AD-A143 372 THOMASTON DAM THOMASTON CONNECTICUT HOUSATONIC RIVER BASIN NAUGATUCK RIVER WATERSHED DROUGHT CONTINGENCY PLAN(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV 1/1

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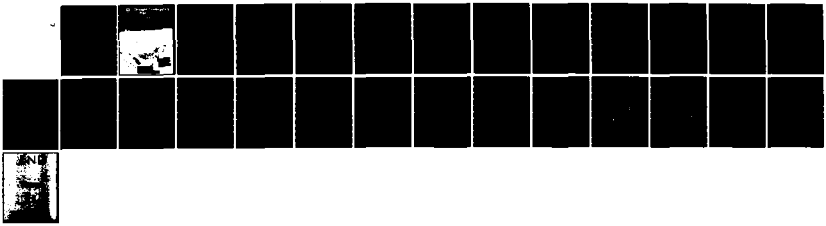

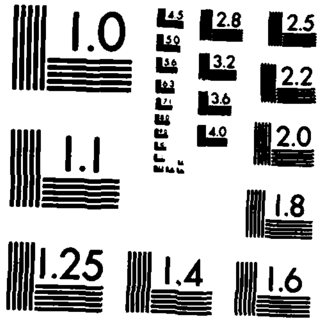

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US Army Corps of Engineers
New England Division

June 1983

Drought Contingency Plan

(2)

Thomaston Dam, Thomaston, Connecticut

AD-A143 372

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A 90% dependable yield of about 10 cfs (6.5 mgd) could be provided while still maintaining a downstream release of 10 cfs or the project filled to elevation 408 feet NGVD providing a maximum water supply reserve of about 1,050 acre-feet (342 million gallons). Thomaston Dam is not a good location for storage of water for public supply purposes. Existing water quality is marginal due to urban runoff and upstream discharges. Stored water is acceptable for industrial uses.

HOUSATONIC RIVER BASIN

NAUGATUCK RIVER WATERSHED

DROUGHT CONTINGENCY PLAN
THOMASTON DAM
THOMASTON, CONNECTICUT

JUNE 1983

NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

DROUGHT CONTINGENCY PLAN

THOMASTON DAM

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DROUGHT CONTINGENCY PLAN

THOMASTON DAM

1. PURPOSE AND SCOPE

The purpose of this study and report was to develop and set forth a possible drought contingency plan of operation for Thomaston Dam that would be responsive to public needs during drought periods and identify possible modifications to project regulation within current administration and legislative constraints. The scope of this drought contingency plan includes information on current water supplies in the region, the possibility of reallocation of reservoir storage within specified limits, description of existing water supply conditions, water quality evaluation, discussion of impacts on other project purposes, and summary and conclusions.

2. AUTHORIZATION

The authority for the preparation of drought contingency plans is contained in ER 1110-2-1941 which provides that water control managers will continually review and, when appropriate, adjust water control plans in response to changing public needs. Drought contingency plans will be developed on a regional, basinwide and project basis as an integral part of water control management activities.

3. PROJECT AUTHORIZATION CONDITIONS

Thomaston Dam was authorized by the Flood Control Act approved 22 December 1944, Public Law 543, 78th Congress, 2d session substantially in accordance with the recommendations of the Chief of Engineers in House Document 338, 77th Congress, 1st session. This authorization provides for flood control only.

4. PROJECT DESCRIPTION

Thomaston Dam, completed in 1960, at Thomaston, Connecticut is located on the Naugatuck River about one mile above Thomaston Center (see plate 1). The reservoir has a total storage capacity of 42,000 acre-feet (14 billion gallons), equivalent to 8.1 inches of runoff from the gross drainage area of 97.2 square miles.

The outlet works consist of a gate chamber, control tower, and operating house on the upstream side of the dam and a 455-foot long, 10-foot diameter, horseshoe-shaped conduit. The gate structure contains two 5'-8" x 10' high hydraulically operated vertical slide gates for regulation purposes. The invert elevations of the intake and outlet ends of the conduit are 380 and 379 feet, NGVD, respectively. An area capacity table is shown on plate 2.

5. PRESENT OPERATING REGULATIONS

a. Normal Periods. The normal gate openings are 3'-3'. This gate setting automatically restricts discharges so that the downstream channel capacity will not be exceeded if the pool rises during unexpected flood conditions. No permanent pool is maintained at the project.

b. Flood Periods. The Thomaston project is operated in concert with other projects in the basin to reduce flooding on the downstream Naugatuck River. Operation for floods may be considered in three phases: Phase I - appraisal of storm and river conditions during the development of a flood, Phase II - flow regulation and storage of flood runoff at the reservoir, and Phase III - emptying the reservoir during recession of the flood.

c. Operating Constraints

(1) Minimum Releases. A minimum release of 10 to 20 cfs (6.5 - 13 MGD) maintained during periods of regulation in order to sustain downstream fish life.

(2) Maximum Releases. The maximum nondamaging discharge capacity immediately downstream of Thomaston Dam is about 3,500 cfs. Releases at or near this rate can be expected whenever peak inflows have exceeded this value and climatologic and hydrologic conditions permit such releases.

6. DESCRIPTION OF EXISTING WATER SUPPLY CONDITIONS

a. General. Water supply systems in the vicinity of Thomaston include those in Litchfield County in its entirety and portions of Hartford, Middlesex, and New Haven Counties. Tables 1 and 2 contain information about public water suppliers in the area which serve a population greater than 1,000 and would serve projected populations through the year 2000. The tables have been formulated using data mainly provided by the State of Connecticut Department of Environmental Protection, supplemented with information from the Housatonic River Basin Urban Study, published by the Corps of Engineers in September 1982. Data provided by the State for the major water suppliers included a computer printout of water utility records for 1980, a summary of surface water sources in the study area, and information on ground water sources where available. In many instances, particularly for the smaller water supplies, portions of the data were missing. Information from the previous Corps of Engineers study was used in instances where data were missing. No effort was made to develop or accumulate missing information as it was considered beyond the level of detail required for this study.

b. Water Supply Systems. The primary objective of this analysis was to accumulate available data regarding water supply systems in the vicinity of Thomaston Dam that could benefit from storage in the lake and present it in a manner portraying existing water supply

MAJOR WATER SUP

Company	Towns Served	Est. Population Served	Sour Surfac
Avon Water Co.	Avon	5720	
	Simsbury	220	
Berlin Water Control Comm.	Berlin	2248	
Bristol Water Co.	Bristol	51450	
	Burlington	45	x
Collinsville Division CT. Water Co.	Avon	473	
	Burlington	137	
	Canton	2418	
Cromwell Fire Dist. Water Div.	Cromwell	9000	
Farmington Water Co. Main Sys.	Farmington	3000	
Farmington Woods Water Co.	Avon	875	
	Farmington	375	
Heritage Village Water Co.	Middlebury	25	
	Oxford	50	
	Southbury	5500	
Indian Hill WC, Ind. Field Co.	Naugatuck	1398	
Kensington Fire Dist.	Berlin	9000	
Lakeville Div., Litch Co. WC	Salisbury	3199	
Litchfield Div., Litch Co. WC	Litchfield	2576	
Meriden Water Dept.	Meriden	57118	x
Met. Dist. Water Bureau	Bloomfield	18595	
	E. Hartford	52554	
	Farmington	650	
	Glastonbury	14200	
	Hartford	136319	
	Manchester	1000	
	Newington	28839	
	Rocky Hill	14559	
	S. Windsor	3300	
	W. Hartford	61301	
	Wethersfield	26013	
	Windsor	25171	x
Middletown Water Dept.	Middletown	35000	x

TABLE 1

MAJOR WATER SUPPLIERS - WESTERN AND NORTHWESTERN CONNECTICUT

...ulation ...d 1980	Source of Supply: Surface	Source of Supply: Ground	Water Production 1980 - MG: Surface	Water Production 1980 - MG: Ground	Est. Safe Yield MGD: Surface	Est. Safe Yield MGD: Ground (Active)	Est. Safe Yield MGD: Ground (Inactive)
)							
)		x		208.8		.988	
3		x		208.5		.837	
)							
5	x	x	2216.2	635.2	3.900	2.050	
3							
7							
3		x		.8		-	
0		x		315.5		1.296	.619
0							
5							
5		x		63.3		.027	
5							
0							
0		x		352.7		.902	.621
8		x		-		.346	
0		x		-		-	
9		x		124.1[1]		.756	.864
6		x		94.9		.345	.017
8	x	x	1818.1	738.9	5.200	2.370	3.350
5							
4							
0							
0							
9							
0							
9							
9							
0							
1							
3							
1	x		20972.0		43.000		
0	x	x	830.9	837.4	2.230	4.260	1.340

2

TABLE 1 (Continued)

MAJOR WATER SUPPLIES - WESTERN AND NORTHWEST

Company	Towns Served	Est. Population Served	Source of Supply 1980 Surface	Ground	Water Produ 1980 - M Surface
Naugatuck Div. CT. Water Co.	Beacon Falls	200			
	Naugatuck	18851			
	Waterbury	315	x	x	1163.8
New Britain Water Dept.	Berlin	180			
	Farmington	495			
	New Britain	73840			
	Newington	800			
	Plainville	50	x		4040.0
New Hartford Water Dept.	New Hartford	1068			
New Milford Water Co.	New Milford	5300	x	x	132.4
North Canaan Div. Litch Co. WC	N. Canaan	1687		x	
Plainville Water Co.	Bristol	45			
	Plainville	16351			
	Southington	458		x	
Southbury Training School	Southbury	2450		x	
Southington Water Works Dept.	Cheshire	248			
	Southington	34568	x	x	278.7
Terryville Div. CT Water Co.	Plymouth	5642	x	x	5.9
Thomaston Div. CT Water Co.	Thomaston	2831	x	x	110.1
Torrington Water Co. Main Sys.	Torrington	-	x		1589.7
Unionville Water Co.	Avon	956			
	Farmington	5320		x	
Waterbury Water Bureau	Waterbury	103300	x		7823.0
Watertown Fire Dist.	Watertown	6600	x	x	0
Western Sec., No. Div. CT WC	E. Windsor	2849			
	Enfield	21686			
	S. Windsor	6591			
	Suffield	5317			
	Vernon	171			
	Windsor Locks	12365		x	
Woodbury Water Co.	Woodbury	1700		x	

1 Information taken from Housatonic River Basin Urban study, U.S. Army Corps of Engineers, Septem Department of Environmental Protection, Natural Resources Center.

1 (Continued)
ESTERN AND NORTHWESTERN CONNECTICUT

ply nd	Water Production 1980 - MG Surface	Ground	Est. Safe Yield MGD Surface	Ground (Active)	(Inactive)	Water Purchased MG
	1163.8	49.5	4.770[1]	-		
	4040.0		8.000			
						64.2
	132.4	206.6	.964[1]	.810		
		118.6[1]		.540		
		905.7		2.948		75.2
		118.6[1]		.658		
	278.7	995.6	-	1.836	1.593	
	5.9	155.6	-	.740		
	110.1	71.8	.400	.110		47.6
	1589.7		4.720[1]			
		185.9	-	-	.648	47.3
	7823.0		70.500			
	0	301.5	1.390	12.800		1.5
		1361.7		.385		374.8
		59.6		.108	.162	

f Engineers, September 1982. All other information provided by the State of Connecticut,

TABLE 2
POPULATION PROJECTIONS

Hartford County	Census 1980	1985	1990	1995	2000	% Change
Avon	11,201	12,200	13,200	13,700	14,200	26.8
Berlin	15,121	15,520	15,920	15,970	15,840	4.8
Bloomfield	18,608	19,510	20,310	21,110	22,110	18.8
Bristol	57,370	58,870	59,970	60,770	61,470	7.1
Burlington	5,660	5,970	6,230	6,430	6,540	15.5
Canton	7,635	7,970	8,320	8,530	8,650	13.3
East Granby	4,102	4,300	4,540	4,730	4,870	18.7
Farmington	16,407	16,710	17,010	17,110	17,610	7.3
Granby	7,956	8,360	8,860	9,260	9,760	22.7
Hartford	136,392	136,390	138,390	140,890	143,390	5.1
Hartland	1,416	1,460	1,530	1,610	1,670	17.9
New Britain	73,840	73,940	73,380	72,270	70,810	-4.0
Newington	28,841	29,640	30,640	31,640	32,140	11.4
Plainville	16,401	16,900	17,370	17,570	17,500	6.7
Rocky Hill	14,559	16,560	18,560	20,060	21,560	48.1
Simsbury	21,161	22,160	23,360	24,660	26,160	23.6
Southington	36,879	37,880	39,380	40,580	41,580	12.7
Suffield	9,294	9,550	9,740	9,890	9,860	6.1
West Hartford	61,301	61,210	61,290	60,910	60,070	-1.9
Wethersfield	26,013	26,310	26,510	26,810	27,010	3.8
Windsor	25,204	26,400	27,500	28,700	29,700	17.8
Windsor Locks	12,190	12,420	12,620	12,620	12,320	1.1
TOTALS	607,551	620,230	634,630	645,820	654,820	7.8

TABLE 2 (Continued)
POPULATION PROJECTIONS

Litchfield County	Census 1980	1985	1990	1995	2000	% Change
Barkhamsted	2,935	3,050	3,230	3,390	3,490	18.9
Bethlehem	2,573	2,710	2,850	2,980	3,120	21.3
Bridgewater	1,563	1,610	1,690	1,730	1,810	15.8
Canaan	1,002	1,020	1,030	1,040	1,050	4.8
Colebrook	1,221	1,250	1,280	1,310	1,350	10.6
Cornwall	1,288	1,300	1,310	1,320	1,330	3.3
Goshen	1,706	1,860	1,960	2,090	2,210	29.5
Harwinton	4,889	5,170	5,470	5,730	5,920	21.1
Kent	2,505	2,630	2,760	2,880	2,960	18.2
Litchfield	7,605	7,830	8,010	7,990	8,040	5.7
Morris	1,899	1,930	1,960	2,000	2,000	5.3
New Hartford	4,884	5,070	5,240	5,320	5,350	9.5
New Milford	19,420	20,420	21,120	22,020	23,120	19.1
Norfolk	2,156	2,160	2,170	2,200	2,230	3.4
North Canaan	3,185	3,210	3,220	3,230	3,240	1.7
Plymouth	10,732	11,080	11,380	11,600	11,730	9.3
Roxbury	1,468	1,590	1,720	1,840	1,970	34.2
Salisbury	3,896	3,930	3,980	4,010	4,040	3.7
Sharon	2,623	2,640	2,670	2,690	2,720	3.7
Thomaston	6,276	6,390	6,570	6,730	6,780	8.0
Torrington	30,987	31,290	31,490	31,790	31,990	3.2
Warren	1,027	1,050	1,090	1,110	1,120	9.1
Washington	3,657	3,710	3,760	3,810	3,860	5.6
Watertown	19,489	19,790	20,090	20,390	20,690	6.2
Winchester	10,841	10,790	10,960	11,090	11,170	3.0
Woodbury	6,942	7,110	7,220	7,280	7,260	4.6
TOTALS	156,769	160,590	164,230	167,570	170,550	8.8

TABLE 2 (Continued)
POPULATION PROJECTIONS

Middlesex County	Census 1980	1985	1990	1995	2000	% Change
Cromwell	10,265	10,870	11,570	12,170	12,770	24.4
Middlefield	3,796	4,000	4,200	4,340	4,320	13.8
Middletown	39,040	40,440	41,740	43,140	44,540	14.1
TOTALS	53,101	55,310	57,510	59,650	61,630	16.1
New Haven County						
Beacon Falls	3,995	4,150	4,250	4,350	4,400	10.1
Cheshire	21,788	23,290	24,790	25,790	26,790	23.0
Meriden	57,118	57,670	58,020	58,120	58,870	3.1
Middlebury	5,995	6,080	6,200	6,310	6,380	6.4
Naugatuck	26,456	27,150	28,040	28,900	29,640	12.0
Oxford	6,634	7,210	7,680	8,140	8,540	28.7
Prospect	6,807	6,790	6,810	6,760	6,630	-2.5
Southbury	14,156	15,060	15,760	16,460	17,260	21.9
Waterbury	103,266	102,760	103,660	104,530	105,410	2.1
Walcott	13,008	13,220	13,650	13,940	13,990	7.5
TOTALS	259,223	263,380	268,815	273,300	277,910	7.2

conditions. Projections of future water demands were not developed because this study addresses only the effects of drought conditions on current system demands.

c. Western Connecticut Water Suppliers. Information pertaining to the larger water suppliers in western Connecticut is presented in table 1. The data given for each supplier include: the communities served, estimated population served within each community, source of supply (ground or surface), water production in million gallons during 1980, and the estimated safe yield of each source. An analysis as to whether existing sources can provide adequate supplies during drought conditions was not performed. The information has been accumulated to present a summary of existing water conditions pertaining to major water suppliers in western and northwestern Connecticut.

d. Population Projections. Population projections for communities in western and northwestern Connecticut are given in table 2 to show the population in each community potentially affected by a prolonged dry period. The projections were taken from Population Projections for Connecticut Municipalities and Regions to the Year 2000, published by the State of Connecticut Office of Policy and Management. This information is presented to indicate potential future growth in western Connecticut.

7. POTENTIAL FOR WATER SUPPLY REALLOCATION

a. General. According to provisions contained in the Water Supply Act of 1958 (Public Law 500, 85th Congress, Title III), as amended, municipal and industrial water supply storage space may be recommended for inclusion in Corps of Engineers reservoirs. The law provides that up to 15 percent of total storage capacity allocated to all authorized Federal purposes or 50,000 acre-feet (16 billion gallons), whichever is less, may be allocated from the storage serving authorized purposes to storage serving municipal or industrial water supply within the Corps discretionary authority. In addition, guidance contained in ER 1110-2-1941 directs field offices to determine the short term water supply capability of existing Corps reservoirs that would be functional under existing authorities.

b. Drought Contingency Storage. At Thomaston Dam it has been estimated that a small amount of the existing storage can be put to multiple use for drought contingency as well as flood control. This infringement would result in a maximum pool elevation of about 408 feet NGVD (28-foot stage), representing a total volume of about 1,050 acre-feet (342 million gallons). This volume constitutes about 2.5 percent of the total reservoir storage. It was concluded that this was the maximum infringement for drought purposes without seriously affecting several important reservoir roads. The reservoir area has been cleared of wood vegetation below the 20-foot stage (400 feet, NGVD). Drought storage at or below this stage will have no serious impact on project operations with the exception of some trash cleanup after the pool is released. Storage between stages 20 to 28 feet would require light to moderate clearing of woody vegetation since most tree species would not tolerate flooding of root systems for a growing season.

Based on all season low flow duration analysis, using the 22 years of flow records for the Naugatuck River at Thomaston, it was determined that during a 10-year frequency drought there would be sufficient riverflow either to maintain a water supply yield of about 17 cfs (11 MGD) and to fill the reservoir from the invert at elevation 380 feet to 408 feet (1,050 acre-feet) in a 31-day period, provided no releases were made downstream. If a release of 10 cfs (0.1 cfs/sq.mi.) were maintained, then either a water supply yield of 10 cfs (6.5 MGD) could be maintained or the project filled to the 408-foot NGVD level over a 54-day period. The water stored could be drawn directly from the reservoir pool or releases downstream for municipal supply with proper treatment. Drought contingency storage versus flow duration at Thomaston Dam is shown graphically on plate 3.

8. WATER QUALITY EVALUATION

a. Water Quality Classification. The waters of the Naugatuck River within the Thomaston Dam project boundaries and downstream are designated class B by the Connecticut Department of Environmental Protection. Leadmine Brook, a tributary located just upstream from the dam, is designated class A. Class B waters are suitable for bathing, other recreational uses, industrial processes, industrial cooling, and fish and wildlife habitat and have good aesthetic value. Class A waters may be suitable for drinking water supply and/or bathing, and are suitable for all other uses. Technical criteria for the waters of Thomaston Dam include:

Dissolved Oxygen	-	5 mg/1 minimum at any time
Turbidity	-	25 JTU maximum (10 JTU for Leadmine Brook)
Fecal Coliform Bacteria	-	Log mean 200/100 ml nor more than 400/100 ml in 10 percent of the samples (Leadmine Brook - arithmetic mean 20/100 ml nor more than 100 in 10 percent of the samples)
pH	-	6.5 to 8.0 (as naturally occurs for Leadmine Brook)
Temperature Increase	-	Not to exceed recommended limit on most sensitive water use and never exceed 85^{o} F. and never raise normal temperature more than 4^{o} F. (Leadmine Brook - none other than of natural origin unless cold water fish spawning and growth are not impaired.

Chemical Constituents - Not in harmful concentrations of combinations.

b. Existing Water Quality. The Naugatuck River, historically, has been of poor quality throughout much of its length but has significantly improved in recent years. This poor quality has been caused by discharge of untreated or inadequately treated municipal industrial wastewater. Effort has been devoted to applying adequate treatment under Connecticut's Clean Water Program. Currently, the Naugatuck River upstream from Thomaston Dam is the recipient of urban runoff from the city of Torrington, treated municipal wastewater discharges from the Torrington wastewater treatment plant, overflows from the Broad Street wastewater pumping station, and several industrial discharges. Water quality data collected at Thomaston Dam in recent years show no major problems involving consistent or repeated violations of State standards. Moderate problems involving occasional violations of State standards include oxygen depletion caused by municipal discharges and urban runoff, high coliform bacteria levels due to urban runoff and high levels of nitrogen and phosphorus. Additional concerns include high dissolved solids concentrations, and high concentrations of heavy metals. There are insufficient data to determine if toxic organic materials are present. By 1986, the Connecticut Department of Environmental Protection expects the dissolved oxygen concentrations to improve to levels causing only a minor problem, but no other significant changes in water quality are expected.

The high nutrient levels in the Naugatuck River cause the river bottom at Thomaston Dam to be covered with a thick layer of attached filamentous algae. These algae cause daily fluctuations of 1 to 2 Standard pH units and 1 to 2 mg/l DO. The DO fluctuations are dampened by gaseous exchange between the river and the atmosphere and the fact that algal DO production is highest during the day when river temperatures are highest and DO solubilities are lowest.

Leadmine Brook has been known for its high water quality, except when it is degraded by wastewater pump stations overflows. The only significant pollution source on Leadmine Brook is a Torrington wastewater pumping station which operates near capacity during dry weather and overflows during storms.

c. Water Quality Requirements for Drought Storage. There are two requirements to be met. The waters must meet State standards for surface waters and must be of a quality suitable for domestic or industrial water supply use. A water which meets State standards will in most ways be good for public water supply. However, there are some parameters such as iron and manganese, taste and odor which are not covered by State standards but are undesirable in a public water supply. These substances can be removed by conventional treatment processes, so if their levels are kept low, it will reduce the amount of treatment required to make the water usable. The water quality required for industrial water supply depends on the industrial process involved.

d. Effects of Drought Storage. Creating a pool at Thomaston Dam for drought storage may create a lake with poor water quality and could degrade water quality conditions in the Naugatuck River below the dam. The principal problems might be caused by algae blooms. Creating a pool may also change the thermal regime of the river; however, the problems caused by this may be masked by the problems caused by the algae.

Creating a 28-foot deep pool at Thomaston Dam would provide a quiescent environment in which the high nutrient levels would allow massive algae blooms. These blooms would be considerably worse than those experienced at West Thompson Lake, a Corps reservoir in Thompson, Connecticut. At that lake, nuisance algae blooms are initiated when the inflow drops such that the hydraulic residence time is six days or more. The estimated hydraulic residence time during drought storage at Thomaston Dam would be 30 days. Additionally, nutrient levels in the Naugatuck River upstream from Thomaston Dam are significantly higher than in the Quinebaug River upstream from West Thompson Lake. Furthermore, West Thompson Lake is controlled by a weir which releases the warmer, algae-laden surface waters downstream; the pool at Thomaston Dam would be controlled by a low level gate. Increased hydraulic detention time, higher nutrient levels, and retention of warmer algae-rich surface waters will foster the growth of algae blooms to an even greater extent than commonly occurs at WestThompson Lake.

Heavy algae blooms at Thomaston Dam could degrade water quality at the project and in the Naugatuck River below the project. Costs of treating the water for public or even industrial water supply may be excessive. Algae blooms could degrade the water quality in the Naugatuck River by their unsightly appearance and by the odors that would occur at night when the DO was depleted. If sufficient reaeration does not occur in the outlet works, low nighttime DO levels in the river could violate State standards. Algae blooms could cause fresh kills either indirectly through severe diurnal fluctuations in DO and pH levels, or directly through poisoning. Finally, algae blooms would make the water of poor quality for water supply both directly by adding taste and odor to the water and indirectly by causing anaerobic conditions in the lake bottom which would allow heavy metals such as iron and manganese to be released from the sediments.

The thermal regime of the river would be altered by creating a pool at Thomaston Dam. Solar warming will raise the temperature of the waters of the impoundment but the low level discharge will release the cooler bottom waters. A 28-foot deep pool will be only weakly stratified at best and the lake bottom waters will be only slightly cooler than the surface waters. The expected net effect on the Naugatuck River immediately below Thomaston Dam would be a temperature increase of 1^{o} Fahrenheit.

e. Water Quality Summary. Thomaston Dam is not considered to be a good location for the storage of water for supply purposes. Existing water quality is marginal due to urban runoff and upstream discharges and the creation of a pool would cause algae blooms and poor water quality.

Most surface water can generally be treated to the point that it is usable for public water supply, but the water quality in a lake at Thomaston Dam would be so poor that treatment costs may not be economical. Whether the water quality would be acceptable for industrial water supply depends on the proposed use; many industrial processes require water of a higher quality than is acceptable for public water supply. An additional use of the water could be for firefighting purposes.

9. DISCUSSIONS OF IMPACTS

a. General. Any action resulting in a temporary change of reservoir storage volume will have impacts on other project purposes which must be evaluated before a storage reallocation plan can be implemented. At Thomaston Dam, an evaluation has been made of the impacts resulting from drought contingency storage on the flood control purpose of this project. Effects on sedimentation and the aquatic and terrestrial environments as well as the historic and archaeological resources have also been addressed.

b. Flood Control. A review of the regulation procedures at Thomaston Dam was undertaken to determine the volume of water that could be made available for drought contingency purposes. The water would be stored by temporarily utilizing existing flood control storage. It is recognized that major floods occur in every season of the year, and any use of flood control storage would be continually monitored to insure there would be no adverse impacts on downstream flood protection.

At Thomaston Dam the maximum pool elevation for drought contingency storage has been estimated to be elevation 408 feet, representing an infringement on the flood control storage of about 0.2 inch of runoff from the upstream 97 square mile drainage area. This level indicates the approximate elevation to which water could be stored without significantly affecting regulation activities.

c. Recreation. Several existing roads would be affected by the drought pool; however, recreational trail bike paths would not be affected by the drought storage.

10. POTENTIAL ENVIRONMENTAL IMPACTS

a. Project Operation. The proposed plan involves implementation of a 28-foot deep temporary storage impoundment in the existing dry-bed reservoir for potential water supply purposes. Based on a 10-year event, the anticipated rate of pool storage would be about 5 inches per day over a 54-day period. This assumes the 10-year, 7-day low flow of 10 cfs (6.5 mgd) would be released downstream for the duration of a drought. Storage would probably take place during the months of May, June and July and would be drawn as needed during the following months. The storage could be held as long as 3 or 4 months during the growing season.

b. Effects on the Aquatic Environment. The aquatic environment of the project area consists of the Naugatuck River main stem, Leadmine Brook and a number of small unnamed stream tributaries of the main stem. The Naugatuck River supports a variety of warm water species such as bass, perch, crappies and bullheads. With the recent improvement of the water quality, the State of Connecticut will have initiated its first trout stocking in many years during the spring of 1983. Stocking would be done in the reach from Thomaston Dam upstream to Campville. This cold water fishery would be considered seasonal because of the warm summer water temperatures. Leadmine Brook and other small tributaries provide high quality cold water fishery habitats because of the excellent water quality and good streamside vegetative cover. Leadmine Brook has been annually stocked throughout its length for many years and receives considerable fishing pressure.

Creation of the proposed temporary pool would impound about 1.5 miles of the Naugatuck River and about 0.4 mile of Leadmine Brook. The trout habitat and associated benthic invertebrates would be destroyed in these streams by siltation and the influx of poorer quality water in Leadmine Brook. The impacts of this loss on natural fish populations would have to be assessed should further study be authorized.

The impact on the fish populations in the downstream Naugatuck River would be related to the restricted downstream flows and the quality of the released water. The proposed discharge, 10 cfs (6.5 mgd) would impose a 10-year, 7-day low flow on the downstream main stem habitat throughout the duration of the drought. The lower stream levels and the poorer quality of the released water would further deteriorate the quality stream habitat in the downstream area. Further study would be required to assess the impact on the downstream resources.

c. Effects on the Terrestrial Environment. The terrestrial environment in the project area consists of the forest and open field areas adjacent to the stream habitats described above. Approximately three-fourths of the 995 acres held in fee are forested and consist mainly of northern and central hardwood species such as sugar maple, beech, birch, oak and hickory interspersed with softwoods such as hemlock and white pine. Open land consists mainly of old field and flood plain area with some encroachment by pioneering shrub and trees. Normal succession has been limited in the lower impoundment area by frequent storage events. Wetlands occur along the east bank of the Naugatuck River in the upper impoundment area. Typical wildlife that use these habitats include game species such as white-tailed deer, cottontail rabbit, ringnecked pheasant, ruffed grouse, woodcock and turkey as well as a variety of small mammals, songbirds, reptiles and intertebrates. Also aquatic wildlife such as waterfowl and furbearers occasionally use the more stable wetland areas in the upper reservoir area. The State of Connecticut annually stocks pheasants at the project for hunting.

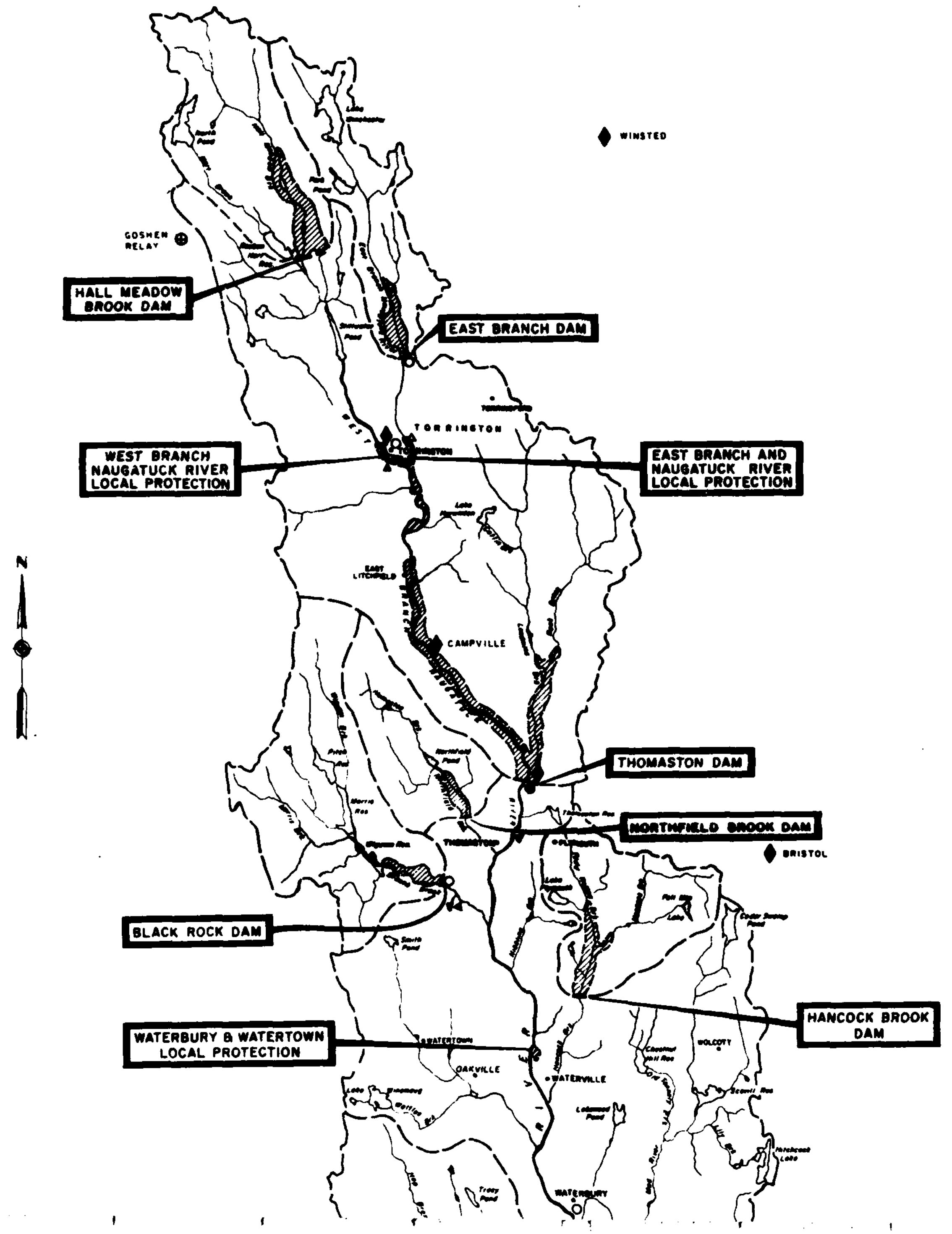
The proposed temporary impoundment would inundate about 107 acres of open land habitats during the growing season. The wetland habitat in the upper reservoir area would not be inundated. A 3 to 4 month storage above the 20-foot stage (elevation 400 feet NGVD) would probably kill tree species such as sugar maple, birch, beech, white pine, hemlock and oak. Red maple and alder would probably be able to survive only one flood season. The anticipated loss of vegetation would degrade wildlife habitat for most of the impounded area. Newly born or hatched young and some adult wildlife would probably perish in the rise waters. Others would be displaced on adjacent land where the habitat would probably not be able to support the added individuals. Further study would be required to assess the significance of these losses on the local populations.

11. HISTORIC AND ARCHAEOLOGICAL RESOURCES

Examination of late 19th century maps reveals no recorded historic period resources below elevation 408 feet NGVD, though numerous structures stood on the flood plain at slightly higher elevations. Several prehistoric archaeological sites are reported within the Thomaston Dam project area, and one of these appears to be below elevation 408 feet NGVD, and would therefore be affected by the proposed drought contingency plans. Should this plan proceed to more detailed study, an archaeological reconnaissance survey of the impact area will be necessary to locate any unrecorded archaeological resources and determine potential project effects upon them, as well as upon the recorded site.

12. SUMMARY AND CONCLUSIONS

A drought contingency plan was studied for Thomaston Dam in an effort to be responsive to public needs during drought situations. A 90 percent dependable yield of about 10 cfs (6.5 mgd) could be provided while still maintaining a downstream release of 10 cfs or the project filled to elevation 408 feet NGVD, providing a maximum water supply reserve of about 1,050 acre-feet (342 million gallons). It was determined that Thomaston Dam would not be a good location for the storage of water for public water supply purposes. Existing water quality is marginal due to urban runoff and upstream discharges. However, the stored water may be acceptable for industrial water supply or firefighting purposes. An evaluation of the effects of drought contingency storage on the environmental aspects has revealed some impacts on the aquatic and terrestrial environments. This evaluation was based on preliminary studies utilizing readily available information. Should a plan proceed to more detailed studies, further evaluation would be required to fully assess the significance of environmental impacts.


WINSTED
GOSHEN RELAY
HALL MEADOW BROOK DAM
EAST BRANCH DAM
TORRINGTON
WEST BRANCH NAUGATUCK RIVER LOCAL PROTECTION
EAST BRANCH AND NAUGATUCK RIVER LOCAL PROTECTION
N
EAST LITCHFIELD
CAMPVILLE
THOMASTON DAM
NORTHFIELD BROOK DAM
BRISTOL
BLACK ROCK DAM
HANCOCK BROOK DAM
WATERBURY & WATERTOWN LOCAL PROTECTION
WATERTOWN
OAKVILLE
WATERVILLE
WOLCOTT
WATERBURY

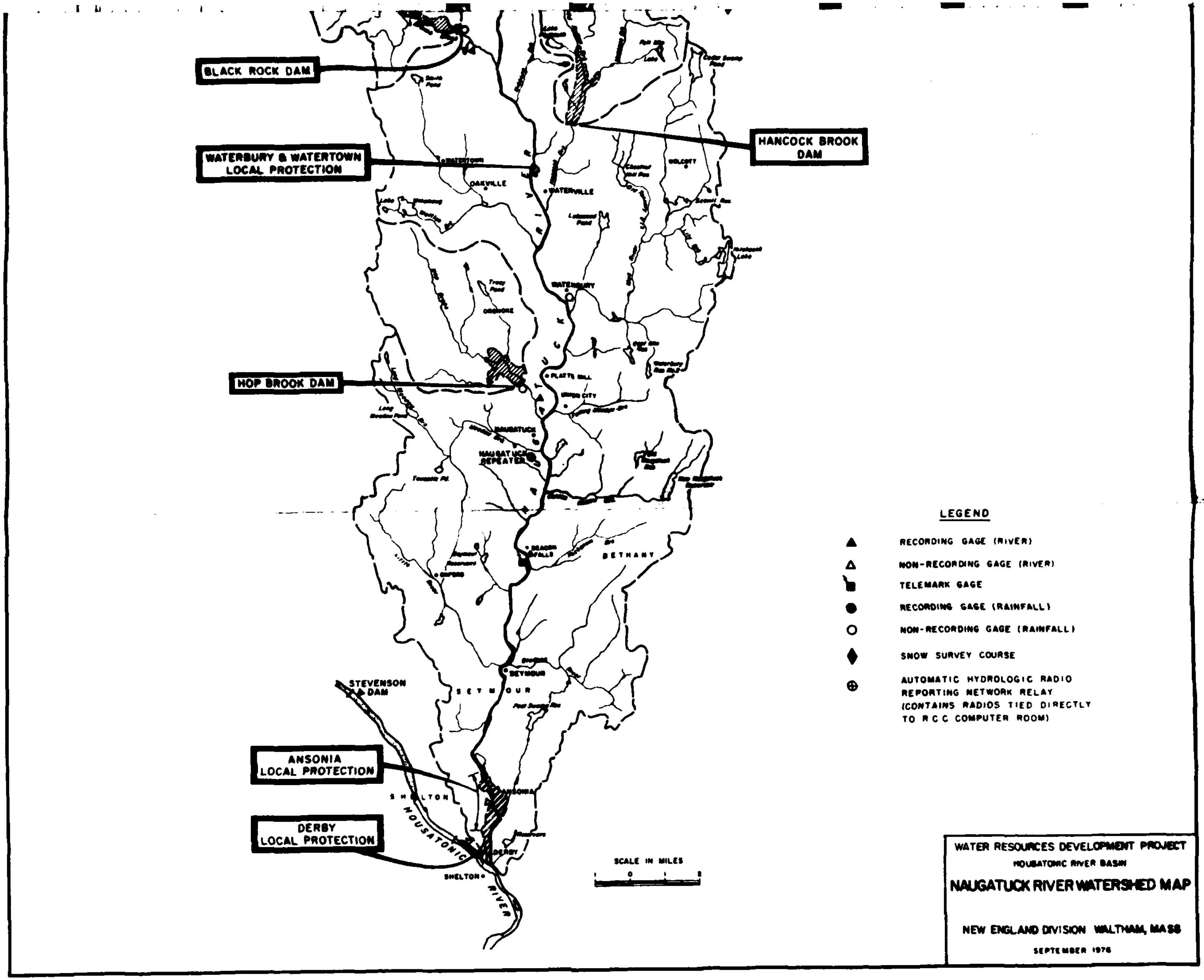

BLACK ROCK DAM
HANCOCK BROOK DAM
WATERBURY & WATERTOWN LOCAL PROTECTION
HOP BROOK DAM
ANSONIA LOCAL PROTECTION
DERBY LOCAL PROTECTION
STEVENSON DAM
WATERTOWN
OAKVILLE
WATERVILLE
WOLCOTT
WATERBURY
OXFORD
PLATTS MILL
UNION CITY
NAUGATUCK
NAUGATUCK REPEATER
BEACON FALLS
BETHANY
SEYMOUR
ANSONIA
DERBY
SHELTON
HOUSATONIC RIVER
SCALE IN MILES
0 1 2
LEGEND
RECORDING GAGE (RIVER)
NON-RECORDING GAGE (RIVER)
TELEMARK GAGE
RECORDING GAGE (RAINFALL)
NON-RECORDING GAGE (RAINFALL)
SNOW SURVEY COURSE
AUTOMATIC HYDROLOGIC RADIO REPORTING NETWORK RELAY (CONTAINS RADIOS TIED DIRECTLY TO R C C COMPUTER ROOM)
WATER RESOURCES DEVELOPMENT PROJECT
HOUSATONIC RIVER BASIN
NAUGATUCK RIVER WATERSHED MAP
NEW ENGLAND DIVISION WALTHAM, MASS
SEPTEMBER 1976

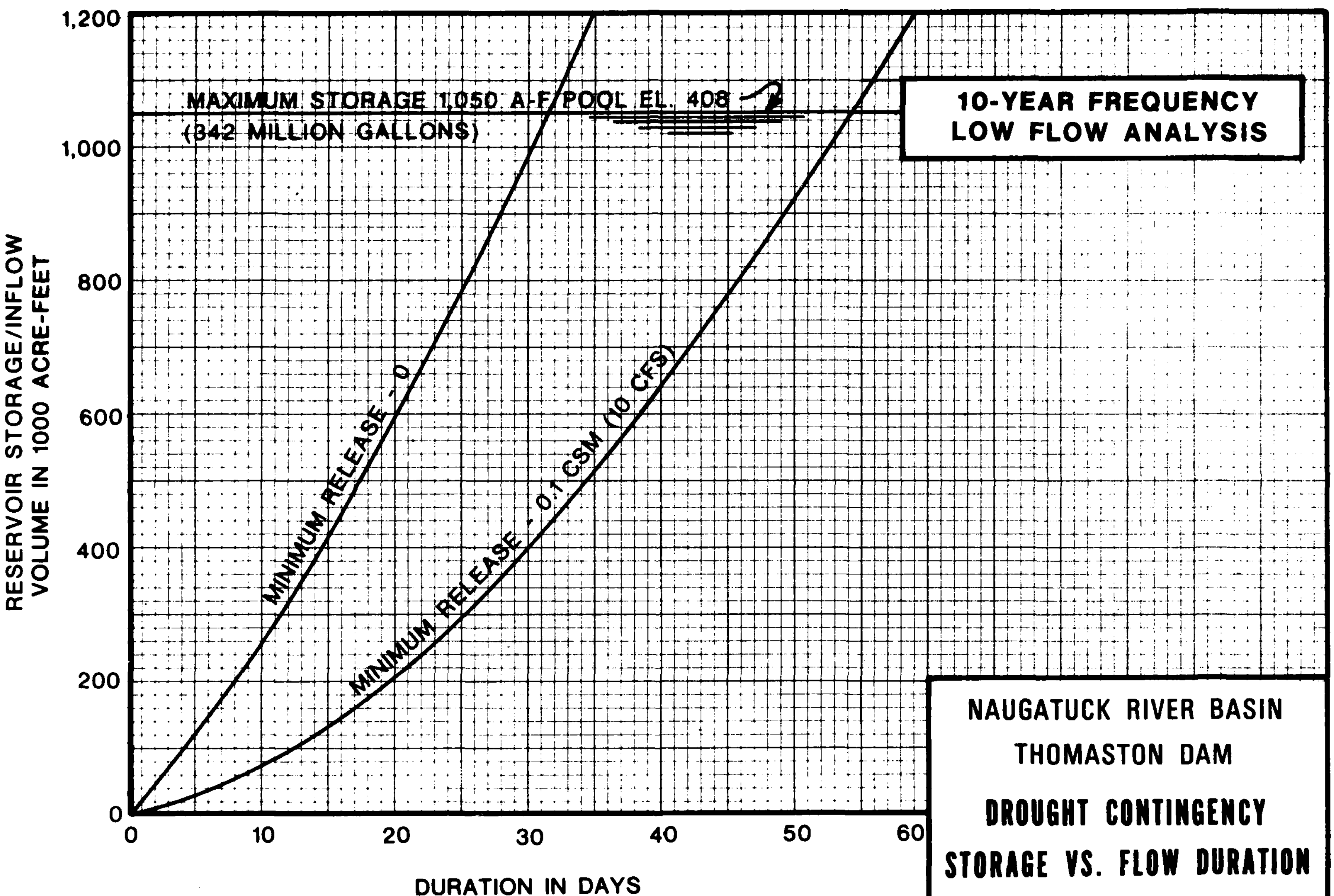
PLATE 1

2

THOMASTON LAKE
AREA-CAPACITY TABLE
DRAINAGE AREA = 97.2 SQUARE MILES

Stage (ft)	Elev. (msl)	Area (acres)	Capacity (ac/ft)	Capacity (inches)
0	380	0	0	0
2	382	1	4	0
4	384	2	7	0
6	386	5	14	0
8	388	8	27	0.01
10	390	12	47	0.01
12	392	16	75	0.01
14	394	25	116	0.02
16	396	35	176	0.03
18	398	50	261	0.05
20	400	62	373	0.07
22	402	73	508	0.10
24	404	85	666	0.13
26	406	96	847	0.16
28	408	107	1,050	0.20
30	410	119	1,276	0.25
32	412	130	1,525	0.29
34	414	140	1,795	0.35
36	416	152	2,087	0.40
38	418	163	2,402	0.46
40	420	174	2,739	0.53
42	422	187	3,100	0.60
44	424	199	3,486	0.67
46	426	214	3,899	0.75
48	428	229	4,342	0.84
50	430	247	4,818	0.93
52	432	265	5,330	1.03
54	434	283	5,878	1.13
56	436	302	6,463	1.25
58	438	321	7,086	1.37
60	440	339	7,746	1.49
62	442	363	8,448	1.63
64	444	383	9,194	1.77
66	446	401	9,978	1.92
68	448	422	10,801	2.08
70	450	443	11,666	2.25
72	452	463	12,572	2.43
74	454	484	13,519	2.61
76	456	502	14,505	2.80
78	458	523	15,530	3.00
80	460	545	16,598	3.20
82	462	567	17,710	3.42
84	464	588	18,865	3.64
86	466	611	20,064	3.87
88	468	635	21,310	4.11
90	470	661	22,606	4.36
92	472	688	23,955	4.62
94	474	710	25,353	4.89
96	476	735	26,798	5.17
98	478	760	28,293	5.46
100	480	784	29,837	5.75
102	482	806	31,427	6.06
104	484	829	33,062	6.70
106	486	852	34,743	6.70
108	488	874	36,469	7.03
110	490	897	38,240	7.38
112	492	923	40,060	7.23
114	494	960	42,000	8.10

(Spillway Crest)



NAUGATUCK RIVER BASIN

THOMASTON DAM

DROUGHT CONTINGENCY

STORAGE VS. FLOW DURATION

PLATE 3

END

FILMED

9-84

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