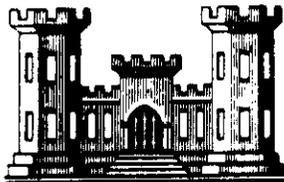


WATER RESOURCES INVESTIGATION
FRANKLIN FALLS DAM

PEMIGEWASSET RIVER, FRANKLIN, N.H.
MERRIMACK RIVER BASIN

REVIEW OF
OPERATIONS
OF
COMPLETED PROJECT



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JANUARY 1976

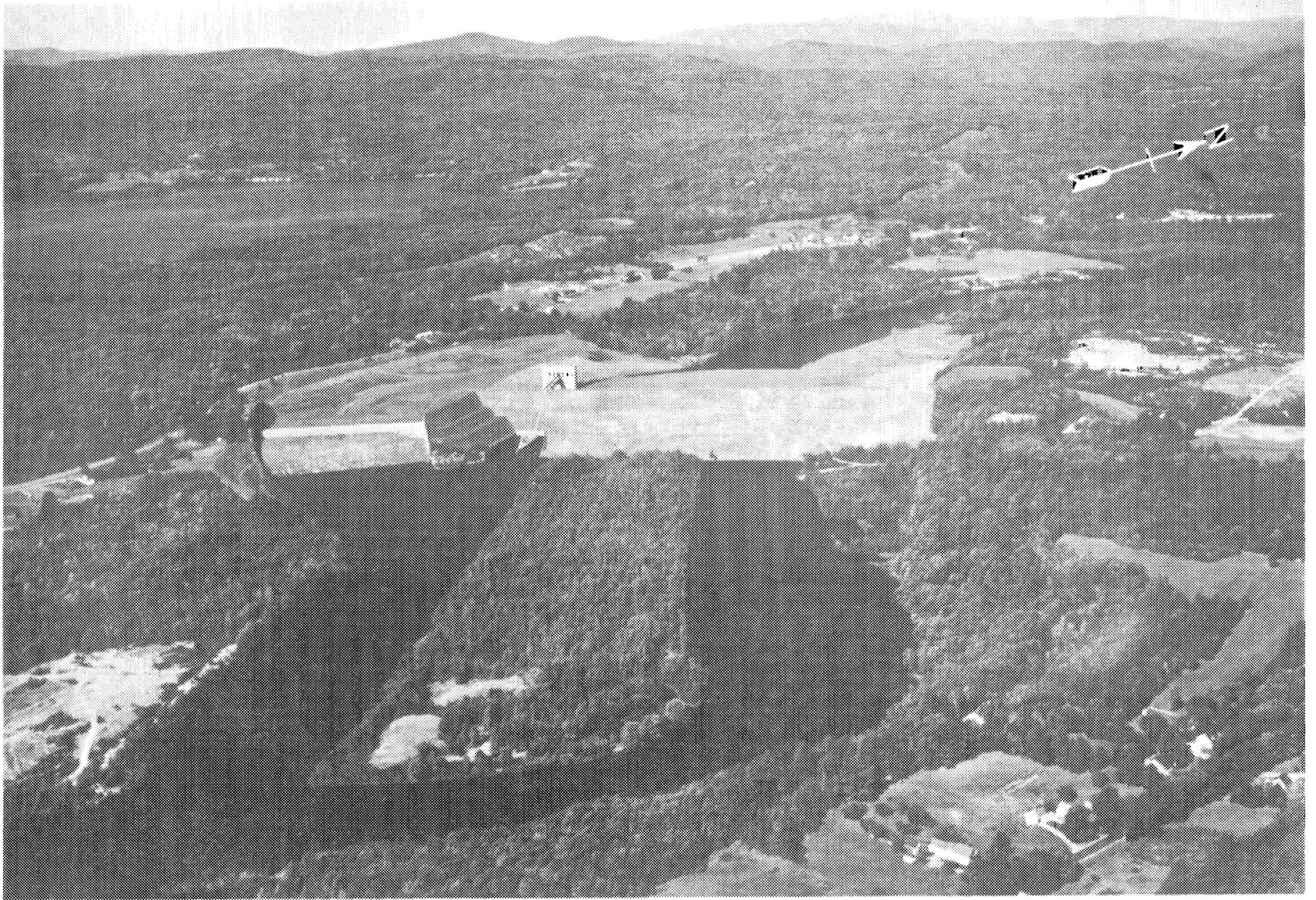
FRANKLIN FALLS DAM
PEMIGEWASSET RIVER, FRANKLIN, N.H.
MERRIMACK RIVER BASIN

REVIEW OF
OPERATIONS OF
COMPLETED PROJECT

Department of the Army
New England Division, Corps of Engineers
Waltham, Massachusetts

January 1976

FRONTISPIECE



FRANKLIN FALLS DAM

Syllabus

This report reviews the operations of the completed Franklin Falls Dam located on the Pemigewasset River about 2.5 miles upstream from the city of Franklin, New Hampshire. The project became operational in 1943 and serves as a unit of a coordinated system of dams and reservoirs constructed to control floods in the Merrimack River Basin.

The study was authorized by the Flood Control Act of 1970 (Title II of Public Law 91-611) Section 216.

The existing project was reexamined in light of up-dated design criteria, population increases and national economy changes which occurred since construction was completed. Investigations included: real estate, hydrology, water quality, operations and flood regulations, foundations and materials, structural analysis, effect of floods on vegetation, and environmental evaluation. The review also gave consideration to recreation and fish and wildlife needs.

Studies revealed that: there is no need for acquiring additional land or relinquishing any of the present real estate holdings; no changes are necessary due to the latest hydrological design criteria; present operations and flood regulations are satisfactory; and the existing project has no adverse affect on the environment.

The structural analysis indicates that most of the concrete structures will have to be reinforced or modified in order to meet up-dated design criteria. However, since structural deficiencies are not considered to be critical, remedial measures will be given further consideration under the Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures, as directed by ER 1110-2-100.

Federal, State, municipal and other interests feel there is no need for low flow water augmentation, hydroelectric power, or a change in the operations of the flood control project. There is no justification for increased recreational development at this time, although the city of Franklin and the towns of Hill and Bristol expressed some interest in future expansion of recreational facilities.

The Division Engineer recommends that no reformulation of the operations of the completed project be made at this time.

FRANKLIN FALLS DAM
PEMIGEWASSET RIVER, FRANKLIN, NEW HAMPSHIRE
MERRIMACK RIVER BASIN
REVIEW OF OPERATIONS OF COMPLETED PROJECT

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JANUARY 1976

FRANKLIN FALLS DAM
PEMIGEWASSET RIVER, FRANKLIN, N. H.
MERRIMACK RIVER BASIN

REVIEW OF OPERATIONS OF COMPLETED PROJECT

The Study and Report

PURPOSE AND AUTHORITY

The purpose of this report is to review the operations of the completed Franklin Falls Dam project, due to significantly changed physical or economic conditions since the project was completed 32 years ago. Significant changes have taken place with respect to hydrological and structural design criteria as relate to earthquake, uplift, sliding, and factor of safety.

The study was undertaken to:

- Assure that the existing project is operationally safe as well as structurally sound in accordance with the most recent design criteria.
- Determine the need for modifying or altering current use or for adding new purposes.

- Up-date the project formulation to insure that the project will continue to make optimum contribution to the nation's economy.
- Determine if there is a need for additional land acquisition for the project or if there is a surplus of property for project needs.
- Examine the current environment to insure compatibility with environmental considerations.
- Recommend modifications to structures, operation, or environmental aspects where necessary.

The study of the completed Franklin Falls Dam project and the preparation of this report was authorized by the Flood Control Act of 1970 (Title II of Public Law 91-611) Section 216; which reads as follows:

"The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable, due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest."

SCOPE OF THE STUDY

This is a report of survey scope. It deals with project planning, and information from compiled technical data and is discussed only so far as it affects the overall operational efficiency of the project.

All studies for this project were coordinated with the appropriate Federal, State or local agencies as well as other

concerned individuals. A consulting engineering firm, Fay, Spofford and Thorndike of Boston, Massachusetts, performed a structural analysis of the concrete structures at the project. This analysis was done under contract and by direction of the Corps of Engineers.

COORDINATION WITH OTHER AGENCIES

Comments were solicited and consultations held with Federal, State and local officials to determine their desires or needs for modifying the project or its operation. The following agencies were contacted:

Federal

Environmental Protection Agency
Fish and Wildlife Service
National Park Service
Bureau of Outdoor Recreation
Department of Housing and Urban Development
Soil Conservation Service

State of New Hampshire

Department of Resources and Economic Development
 Division of Resources
 Division of Recreation
Water Supply and Pollution Control Commission
Fish and Game Department
Water Resources Board
Office of State Planning
Division of Parks
Department of Public Works and Highways

Regional, Local, and Other Interests

New England River Basins Commission
Lakes Region Planning Commission
City of Franklin

Towns of Sanborton, Hill, Bristol, and New
Hampton
Public Service Company of New Hampshire
Merrimack River Valley Flood Control Com-
mission

THE REPORT

Engineering Circular 1110-2-119, "Review of Operation of Existing Projects", dated 1 September 1971 served as a guideline for the preparation of this report. Results are presented in two parts: the main report and the appendix. The main report presents a broad view of the overall investigation with supportive maps, photographs, relevant data and recommendations. The appendix contains the pertinent correspondence in connection with the study.

PRIOR STUDIES AND REPORTS

A number of completed and on-going reports concerning the Franklin Falls Dam project and the Merrimack River Basin are in existence. They are as follows:

a. "308" Report. A report dated 1 December 1930 and printed as House Document No. 649, 71st Congress, 3rd Session, found that navigation, flood control, power development, and irrigation improvements in the basin were not warranted at that time.

b. 1938 Report. A report dated 18 May 1938 and printed as House Document No. 689, 75th Congress, 3rd Session, presented a comprehensive plan for flood control in the basin. A plan, consisting of four reservoirs, all located in New Hampshire, and related flood control works, was recommended for development. The plan was authorized in compliance with Public Law No. 738, 74th Congress, as amended by Public Law No. 761, 75th Congress.

c. Survey Report of April 1940. A report on navigation, flood control and water power recommended the addition of West Peterborough (MacDowell) Reservoir to the authorized flood control system. The project was subsequently approved by the Office of the Chief of Engineers as part of the comprehensive flood control plan for the Merrimack River Basin authorized by the Flood Control Acts of 1936 and 1938. The report also concluded that "Additional flood control on the Pemigewasset River can be obtained most economically through a multiple-purpose development at Livermore Falls in conjunction with Franklin Falls Reservoir".

d. Report to the States. This report dated March 1947 and entitled "Comprehensive Plan for Flood Control", was prepared to give the concerned States advance information on the plan for flood control in the Merrimack River Basin. The report proposed seven reservoirs for flood control, of which three included power storage with provisions for future addition of generating facilities.

e. NENYIAC Report. Flood control and allied water uses in the Merrimack River Basin are considered in Part 2, Chapter XV, "Merrimack River Basin", of The Resources of the New England-New York Region, a comprehensive survey of the land, water, and related resources of the New York-New England region. Prepared by the New England-New York Inter-Agency Committee, the report was referred in 1955 to the Governors and agencies concerned for comment, and submitted to the President of the United States by the Secretary of the Army on 27 April 1958. Part I and Chapter I of Part 2 are printed as Senate Document No. 14, 85th Congress, 1st Session. The report stated that the flood potentialities of the Merrimack River Basin constitute a flood problem that warrants serious consideration of additional flood control measures. The report further states that substantial control of flood flow contributions from the Pemigewasset River is obtained from the Franklin Falls Reservoir but as the storage provided by this project is limited, being equivalent to only 2.9 inches of run-off from its drainage area, an additional reservoir or reservoirs in the watershed of the Pemigewasset River would be highly desirable.

f. "205" Report. A report on flood control and allied purposes in New England River Basins dated 30 June 1955, found that the flooding problem in the Merrimack River Basin warranted construction of two reservoirs in addition to the three that had been completed. It stated that the proposed Hopkinton-Everett Lakes Project (completed in 1962) was adequately justified, but the construction of the other proposed projects, namely Livermore Falls Reservoir "would have adverse effects upon the economy of the area and is not recommended at this time." This report was completed subsequent to the initial printing of NENYIAC (see above), but prior to the printing of part of that report as a Senate Document.

g. The Merrimack River Basin Report. A comprehensive water resources investigation of the entire basin dated August 1972. The report investigated the advisability and economic feasibility of flood protection, navigation, and other water resources development in the remainder of the basin, and makes specific recommendations for programs and measures needed for the basin.

h. North Atlantic Regional Water Resources. The NAR study was one of 20 regional framework comprehensive water and related land resources studies conducted throughout the United States under guidelines established by the Water Resources Council. The NAR study, authorized by the 1956 Flood Control Act (Section 208, Public Law 89-298) had as its objective the establishment of a broad master plan of framework to serve as a basis for future regional water resources development and management. The requirements and needs of the people of the region were considered in analyzing water resource needs including water quality control, flood control, municipal and industrial water supply, irrigation and rural water supply, navigation, hydroelectric power, recreation, fish and wildlife and other environmental resources. These needs were projected through the year 2020. The study, which began in 1966, was completed in June 1972.

i. Environmental Assessment. An environmental assessment report of the environmental impact on the project area due to the routine operation and maintenance of Franklin Falls Dam and

Reservoir, was prepared by the New England Division in September 1973. Pertinent items are included in this report under the Environmental Evaluation Section.

j. Merrimack River Basin Water Quality Management Plan. Staff Report No. 61, New Hampshire Water Supply and Pollution Control Commission, dated November 1973. The report addresses the matter of compliance with the new stream classification standards resulting from the Federal Water Pollution Control Amendments of 1972. Recommendations are presented as to degree and location of waste treatment facilities throughout the Merrimack River Basin.

k. Periodic Inspection Report No. 1. A report on Franklin Falls Dam prepared by Goldberg-Zoino and Associates, Inc., for the Corps of Engineers in January 1975. A detailed technical inspection of the Franklin Falls Dam was made to insure the structural safety and operational adequacy of the project. This inspection did not include a review of the stability of structures under current criteria. No immediate remedial activities were recommended at the project.

l. Inundation Damage to Vegetation at Selected New England Flood Control Reservoirs. Special Report 220 prepared by the U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, in March 1975. This report resulted from a cooperative program between the U.S. Army Engineer Division, New England, and the U.S. Army Cold Regions Research and Engineering Laboratory, which was initiated in September 1973 to determine the extent of vegetative damage in the New England Division reservoir system caused by the storage of floodwaters in late June and early July of 1973.

m. Northeastern United States Water Supply Study. The unprecedented drought that started in 1960 over the northeastern seaboard of the nation led Congress to authorize the Secretary of the Army, in October 1965, to cooperate with Federal, State, and local agencies in preparing plans to meet the long-range water needs of the Northeastern United States. It anticipated that such

plans may include major reservoirs, major conveyance facilities to transfer water between river basins, and major purification facilities to be constructed under Federal auspices with appropriate non-Federal financial participation. The NEWS study was initiated in 1966 and is scheduled for completion in late 1975.

n. Wastewater Management Program Study. In November 1974 the Corps of Engineers, New England Division, completed a survey scope type study for Wastewater Management of the Merrimack River. It presents a visionary and broad comprehensive program of wastewater management which considers all alternative measures for the control of pollution, as well as the feasibility of recycling wastes and storm water runoff. The study was reviewed and approved by the Board of Engineers for Rivers and Harbors in October 1975. Any future phases of this program, if undertaken, will be accomplished by the Environmental Protection Agency and the Commonwealth of Massachusetts.

Resources and Economy

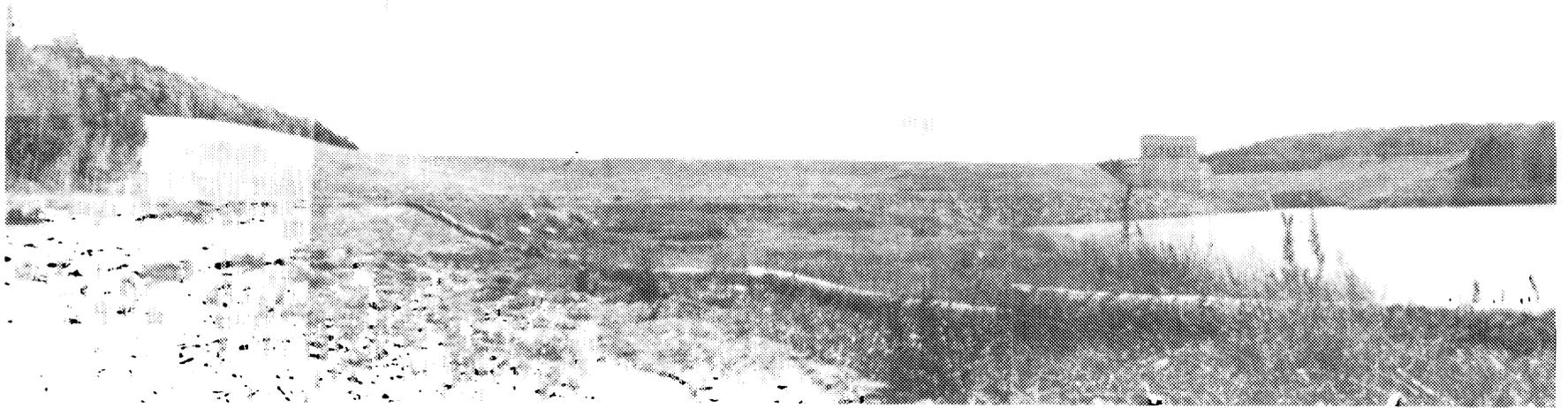
PROJECT DESCRIPTION

The Franklin Falls Dam and Reservoir is located on the Pemigewasset River, the main tributary of the Merrimack River, about 2.5 miles upstream from the city of Franklin in Merrimack County, New Hampshire (see Plate 1). The dam is operated in conjunction with four other flood control reservoirs as part of a system of flood control works in the Merrimack Basin. These are the Hopkinton-Everett Lakes on the Contoocook and Piscataquog Rivers (completed December 1962); Blackwater Dam on the Blackwater River (completed November 1941); and McDowell Lake on the Nubanusit Brook (completed March 1950). The important components of the Franklin Falls project are the earthen dam, the spillway, and the outlet works.

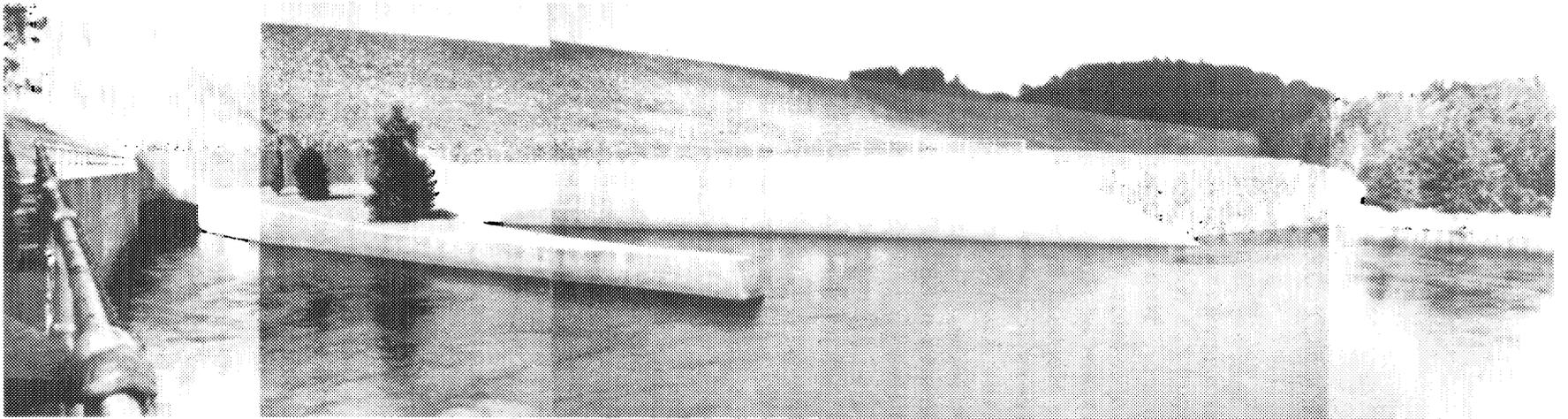
Franklin Falls Dam was authorized by the Flood Control Act approved 22 June 1936 (Public Law 738-74th Congress) and modified by the Flood Control Act of 28 June 1938 (Public Law 761-75th Congress). Construction began in November 1939 and was completed in October 1943.

The reservoir is used for flood control purposes and is normally kept empty. When full to spillway crest, a narrow 2,800 acre reservoir would extend about 13 miles upstream of Franklin Falls Dam and would encroach into the tailwater level of the Ayers Island Dam. Pertinent data for the Franklin Falls Project is listed in Table 1. Plate 2 shows a map of the overall project area. Plate 3 shows a general plan and typical sections of the dam.

The embankment consists of compacted earth fill with rock slope protection, a top length of 1,740 feet with a maximum height above the streambed of 140 feet. The top of the dam is 35 feet wide and is at elevation 416 feet, msl. It provides 22 feet of spillway surcharge plus 5 feet of freeboard under the original design conditions in 1939.



Dam and Reservoir— View of Upstream Side of Dam, Log Boom, and Permanent Pool.



Dam and Stilling Basin— View of Downstream Face of Dam, Outlet Conduit, and Stilling Basin Walls.

TABLE 1
PERTINENT DATA
FRANKLIN FALLS DAM*

<u>Location</u>	Pemigewasset River, Franklin, N.H.			
<u>Drainage Area</u>	1,000 square miles			
<u>Project Uses</u>	Flood Control			
<u>Reservoir</u>				
<u>Pool</u>	<u>Elevation of Pool (ft., msl)</u>	<u>Capacity (acre-feet)</u>	<u>Area (acres)</u>	<u>Capacity (inches)</u>
Gate Invert	300	--	--	--
Permanent	307+	3,400	440	0.1
Flood Control	307-389	150,600	2,800	2.8
Total Storage	389	154,000	2,800	2.9
<u>Embankment Features</u>	Rolled earth fill with rock slope protection			
Type				
Length (feet)	1,740			
Top elevation (ft., msl)	416			
Maximum height (ft.)	140			
Top width (ft.)	35			
<u>Spillway Features</u>	Chute spillway, ogee weir			
Type				
Crest Length (ft.)	546			
Crest elevation (ft., msl)	389			
<u>Spillway Design Flood</u>				
Peak Inflow (cfs)	210,000			
Peak Outflow (cfs)	205,000			
Maximum Surcharge	22 ft. above crest, (elev. 411 ft., msl)			
<u>Outlet Works</u>	Horseshoe-shaped conduits			
Type				
Number and size	Two each-22' wide x 19' high			
Gates	4 - Broom type in each conduit			
Gates - size	6 at 7'6"x16', 2 at 4'6" x 10'			
Channel capacity	18,000 cfs			
<u>Stilling Basins</u>				
Number & size	(2) 85' wide x 95' long			
<u>Project Cost</u>	\$7,950,000, thru June 1974			
<u>Date of Completion</u>	October 1943			

*Original Design

The spillway is located on the west side of the dam and is a low, concrete ogee weir, with a crest length of 546 feet, at an elevation of 389 feet, msl. The spillway approach channel is in earth and rock cut 1,785 feet in the length; the spillway discharges into a rock and concrete walled channel 900 feet in length which joins the outlet discharge channel about 500 feet downstream of the toe of the dam.

The outlet works consist of twin 22-foot diameter horse-shoe shaped conduits, 542 feet long, and regulated by eight cable operated Broom Gates. The elevation of all the gate sills is 300 feet, msl. The total discharge capacity of the gates with the pool at elevation 389 is approximately 42,500 cfs. However, the maximum non-damaging downstream channel capacity is about 18,000 cfs.

Water released from the reservoir passes through the conduits into a concrete stilling basin. The lower seven feet of the reservoir are in the backwater from the Eastman Falls power dam which is located 1.8 miles downstream.

ENVIRONMENTAL SETTING

Franklin Falls Reservoir lies within a narrow section of the Pemigewasset River Valley characterized by steep hills and gently sloped bottom lands. During periods of normal flow, the river meanders along the valley floor with a slope of about 6 feet per mile. The watershed above the dam is irregular in shape and elongated with a maximum length (north-south) of approximately 55 miles and a maximum width of 28 miles. The elevations of the watershed divide average about 1,700 feet above mean sea level (msl) on the west and nearly 3,000 msl on the east, while peaks up to 5,000 feet msl are common in the north. At the head of the Pemigewasset River, Mount Lafayette rises to an elevation of 5,249 feet, the highest point in the watershed. The quality of water in the numerous tributaries which drain the upland areas is good. However, corporate recreational developments and seasonal homes in the watershed are becoming sources of water quality concern for the future.

The climate of the area is variable with a mean annual temperature of 45°F. The average monthly temperature varies from 70°F in July to about 20°F in January. The average annual precipitation in the watershed is about 44 inches with areas in the northern headwaters receiving greater amounts. The average annual snowfall varies from 70 inches at Franklin to 85 inches in the headwaters. Average water content of the snow-cover amounts to more than 8 inches and spring melting generally occurs in late March and April. Runoff over 68 years of record at the USGS stream gage at Plymouth has averaged 29 inches per year. The growing season averages about 160 days.

NATURAL RESOURCES

The principal soils within the project area are deep, sandy, excessively drained, and strongly acidic. Moisture holding capacity is mostly very low and little moisture is available to plants. Some of the flood plains within the project area consist of moderately coarse textured soils through which water moves rapidly but enough moisture is available for plants during the growing season.

There are approximately 2,500 acres of woodland and more than 800 acres of open and pasture land within the project. A license has been issued to the New Hampshire Department of Resources and Economic Development for use of the reservoir area for a long-term forestry improvement, fish and wildlife, and public recreation program. The major activity of the State has been improvement of the forestry resources of the reservoir. Forest cover is predominantly softwood consisting of white pine, red pine, hemlock, and some red spruce. Associated hardwoods include sugar, red and silver maple, elm, aspen and alder.

Abundant fish resources are supported in the 12-mile section of the Pemigewasset River that flows through the reservoir. From Ayers Island Dam to Eastman Falls Dam the fish consist mostly of golden shiner, yellow perch, brown bullhead and white sucker. Tributary streams that flow into the reservoir provide excellent trout habitat and are stocked with rainbow and brook trout. In the past, brown trout were stocked in several tributary streams within the project. An ongoing shad stocking program has

been in progress since 1969. Shad eggs are stocked on the Merrimack River as far upstream as the junction of the Pemigewasset and Winnepesaukee Rivers. An atlantic salmon stocking program upstream from the Franklin Falls Dam commenced in the Spring of 1975.

Project lands provide big-game habitat primarily for white tail deer, but moose and black bear occasionally pass through the area. The deer population within the general area is abundant. Fur-bearing species in the vicinity include beaver, mink, otter, fisher, muskrat, raccoon, and red and gray fox. In recent years no trapping permits have been issued.

Some wood duck, mallard, hooded merganser and black duck breed in the area, although the project does not contain fowl habitat. The river is utilized by migrating ducks and geese during both spring and fall flights.

In general there is moderate to heavy hunting and fishing activity within the project area. Periodic flood storage may cause some mortality to certain fur-bearing species and upland birds and mammals especially if it occurs during the breeding season. However, due to the relatively infrequent higher flood storage level behind the dam, the long-term effects on populations in the area at large are considered not to be significant.

HUMAN RESOURCES

The communities which abut the Franklin Falls Dam and Reservoir consist of the city of Franklin and the towns of Sanbornton, Hill, Bristol, and New Hampton. A comparison of the 1940 and 1970 census figures (see Table 2) indicates a composite increase of approximately 10 percent among these communities.

The 1970 population characteristics of the city of Franklin and the counties in which the other communities are located are shown in Table 3.

TABLE 2

POPULATION FIGURES FOR ABUTTING COMMUNITIES

	<u>1940</u>	<u>1970</u>
Franklin	6,749	7,292
Sanbornton	677	1,022
Hill	498	450
Bristol	1,632	1,670
New Hampton	<u>791</u>	<u>946</u>
TOTALS	10,347	11,380

TABLE 3

1970 POPULATION CHARACTERISTICS

<u>Item</u>	<u>City of Frank- lin</u>	<u>Merri- mack County (Hill)</u>	<u>Belknap County (New Hampton, Sanbornton)</u>	<u>Grafton County (Bristol)</u>
Median school years completed	12.1	12.3	12.2	12.4
Employment				
Non-worker/worker (1)	1.35	1.42	1.40	1.42
Percent in manufacturing industry	55	28	31	23
Percent in white collar occupation	39	47	42	44
Income				
Median for families	\$9276	\$9765	\$9526	\$9066
Per Capita income of persons	\$2704	\$3046	\$3140	\$3193

(1) Ratio of persons not in labor force (including children under 16) to labor force.

The Franklin Falls project is located in the area defined by the New Hampshire Office of State Planning as Region II (Lakes Region). Regional employment data for both 1960 and 1970 are presented in Table 4.

Regional population and labor force projections are presented in Table 5.

TABLE 4

EMPLOYMENT STATISTICS
REGION II (Lakes Region)

	<u>Units</u>		<u>Employment</u>	
	<u>1970</u>	<u>1960</u>	<u>1970</u>	<u>1960</u>
Total - All Industries	656	522	13,194	11,860
Manufacturing	98	117	6,382	7,348
Durable Goods	63	72	3,706	4,398
Lumber & Wood Prods. incl. Furniture & Fixtures	15	30	604	912
Machinery, Stone and Clay, Primary & Fabr. Metal, Electrical & Other Prods.	48	42	3,106	3,486
Nondurable Goods	35	45	2,676	2,950
Textile Mill, Apparel, Paper, Prtg. & Publ. Leather, Food, & Other	26 9	35 10	1,406 1,270	1,975 975
Nonmanufacturing	558	435	6,812	4,512
Construction (incl. Mining)	107	110	1,041	955
Trans., Comm., Util.	36	26	510	338
Trade	267	184	3,357	1,883
Fin., Ins., & Real Estate	47	29	428	258
Services & Other	101	86	1,476	1,078

Prepared by: N.H. Office of Industrial Development
Based on data prepared by: N.H. Dept. of Employment Security

TABLE 5

POPULATION & LABOR FORCE PROJECTIONS
REGION II (Lakes Region)

POPULATION & LABOR FORCE (000's)

	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>
Total Population	57.2	66.9	79.5	98.2	124.9	160.7
Labor Force	22.9	26.8	31.8	39.3	50.0	64.3

1970 Data: Based on 1970 Census
Projections: Based on Population Projections prepared by the
Office of State Planning

DEVELOPMENT AND ECONOMY

Franklin Falls Reservoir is located in the central "Lakes Region" of New Hampshire in close proximity to the industrial and population centers of the State. The area is largely wooded with an abundance of mountains and lakes nearby. Farming constitutes a minor proportion of the economic activity. Land with agricultural potential has given way to seasonal and permanent housing and other developments. The major economic centers within the region are Wolfboro-Ossipee, Laconia, and Franklin-Tilton. Concord, the capitol city, lies 20 miles to the southeast; Manchester, the largest industrial center is 35 miles to the southeast; and Nashua, another important industrial center, is 50 miles to the south. Franklin Falls Dam and Blackwater Dam are 10 miles apart and as such serve approximately the same region. Thus, a common zone of influence, covering a radius of 40 miles centered midway between the two reservoirs has been established. A major portion of the population in New Hampshire lives within this 40 mile zone. Recreation and tourism are of great importance in the upper basin where the natural features have made it one of the leading vacation spots of the northeast. The Franklin Falls project is readily accessible from Interstate 93 and U.S. Route 3 which pass within two miles of the reservoir. The White Mountain National Forest, about 20 miles to the north, attracts sightseers, campers, mountain climbers, skiers, fishermen, and hunters from considerable distances.

The economy of the area is nearly equally divided between manufacturing and non-manufacturing, a reflection of the importance of the recreation industry, further illustrated by a high incidence of self-employment and rapid expansion in the trade sector. Manufacturing activity is concentrated in the production of machinery, primary and fabricated metals, electronics, plastics and rubber moldings, shoes and apparel. Expansion of existing and the location of new durable goods industries have tended to offset losses in the textile, shoe, and apparel industries. A significant number of residents of this area commute to public and private employment in the Greater Concord and Manchester areas.

The population of the "Lakes Region" is projected to nearly double by the year 2000, reflecting the impact of Interstate Route 93 and the connecting State highway system, the regional Vocational College in Laconia, and the effects of ever increasing year-round recreational activity associated with Lake Winnepesaukee and the Belknap-Lakes Region area.

Investigations

GENERAL

Investigations were made in the following areas: real estate; hydrology; water quality; operations and flood regulations; foundations and materials; structural analysis; effect of floods on vegetation; and environmental evaluation. The investigations included general operation of the project and any problems which may have become apparent through the investigations.

REAL ESTATE

Reservoir land comprises approximately 3,700 acres, of which the government owns 3,682 acres in fee, and the perpetual right and easement to overflow 25 acres. The guide contour elevation is 395 feet, msl, which is 6 feet above the spillway crest of Franklin Falls Dam and about 21 feet above the normal tailwater elevation of 374 feet at the Ayers Island Power Station. In addition, a parcel of land within the flow line of the Franklin Falls Flood Control Reservoir located about one mile downstream of the Ayers Island Dam, owned by the Public Service Company of New Hampshire, was considered for acquisition in 1946. It was not acquired because the owners use it for their power purposes and wanted to retain it.

The land in question (tracts 292, 312, and 333 which contain 29 acres, 2.7 acres, and 10 acres respectively) still remains in the ownership of the Public Service Company of New Hampshire.

In October 1973 the New England Division reviewed the matter of acquiring this land, however, from the viewpoint of the operations, no need exists for acquisition of the land. No complaints of damage have ever been received from the owner. Therefore, action to acquire the land will be held in abeyance until such time that it becomes apparent that the land of the company has been damaged. Lands acquired for the remainder of the Franklin Falls Dam are of ample amount to take care of flowage needs. There is no surplus of property in excess of project needs.

HYDROLOGY

A hydrologic analysis of the Franklin Falls watershed system was completed in August 1973. Due to the configuration and characteristics of the watershed, five unit hydrographs were developed in lieu of only one for the entire 1,000 square mile drainage area. The "Probable Maximum Precipitation" was determined by using criteria described in Hydrometeorological Report 33. An index rainfall of 19 inches was determined and then adjusted for size of drainage areas. The storm was centered about 10 miles upstream of the Plymouth gauge in such a manner as to produce the most critical inflow conditions at Franklin Falls Dam. Table 6 is a tabulation of the maximum 24-hour rainfall for the five subwatersheds.

TABLE 6
MAXIMUM 24-HOUR RAINFALL

<u>Subwatershed</u>	<u>24-Hour Rainfall</u> (inches)
Pemigewasset River at Plymouth	15.0
Smith River at Bristol	13.9
Squam Lake	13.6
Newfound Lake	16.1
Franklin Falls Local	15.0

Losses from infiltration and other factors were assumed at the rate of 0.4 inch/6-hour period.

In order to analyze the adequacy of the spillway and dam height, under updated design criteria, the maximum water surface elevation of the spillway design flood (SDF) was determined. An SDF is defined as the flood discharge from the most severe combination of meteorological and hydrological conditions reasonably possible in the region.

Flood flows on the Pemigewasset River result from either snow-melt accompanied by rain or from heavy rainfall alone. The largest floods of record (1903 to date) at the USGS gauge on the Pemigewasset River at Plymouth (drainage area = 622 square miles) are shown in Table 7.

TABLE 7
RECORD FLOODS

<u>Event</u>	<u>Peak Discharge</u>	
	<u>CFS*</u>	<u>CSM**</u>
March 1936	65,400	105
Nov. 1927	60,000	96
Oct. 1959	52,700	85
Sep. 1938	50,900	82
July 1973	47,600	76
March 1953	44,700	72

*Cubic feet per second

**Cubic feet per second per square mile

Spillway design flood inflow hydrographs for each of the five sub-watersheds were derived by applying 6-hour rainfall excess values to the adopted 6-hour unit hydrographs. Drainage Areas and Unit Hydrograph Peaks are shown in Table 8. Peak Inflows are shown in Table 9.

TABLE 8

DRAINAGE AREAS AND UNIT HYDROGRAPH PEAKS

<u>Subwatershed</u>	<u>Drainage Area</u> (sq. mi.)	<u>Peak 6-Hour Unit Hydrograph Flow</u>	
		<u>CFS</u>	<u>CSM</u>
Pemigewasset River at Plymouth	622	24,250	39
Smith River at Bristol	86	2,200	26
Squam Lake (inflow)	58	5,100	88
Newfound Lake (inflow)	96	5,900	61
Franklin Falls Local	<u>138</u>	6,045	44
Total	1,000		

TABLE 9

PEAK INFLOWS

<u>Subwatershed</u>	<u>Peak Inflow</u>	
	<u>CFS</u>	<u>CSM</u>
Pemigewasset River at Plymouth	258,200	415
Smith River	19,800	230
Squam Lake	40,900	705
Newfound Lake	59,300	615
Franklin Falls Local	62,100	450

SDF hydrographs were routed downstream to obtain the total Franklin Falls reservoir inflow of 300,000 cfs (300 csm), which peaked 36 hours after the beginning of rainfall excess. The inflow hydrograph included a receding "base flow" produced by a preceding flooding event of 18,000 cfs at time 0, gradually receding to 10,000 cfs. The explanation for this is that a preceding flood would have been required to fill the reservoir to spillway crest, with gated discharges of 18,000 cfs. The residual hydrograph of the preceding storm was assumed to recede during the time of the SDF.

The SDF was routed through the reservoir with initial pool elevation at spillway crest. The resulting outflow of 286,000 cfs peaked approximately 42 hours after beginning of rainfall excess. Table 10 compares the hydrologic data associated with the original analysis of design and the data computed in this study. There was little change in total spillway design storm rainfall, and the increase in peak inflow from 210,000 to 300,000 cfs was largely due to: increased maximum 6-hour rainfall; adjustments in unit hydrographs to allow for greater peak rates; coincidence of runoff from component areas; and a higher assumed baseflow. It was noted that the compound effect of all adjustments caused about a 3 foot rise in design surcharge but it was still slightly more than 2 feet below the top of the dam. Table 10 compares the Freeboard Characteristics for the original analysis and the data computed in this study.

In light of the results of the current hydrologic study, it was concluded that the existing spillway length and top of the dam elevation are not sufficiently inadequate to warrant modification at this time. It was further concluded that present fee taking in the Franklin Falls reservoir area to elevation 395 feet msl which is 6 feet above spillway crest is adequate for regulation purposes.

An analysis of possible upstream dam failures for both Squam and Newfound Lakes indicates that the situation would not be critical to the integrity of Franklin Falls Dam (see Plate 1 for location). These lakes are both natural, with small dams added to better maintain constant water surface elevations. Both dams are kept in good condition by the New Hampshire Water Resources Board. If either dam was to be breached by high flows associated with the SDF, there would be no great surge released downstream.

An analysis of Ayers Island Dam indicates that flows associated with the SDF could be critical to the structural integrity of that project. The dam, located approximately 13 miles upstream of Franklin Falls was constructed in 1923-24 and is a concrete Ambursen type, operated for hydroelectric power by the Public Service Company of New Hampshire. The structure is about 75 feet high with crest at elevation 445 and toe at elevation 370. The normal storage capacity at spillway crest is about 10,000 acre-feet which is equivalent to about 3 feet of storage in the upper levels of Franklin Falls

TABLE 10

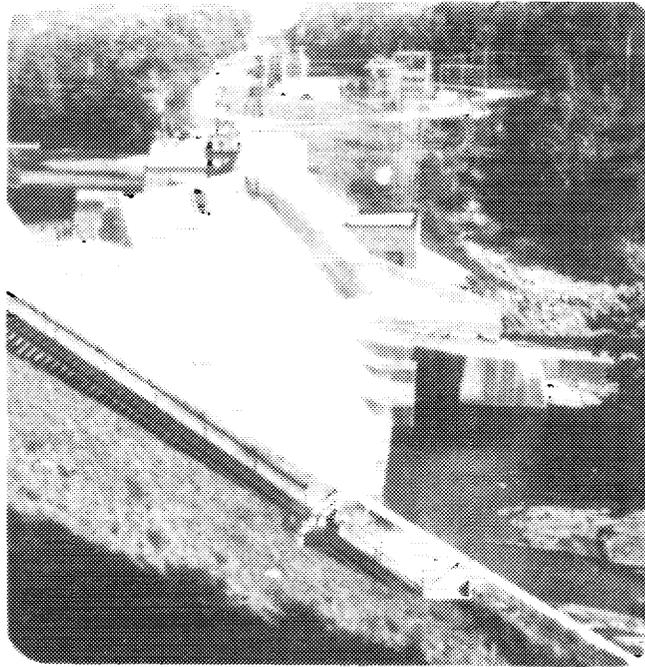
SPILLWAY DESIGN CRITERIA
FRANKLIN FALLS DAM

<u>Item</u>	<u>Design Criteria</u>	<u>1973 Criteria</u>
<u>Spillway Design Storm</u>		
Basis of Design	USWB	HR No. 33
Volume of Rain (in/48 hrs.)	15.8*	16.2
Losses (in/48 hrs.)	2.4	3.2
<u>Unit Hydrograph</u>		
Unit Rainfall Duration (hrs)	6	6
Peak Flows (cfs)	19,600	See Table 8
<u>Spillway Design Flood</u>		
Peak Inflow (cfs)	210,000	300,000
Peak Outflow (cfs)**	205,000	286,000
<u>SDF Reservoir Regulation Plan</u>		
Initial Pool Elevation (ft, msl)***	389.0	389.0
Outlet Facility During Flood	Operable	Operable
Max. Surge Elev. (ft, msl)	411.0	413.9
<u>Freeboard Characteristics</u>		
Design Wind Velocity (mph)	80	50
Effective Fetch (miles)	2.0	0.76
Average Depth (feet)	125	70
Wave Runup (feet)	4.84	2.2
Wind Tide (feet)	0.13	0.0
Adopted Freeboard (feet)	5.0	2.1
Design Height of Dam (feet)	416.0 (built)	416.0

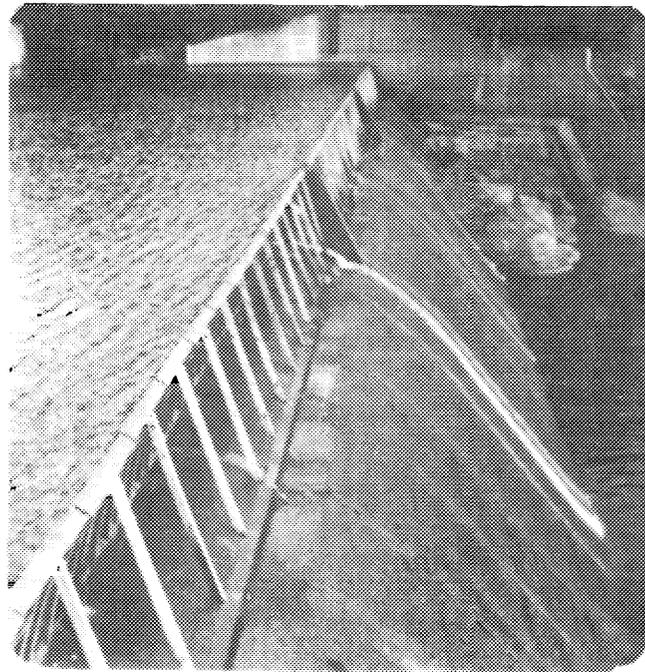
* 15.8 inches include 7.2 inches snowmelt

** Original Design: spillway - 195,000 cfs, conduit - 10,000 cfs
1973 Criteria: spillway - 243,000 cfs, conduit - 43,000 cfs

*** Pool initially full to spillway crest elevation



AYERS ISLAND DAM-
Existing Concrete Ambursen Type Hydroelectric
Power Dam, Located about 13 miles Upstream.



EASTMAN FALLS DAM-
Existing Small Hydroelectric Power Dam Located about
1.8 miles Downstream. Flashboards Control Shallow Pool
Extending Through Franklin Falls Dam.

Reservoir. It is estimated that during the SDF, a flow of approximately 250,000 cfs would pass this dam at a level of about 30 feet above spillway crest. The impact of a partial or total breach of the structure on Franklin Falls would depend on the timing and rate at which the breach occurred.

With a flow of 250,000 cfs, it has been estimated that the surcharge storage in Ayers Island reservoir over and above the 250,000 cfs stream profile would be on the order of 32,000 acre-feet, equivalent to approximately 10 feet of storage at Franklin Falls. Obviously, sudden failure of the dam precisely at the time of peak flow and peak surcharge at Franklin Falls could result in the dam being overtopped at Franklin Falls and the possibility of a failure. However, sudden and complete failure under such a particular condition and time is considered extremely remote. With the SDF discharge at Ayers Island and maximum surcharge at Franklin Falls, the head differential on Ayers Island Dam would be about 55 feet (475 ft. msl - 420 ft. msl), whereas the normal head differential at the dam is about 75 feet (445 ft. msl - 370 ft. msl). Therefore, horizontal loading on Ayers Island Dam would be reduced under maximum surcharge conditions at Franklin Falls and the chance of a failure at Ayers Island Dam would be lessened.

The design capacity of the Ayers Island Dam is estimated to be in the order of 150,000 cfs, or about twice the flood of record. The percent chance of occurrence of a design flood or SDF is small and the degree of risk posed by the failure of the dam is not considered great enough to justify major modifications at this time. However, if in the future, renovations or modifications are contemplated, then provisions should also be made to provide additional spillway capacity. Similarly, if in the future the dam becomes obsolescent and is no longer used for hydro-power, consideration should be given to lowering the height or removing it in its entirety.

During the recent July 1973 flood, a vortex effect (whirlpools) with accompanying gate house vibration was experienced at Franklin Falls Dam. The vortex appeared in the outlet approach channel just upstream of the gate house. A review of the records indicates that this has occurred four times since completion of the project. The

vortex problem and its solution is discussed in the section entitled "Operations and Flood Regulation" on page 28 . Table 11 shows the dates and pertinent data on vortex occurrences.

TABLE 11
VORTEX OCCURRENCES

<u>Event</u>	<u>Maximum Pool Elevation</u>	<u>% Full</u>	<u>Discharge</u>
March 1953	375.7	76	19,000
Oct. 1959	355.7	44	16,000
April 1969	349.7	35	18,000
July 1973	369.5	66	14,000

WATER QUALITY

The water quality of the main stream of the Pemigewasset River is presently Class B. Many of the tributaries upstream of Franklin Falls Dam are presently classified as Class A waters, therefore, potentially acceptable for public water supply use after disinfection. There are two very small tributaries upstream from the dam which are classified as Class C waters; these are acceptable for recreational boating, fishing and industrial water supply.

There has been a significant improvement in the water quality of the Pemigewasset River in the past few years as a result of the closing of two paper industries and the construction of 5 municipal wastewater treatment facilities. One paper mill in Lincoln, New Hampshire reopened early in December 1975. It will produce 30,000 to 40,000 tons of newsprint processed from old newspapers. There will be no discharge into the Pemigewasset River, because the plant has a closed wastewater processing system.

Currently there are 7 municipal secondary waste treatment facilities which discharge approximately 0.7 million gallons per day of treated effluent to the river above Franklin Falls Dam. There is also one municipal primary waste treatment plant discharging approximately 0.38 million gallons per day. In addition, there are 2 fish hatcheries which discharge approximately 2.73 million gallons per day and one industrial secondary waste treatment facility discharging approximately 0.4 million gallons of water per day.

The operation of Franklin Falls Dam has had little effect on the water quality of the Pemigewasset River during non-regulatory periods. A slight increase of a few degrees Fahrenheit in water temperature is evident at the outflow. This phenomenon is attributed to solar heating of the impoundment behind Eastman Dam. The maximum surface temperature measured in the discharge water was 76°F in August 1972. Between 1971 and 1974, the average saturation values for dissolved oxygen at two inflow stations were 93 and 95 percent while the average discharge value for the 4 year period was 93 percent saturated.

On three separate sampling dates in the summer of 1971, small amounts of mercury ranging from 0.2 to 0.4 ug/l were detected in the outflow samples. The mercurio-organic compounds which are used extensively to control slimes in paper mill operations are believed to be a contributing cause of the mercury detected in those samples. In 1974, mercury was again detected at a concentration of less than 0.1 ug/l.

Erosion, associated with rapid runoff and flooding, has caused temporary increased sediment loads in the Pemigewasset River. The problem of erosion is discussed in the section entitled "Flooding" under "Problems and Needs" on page 39.

OPERATIONS AND FLOOD REGULATION

Reservoir regulation functions of the New England Division are performed by the Reservoir Control Center (RCC), which is part of the Water Control Branch of the Engineering Division.

During normal (nonflood) periods at Franklin Falls, the eight gates are maintained fully open so as to quickly develop a high rate of discharge during the early period of a flood, thereby minimizing storage build-up. For minor increases in flow, the reservoir acts as a simple retarding basin, even with the gates fully open. The normal pool elevation of 307 feet, msl, is created by Eastman Falls Dam, (Public Service Company of New Hampshire), 1.8 miles downstream. There are no difficulties in gate operation due to icing during the winter months with normal low pools.

During flood periods, Franklin Falls Dam is regulated as part of a reservoir system to provide protection to all downstream communities on the Merrimack River.

The maximum nondamaging channel capacity immediately downstream is about 18,000 cfs. Because the storage capacity of the reservoir is limited (equivalent to 2.8 inches of runoff from its 1,000 square mile watershed), it is necessary to coordinate the rate of discharge with the expected volume of flood runoff. Attempts to store the entire runoff during a flood, similar to the operation at other projects with greater storage, could result in filling the reservoir during the early or middle phases of a major flood, and lead to uncontrolled spillway discharges. Hydrologic studies of past floods and operating experience indicate it is essential to release water continuously in order to utilize the reservoir storage most expeditiously.

There is no "flood-free" season of the year; however, of the 33 significant storage operations since the project became operational in 1943, 14 of these occurred during the snowmelt season of March-April. The five highest reservoir impoundments are shown in Table 12.

TABLE 12

MAJOR IMPOUNDMENTS

<u>Year</u>	<u>Date</u>	<u>Maximum W.S. Elevation (feet, msl)</u>	<u>Storage (acre-feet)</u>	<u>% of Storage Utilized</u>
1953	March	375.7	116,800	76
1973	July	369.5	101,700	66
1959	October	355.7	70,100	44
1969	April	349.1	56,200	35
1973	December	347.9	50,800	33

During these impoundments, the project has operated in a satisfactory manner. However, during periods of regulation, when reservoir pool stages rose above 340 feet (24 percent full), whirlpool action near the intakes, accompanied by continuous gatehouse vibrations were experienced. No structural damage has been observed to result from these vibrations. A study conducted in 1973 concluded that this phenomenon was the result of high entrance velocities and accompanying low hydrostatic pressures created by a concentration of all discharges through only three or four fully open gates, instead of an even distribution of flows through a partial opening on all eight gates. As a result of this review, a revised gate operation schedule was developed in 1975, which utilizes all eight gates whenever passing substantial flows.

The Project Manager immediately notifies the Reservoir Control Center by radio or telephone if any of the following conditions occur:

- a. One inch of precipitation during any 24-hour period
- b. A rising pool reaches 315 feet, msl (outflow 7,000 cfs with all gates open)
- c. River rising to the noted stages and discharges at any one of the following control points:
 - (1) 4.4 feet (4,700 cfs) on the Pemigewasset River at Plymouth
 - (2) 4.5 feet (4,500 cfs) on the Contoocook River at Penacook
 - (3) 10.0 feet (10,350 cfs) on the Merrimack River at Franklin Junction
 - (4) 10.0 feet (18,000 cfs) on the Merrimack River at Concord

During a flood period, regulation occurs in three phases:

- a. Initial Regulation of Flows. Initially, releases are normally made up to a discharge of 18,000 cfs, depending on downstream runoff conditions.
- b. Continuation of Regulation. Depending on storm rainfall, snowpack, weather forecasts, and upstream and downstream conditions, outflows are either decreased to reduce downstream flooding, or increased to try to avoid spillway discharge (such as would occur during a repeat of the 1936 flood).
- c. Emptying the Reservoir. Following the recession of the flood at downstream control points, the reservoir is emptied as quickly as possible without exceeding downstream channel capacities. The above regulating procedures have proven satisfactory since completion of the project, and no major changes are presently contemplated.

FOUNDATIONS AND MATERIALS

Embankment Stability. A review of the original embankment stability investigations indicated that they were done essentially in accordance with current practice and that the stability of the dam embankment against shear failure satisfies current criteria. It is noted that in over 32 years of operation, the dam embankment has performed satisfactorily in this respect.

Seepage Control. The original designs for seepage control features for Franklin Falls Dam were developed to criteria differing little from current standards. A review of these designs indicated that they satisfy current seepage control criteria. This conclusion is supported by piezometric observations conducted by this office during flood control operations,

STRUCTURAL ANALYSIS

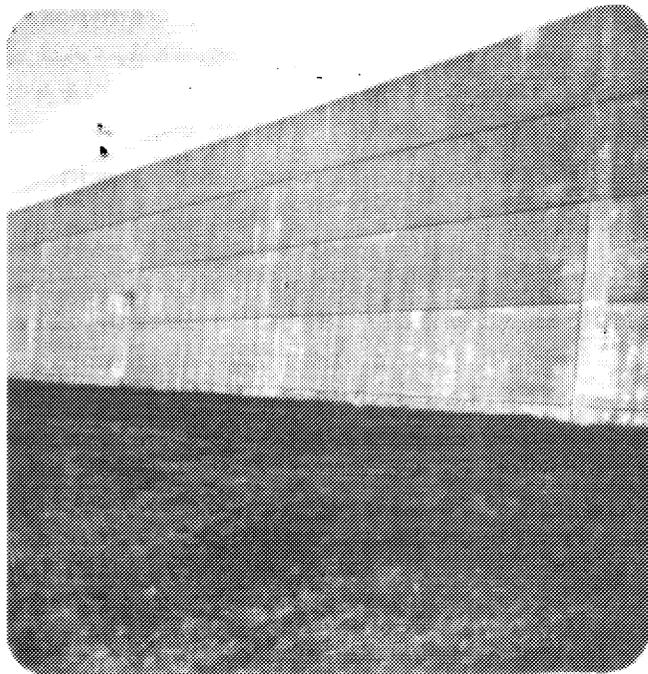
A detailed structural analysis of the concrete structures at the Franklin Falls Dam was made in July 1974. The analysis includes: the intake tower, service bridge pier and abutment; spillway weir; spillway retaining walls; outlet approach channel walls; and stilling basin head and retaining wall. All structures were analyzed under present Corps design criteria and recent earthquake loading changes, by the engineering consultant, Fay, Spofford & Thorndike, Boston, Massachusetts, under contract to and supervision by the Corps of Engineers.

The intake tower is stable under all of the specified loading cases and no modification or strengthening is required. The service bridge pier and abutment is also stable and no strengthening is necessary.

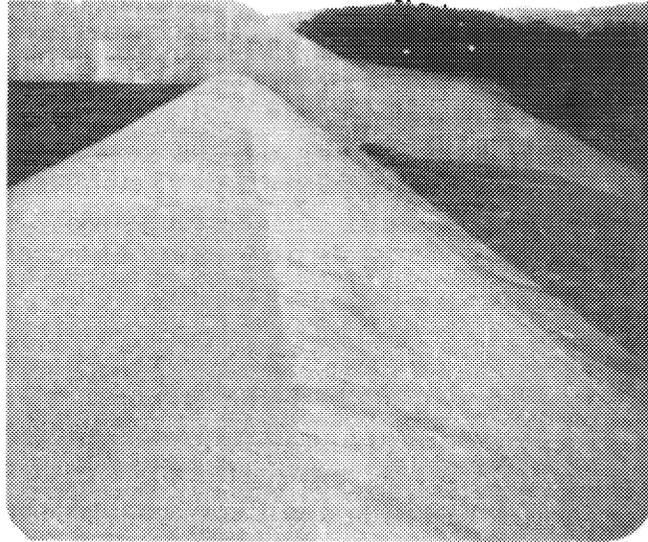
The spillway weir and spillway walls are stable under full pool (spillway crest) conditions, however, they do not satisfy the stability criteria for Flood Discharge (reservoir at peak level of probable maximum flood). In both structures, the resultant falls outside the base and the monoliths may not be stable in case of a maximum design flood, should the rock develop a cracked seam at the base of existing anchors. These structures will require strengthening with additional tie rod anchors.



Reservoir Outlet- Approach Channel Wall, Looking Upstream of Intake Tower and Gate Structure.



Spillway Wall- Concrete Gravity Structure on Easterly Side of Spillway Approach Channel, Maximum Height 58 feet.



Spillway and Spillway Wall- Looking Northeasterly.
Ogee Weir Type Spillway is 546 feet in Length.



Toe of Spillway- Spalling and Efflorescence
Occurring Mid-way Along Toe of Weir.

The outlet approach channel walls are unstable under Loading Cases II and III, sudden drawdown in channel with saturated backfill, full height; and sudden floodwater increase in channel and low water level in backfill, respectively. A system of tie rods anchored to concrete deadmen will be required. The stilling basin headwall did not meet the stability requirements of Case IA, earthquake loading. The resultant fell outside of the kern in all sections analyzed, but safely within the width of the base. The stilling basin side and center retaining walls did not meet the updated criteria and should be provided with an anchor system.

The case loadings used to analyze the structures are considered to occur under rare events and there is no immediate danger of the structures collapsing. However, estimates have been initiated to determine the cost and scheduling and the proposed remedial measures will be given further consideration under the Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures as directed by ER 1110-2-100, which directs that Civil Works Structures whose failure or partial failure would endanger the lives of the public or cause substantial property damage will be continuously evaluated to insure their structural safety and stability, and operational adequacy. Such evaluations will be conducted to detect conditions of significant structural distress or operational inadequacy and to provide a basis for timely initiation of restorative and remedial measures.

EFFECT OF FLOODS ON VEGETATION

A cooperative study by the U.S. Army Engineer Division, New England, and the U.S. Army Cold Regions Research and Engineering Laboratory was initiated in September 1973 to determine the extent of vegetation damage in the New England Division reservoir system caused by storage of floodwater in late June and early July of 1973. Several factors related to the flood were investigated: the areal extent of inundation, degree of siltation, bank slumping effects on the vegetation and the susceptibility of various tree species to inundation. Complete results appear in the report entitled "Inundation Damage to Vegetation at Selected New England Flood Control Reservoirs", Special Report 220, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, March 1975. Pertinent results of the study are discussed on page 36 and in the section on Problems and Needs, on page 39.

ENVIRONMENTAL EVALUATION

An environmental assessment of the Franklin Falls Dam and Reservoir was conducted in September 1973 to determine the environmental impact of the routine operation and maintenance on the overall project area.

Operation of the flood gates at the dam to prevent or reduce downstream flooding; maintenance and management of the project, including recreation facilities during non-flood periods; enhancement of fish and wildlife resources; and protection of the environment within and around the reservoir area was given careful consideration. The reservoir is operated whenever it is expected that flood stages will be exceeded downstream on the Merrimack River.

An estimated \$2,800,000 in damages to downstream communities were prevented within the Merrimack River Basin when waters were impounded for about two weeks in July 1973. At that time the reservoir was at approximately 65 percent of total capacity with the water level only twenty feet below spillway crest. It is estimated that \$20,162,000 in damages to downstream communities has been prevented through 1 January 1975.

Data collected by the New Hampshire Water Supply and Pollution Control Commission between 1951 and 1972 at three stations upstream and one station at Franklin Falls Dam show that the river was formerly grossly polluted from both municipal and industrial wastes. Installation of secondary treatment facilities in New Hampton (1965), Lincoln (1968), Ashland and Plymouth (1969), and Woodstock and Bristol (1970) have contributed to the improvement in water quality. The former Franconia Manufacturing Company in Lincoln, formerly a major source of industrial pollution, has been in intermittent operation for the last few years. It was recently purchased by the New England Pulp and Paper Company, Incorporated. No waste water discharge permit will be issued because the plant will have a closed cycle discharge system and will not discharge effluent into the Pemigewasset River. Cessation of river discharges and subsequent cleansing of the river through natural flushing have been significant factors in recent water quality improvement.

Trees in the flood pool area are periodically inundated. Review of the records indicates that flood pools have been sustained primarily in April and May for average periods of 10-14 days. Some flooding has occurred during March with high water lasting for about 5 days. Flooding has also occurred during the late summer, fall and winter months, with high water held for an average of 2-3 days.

There is an ever-present possibility of mortality to trees, shrubs, and other vegetation if flooding and backup of water occur after the growing season begins such as in 1973. Most trees suffer no adverse effects from flooding during the dormant season. However, once actively growing, many species may be readily killed or damaged if flooded for long. Trees which are entirely inundated are often killed and thus seedlings and younger trees are more apt to be damaged than mature trees. Trees weakened and injured from flood damage are more prone to attack by pathogenic organisms and insects and may succumb at a later date. Most hardwood species will not survive floodings beyond two to three weeks during the growing season. In general, conifers are more adversely affected by flooding than deciduous trees.

The weed and brush control program utilizes various kinds of herbicides as needed to prevent growth on the dam and spillway

approach channel. While it would be difficult to assess the total environmental effects of the plant control program, it is probable that adverse effects, if any, are minimal.

Periodic flooding may cause some mortality to certain fur-bearing species and upland birds and mammals, especially if it occurs during the breeding season. It is not possible to determine the specific effects of flooding on population dynamics of local species without an intensive study. However, due to the relatively low storage capacity of this project, it is felt that long-term effects on populations in the area at large are minor.

Management of the project resources on a multiple-use basis will provide the greatest benefits for wildlife, aesthetics, and recreation, as well as the timber stand itself. Agricultural leases provide a means of benefiting the local economy and at the same time help to preserve the open areas within the project which are also important for wildlife, recreation, and aesthetics. Hunting and fishing opportunities not only provide recreational benefits, but are also necessary to help maintain populations within the limits of habitat carrying capacity. Approximately 841 acres of land are available for lease for pasture and hay production. Pasture areas are fenced to prevent escape of livestock and to reduce pollution of tributary streams and the main river from animal feces. Most pasture and hayfields are in good condition. The agriculture lease holder is responsible for maintaining the open areas and fields which would otherwise undergo natural succession to brush and forest cover. It was observed that brush and trees are encroaching in some areas because the sites are not under an active lease. It is desirable from the standpoint of aesthetics, recreation and wildlife management to perpetuate these open areas. The New Hampshire Fish and Game Department is considering cutting brush and mowing as techniques for retarding natural plant succession should the leasing program prove inadequate.

There is an active pheasant stocking program at this project. The "put and take" pheasant program is supported by the sale of pheasant stamps, which determines the number of pheasants to be stocked. There is also an active brook and rainbow trout stocking program. Approximately 10,000 yearlings are stocked annually in the Prescott Brook and Smith River.

The forestry program has been in operation for 12 years. Yearly activities include timber sales, road construction, timber stand improvement (TSI) work, bank stabilization, and related improvement programs. The road system in the project area has been extended as a result of timber harvesting activities. This system is beneficial not only to forest management, but to fire protection and recreational activities as well.

Money derived from stumpage sales has been used to finance trash removal, boundary marking, road building and maintenance, blister rust control and timber stand improvement such as thinning, pruning, weeding, etc. All timber harvesting with the exception of the bank stabilization operations has been on a selective basis with the result that after a few years, it is difficult for the public to identify areas which have been previously harvested. Cutting has opened up the forest lands and has provided additional food, cover, and habitat diversity for game and non-game birds and mammals. Thinning, pruning, and weeding have increased the aesthetic and recreational characteristics of the area as well as benefiting the timber stand itself.

Logging operations have been carried out on approximately 250 acres of badly slumped river embankments. All of the larger trees were removed which had the effect of reducing soil movement (through weight elimination) as well as encouraging the growth of grasses and brush which helped stabilize the bank areas.

The majority of the recreational usage at this project is from local area residents. Litter and vandalism are the most important problems associated with recreation but cannot be identified with a particular activity.

Annual attendance at Franklin Falls Dam remained fairly stable from 1964 through 1966. A slight increase was noted in 1967 but numbers were comparable in 1968. There was a substantial increase in attendance in 1969, 1971, and 1972. Recreational activities in the project area include fishing, hunting, sightseeing, boating, picnicking, cross-country skiing and snowmobiling. Motorcyclists use the project but ride primarily on the roads.

Problems and Needs

The problems and needs of the Franklin Falls Dam and reservoir that are discussed in this report are primarily concerned with flooding and related water resources uses and needs in the recreational area.

FLOODING

Flood flows on the Pemigewasset River result from either snow-melt accompanied by rain, or from heavy rainfall alone. The greatest floods of record (from 1903 to date) at the USGS gage on the Pemigewasset River at Plymouth are recorded in the "Hydrology" section of this report.

A flood loss and benefit analysis was performed in connection with the preparation of the Water Resources Investigation, Merrimack River Basin, U.S. Army Corps of Engineers, August 1972 - Main Report and Appendices. An estimated \$20,162,000 in flood damages to downstream properties have been prevented through January 1975. The losses represented by this amount include urban (residential, commercial and public), industrial, highway, railroad, utility, and rural. These losses include (1) physical losses, such as damage to structures, machinery and stock, and the cost of clean-up and repairs, and (2) non-physical losses such as unrecoverable loss of business and wages, cost of temporary facilities and increased cost of operation. The estimate does not take into account intangible losses such as possible loss of life, hazards to health, and possible detrimental effects on the national security.

Despite the operation of the existing projects in the Merrimack River Basin (i. e., Franklin Falls Dam, Blackwater Dam, Hopkinton-Everett Lakes, Edward MacDowell Dam) there remains a continuing

and increasing threat of damage from flooding in many areas of the basin. According to the Water Resources Investigation cited above, the natural recurring loss under 1971 conditions amounts to \$188.0 million on the main stem of the Merrimack, \$1.6 million on the Pemigewasset and \$7.8 million on the portion of the Shawsheen River subject to backwater from the Merrimack. The recurring losses are reduced to \$51.6 million with the existing reservoir and local protection projects. Geographically about 88 percent of these estimated recurring losses would occur in Massachusetts, and about 12 percent in New Hampshire. The distribution of these estimated losses are shown in Table 13.

TABLE 13
RECURRING LOSSES - 1936 FLOOD STAGES
 (Based on 1971 Economic Conditions)

<u>Location</u>	<u>Natural</u>	<u>Modified by Existing System</u>
Haverhill	\$21,132,000	\$ 3,658,000
Lawrence	74,167,000	31,905,000
Lowell	36,141,000	9,734,000
Nashua	31,871,000	4,333,000
Manchester	24,021,000	283,000
Concord	7,222,000	126,000
Franklin	1,319,000	3,000
Bristol	314,000	314,000
Plymouth	1,269,000	1,269,000
TOTAL	<u>\$197,456,000</u>	<u>\$51,625,000</u>

Prevented by Existing System: \$145,831,000

During the flood of June-July 1973, flood waters were held in the Franklin Falls reservoir for about two weeks and at the height of the flooding the reservoir was at approximately 65 percent of total capacity and damages prevented were about \$2,800,000.

The principal contributor to Merrimack River flooding is the Pemigewasset River. Franklin Falls Dam provides a limited amount

of storage, only 2.8 inches of runoff, from the 1,000 square mile drainage area, therefore, the regulation procedures during flood periods provides for continual discharges. The possibility of raising the dam has been considered, however, additional storage at this site would adversely affect upstream developments, such as the Ayers Island hydroelectric plant and other costly real estate.

Most trees suffer no adverse effects from flooding during the dormant season. However, once actively growing, many species may be readily killed or damaged if flooded for long. Only once has there been apparent tree or vegetation damage of a significant degree. This occurred during the July 1973 flooding. Using color infrared photography and ground survey information the U.S. Army Cold Regions Research and Engineering Laboratory delineated the pattern of tree kill in the Franklin Falls reservoir area. The combination of inundation during the growing season plus sediment deposition on the plants caused damage or mortality to certain species. Smaller (less than 5 inches in diameter) and younger trees were more affected by inundation than larger, mature trees. However, all trees that were inundated for more than 90 hours were affected to some degree. Slumping occurred primarily in a highly erodible glaciofluvial terrace at five sites on the northeast side of the Pemigewasset River. While damage was confined to narrow bands on either side of the river, it extended nearly the entire length of the reservoir. Substantial bank erosion has occurred in previous years (primarily 1953) as a result of major flood control operations. Slumping during the 1973 flood involved many of the same spots where the earlier slumping had occurred, even though vegetation had largely become re-established in the slide areas over the twenty year interval. It is possible, however, that back-up of flood waters in the future may cause additional soil movement on some of the unstable embankment areas such as occurred in July 1973.

Erosion, associated with rapid runoff and flooding, has caused temporary increased sediment loads in the Pemigewasset River. Periodic suspended sediment data collected on 59 dates from May 1967 to September 1973 in Plymouth, New Hampshire, about 30 river miles upstream of the project, indicate that the sediment yield rate for the river is 160 tons per square mile per year. This represents a volume of approximately 70 acre-feet per year.

The quantity of suspended sediment actually deposited in the reservoir area during flood control operations is undetermined. There appears to be no significant long-term sediment accumulation during the detention time in the reservoir. However, any accumulation of organic sediments in the flood control pool area is expected to cause a short-term oxygen demand on the stream.

Another aspect of the problem is a need for control of flood waters that has developed in the years since the inception of the comprehensive plan. (The report dated 18 May 1938 and printed as House Document No. 689, 75th Congress, 3rd session, presented a comprehensive plan for flood control in the basin.) New developments and sometimes reuse of facilities within the flood plain, once abandoned after flooding, have added to the number of flood-prone structures. Development in areas of the basin has replaced open spaces with hard surfaces, such as parking areas and rooftops, resulting in changed runoff patterns. Such changes raise the level of flood stages at downstream damage centers thereby increasing the flood threat to already flood-prone structures and making additional areas flood-prone. Modifying the existing structures for additional storage would raise the full pool elevation to a level that would result in inundation of upstream developments such as Ayers Island Hydroelectric Power Station and the Town of Hill.

RECREATION

At the present time the developed recreational facilities at Franklin Falls Dam are minimal. The Fish & Wildlife Service and the New Hampshire Fish & Game Department state that the best use of the project lies in maintaining its semi-primitive nature and that public use of the area for camping and picnicking should be managed for maximum mutual compatibility with hunting and fishing. The New Hampshire Department of Resources and Economic Development feels that current management of the project for a variety of recreational uses including canoeing, trail biking, picnicking, jogging, hiking, fishing, swimming, horseback riding, hunting, and snowmobiling is compatible with today's needs. They see no need for intensive permanent recreational developments. Currently, neither the Corps of Engineers nor the State of New Hampshire has plans for development of major recreational facilities.

OTHER

Adequate quantity and quality of water is a concern in the Merrimack Basin. Low flow augmentation can be useful in improving the downstream water temperature and dissolved oxygen levels thus increasing the ability of the stream to support year-round fish life, in addition to increasing the outputs of downstream hydroelectric facilities. Franklin Falls Dam and Reservoir, however, does not contribute to low flow augmentation. Except for a small pool, the reservoir is kept nearly empty most of the time to permit it to have maximum storage available to hold back flood waters. It cannot be counted on, therefore, for low flow augmentation purposes.

Views Of Other Interests

FEDERAL

Statements by those interests expressing views or recommendations are contained in Appendix A and summarized as follows:

- The Soil Conservation Service states that any additional water storage in the form of a permanent pool, would to some extent, adversely affect the recreational potential of the area. During periods when the dam is not impounding flood storage, the old road is functional and the area is generally utilized. The primary use is for land based recreation. In addition, it appears that some of the bottom land is still useful for agricultural purposes.

- There was no direct interest in the project on the part of the National Park Service, or the Department of Housing and Urban Development. The Bureau of Outdoor Recreation was unwilling to provide review and comments unless a significant impact on outdoor recreation was contemplated.

- The Environmental Protection Agency stated that maintenance of adequate streamflow on the Merrimack River is essential, if full

public benefits are to be secured from water pollution control facilities, however, since the regulation of the river is shared by a number of public and private agencies, the problem of streamflow maintenance is complex. They made no specific recommendations concerning modifications of the Franklin Falls Dam.

- The Fish and Wildlife Service is primarily concerned with improving the fishery resource. They recommend improving boat access, continuing coordination with the State of New Hampshire's Fish and Game Department, prohibition of water skiing and speed-boating, and improving management with regard to the game and aquatic animal environment. Their goal is to maintain the semi-primitive nature of the project area.

NON-FEDERAL

The most commonly held view among the non-Federal agencies was that the project remain in its current state as a single purpose flood control reservoir and that no enlarged permanent pool be maintained behind the dam.

- The New Hampshire Office of Comprehensive Planning states, in the Merrimack Guide Plan, that water should not be impounded behind the Franklin Falls Dam for the purpose of water supply development, reservoir recreational development, hydroelectric power or low flow augmentation. The Merrimack and Pemigewasset Rivers are being restored as anadromous fishways. Maintaining a pool behind the Franklin Falls Dam other than temporarily during flood stage would block the passage of anadromous salmon. Due to the dam height (140 ft.), construction of a fish ladder is thought to be impractical. The Guide Plan endorses the present operation of the Franklin Falls Dam of leaving the control gates open all the time except during flood stage. Furthermore, this agency endorses the idea of non-structural flood damage for towns in the flood plains downstream of the dam.

- The New Hampshire Water Supply and Pollution Control Commission is currently in the process of restoring the quality of the waters in the Merrimack River Basin. This work follows the goals set forth in Public Law 92-500, the Federal Water Pollution Control

Act Amendments of 1972. The steps being taken include controlling wastes at their source in order to improve water quality in the Pemigewasset and Merrimack Rivers.

- The New Hampshire Department of Resources and Economic Development feels that current management and use of the forest and land resources are compatible with today's needs. Intensive permanent recreational development is not needed at this time. Extensive rather than intensive recreational use is preferred.

- The New Hampshire Water Resources Board states that no further use of the impoundment should be made which would in any way diminish the storage capacity of the pond. Land recreational development is of no concern.

- The New Hampshire Fish and Game Department is very much opposed to any modification of the existing project and wishes it to remain unchanged.

- The New Hampshire Department of Resources and Economic Development, Division of Parks, stated that they have no current plans to become involved in recreational development or management at Franklin Falls. Due to limits in funding they feel compelled to place priorities elsewhere. (Reference: Letter dated 2 January 1974 from New Hampshire Department of Resources and Economic Development to Engineering Division, New England Division).

- The city of Franklin expressed a desire to increase flood protection and feels that the existing storage capacity of the project is needed for flood control purposes. The city of Franklin and the towns of Hill and Bristol would endorse future expansion of recreational facilities.

Summary

The Franklin Falls Dam and Reservoir is a single purpose flood control project located on the Pemigewasset River in the Merrimack River Basin. The dam is of rolled earthfill with a dumped rock shell 140 feet high and 1,740 feet long. It is located about 2.5 miles upstream of the city of Franklin.

The cost of the project was \$7,950,000 and became operational in 1943. The reservoir is operated as a part of a flood control system in the Merrimack River Basin, in conjunction with the Hopkinton-Everett Lakes, Edward Mac Dowell Lake and the Blackwater Dam.

The water resources within the project area support fisheries, wildlife habitat, and related small scale recreational uses.

There have been 33 significant flood storage operations since the project became operational. Nearly half occurred during the months of March and April. The largest, in terms of storage, occurred over 22 years ago in March 1953, when the reservoir was 76 percent full.

Investigations were made in the areas of: real estate; hydrology; water quality; operations and flood regulations; foundations and materials; structural analysis; effects of floods on vegetation; environmental evaluation; and recreation and wildlife needs.

Structural stability studies indicate that corrective action is required in order to bring several of the dam structures into conformity with up-to-date design criteria.

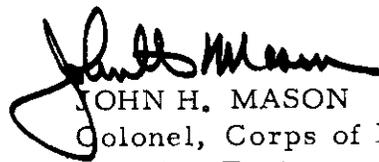
Conclusions

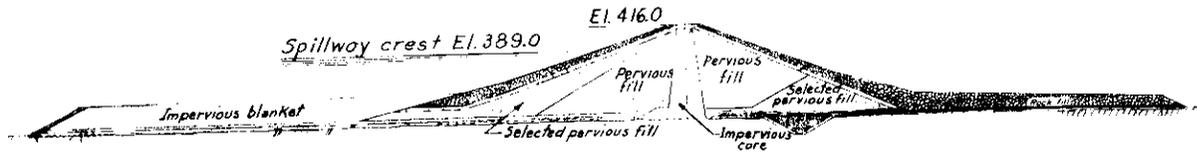
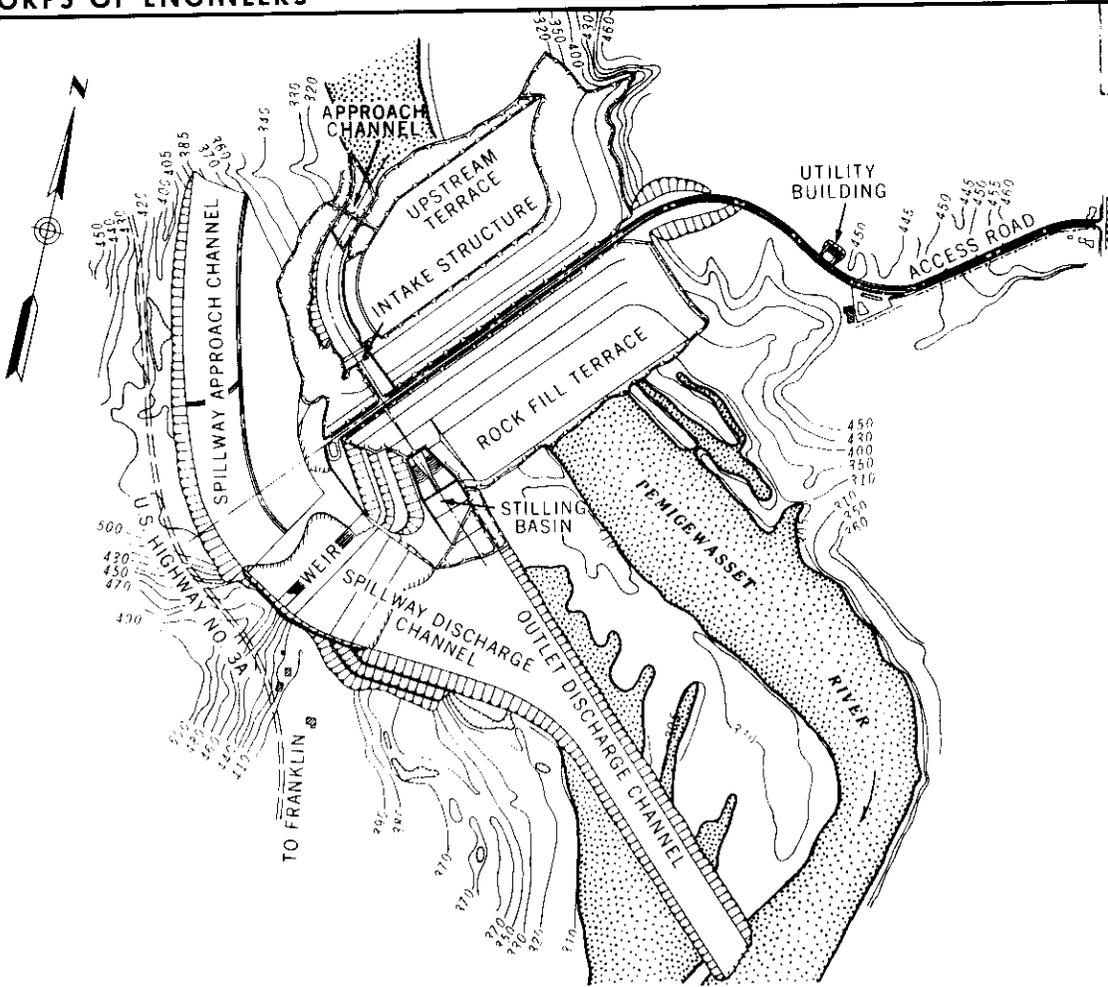
The Division Engineer finds that:

- Structural modifications are required on the spillway weir, spillway wall, stilling basin side and center walls, and outlet approach channel wall, to comply with up-dated design criteria.
- The present operations and flood regulations of the project are satisfactory.
- There is no justification at this time to expand the purposes served by the Franklin Falls Dam beyond the primary flood control purpose in accordance with its original design.
- There is no need for acquiring additional land or relinquishing any of the present real estate holdings.
- There is no justification for providing additional recreational uses or facilities.

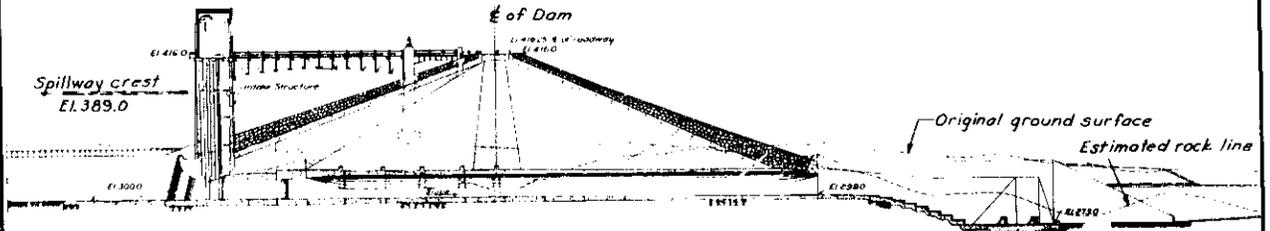
Recommendations

The Division Engineer recommends that no reformulation of the operation of the completed project be made at this time.


JOHN H. MASON
Colonel, Corps of Engineers
Division Engineer



TYPICAL DAM SECTION



SECTION THRU OUTLET WORKS

MERRIMACK RIVER FLOOD CONTROL
FRANKLIN FALLS DAM
 GENERAL PLAN AND SECTIONS
 PEMIGEWASSET RIVER NEW HAMPSHIRE
 30 JUNE 1974
 NOT TO SCALE
 NEW ENGLAND DIVISION WALTHAM, MASS.

APPENDIX A
PERTINENT CORRESPONDENCE

LETTERS OF COMMENT

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STATE OF NEW HAMPSHIRE
FISH AND GAME DEPARTMENT
34 BRIDGE STREET
CONCORD, N.H. 03301

BERNARD W. CORSON
DIRECTOR

December 17, 1973

Meyer S. Slotkin
Acting Chief, Engineering Division
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

re NEDED-R

Dear Mr. Slotkin:

This is in reference to your letter of December 12 in which you ask for comments concerning the present status of the Franklin Falls Flood Control Project.

As we have indicated at several meetings this past year - one on April 11 and another on June 15 - we strongly feel that the Franklin Falls area will realize its greatest potential if left as it is now. Not only will it serve its true function of acting as a flood control structure by remaining as a so-called dry dam, but also the area currently under federal control above the dam will continue to be most useful to sportsmen of the state if it is not inundated by an impoundment. As field and woodland, it can be stocked with pheasants to be hunted. It can be farmed, thus providing open fields for wildlife. The wooded edges provide sportsmen attractive grouse covers to hunt.

The New Hampshire Fish and Game Department is involved in a cooperative project with the state of Massachusetts, U.S. Fish and Wildlife Service and the National Marine Fisheries Service to restore Atlantic salmon and American shad to the Merrimack Watershed. The only substantial amount of high quality salmon spawning and nursery habitat in this watershed exists in the Pemigewasset River upstream of the Franklin Falls impoundment. Since the retention of water behind this dam for recreational or other uses would render this restoration attempt virtually impossible, this department would strongly recommend that the project remain in its current state as a single-purpose flood control reservoir.

Sincerely,


Bernard W. Corson
Director

BWC/eem

A-1



STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
JOHN O. MORTON BUILDING CONCORD, N.H. 03301

ROBERT H. WHITAKER
COMMISSIONER

December 21, 1973

Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Attention: Meyer S. Slotkin
Acting Chief, Engineering Division

Dear Mr. Slotkin:

This will acknowledge your letter of December 12, 1973, soliciting comments in specific regards to the Department's interests in the current water resources needs and/or improvements to the environment due to changed conditions within the limits of the Franklin Falls Project at Franklin, New Hampshire.

A staff review of your request has been conducted with no Department needs developed in the specific areas delineated in your letter.

Very truly yours,

A handwritten signature in dark ink, appearing to read "R. H. Whitaker". Below the signature, the name "R. H. WHITAKER" is printed in a smaller, spaced-out font.

R. H. WHITAKER

RHW:ja

ENVIRONMENTAL PROTECTION AGENCY

141 Milk Street
Boston, Massachusetts 02109

December 26, 1973

Mr. Meyer S. Slotkin
Acting Chief, Engineering Division
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Slotkin:

Thank you for your letter of December 12, concerning possible modifications to the Franklin Falls Dam.

Maintenance of adequate streamflow on the Merrimack River is essential if full public benefits are to be secured from the multi-million dollar investment in water pollution control facilities. Since the regulation of the river is shared by a number of public and private agencies, the problem of streamflow maintenance is particularly complex.

We have initiated efforts in cooperation with the States to establish a strategy for securing a minimum environmental baseflow. The Corps of Engineers' dams in the Basin obviously are an important element of a flow maintenance program. However, at the present time we are not in a position to make specific recommendations concerning modifications of the Franklin Falls Dam. Within the next few months we believe the legal framework for streamflow maintenance may be clarified and the role of public and private storage may be better defined.

We will keep you informed of our cooperative efforts with the States so that appropriate options can be considered by your agency.

FOR THE REGIONAL ADMINISTRATOR:

Sincerely yours,



Walter M. Newman, Chief
Water Quality Branch



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
MANCHESTER AREA OFFICE
DAVISON BUILDING, 1230 ELM STREET
MANCHESTER, NEW HAMPSHIRE 03101

REGION I
Room 800
John F. Kennedy Federal Building
Boston, Massachusetts 02203

JAN 2 1974

IN REPLY REFER TO:
1.3PMC (Sieminski)

RE: NEDED-R

Mr. Meyer S. Slotkin
Acting Chief, Engineering Division
Department of the Army
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Slotkin:

We have received your communication of December 12, 1973, related to the Franklin Falls project at Franklin, New Hampshire.

Please be advised that HUD has no direct interest in the project. It is not related to any current or proposed HUD-financed community development or housing projects or programs. However, any revisions to the current design of this project may have impact on both the Lakes Region Planning Commission and New Hampshire Water Supply and Pollution Control Commission, the agencies responsible for comprehensive water resource planning in this area.

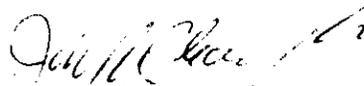
We do however wish to indicate that the water needs of the Merrimack Valley are currently increasing markedly, and all estimates indicate that demand will continue to increase in the future. As the basin shifts from rural and suburban to urban, water as a resource will grow in importance and will remain the prime dependent variable upon which development can be sustained. Flood control, public outdoor recreation, water supply, fish and wildlife habitat, and low flow augmentation are all related prerequisites to sustaining urban development, which appears to be the trend in the Merrimack River Valley.

Our review of several long range plans for key cities in the Southern New Hampshire portion of the Merrimack Valley indicates that by 1990 the River will be the prime source of domestic and industrial water supply as well as a major conduit for effectively treated waste water.

In order to provide your agency with other comments related to Franklin Falls, we have made a copy of your communication available to the Lakes Region Planning Commission, the areawide planning agency for that jurisdiction. That agency will respond to you directly on the project.

Should you have any questions or require more specific information, please do not hesitate to contact Arthur V. Tonini, Assistant Director for Planning and Relocation, at (603) 669-7641/2.

Sincerely,



Joseph P. Garaffa
Director of Operations



STATE OF NEW HAMPSHIRE
DEPARTMENT of RESOURCES and ECONOMIC DEVELOPMENT
DIVISION OF PARKS

STATE HOUSE ANNEX . . . CONCORD, NEW HAMPSHIRE
TELEPHONE

Director of Parks 603-271-3254
Parks Operations 603-271-3556

January 2, 1974

Mr. Meyer S. Slotkin
Acting Chief, Engineering Division
New England Division, Corps of Engineers
Department of the Army
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Slotkin:

I am responding to your letter of December 12, 1973. I have sent a copy of your letter to Mr. Theodore Natti, Director of Division of Resources, whose agency is more directly involved with the Franklin Falls Reservoir than with the Division of Parks.

The Division of Parks has no current plans to become involved in recreational development or management at Franklin Falls. It is unlikely that this will change for many years in light of anticipated levels of funding and what we feel are of higher priority elsewhere, one of which is the Hopkinton-Everett Reservoir.

Sincerely,

A handwritten signature in cursive script that reads "George T. Hamilton".

George T. Hamilton
Director of Parks

GTH/ek

cc: Commissioner Gilman
Theodore Natti

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Federal Building, Durham, New Hampshire 03824

January 11, 1974

Mr. Meyer S. Slotkin
Acting Chief, Engineering Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

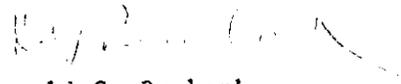
Dear Mr. Slotkin:

We have received your letter of December 12, 1973, which gives consideration to modifying Franklin Falls Dam to accommodate additional storage for other purposes. It is difficult at this point to determine the magnitude, scope, and type of additional storage that might be considered. However, we would offer the following comments.

Any additional water storage, in the form of a permanent pool, would to some extent, adversely effect the recreational usage made of the area at the present time. During periods when the dam is not impounding flood storage the old road is functional and the area in general is utilized, primarily for land based recreational purposes. In addition we believe some of the bottom land is still utilized for agricultural purposes.

At such time as more detailed information becomes available as to our plans for the area we would be glad to give further review to this proposal.

Sincerely,


Donald G. Burbank
State Conservationist





United States Department of the Interior

BUREAU OF OUTDOOR RECREATION

NORTHEAST REGIONAL OFFICE

Federal Building - Room 9310

600 ARCH STREET

Philadelphia, Pennsylvania 19106

IN REPLY REFER TO:

JAN 15 1974

John Wm Leslie
Chief, Engineering Division
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Leslie:

We have received your notifications concerning review of the operations of the Franklin Falls project, dated December 12, 1973 and of the Edward MacDowell project, dated January 4, 1974.

We note that these reviews are both conducted under the authority of the 1970 Flood Control Action, Section 216. Also, both projects are within the Merrimack Basin and that there are three other Corps reservoir projects within that Basin, namely: the Blackwater, the Hopkinton, and the Everett projects.

Both the New Hampshire Statewide Comprehensive Outdoor Recreation Plan (SCORP) and the Corps' "Environmental Assessment" Report for the Franklin Falls Dam (September, 1973) cite planned launching ramps for fishermen at Franklin Falls. The SCORP also cites various limited plans for Surrey Mountain, Blackwater, and Hopkinton-Everett within a five year period.

However, the "Environmental Assessment" Report for Franklin Falls raises the point that some people "... feel that developed day-use and camping areas would best serve the public interest." Further, the "Main Report" Merrimack River Basin, August 1972, leads with an observation of "enormous potential for recreational development" and "tremendous demand for recreational opportunities."

The coincidental announcement of reviews of the Franklin Falls and MacDowell projects coupled with the observations made in these recent reports prompts great interest. However, our current staffing and funding limitations

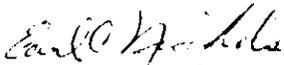


A-8

Let's Clean Up America For Our 200th Birthday

constrain us only to providing review and comments on projects which involve significant impacts on outdoor recreation. To further assess the significance of these proposals, we would be grateful to know if you plan a similar review of either or both of the remaining Merrimack projects or of other nearby reservoirs within your District during FY 1974 or FY 1975. If so, do you plan any specific recreation developments beyond those noted in chapter IV of the current New Hampshire SCORP?

Sincerely yours,


Earl C. Nichols
Assistant Regional Director

NEDED-R

1 February 1974

**Mr. Earl C. Nichols
Asst. Regional Director
U. S. Dept. of the Interior
Bureau of Outdoor Recreation
Northeast Regional Office
Federal Building - Room 9310
600 Arch Street
Philadelphia, Penn. 19106**

Dear Mr. Nichols:

In your letter of 15 January 1974, commenting on the Franklin Falls and Edward MacDowell projects, you requested additional information on recreational development planned for the Corps of Engineer' projects in New Hampshire.

The recreational development as noted in Chapter IV of the New Hampshire Statewide Comprehensive Outdoor Recreation Plan (SCORP) contains the short range recreation plans of Corps' projects and were developed jointly by the State of New Hampshire and the Corps of Engineers. No specific or additional recreational development beyond those noted in Chapter IV of the New Hampshire SCORP are envisioned at this time. Additional recreational facilities are planned for the Hopkinton-Everett Lakes this spring, but these facilities are included in the overall development plan for the Hopkinton-Everett Lakes as contained in the present Master Plan. The Master Plan for this project is currently being reviewed and coordinated with the State of New Hampshire and when revised may ultimately reflect some changes in future recreational development.

The recreation needs and demands presented in the Merrimack River Basin report dated August 1972 were developed by your Agency for Basin 7, the Merrimack River Basin sub-region, as part of the North Atlantic Regional Water Resources.comprehensive study.

1 February 1974

NEDED-R

Mr. Earl C. Nichols

In Appendix M, Outdoor Recreation of the NAR report, it was stated that for Basin 7, the existing and definitely proposed recreation plant will provide for only 22 percent of the anticipated 1980 recreation load.

Under the authority of Section 216 of the 1970 Flood Control Act, all of the Corps of Engineers' existing projects will be reviewed as funds are appropriated. Our present schedule includes a review of the Blackwater project during Fiscal Year 1975 if funds are made available. Hopkinton-Everett, Surry Mountain and Otter Brook are scheduled for study after Fiscal Year 1975.

Sincerely yours,

JOHN WM. LESLIE
Chief, Engineering Division

CF:

Mr. Leslie
Mr. Ignazio
Mr. Ciriello
Mr. McCarthy
Engr Div Files

¹⁰¹
PALMA

Ciriello
CIRIELLO

Ignazio
IGNAZIO

R
LESLIE

NON-FILED



OFFICE OF COMPREHENSIVE PLANNING
STATE OF NEW HAMPSHIRE
STATE HOUSE ANNEX, CONCORD 03301

TO: Irv Waitsman

SUBJECT: Corps of Engineers letter to Mr. Gregg requesting
comments on the operation of the Franklin Falls Dam (NEDED-R)

FROM: Anthony Dater A.W.D.

DATE: January 16, 1974

In response to your memo of December 18, 1973, I offer the following comments in answer to your questions, for the NERBC to forward to the Corps of Engineers.

A. Merrimack Guide Plan findings and recommendations re: the operation of the Franklin Falls Dam

1. Soils - The soils above the Franklin Falls Dam and downstream from it are suitable for agriculture. As long as there is no development on these floodplain soils, then occasional flooding of them is beneficial to their agricultural suitability.

2. Surface Water - The volume of flow of the main-stem Merrimack River above and below the dam is generally large. The 10-year mean flow for 1960-1969 was 1,554.4 mgd. The 10-year high flow was 650.5% of the mean flow, or 10,111.4 mgd. The 10-year low flow is 16.3% of the mean flow, or 253.4 mgd. The 1965 drought year mean flow was 979.2 mgd. The entire Merrimack River below the dam does not generally have low flow problems. Only 1.29% of the time between 1960 and 1969 was the Merrimack River below a standard fish habitat support flow of .25 CFS per square mile of drainage area. At Manchester and Nashua flows below the fish support level occurred 3.97% of the time between 1960 and 1969. The only low flow problem on the Merrimack River itself has been the sometimes difficulty in meeting by the Public Service Co. of the agreed-upon 50 CFS flow of the river over the Amoskeag Dam at Manchester.

3. Ground Water - The extensive sand and gravel deposits of the Merrimack River downstream from the dam, both on and above the floodplain, provide prime ground water recharge areas. There are likely a number of sites in these areas which could be developed as a ground water source for water supply. The sand and gravel deposits of the floodplain need to be protected from development because of the resultant likelihood of water quality hazards and the disruption of ground water flow, possibly magnifying stream level oscillations downstream.

4. Mineral Resources and Mining - Extensive sand and gravel extraction of the floodplain will destroy suitable agricultural bottom land and magnify river oscillations downstream, as well as reduce the amount of ground water storage of the Merrimack Valley during normal flow periods. On the other hand, excavated sand and gravel pits would allow greater storage of flood stage water on the floodplain.

5. Fish and Game - The Merrimack and Pemigewasset Rivers are being restored as anadromous fishways. Maintaining a pool behind the dam other than temporarily during flood stage would block the passage of anadromous salmon. The dam height is some 140 feet, and therefore the construction of a fish ladder is impractical.

The Guide Plan endorses the present operation of the Franklin Falls Dam of leaving the control gates open all the time except during flood stage.

Water supply development or reservoir recreation development in the Merrimack Basin, should take place on impoundments or lakes other than behind Franklin Falls Dam. Low flow augmentation of the Merrimack River below the dam should be accomplished by conjunctive ground water well-field development or tributary stream impoundments rather than from the Franklin Falls Dam. The dam should not be contemplated to be developed for hydro-electric power, as run-of-the-river, or low impoundments with fish ladders would serve that objective without destroying the anadromous fishway.

There has been no reports of dissolved oxygen sags below the Franklin Falls Dam. At the head of the Franklin Falls Dam pool at the Ayers Island hydro-electric dam there has accumulated considerable sludge, chiefly from the Lincoln paper mill. The gases from this sludge do cause a hazard to aquatic life.

6. Natural Resources Development Capability - Due to the floodplain below the dam, the New Hampshire Guide Plan recommends limited development of this floodplain consistent with agriculture, recreation, and water quality support. On the bluffs above either side of the floodplain intense and moderate development capable land exists, such that there will likely be increased demand on water from the Merrimack River in the future to serve these areas. Again ground water, or local tributary development, should be developed to augment future low flows of the Merrimack River, that might arise because of future development, rather than the Franklin Falls Dam.

7. Development Capability and Limitations - The Merrimack River Valley will remain the center of development of the Merrimack Basin in the future largely because the river provides the most reliable source of water in the basin. The Contoocook, Suncook, Piscataquam, and Souhegan Rivers all have low flow problems. In order to support water quality, the Guide Plan recommends that future regional water supply development and sewage collection development proceed in one of two ways in the Merrimack Basin: (1) Regional water supply should be taken from the Merrimack River and sewage treatment done in the tributary sub-basins and released to the tributary streams in order to augment low flow. An exception to this is the Winnepesaukee sub-basin. With properly treated wastewater, centralized wastewater distribution, and scattered treatment of wastewater, water quality of the tributary streams will be enhanced, and therefore, the main-stem Merrimack River. (2) Water-supply should be developed, either from ground sources alone or in conjunction with local surface impoundments, in local tributary watersheds and sewage treatment done in the same local tributary watersheds. This will again mitigate low-flow conditions of the tributary streams thus enhancing water quality. For local tributary watershed water supply development, the Merrimack River could be a second or third order back-up source.

The Guide Plan does not recommend any additional single-purpose flood control impoundments in the Merrimack Basin. It does recommend that multi-purpose impoundments could be studied among other alternatives for water management for the Suncook, Suncook, Piscataquam, Souhegan, and Nashua River watersheds.

B. Regional Implications of the Franklin Falls Dam

Development on the floodplain downstream from the Franklin Falls Dam may necessitate the ~~rate of~~ release of impounded water from behind the dam to be extended over a longer period of time. By causing the flood control gates to be closed for long periods of time, this could affect the anadromous fish restoration program in the basin. The results of a decreasing release rate over time could also reduce the capacity of the Franklin Falls Dam to respond to an extended period of high

flow, or to several closely spaced flood-stage events in the Merrimack Basin. To the extent that the Corps of Engineers can encourage the towns on the floodplain downstream from the Dam to implement non-structural flood damage reduction, the optimum functioning of the Franklin Falls Dam can be assured for the future. Zoning for the agricultural and recreational use of the Merrimack River floodplain should be implemented.

If water were to be diverted from the Merrimack River from somewhere between Concord and Manchester, or from the Merrimack Basin from the Soucook or Suncook watersheds, the Guide Plan recommends that it be impounded in the Coastal Basin, such as in the Isinglass Watershed. Diversion from the main-stem Merrimack River may be able to be accomplished by a river-side well-field in sand and gravel, which would induce river water to the well points. This could enhance water quality of this pumped water into the Coastal Basin. By a proper pumping regime, such a well field may also be able to augment flows of the Merrimack River during extremely low flow periods. Also, additional capacity of the Hooksett water treatment plant could possibly be developed to divert water to the Coastal Basin.

The Guide Plan recommends that water not be diverted from Lake Winnepesaukee to supply water for the Coastal Basin.

C. Interstate Implications of Franklin Falls Dam and Future Use of the Merrimack River

Under the NEWS program, the possible diversion of the Merrimack River at Lowell to the MDC of Boston could bring great changes to water resources management of the Merrimack Basin in New Hampshire. Because the New Hampshire Guide Plan agrees with other agencies, which do not recommend that the Franklin Falls Dam be used for water supply or low flow augmentation in the future, the NEWS Program is considering among other alternatives the possibility of constructing a series of water supply and low-flow augmentation impoundments in tributary watersheds in New Hampshire for the MDC Lowell diversion.

If New Hampshire is to provide to the Corps of Engineers and the MDC an agreed-upon flow of the Merrimack River to Lowell, as well as impound water to meet that flow, it seems equitable that the Corps of Engineers, the MDC, and Massachusetts, guarantee to New Hampshire that the flow of the Merrimack River in Massachusetts and the water quality be maintained to support the anadromous fish restoration program. Also, the necessary fish ladders and other structural or non-structural measures in Massachusetts, necessary to maintain the fishway for anadromous fish should be guaranteed New Hampshire in return for New Hampshire's guarantee to maintain the Merrimack's flow.

The New Hampshire Guide Plan suggests that the NEWS program also study the feasibility of creating reservoir sites in the Tynsboro, Mascopic Lake, Collinsville, and Dracut area to impound high flow Merrimack River water for the MDC. This might be accomplished by pumping the water from the Merrimack River during high flow to reservoirs in these areas and using gravity flow back to Lowell when needed.

The Guide Plan recommends that a computer-assisted study be undertaken of the future MDC, S. E. New Hampshire, and Coastal Basin New Hampshire future additional water supply needs together, that would optimize the minimum area of land to be inundated by impounded water. For instance, it does not seem equitable that a greater amount of land be taken for impoundments in New Hampshire to provide flow at Lowell to be returned to New Hampshire for domestic and industrial water supply, than taking less land for impoundments in New Hampshire by providing water supply for S. E. New Hampshire and/or the Coastal Basin from Hooksett. In addition, if additional water supply were provided the Coastal Basin from Hooksett, or some other location from the Merrimack River in New Hampshire and then impounded in the Coastal Basin, this would more equitably spread the location of impoundment

than if the lower Merrimack Basin were to impound all the additional water for
Merrimack Basin by sending it via Lowell and the MDC to the coastal area.

Wastewater Studies by the New Hampshire Water Supply and Pollution Control
Commission

The New Hampshire Water Supply and Pollution Control Commission has a number
wastewater studies on-going in the Merrimack Basin which will have an effect
on water quality of the basin:

Merrimack River Basin Water Quality Management Plan, under 303E of P. L. 92-500,
setting over-all standards for the water quality maintenance in the basin.

Individual municipal and/or regional wastewater collection and treatment plans
New Hampshire Water Supply and Pollution Control Commission in the Merrimack

Basin.

Phase I (1973-1977/78)

Pemigewasset Sub-basin

- Lincoln - secondary treatment
- Woodstock - secondary treatment
- Waterville Valley - physical-chemical treatment plant
- Ashland - secondary treatment plant
- Bristol - secondary treatment plant

Winnepesaukee Sub-basin

- Center Harbor - Moultonboro - secondary treatment plant
- Meredith - secondary treatment plant
- Wolfeboro - secondary treatment plant
- Weirs - Gilford - Laconia - regional collection system and secondary plant
at Laconia
- Tilton - Northfield - Franklin - regional collection system and physical-chemical
treatment plant on the Merrimack River downstream
from Franklin, in Franklin treatment of both do-
mestic sewage and non-point storm water run-off
will occur either combined or separately
- Merrimack County Home - secondary treatment
- Penacook - regional sewer extentions and secondary treatment
- Concord - collection of Bow wastewater and treatment of domestic and storm-sewer
run-off separately or combined
- Pittsfield - secondary treatment and treatment of domestic sewage and storm-sewer
run-off either separately or combined
- Allenstown - collection of Pembroke wastewater
- Hooksett - secondary treatment
- Manchester - secondary treatment; regionalizing of wastewater collection to Bedford,
Hillsboro County Home, and to the south east of the city; treatment of
domestic sewage and storm-water run-off either separately or combined
- Merrimack - secondary treatment
- Derry - collection of some of Londonderry's wastewater and secondary treatment
- Nashua - regionalization of collection and collection of Hudson wastewater;
secondary treatment; and treatment of domestic sewage and storm water
run-off either separately or combined
- Salem - physical-chemical treatment

Phase II (1978-1985)

In general, in the Merrimack Basin the best practical technology (BPT) is to
be on-line by 1985. This may entail additions to existing secondary treatment
plants, recycling, spray irrigation of treated waste, or some other form of
advanced waste treatment.

New construction being studied, considered, or planned between 1978 and 1985

are:

Lower Winnepesaukee Basin - intercepting link from Silver Lake to Tilton-Northfield thus bringing the entire Winnepesaukee River area wastewater to Franklin for treatment

Northeast shore of Lake Winnepesaukee - the towns of this area are to have "no-discharge" to Lake Winnepesaukee by 1985 and the New Hampshire Water Supply and Pollution Control Commission is proposing alternative wastewater treatment by either a regional collection scheme, by spray irrigation, or by individual septic tank systems in one area. Regional wastewater collection is the preferred alternative for only Alton.

Outer peripheral area of northern, eastern, and southern portions of the Winnepesaukee sub-basin

Depending upon growth, the New Hampshire Water Supply and Pollution Control Commission sees this area preferably being served by individual wastewater treatment systems so long as the population density and zoning in this area conforms to this objective.

The Guide Plan feels that the wastewater planning being done for the Merrimack Basin will meet water quality standards in the future without changing the present operation of the Franklin Falls Dam. The only water quality problems associated with the operation of the Franklin Falls Dam, other than the sludge-related BOD from behind the Ayers Island Hydroelectric Dam, will likely be temporary organic BOD loads picked-up from organic ground litter by the temporarily impounded waters behind the Franklin Falls Dam.

The Status of official New Hampshire response to the Corps of Engineers Franklin Falls Dam letter

The Office of Comprehensive Planning has forwarded copies of the letter to the resource agencies in the state: Fish and Game Department; Water Resources Board; New Hampshire Water Supply and Pollution Control Commission; Department of Resources and Economic Development; and Department of Public Works and Highways. These agencies have, or will write a response directly to the Corps of Engineers if they want to.

WD:jmb

cc: William Fuller
Arthur Newell
Charles Rossell



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE

MID-ATLANTIC REGION
143 SOUTH THIRD STREET
PHILADELPHIA, PA. 19106

MAR(PSN)

January 31, 1974

Mr. Meyer S. Slotkin
Acting Chief, Engineering Division
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Slotkin:

In your letter of December 12, 1973 you ask for comments concerning our interests within the Franklin Falls project currently under review.

While the project does not effect any area for which we have administrative responsibility we hope that consideration is being given to any archeological and historical values in the area. Also you should consult the State Historic Preservation Officer for New Hampshire, (Mr. George Gilman, Commissioner, Department of Resources and Economic Development, P. O. Box 856, Concord, New Hampshire 03301) to determine if any National Register property, or historic sites that he intends to nominate to the National Register may possibly be adversely affected by any modifications and or operational changes in the Franklin Falls project.

We appreciate this opportunity to comment on the study.

Sincerely yours,

Chester L. Brooks
Regional Director
Mid-Atlantic Region



A-17

Let's Clean Up America For Our 200th Birthday

NEW ENGLAND RIVER BASINS COMMISSION

NERBC

55 COURT STREET • BOSTON, MASSACHUSETTS 02108
PHONE 617 223 6211

February 4, 1974

Mr. John Leslie, Chief
Engineering Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear John:

I am responding to two letters to Frank Gregg requesting comments on the Corps' review of dam operations in New England; one from Meyer Slotkin, dated December 12, 1973, on the Franklin Falls project, and one from you, dated January 4, 1974 on the Edward MacDowell project.

We have referred both of these letters to Tony Dater who represents NERBC on the New Hampshire Guide Plan staff. Memoranda containing his comments on the two projects are attached.

The comments are based on the inventories, evaluations and recommendations prepared by the guide plan staff and do not necessarily represent official positions of the State of New Hampshire or the New England River Basins Commission. Nevertheless, we believe the comments will be helpful in your review of dam operations.

Sincerely,



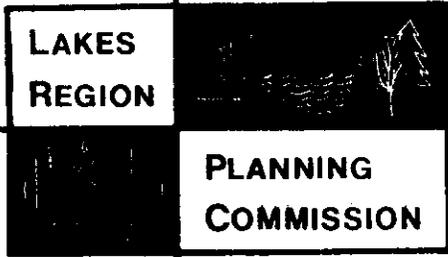
Robert D. Brown
Staff Director

RDB:jm

Enclosures (2)

cc: w/enclosures

James Minnoch, N.H. Office of Comprehensive Planning
William Healey, N.H. Water Supply & Pollution Control



11 Lang Street Meredith New Hampshire 03253

Telephone 379-6550

February 14, 1974

Meyer S. Slotkin, Acting Chief
Engineering Division
Department of the Army
Corp of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Re: NEDED-R

Dear Mr. Slotkin:

This is with reference to your letters regarding the Franklin Falls Dam of December 12, 1973, sent to Mr. Creeley S. Buchanan, Director of HUD, and Mr. James Minnoch, New Hampshire Office of Comprehensive Planning.

The Lakes Region Planning Commission is presently preparing a Land Use Plan for the Region which includes the Franklin Falls Dam. It would appear that careful consideration should be given to multiple use of the area particularly with regard to approved public recreation facilities.

Should new recommendations result from your review, I would appreciate the opportunity to provide further comments. As the LRPC plans become finalized, we would be pleased to submit a copy to your office should this be considered appropriate.

A copy of your letter was forwarded to Mr. Donald Foudriat, Chairman of the Sanbornton Planning Board. A substantial portion of the reservoir area lies within the Town of Sanbornton.

Cordially,

David G. Scott
Executive Director

DGS/mlh

A-19



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
John W. McCormack Post Office and Courthouse
BOSTON, MASSACHUSETTS 02109

REG-10-1374

Division Engineer
New England Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Sir:

This is in response to Mr. Slotkin's letter of December 12, 1973, requesting our comments concerning management of the Franklin Falls flood control project at Franklin, Merrimack County, New Hampshire.

We understand that agencies concerned with management and public use generally favor maintaining the areas as semi-primitive areas with limited, but diversified, public use provided. We recommend that existing roads within the Franklin Falls Flood Control Area not be subjected to closure, but kept open for public utilization. Maintenance of such roads should be kept to a minimum and not improved to the degree that the area loses its semi-primitive nature.

This Bureau's primary interest in the Franklin Falls Dam area concerns the fishery resource. We are working with Massachusetts and New Hampshire to restore anadromous fish, including the Atlantic salmon, to the Merrimack River Basin. The New Hampshire Fish and Game Department estimates that by the late 1980's Atlantic salmon will be managed in the area. At present, the reservoir area supports warmwater fish species that are moderately utilized. Fisherman utilization of the area could be increased by improving boat access. The anticipated restoration of anadromous fish will make improved fisherman access even more desirable. One boat launching site exists on the west side of the Pemigewasset River several hundred feet south of Thompson Cove. We concur with New Hampshire Fish and Game Department in their suggestion that boat launching and parking facilities be added on the east side of the Pemigewasset at the Shaw Cove Camping Area. We recommend that details of the east side access improvement and west side access development be coordinated with the New Hampshire Fish and Game Department.

Water skiing and speedboating restrictions should be considered and coordinated with New Hampshire Fish and Game Department. There is a possibility that existing State law prohibits water skiing within a certain distance of shore, and that the permanent water area is so narrow that nowhere in the project could water skiing be legally done. Nevertheless, for safety and to prevent degradation of the fishing experience, we recommend that existing State statutes be examined or that special regulations be developed to prevent water skiing in the area. Ample posting of the regulation should be provided.

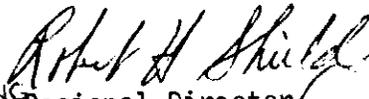
It may be desirable to develop regulations to prevent speedboating. Regulations could limit boat motor size permitted on the area, require "no wake" speed or otherwise provide for the desired result. We recommend that you coordinate with the New Hampshire Fish and Game Department and other appropriate State agencies in developing these regulations and the timing of their implementation.

New Hampshire Fish and Game Department personnel informed us that coordination with your agency regarding game management has been excellent. Studies by Game Division personnel indicate that additional management for game animals including pheasant, cottontail, ruffed grouse, and woodcock would be beneficial. The Game Division is interested in establishing a few relatively small experimental plots in order to evaluate prescribed burning as a management tool for improving and maintaining wildlife habitat. Initial work would probably consist of burning several 1- to 6-acre sections of an old field along the river which are reverting to woodland. In New England there are very few times of the year when this type of prescribed burning can be accomplished effectively because of climatic conditions. Burning usually takes place during a 1- 2-week period in the spring and sometimes during a 1- 2-week period in the fall of the year. The Forestry Department at the University of New Hampshire has been developing the techniques for prescribed burning on university land for the last several years and might provide technical assistance and guidance in selecting and burning the experimental plots on the Franklin Falls Flood Control Area. The Game Division would also like to establish some small experimental plots where brush cutting techniques could be evaluated. The Division has recently had on trial loan a Bombardier Muskeg Brushcutter which can cut saplings up to six inches in diameter. We recommend that details for management be coordinated with the New Hampshire Fish and Game Department.

Public use of the area for camping and picnicking should be managed for maximum mutual compatibility with hunting and fishing. This can be accomplished by coordinating with New Hampshire Fish and Game Department of Resources and Economic Development, Division of Parks.

We appreciate your interest and cooperation in managing the natural resources of the Franklin Falls project area. If we can be of further assistance in this matter, please let us know.

Sincerely yours,


ACTING Regional Director



CITY OF FRANKLIN, NEW HAMPSHIRE

A Friendly City on the Move

03235

OFFICE OF City Manager

April 15, 1975

Department of the Army
Division Engineer
New England Division,
Corp. of Engineers
424 Trapelo Road
Waltham, Mass. 02154

Attention: NEDPL-P

Re: Franklin Falls Dam
Franklin, N.H. (NEDPL-P)

Gentlemen:

Pursuant to your request to comment on the current water resource need regarding the above installation and future improvements the following is submitted:

1. Copy of letter to HUD (attention Robert D. Carr, Area Site Engineer) dated June 27, 1974 is enclosed.
2. Copy of letter from HUD, (to the City of Franklin) dated March 8, 1974, also enclosed.

Obviously, our main concern at this time is the fact that the Franklin Falls Dam does afford a flood protection to the City of Franklin. Any improvements that are to be considered by the Corps hopefully would further increase the flood protection factor.

Knowing that flood protection presently exists and that improvements are being considered, this information should be forwarded to HUD and/or the Federal Insurance Agency to insure that the proper agencies are fully aware of at least the protective measures currently existing.

We have reason to suspect that F.I.A. is not fully considering the Franklin Falls Dam in their tentative identification of the flood prone areas in Franklin.

On behalf of the City of Franklin we would concur with the assessment of the Corps, i.e.

" A recent review of the flood control needs for the Pemigewasset and Merrimack Rivers indicate that the existing storage capacity of the Franklin Falls project is needed for flood control purposes."

This fact may be critical at this time in view of the City's contemplated involvement in the National Flood Insurance Act of 1968 (P.L. 90-448, August 1, 1968; 42 U.S.C. 4011--4127).

In addition to the above we would respectfully request that any improvements undertaken would enhance not only the protective factor but also open up the recreational uses that currently may not be available in the project area.

Hopefully this information will satisfy your request. If not please feel free to contact the City of Franklin at any time.

Sincerely,
James A. McSweeney
James A. McSweeney
City Manager

JAM/b



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION
WASHINGTON, D. C. 20410

3/8/74

Franklin (10)

015935
E-1000

IN REPLY REFER TO:

IF0-1

City Council
Franklin, N. H. 03235

Dear Gentlemen:

In accordance with the provisions of section 201 of the Flood Disaster Protection Act of 1973 (P.L. 93-234, December 31, 1973, hereinafter referred to as the 1973 Act), the purpose of this letter is to give you formal notice of the tentative identification by the Federal Insurance Administration (FIA), on behalf of the Secretary of Housing and Urban Development, that your community contains one or more areas having special flood hazards. A map showing the boundaries of the areas affected by the proposed identification is enclosed.

The effect of this notification, as required under the 1973 Act, is to inform communities that are not presently participating in the National Flood Insurance Program of the flood danger to which they appear to be exposed and to give them an opportunity to enroll promptly in the program so that their residents will be protected financially against future flood losses, since flood insurance is not available privately. However, if you believe that your community either is not seriously flood prone, or that such flood hazards as may have existed have been corrected by floodworks or other flood control methods, the community may appeal the proposed determination.

If it desires to appeal, the community, at any time during the next six months, should submit to FIA whatever technical or scientific data it may have that is sufficient to prove its contention that it is not flood-prone. If the Federal Insurance Administrator concurs in the evidence submitted, then the proposed identification will be cancelled.

If the community does not successfully refute FIA's proposed identification, then it must seek eligibility for the sale of Federally-subsidized flood insurance by adopting preliminary land use and control measures to help reduce or avoid flood losses and by applying to FIA for participation in the program. Generally, flood insurance can be made available within two weeks after receipt of a complete application. Flood insurance will then be available through any licensed property insurance agent or broker in the community.

Communities where special flood hazard areas have been formally identified must be actively participating in the program by June 30, 1975 (or one year after identification, whichever is later), or else no Federal financial assistance, such as loans or grants, and no mortgage loans from Federally-insured or regulated banks or savings and loan associations will thereafter be available for buildings within these identified special hazard areas. The details of this prohibition are set out in section 202 of the 1973 Act (copy enclosed) and in the individual regulations of the various Federal agencies.

In addition to its community participation requirement, the 1973 Act also requires that individuals within eligible areas purchase flood insurance in connection with all Federal or Federally-related assistance (including mortgage loans from Federally-insured lending institutions) that is received after March 1, 1974, for buildings within identified special flood hazard areas. The amount of flood insurance required is the amount of the loan balance or the maximum amount of insurance available, whichever is less.

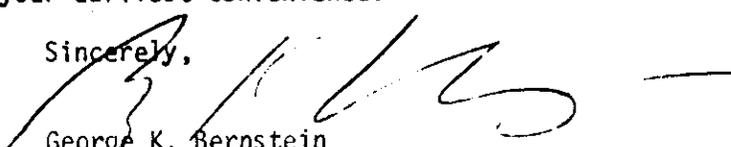
Aside from these new participation requirements, the 1973 Act essentially constitutes an expansion and improvement of the National Flood Insurance Program authorized under the National Flood Insurance Act of 1968 (P.L. 90-448, August 1, 1968; 42 U.S.C. 4011--4127). The 1973 Act provided greatly increased limits of subsidized and total coverage, repealed the provision that would have denied Federal disaster assistance after December 31, 1973, for those who could have purchased flood insurance but did not do so (this requirement was replaced with the insurance purchase requirement explained above), and permitted substantial reductions in subsidized flood insurance premium rates.

We believe the National Flood Insurance Program has been greatly improved by the 1973 Act and that every flood-prone community in the United States will eventually benefit from its provisions. The provisions of the 1968 Act requiring the adoption and periodic updating of adequate local land use and control measures within the flood plain as a condition of continued eligibility for Federal flood insurance remains unchanged, however. These requirements are set out in section 1910.3 of the enclosed program regulations.

More than 3,000 communities had voluntarily entered the National Flood Insurance Program before this letter was written, and more are applying each day. We have therefore enclosed a packet of materials that will assist you in making application, and we would be glad to assist you in any other way that we can. The telephone number of the Office of Flood Insurance within FIA is (202) 755-5581.

Please let us hear from you at your earliest convenience.

Sincerely,


George K. Bernstein
Federal Insurance Administrator

Enclosures

June 27, 1974

Department of Housing & Urban Development
Federal Housing Administration
John F. Kennedy Federal Building
Government Center
Boston, Mass. 02203

Attention: Robert D. Carr
Area Site Engineer

Dear Mr. Carr,

The City of Franklin has been designated as a community that has special flood prone areas. The City Council as a result of being notified on March 8, 1974 (see attached letter-A-) by HUD, has seen fit to appoint a committee to study this matter. The Committee will consist of a cross section of interested people in the community with the goal of coordinating the Flood Plain Information.

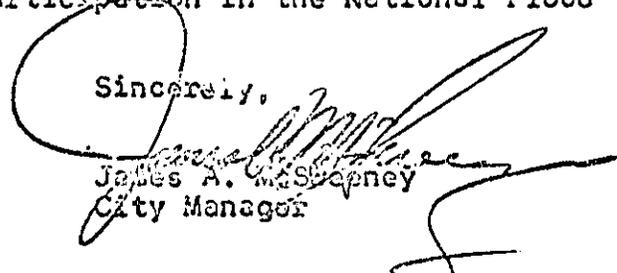
In reviewing the situation it appears that a possibility may exist that we may not be entirely in a Flood prone area. Without going into a lot of verbal detail I would like to request that an official from your organization meet with me or the committee to discuss further details on this matter.

One point of concern to me at this particular time is that the Army Corps of Engineers has expressed an interest in expanding it's flood storage area to prevent future flooding.

I have enclosed copies of letters and maps (Exhibit "B") relative to the Corps desires hoping that this information may prevent some duplication of effort.

Subsequent to this letter and under seperate cover we will be forwarding "Application for participation in the National Flood Insurance Program.

Sincerely,


James A. McSpaeny
City Manager

2-11-75

No copy received as of this date.



State of New Hampshire

WATER RESOURCES BOARD

CONCORD 03301

April 17, 1975

Division Engineer
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Attn: NEDPL-P

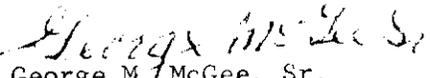
Dear Sir:

In regard to your recent inquiry relating to the review of the Franklin Falls project in Franklin, New Hampshire, under title II of Public Law 91-611, Section 216, this office has reviewed its needs concerning present and future operation of the impoundment of the Franklin Falls flood control dam on the Pemigewasset River.

Due to the extreme small amount of flood storage at this site, it is the opinion of this office that no future use of this impoundment should in any way diminish the storage capacity of the pond. Changes in land use within the project boundaries for recreation and other purposes would not necessarily deter the flood storage capacity of the site and are of no concern to this Board.

I hope the above will satisfy your requirements regarding our interest in the Franklin Falls dam.

Very truly yours,


George M. McGee, Sr.
Chairman

gmcg/c



STATE OF NEW HAMPSHIRE
DEPARTMENT of RESOURCES and ECONOMIC DEVELOPMENT
DIVISION OF RESOURCES DEVELOPMENT

P. O. BOX 856...STATE HOUSE ANNEX...CONCORD, NEW HAMPSHIRE...03301

April 17, 1975

Mr. Larry Dolinsky
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Attention: NEDPL-P

Dear Mr. Dolinsky:

Reply to your letter of December 12, 1973, concerning future use of the Franklin Falls Flood Control Area was apparently inadvertantly overlooked. Therefore, in response to your recent reminder, we forward the following observations.

This department feels that the current management and use of the forest and land resources of this flood control area are compatible with today's needs. During our fifteen years of management of the area we have noted a considerable wide variety of recreational uses of the area including canoeing, trail biking, picnicking, jogging, hiking, fishing, swimming, horseback riding, hunting, and snowmobiling. Based on these observations, we feel that the area is meeting definite public needs. Use is not intensive, though unquestionably it is growing gradually.

Intensive permanent recreational developments do not appear to be needed at this time. State and other public facilities in the immediate region seem to take care of this need. Also, development at the Franklin Falls area poses certain risks as demonstrated by the July 1973 floods. The deadening vegetation and the deposition of silt and debris leaves the area unattractive for long periods of time. For this reason, particularly, we feel that the recreational development should be limited to extensive rather than intensive uses.

The forest resource continues to be managed in keeping with the available funds derived from the area. There is no question that added forest improvement funds would be helpful in accelerating forest improvement programs and road maintenance projects. However, these funds are not forthcoming at this time because of current state budget constraints and such funds do not appear to be available in the immediate future. However, the forest management program will proceed in a systematic manner, though not to the optimum extent.

Two current problems being faced inadequately are the control of littering and policing. This department has operated a litter patrol and involved towns have done some policing, but neither is adequate. We will continue to strive to solve these problems but the final solution will, undoubtedly, require added personnel and funding.

Larry Dolinsky

-2-

April 17, 1975

We look forward to our continuing involvement in the management of the Franklin Falls Flood Control Area and urge future staff discussions in helping to meet obvious needs.

Sincerely yours,



Theodore Natti
Director

TN:cw

cc: George Gilman, Commissioner, Department of Resources and
Economic Development
Sargent Goodhue, Chief, State Lands Management

OFFICE OF SELECTMEN

HILL, N. H. 03243

April 22, 1975

Division Engineer
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

Att. NEDPL-P

Gentlemen:

We regret the delay in answering your inquiry dated Dec. 12, 1973 asking for comments regarding the Franklin Falls Reservoir and its effect on the Town of Hill.

We have very little to offer in the way of suggestions other than to state our approval of the use to which the reservoir has been put- namely flood control.

We appreciate and approve of the efforts to clean up the Pemigewasset River.

Some talk has been made that the area in Hill and Franklin might be made into a recreation area and opened to the public. This might meet with the approval of Hill if proper maintenance, supervision and policing could be established.

Very truly yours,

Richard H. Edin
Richard H. Edin
Selectmen, Hill N.H.

MEMO-LETTER

TOWN OF BRISTOL
71 LAKE ST. - BRISTOL, N. H. - Phone 744-3354

MESSAGE

REPLY

TO Division Engineer
New England Division
Corps of Engineers
624 Trapelo Road
Waltham, Massachusetts 02154
Attn: HOPL-P

DATE

DATE May 6, 1975

Dear Sirs,

This is in reply to your letter requesting views and
feelings as to usage of the Flood Control Area of
the Franklin Falls project at Franklin, New Hampshire.

Now that the Penigewassett is being cleaned up the
possibility of more recreation in this area should be
seriously considered.

One area in particular the Old Hill Village is
being used for snowmobiling and sled dog trails.
A larger parking facility on the Bristol end
certainly would be utilized.

Sincerely yours,

GEORGE S. KING }
CHARLES E. SHERWOOD } Selectmen
BURTON W. WILLIAMS } of
Bristol, N. H.

SIGNED

SIGNED