentation above the flows specified in the Regulation Manual. Continuing drought conditions in the James River Basin resulted in two separate requests, from the Commonwealth of Virginia, for deviations from the water control plan to provide lower releases to attempt to preserve the remaining conservation storage. This deviation is outlined in Table 3-2, Water Control Deviations.

2.3 New York District

The New York District has no water control functional unit as this District has no water control operational responsibility for any projects in the District. The District prepares water control manuals for three federally funded, state owned reservoir projects in the District, Waterbury, Wrightsville and East Barre Dams. These projects were built by the Civilian Conservation Corps in the 1930's, and redesigned and modified by the Corps of Engineers in the 1950's. The State of Vermont is responsible for project operations.

2.4 Flood Control

There was no major flooding in any New York District basin during fiscal year 2002.

2.5 Water Supply

New York District river basins suffered from drought conditions through much of the fiscal year.

In New Jersey statewide rainfall was below normal for ten out of twelve months of calendar year 2001, averaging 9.5 inches below normal for the year. Dry conditions evidenced by reduced stream flows, lowered lake levels and lowered ground water levels.

The New Jersey Department of Environmental Protection (NJDEP) issued a drought watch for all of New Jersey on 30 October 2001.

In early January 2002, the thirteen reservoirs in northeast New Jersey the District customarily monitors during a drought were at a total capacity of 45.6 %, far below the normal of 80.6 % for this date.

The NJDEP issued a drought warning on January 24, 2002. Voluntary efforts to curtail water use did not succeed in maintaining adequate water supply levels. Resulting in the Governor declaring a water emergency on March 4, 2002. Drought emergency conditions continue into fiscal year 2003.

In New York State, a drought watch was declared for thirteen southeastern New York counties on 5 November 2001 including eleven counties in the Hudson, Mohawk, and Ramapo river basins. A drought warning was issued on 6 December 2001 for nine counties in the New York District. A drought watch was also in effect for east central New York State.

Due to the timing of this drought, it had much less impact than if it had occurred during the late spring and summer, when large amounts of water are needed for crops in rural areas. Most municipal water systems in east central New York were not experiencing problems. However, in rural areas, farm ponds going dry, and shallow wells either going dry, or having such a low yield that some rural residents were experiencing serious water shortages. In Montgomery and southern Herkimer counties, it was necessary to truck in water for livestock.

The New York State Department of Environmental Conservation (NYSDEC) issued revised drought advisories on 13 June 2002, due to improving conditions in many areas. Nine counties were under a drought watch and four counties under a drought warning.

New York City, Nassau and Suffolk counties were not under drought watches or warnings as the fiscal year began. However, a Stage 1 Drought Emergency went into effect in New York City on 1 April 2002. Above average rainfall in September and October of 2002 had made up for critical water shortages in New York City's Catskill and Delaware reservoir system. New York lifted its drought emergency as of 1 November 2002, downgrading it to a drought watch.

In Vermont below normal spring rainfall resulted in low river levels throughout the state. Flows were lowest in central and southern Vermont. In December 2001, the USGS gages on the Lamoille River at Johnson, and Winooski River at Montpelier, were below the lowest ten percent of recorded flows. Dog River at Northfield Falls and Ayers Brook at Randolph continued to post record low daily flows. Lake Champlain at 93.9 ft. NGVD was well below its normal of 96.2 ft. NGVD. Rural water supply issues remained a concern through the winter of 2001-02, for homes and farms that needed to haul water. Cold winter temperatures made the transfer, and above ground storage of water, much more difficult. There has been a steady improvement of water supply conditions in

Vermont since January 2002. Stream flow conditions were returning to normal at the end of the fiscal year.

2.6 Philadelphia District

2.6.1 Flood Control

There was no major flooding in the Delaware River Basin during fiscal year 2002, and therefore there was no flood damage reduction attributable to District projects in the basin.

2.6.2 Low Flow Regulation

Water quality releases of 50 cfs above normal conservation release were made from Blue Marsh Lake from 16 to 19 August 2002 at the request of the Delaware River Basin Commission (DRBC) to augment low flows in the Schuylkill River.

2.6.3 Water Supply

The DRBC has contracted storage capacity at Blue Marsh and Beltzville Lakes. Releases are made to supplement flows on the Lehigh, Schuylkill and Delaware Rivers and to repulse salinity intrusion in the Delaware estuary. The DRBC also contracted to provide water from Blue Marsh Lake to the Western Berks Water Authority.

The DRBC directed releases from Blue Marsh Lake on 14 and 15 August 2002 to augment downstream flows.

The DRBC declared a drought warning on 6 November 2001 and a drought emergency on 18 December 2001. The Corps began storing water in the flood control pool at F.E. Walter Reservoir on 1 February 2002 at the request of DRBC for drought purposes. To preserve flood control benefits, this stored water would be evacuated in anticipation of a storm. The drought declaration continued into fiscal year 2003. See Table 3-2, Water Control Deviations.

2.6.4 Recreation

Philadelphia District reservoir projects hosted over 1.6 million visitors in fiscal year 2002. Whitewater releases were made from F.E. Walter Dam for two 2-day events in June and three 1-day events, one in September and two in October. Additionally, from 20 July to 18 August flows sufficient for float trips were provided on weekdays and higher flows provide on weekends. See Table 2-3 Whitewater Releases at Corps Dams.

2.7 New England District

2.7.1 Flood Control

There was no significant flooding in the New England District during fiscal year 2002. The New England region experienced varied weather conditions during the year, the first half of the year being dryer than normal, the second half wetter. Annual precipitation including snowfall was below normal for the fiscal year. In early March 2002, over sixty five percent of the regions major watersheds were snow free. The remaining watersheds had fifty percent of normal snow pack. The flood potential in the New England region during March and April was low due to the below normal snow cover. A relatively wet spring and early summer did not produce any significant flooding due the below normal snow cover.

None of the tropical storms or hurricanes, which developed in the Atlantic, affected the New England coastline.

District reservoirs were regulated only for minor events. At those projects experiencing flood storage, downstream runoff was not significant enough to cause river stages to approach or exceed flood stage.

The hurricane barrier at Stamford, CT was operated 7 times during the fiscal year but tides did not reach damaging levels. The hurricane barrier at New Bedford, MA was operated 6 times during the fiscal year preventing \$195,000 in damages.

A summary of damages prevented by New England District water control projects is shown in Tables 2-1 and 2-2.

2.7.2 Low Flow Regulation

New England experienced persistent dry conditions during the first part of the fiscal year. Some areas of northern New Hampshire and Maine reported moderate to severe drought conditions during the summer of 2002. Massachusetts reported drought watch conditions for the same period. The fiscal year ended with improving conditions, most areas no longer reporting moderate or severe drought conditions.

Drought contingency measures were not requested nor implemented during the fiscal year.

2.7.3 Water Supply

Three District reservoirs have allocated water supply storage, Littleville Lake, Colebrook River Lake, and East Brimfield Lake. A fisheries pool is maintained at Colebrook River Lake in the spring and fall, releases were made to augment flows on the Framington River. Water supply releases were made at East Brimfield Lake in accordance with contractual obligations.

2.7.4 Recreation

Releases are made at New England District projects to support downstream whitewater activities. See Table 2-3 Whitewater Releases at Corps Dams.

3 Activities and Accomplishments

3.1 General Summary

3.2 Water Control Data System (WCDS)

The water control data system is implemented on the LAN at each district and division headquarters.

Baltimore District

Significant accomplishments in FY 2002 include:

- Continued migration to the Corps Water Management System (CWMS). Most data processing is now accomplished on a Sun Blade 1000 workstation using both HEC-DSS and Oracle databases.
- Improving displays of water control information using both web sever capabilities and the CWMS Control and Visualization Interface (CAVI).
- Successful test of Continuity of Operation Plan (COOP) with Philadelphia District in November 2001 and July 2002.
- Continued loading of water quality data into a Microsoft Access database using the Data Management and Analysis System for Lakes, Estuaries, and Rivers (DASLER).
- Installed Unidata Local Data Manager (LDM) software on one Sun workstation. LDM software will allow automatic acquisition and sharing of data and files with other networked computers over the Internet. LDM capabilities may replace the dedicated telephone circuit between the Baltimore District and Middle Atlantic River Forecast Center.
- The high frequency radio system was replaced with Motient satellite telephones.

3.2.1 Norfolk District

CWMS is deployed and is functioning. Efforts are being made to fully develop CWMS capabilities for Gathright Dam and Lake Moomaw.

The WCDS is fully operational and will be maintained as a backup to CWMS.

The District plans to replace their existing 100-baud data collection platforms (DCPs) with 300/1200-baud models as they become available.

3.2.2 Philadelphia District

CWMS has not performed as efficiently as the WCDS for the Philadelphia District. However, data capture, validation and transformation processes are functioning. The District initiated modeling the Delaware River Basin.

3.2.3 New England District

In cooperation with the National Weather Service (NWS) the District procured and installed air temperature sensors and heated tipping bucket rain gages at 11 dams. These installations are in support of NWS and Department of Energy (DOE) initiative to retrieve real time air temperature data across central and southern New England. In addition to installations at these 11 projects, the Reservoir Regulation Team (RRT) procured and installed heated tipping bucket rain gages at the remaining 17 staffed dams in the District; a total of 28 projects are now so equipped.

A new DCP was installed downstream from West Hill Dam in Uxbridge, MA.

The DOMSAT receive system was upgraded. An old PC with SCO UNIX operating system was replaced with a new PC running the Linux operating system.

CWMS is deployed in the New England District. DOMSAT, NOAAPORT, and SHEF data is being entered into the Oracle database in real time. The District procured a Sun Blade 2000 workstation late in the fiscal year to replace a Sun Ultra 60 workstation as a CWMS platform. The Sun Blade 2000 will be configured and become operational in fiscal year 2003. Data validation procedures were developed for the District's precipitation gage network, the accuracy and success of these procedures will be determined during fiscal year 2003.

The functional ability to access hydrologic data via Personal Data Assistant (PDA) and cellular phone was added to the RRT web site in fiscal year 2002.

3.3 Status of Water Control Plans and Manuals

The status of Water Control Manuals for all North Atlantic Division reservoirs and reservoirs subject to Corps prescribed regulations per ER1110-2-241 is summarized on Table 3-1.

Drought Contingency Plans also referred to as Drought Management Plans, have been completed for all NAD Corps reservoir projects. Dam Failure Inundation Mapping and Flood Emergency Plans have also been completed for all NAD Corps reservoir projects in prior years.

"Acquisition of Lands Downstream from Spillways for Hydrologic Safety Purposes" Studies per ER 1110-2-1451 have been completed for all Corps reservoirs in NAD.

3.4 Deviations from Water Control Plans

Deviations from approved water control plans are shown on Table 3-2.

3.5 Constraints on Water Control Plans

3.5.1 General

Constraints on individual project Water Control Plans are encountered at some Division projects. These constraints are usually relatively minor, and usually entail limitations to the magnitude of reservoir releases, gate openings, or time to close gates. There are several instances where the planned bank full capacity reservoir release causes some nuisance or minor flooding to downstream encroachments. This type of problem is presently resolved by limiting reservoir releases to below bank full capacity, where necessary, during regulation of most flood events. During future major flood events, the full bank full release will be made when necessary with the acceptance of some minor damages caused by the necessary floodwater releases. Perceived constraints are being studied and eliminated where possible. Individual projects where constraints are evident are noted in the individual District Appendices.

3.5.2 Baltimore District

3.5.2.1 Jennings Randolph Lake

Early operating experience at this project revealed the need for some restrictions regarding the operation of the selective withdrawal system. Certain combinations of intake ports and quality control (QC) gate settings created noticeable vibrations in the tower. Operation of the selective withdrawal system is restricted to eliminate these vibrations at certain combinations of intake port and water quality control gate settings.

Slug flow problem occurs for large releases under low-head conditions, this should not be a problem under normal reservoir operations. Non-emergency releases of up to 9,000 cfs will be permitted, provided project personnel can monitor downstream conditions closely.

The impact of gas supersaturation on the tailwater trout population is a concern that also needs to be addressed whenever outflows exceed 2,500 cfs. The establishment of a trout rearing facility in the stilling basin has resulted in a thriving trout population both inside and outside of the facility's net pens. Increased fish mortality can be expected as the degree of gas supersaturation increases with increasing outflows.

3.5.2.2 Tioga-Hammond Lakes

The Crooked Creek outlet from Hammond Lake is closed when the pool is forecast to reach elevation 1089. All subsequent releases are made through the Hammond outlet works in the connecting channel.

3.5.2.3 Foster Joseph Sayers Dam

Regulation constraints are in place due to increased year-round utilization of low lying flood plains downstream of the project.

3.5.3 Norfolk District

The capacity of the water quality outlet works is less than rated

3.5.4 Philadelphia District

3.5.4.1 Blue Marsh Lake

There are some release restraints due to down stream nuisance flooding.

3.5.4.2 F.E. Walter Dam

The bypass system is inoperable due to the threat of cavitations and partial collapse of an access ladder. The inability to use this system results only in minor problems related to temperature.

3.5.5 West Hill Dam

Due to seepage during the March 1998 flood, the maximum pool is restricted to 15 feet during minor to moderate floods. Geotechnical surveillance is undertaken when the pool approaches or exceeds 12 feet. Remedial construction will be completed in FY 2003.

3.6 Changes to Water Control Plans

3.6.1.1 Baltimore District

The District is proposing a change to the water control plan for Whitney Point Lake as a result of studies conducted for a Section 1135 Environmental Restoration Project. The proposed plan would establish a year-round conservation pool level at the current summer pool elevation. Lake drawdowns would be permitted during periods of low flow when releases would be made to meet new downstream environmental targets established for this project.

3.6.1.2 New England District

New England District in cooperation with the Vermont Agency of Natural Resources and the US Fish and Wildlife Service (USFWS) are adopting a 3-year adaptive management plan for conservation releases at projects in Vermont (Union Village Dam, North Hartland Lake, North Springfield Lake, Ball Mountain Lake and Townsend Lake). The adaptive management plan modifies the daily outflow by making smaller incremental

releases to avoid rapid fluctuations. New minimum outflows for each project will be based on USFWS Seasonal Aquatic Base Flows. There will be no compromises or modifications to flood control operations.

The operation plan at Surrey Mountain Lake will be investigated by the District in cooperation with The Nature Conservatory to determine if changes to project regulation could enhance biodiversity downstream of the project.

3.7 New Water Control Projects

There are no new Corps water control projects under construction in the North Atlantic Division.

3.8 Cooperative Hydrologic Programs

No significant changes were made in the fiscal year 2002 Cooperative Stream Gauging Program with the U.S. Geological Survey (USGS) and National Weather Service (NWS). Water quality monitoring is being reduced downstream of Gathright Dam. The program has been successful to date.

3.9 Environmental Initiatives

The New England District in cooperation with the Vermont Agency of Natural Resources and US Fish and Wildlife Service (USFWS) developed a 3-year adaptive management plan. The plan modifies routine release changes to avoid unnecessarily rapid changes in discharge. The USFWS Seasonal Aquatic Base Flows will be used to determine minimum outflows for each project. The plan will be evaluated over a three-year period to determine its effectiveness. No compromises or modifications will be made to flood control regulation.

New England District and The Nature Conservatory (TNC) selected Surrey Mountain Dam in New Hampshire to investigate improvements in operational procedures for biodiversity.

4 Current and Future Programs

4.1 General Summary

All current programs will be continued including procuring new or replacement WCDS equipment and software as outlined in the North Atlantic Division Water Control Data Systems Master Plan or on an as needed basis. Reservoir sedimentation studies and revision and updating of water control manuals will continue. On-going interagency programs such as the Coordination of Water Data Collection Activities and the Cooperative Stream Gauging Program with the United States Geological Survey will be continued on an annual basis. Training of Water Control Management personnel is continual on an annual basis as courses are made available, and new personnel are hired to fill vacancies. The annual North Atlantic Division Water Control Managers Meeting was held in June 2002, and the annual meeting will be continued in the spring of each year.

4.2 Water Control Data System – Corps Water Management System

CWMS Version 1.1.03 is scheduled for deployment in January 2003. Each district will update existing models to take advantage of new features of the CWMS software.

4.2.1 Baltimore District

Efforts will be made to improve the data visualization products for District watersheds. The models for the Juniata River Basin will be integrated into the CAVI for forecasting purposes. The District will select and initiate modeling on an additional watershed.

GIS modeling for CWMS will continue. District staff will continue model development and continue developing web based data dissemination products.

Use of the LDM software to exchange data and files with the MARFC and other Corps offices will be continued and expanded.

4.2.2 Norfolk District

Modeling efforts for Gathright Dam and Lake Moomaw will continue in FY 2003 with the goal of using all CWMS capabilities.

4.2.3 Philadelphia District

Modeling efforts will continue for the Schuylkill, Lehigh River Basin and Delaware River Basins in FY 2003 utilizing the capabilities of CWMS Version 1.1.03.

4.2.4 New England District

The District goals for fiscal year 2003 include:

- Migration of the CWS software suite to the Sun Blade 2000 workstation
- Complete development and calibration of CWMS models for the Ware River watershed and initiation of modeling for other watersheds.
- Use GIS to map flood prone areas downstream of District dams.
- Begin using the scripting capabilities in CWMS with the goal of replacing *repgen* and *dsply*
- Prepare a CWMS flow chart that will clearly identify the directory structure, data flow, process controls and log files
- Work on web clip applications for use with personal data assistant (PDA) hardware
- Explore the feasibility of using Ethernet connections for communications with existing DCP's at District projects.
- Explore upgrade/addition of Sutron SatLink components to existing Sutron8210 DCP's to enable GOES clock calibration and high rate data transmission
- Investigate possible upgrading of Sutron8210 DCP;s with state of the art Sutron9210 DCP's
- Investigate possible upgrade of data collection sites using coniflow gas systems.

4.3 Studies to be undertaken

Baltimore District Water Control Team staff will continue to assist the Interstate Commission Potomac River Basin (ICPRB) with modeling efforts of Savage River Dam and Jennings Randolph Lake.

4.4 Cooperative Program

The cooperative programs with the National Weather Service and U.S. Geologic Survey will continue in fiscal year 2003.

Table 2-1

**North Atlantic Division
Flood Damages Prevented - Fiscal Year 2002**

Flood Damages Prevented by Corps Controlled Reservoir Projects						
(In thousands of dollars)						
STATE	NAB	NAE	NAN	NAO	NAP	TOTAL
CT		0	0			0
DC	0					0
DE	0				0	0
MA		0	0			0
MD	0					0
ME		0				0
NH		0				0
NJ			0		0	0
NY	855		0			855
PA	2,299				0	2,299
RI		0				0
VA	0			0		0
VT		0	2,154			2,154
WV	0					0
TOTAL	3,154	0	2,154	0	0	5,308

Flood Damages Prevented by Levees, Channels and other projects
(In thousands of dollars)

STATE	NAB	NAE	NAN	NAO	NAP	TOTAL
CT		0	83			83
DC	0					0
DE	0				0	0
MA		195	3,836			4,031
MD	0					0
ME		0				0
NH		0				0
NJ			3,591		0	3,591
NY	10,065		4,153			14,218
PA	1,577				0	1,577
RI		0				0
VA	0			0		0
VT		0	1,349			1,349
WV	0					0
TOTAL	11,642	195	13,010	0	0	24,847

Table 2-2

North Atlantic Division
Damages Prevented by Water Control Projects
Fiscal Year 2002
(October 2002 Price Levels)

DISTRICT	PROJECT	CUMULATIVE	
		FY 02 (\$1,000)	INCLUDING FY (\$1,000)
NAB	EAST SIDNEY LAKE, NY	186	150,884
NAB	WHITNEY POINT LAKE, NY	184	518,279
NAB	ARKPORT DAM, NY	21	44,138
NAB	ALMOND LAKE, NY	20	120,367
NAB	TIOGA-HAMMOND LAKES, PA	981	279,739
NAB	COWANESQUE LAKE, PA	442	157,914
NAB	CURWENSVILLE LAKE, PA	368	118,539
NAB	ALVIN R. BUSH DAM, PA	42	163,871
NAB	FOSTER JOSEPH SAYERS LAKE, PA	148	110,813
NAB	RAYSTOWN LAKE, PA	0	163,133
NAB	STILLWATER LAKE, PA	759	85,974
NAB	ALESWORTH CREEK LAKE, PA	2	5,098
NAB	INDIAN ROCK, PA	0	(1)
NAB	JENNINGS RANDOLPH LAKE, MD & WV	0	356,333
NAB	SAVAGE RIVER DAM, MD	3,153	96,793
NAE	UNION VILLAGE DAM	0	32,621
NAE	NORTH HARTLAND LAKE	0	88,443
NAE	NORTH SPRINGFIELD LAKE	0	89,514
NAE	BALL MOUNTAIN LAKE	0	103,925
NAE	TOWNSHEND LAKE	0	69,107
NAE	SURRY MOUNTAIN LAKE	0	63,882
NAE	OTTER BROOK LAKE	0	28,713
NAE	BIRCH HILL DAM	0	60,138
NAE	TULLY LAKE	0	22,333
NAE	BARRE FALLS DAM	0	23,473
NAE	CONANT BROOK DAM	0	2,319
NAE	KNIGHTVILLE DAM	0	146,317
NAE	LITTLEVILLE LAKE	0	55,172
NAE	COLEBROOK RIVER LAKE	0	37,726
NAE	MAD RIVER DAM	0	2,795 (2)
NAE	SUCKER BROOK DAM	0	172 (2)
NAE	EAST BRANCH DAM	0	10,512 (2)
NAE	HALL MEADOW BROOK DAM	0	9,596 (2)
NAE	THOMASTON DAM	0	242,362
NAE	NORTHFIELD BROOK LAKE	0	22,420
NAE	BLACK ROCK LAKE	0	65,060
NAE	HANCOCK BROOK LAKE	0	29,894
NAE	HOP BROOK LAKE	0	31,076

Table 2-2 Con't

NAE	FRANKLIN FALLS DAM	0	69,135	
NAE	BLACKWATER DAM	0	19,852	
NAE	EDWARD MACDOWELL LAKE	0	7,846	
NAE	HOPKINTON-EVERETT LAKES	0	63,301	
NAE	BUFFUMVILLE LAKE	0	54,684	
NAE	HODGES VILLAGE DAM	0	52,218	
NAE	EAST BRIMFIELD LAKE	0	46,474	
NAE	WESTVILLE LAKE	0	25,521	
NAE	WEST THOMPSON LAKE	0	18,708	
NAE	MANSFIELD HOLLOW LAKE	0	43,611	
NAE	WEST HILL DAM	0	34,471	
NAE	NEW BEDFORD HURRICANE BARRIER	195	17,791	
NAE	STAMFORD HURRICANE BARRIER	0	25,269	
NAN	EAST BARRE DAM (SECT 7)	452		(3)
NAN	WATERBURY DAM (SECT 7)	414		(3)
NAN	WRIGHTSVILLE DAM (SECT 7)	1,288		(3)
NAO	GATHRIGHT DAM & LAKE MOOMAW, VA	0	204,779	
NAP	F.E. WALTER RESERVOIR, PA	0	8,818	
NAP	BELTZVILLE LAKE, PA	0	5,777	
NAP	BLUE MARSH LAKE, PA	0	107,179	
NAP	PROMPTON RESERVOIR, PA	0	10,391	
NAP	JADWIN RESERVOIR, PA	0	36,455	

NOTES:

- (1) Flood damages prevented by the Indian Rock Dam, York, PA are not included. The economic data required to compute these estimates is not available at this time.
- (2) Owned & Maintained by CT Dept. of Environmental Protection. Operated for flood control by the New England District
- (3) Cumulative flood damages prevented since FY 1996

Table 2-3**North Atlantic Division****Whitewater Releases at Corps Dams
Fiscal Year 2002**

Project	District	Dates	Special Event
Jennings Randolph Lake	Baltimore	6-8 October 2001 6,7,20,21 April 2002; 4,5,18,19 May 2002; 17-18 August 2002	
F.E. Walter Lake	Philadelphia	8-9 and 22-23 June 2002; 21 September 2002, 5 October 2002, 19 October 2002	
Ball Mountain Lake	New England	27-28 April 2002; 21-22 September 2002	
Townshend Lake	New England	27-28 April 2002; 21-22 September 2002	
Otter Brook Lake	New England	16-17 March 2002; 14-14 April 2002	
Surry Mountain lake	New England	4 May 2002	
Birch Hill Dam & Tully Lake	New England	13-14 April 2002	39 th Annual River Rat Race (13 April)
Knightville Dam & Littleville Lake	New England	20-21 April 2002	48 th Annual Westfield River
Blackwater Dam	New England	26-28 April 2002	Blackwater Slalom Race
East Brimfield Lake	New England	28 April 2002	Sturbridge Lions Club All American River Race
Mansfield Hollow Lake	New England	16 June 2002	Shetucket River Days Canoe Cruise

Table 3-1

***North Atlantic Division
Water Control Manuals***

Project	Stream	Owner	District	Last Submission	Approval Date	Approved By	Revision Schedule
Almond Lake & Arkport Reservoir	Canacadea Cr./Canisteeo R.	NAB	CE	Sep 1987	Dec 1987	NAD	FY 04
East Sidney Lake	Ouleout Cr.	NAB	CE	Aug 1996	Oct 1996	NAD	FY 06
Whitney Point Reservoir	Otselic R.	NAB	CE	Sep 1996	Dec 1996	NAD	FY 03
Alvin R. Bush Dam & Kettle Creek Lake	Kettle Cr.	NAB	CE	Nov 1997	Feb 1998	NAD	FY 08
Cowanesque Lake	Cowanesque R.	NAB	CE	Sep 1990	Nov 1990	NAD	FY 05
Curwensville Lake	West Branch Susquehanna R.	NAB	CE	Dec 1997	Feb 1998	NAD	FY 08
F.J. Sayers Dam & Reservoir	Bald Eagle Cr.	NAB	CE	Sep 1996	Oct 1996	NAD	FY 06
G.B. Stevenson Dam	First Fork Sinneahoning Cr	NAB	PA	Jul 1999	Jan 2000	NAD	FY 10
Raystown Lake	Raystown Branch Juniata R.	NAB	CE	Sep 1989	Dec 1989	NAD	FY 04
Stillwater & Aylesworth Creeks Reservoirs	Lackawanna R / Aylesworth Cr.	NAB	CE	Sep 2000	Feb 2001	NAD	FY 11
Tioga-Hammond Lake	Tioga R / Crooked Cr	NAB	CE	Sep 1988	Oct 1988	NAD	FY 04
York - Indian Rock	South Branch Codorus Cr.	NAB	CE	May 1987	May 1987	NAD	FY 04
Jennings Randolph Lake	North Branch Potomac R.	NAB	CE	Dec 1996	Jul 1997	NAD	FY 07
Savage River	Savage R.	NAB	MD	Sep 1997	Apr 1999	NAD	FY 09
Master Manual	Upper Susquehanna R.	NAB		Dec 1984	Jan 1985	NAD	FY 05
Master Manual	Lower Susquehanna R.	NAB		Dec 1984	Jan 1985	NAD	FY 05
Master Manual	North Branch Potomac R.	NAB		Sep 1986	Oct 1986	NAD	FY 04
Gathright Dam & Lake Moomaw	Jackson R.	NAO	CE	Jan 1985	Jan 1985	NAD	FY 04
Waterbury Dam & Reservoir	Little R.	NAN	VT	Oct 1970	Nov 1970	OCE	FY 03
General Edgar Jadwin Dam & Reservoir	Dyberry Ck.	NAP	CE	Oct 1997	Dec 1997	NAD	FY 08

Table 3-1 (Con't)

***North Atlantic Division
Water Control Manuals***

Project	Stream	Owner	District	Last Submission	Approval Date	Approved By	Revision Schedule
Prompton Dam & Reservoir	West Branch Lackawaxen R.	NAP	CE	Sep 1997	Dec 1997	NAD	FY 08
Francis E. Walter Reservoir	Lehigh R.	NAP	CE	Oct 1994	Dec 1994	NAD	FY 05
Beltzville Dam & Reservoir	Pohopoco Cr,	NAP	CE	Jun 1996	Aug 1996	NAD	FY 06
Blue Marsh Dam & Reservoir	Tulpehocken Cr.	NAP	CE	Nov 1996	Jan 1997	NAD	FY 07
Master Manual	Conneticut River Basein	NAE		Jan 1984	Jan 1984	NED	FY 07
Union Village Dam	Ompompansoosuc R.	NAE	CE	Apr 1994	Apr 1994	NED	FY 04
North Hartland Lake	Ottauquechee R.	NAE	CE	Dec 1985	Dec 1985	NED	FY 04
North Springfield Lake	Black R.	NAE	CE	Apr 99	Sep 99	NAD	FY 09
Ball Mountain Lake	West R.	NAE	CE	Sep 1973	Sep 1973	NED	FY 04
Townshend Lake	West R.	NAE	CE	Sep 1973	Sep 1973	NED	FY 04
Surrey Mountain Lake	Ashuelot R.	NAE	CE	Jan 1972	Jan 1972	NED	FY 05
Otter Brook Lake	Otter Bk.	NAE	CE	Jan 1972	Jan 1972	NED	FY 05
Birch Hill Dam	Miller R.	NAE	CE	Jun 2000	Sep 2000	NAD	FY 10
Tully Lake	East Branch Tully R.	NAE	CE	Jun 2000	Sep 2000	NAD	FY 10
Barre Falls Dam	Ware River	NAE	CE	Feb 1979	Feb 1979	NED	FY 03
Conant Brook Dam	Conant Bk.	NAE	CE	Feb 1979	Feb 1979	NED	FY 03
Knightville Dam	Westfield R.	NAE	CE	Jan 1978	Jan 1978	NED	FY 03
Littleville Lake	Westfield R.	NAE	CE	Jan 1978	Jan 1978	NED	FY 03
Colebrook River Lake	West Branch Farmington R.	NAE	CE	Mar 1990	Mar 1990	NED	FY 07
Mad River Dam	Mad River	NAE	CE	Mar 1990	Mar 1990	NED	FY 07

Table 3-1 (Con't)

***North Atlantic Division
Water Control Manuals***

Project	Stream	Owner	District	Last Submission	Approval Date	Approved By	Revision Schedule
Sucker Brook Dam	Sucker Bk.	NAE	CE	Mar 1990	Mar 1990	NED	FY 07
Master Manual	Merrimack River Basin	NAE		May 1999	Sep 1999	NAD	FY 09
Franklin Falls Dam	Pemigewaset R.	NAE	CE	May 1999	Sep 1999	NAD	FY 09
Blackwater Dam	Blackwater R.	NAE	CE	May 1999	Sep 1999	NAD	FY 09
Edward MacDowell Dam	Nubanusil Bk.	NAE	CE	May 1999	Sep 1999	NAD	FY 09
Hopkinton-Everett Lakes	Contoocook R.	NAE	CE	May 1999	Sep 1999	NAD	FY 09
Master Manual	Thames River Basin	NAE		Aug 2001	Oct 2001	NED	FY 11
Mansfield Hollow Lake	Nachaug R.	NAE	CE	Aug 2001	Oct 2001	NED	FY 11
Buffumville Lake	Little R.	NAE	CE	Aug 2001	Oct 2001	NED	FY 11
Hodges Village Dam	French R.	NAE	CE	Aug 2001	Oct 2001	NED	FY 11
East Brimfield Lake	Quinebaug R.	NAE	CE	Aug 2001	Oct 2001	NED	FY 11
Westville Lake	Quinebaug R.	NAE	CE	Aug 2001	Oct 2001	NED	FY 11
West Thompson Lake	Quinebaug R.	NAE	CE	Aug 2001	Oct 2001	NED	FY11
Master Manual	Blackstone River Basin	NAE		Jul 1980	Jul 1980	NED	FY 03
West Hill Dam	West R.	NAE	CE	Jul 1980	Jul 1980	NED	FY 03
Master Manual	Housatonic River Basin	NAE		Oct 1976	Oct 1976	NED	FY 03
Hall Meadow Brook	Hall Meadow Brook	NAE	CE	Oct 1976	Oct 1976	NED	FY 03
East Branch Dam	East Branch Naugatuck R.	NAE	CE	Oct 1976	Oct 1976	NED	FY 03
Thomaston Dam	Naugatuck R.	NAE	CE	Oct 1976	Oct 1976	NED	FY 03
Black Rock Lake	Branch Bk.	NAE	CE	Oct 1976	Oct 1976	NED	FY 03

Table 3-2 (Con't)

*North Atlantic Division
Water Control Manuals*

Project	Stream	Owner	District	Last Submission	Approval Date	Approved By	Revision Schedule
Northfield Brook Lake	Northfield Bk.	NAE	CE	Oct 1976	Oct 1976	NED	FY 03
Hancock Brook Lake	Hancock Bk.	NAE	CE	Oct 1976	Oct 1976	NED	FY 03
Hop Brook Lake	Hop Bk.	NAE	CE	Oct 1976	Oct 1976	NED	FY 03
New Bedford Hurricane Barrier	N/A	NAE	CE	Aug 1983	Aug 1983	NED	FY 04
Stamford - Fairhaven Hurricane Barrier	N/A	NAE	CT	Sep 1998	Oct 99	NAD	FY 08

Table 3-2
North Atlantic Division
Water Control Deviations
Fiscal Year 2002

Project	District	Description	Major/Minor	Time Period
Raystown Lake	Baltimore	Decrease minimum release from 480 cfs to normal summer minimum of 200 cfs due to in-lake environmental concerns and help ensure the lake would refill by start of recreation season.	Minor	23 Feb 02 - 19 Apr 02
Gathright Dam	Norfolk	Decrease minimum release to 100 cfs to preserve lake storage due to drought conditions.	Minor	18 Jan 02 - 30 Apr 02
Gathright Dam	Norfolk	Decrease flow augmentation release to 50 cfs to preserve lake storage due to drought conditions	Minor	23 Jan 02 - CWY
F.E. Walter Reservoir	Philadelphia	Fill and maintain drought storage pool in order to make requested low flow releases due to drought conditions in the Delaware River Basin.	Minor	1 Feb 02 - 25 Nov 02