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UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
Bureau of Sport Fisheries and Wildlife  
Washington 25, D. C.

NEW ENGLAND DIV.  
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A Detailed Report on the Fish and Wildlife Resources  
in Relation to the Water Development Plan  
for the  
HODGES VILLAGE DAM AND RESERVOIR  
French River, Massachusetts

March 1958

7.02

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## PREFACE

1. This report presents the probable effects of the Hodges Village Reservoir on the fish and wildlife resources. The planning agency for this authorized project is the Corps of Engineers, U. S. Army. This report is based on engineering data furnished by the New England Division, Corps of Engineers, Boston, Massachusetts. Personnel of the Massachusetts Division of Fisheries and Game furnished valuable assistance in the field investigations. Since it has been determined that additional studies are not needed this constitutes the Fish and Wildlife Service's report on the project.

## INTRODUCTION

2. The Hodges Village Project will provide for flood control along the French River and function as a unit in the comprehensive plan for flood control in the Thames River Basin.

3. The project site is located on the French River in Worcester County, Massachusetts about one mile west of the village of Oxford at Howarth or Hodges Village, 15 miles above the river's mouth. The French River is one of the principal headwater streams of the Thames River.

## DESCRIPTION OF THE AREA

4. The project site lies in the rolling hill section of south-central Massachusetts. It is situated in an intervalle of a north-south valley flanked by low hills. Topographic relief in the vicinity

of the project varies from elevation 460 to over 800 feet.<sup>1/</sup> French River is approximately 22 miles in length and drains a 30 square-mile area above the project site. From its source in Rochdale to its mouth the river drops approximately 420 feet for an average gradient of about 19 feet per mile. Stream flows for the French River at the dam site have not been recorded, but annual flow records on the nearby Little River, with about an equal watershed area, are available. The annual flow of Little River for the period 1940-1953 averaged 44 cubic feet per second, while a maximum instantaneous flow of 8,340 c.f.s. was recorded in August, 1955. Maximum monthly flow of 243 c.f.s. occurred in April, 1940 while the minimum month of 2.38 c.f.s. occurred in September, 1949. A low flow of 0.5 c.f.s. for a minimum day was recorded in November 1949.

5. The river averages 20-40 feet in width within the project site. The flow is sluggish to moderately fast with many reaches that are deep and smooth flowing. Stream depth varies from one to several feet, depending upon the gradient. The stream bottom is mud, gravel and rubble. Some industrial and domestic pollution enters the main stem upstream from the dam site. Wellington Brook, the principal tributary within the reservoir area, varies in width from 6 to 15 feet, and flows through the two dry Pope Pond flowages, both of which will be within the maximum flow line. Wellington Brook is a non-turbid, unpolluted stream. For the most part the banks along French River and Wellington Brook support heavy brush cover.

6. Soils of the area are mainly of the Gloucester type, belonging to the Gray-Brown Podzolic Great Soil Group, predominately

<sup>1/</sup> All elevations in this report are in feet and are referred to mean sea level datum.

dark brown in color and coarse in texture. Development of the soil has been principally from material derived from crystalline schists and gneisses and accumulated by glacial action. Some peat deposits exist in the lower basin within the reservoir site.

7. There are many permanent residences near and on the site. A large portion of a new housing development in the North Oxford section lies within the limits of the maximum flow line. Many of these homes suffered severe damages in the 1955 flood. Long drainage ditches were dug and stream channels improved as a protective measure comprising part of the housing development. The Oxford water-pumping station will require relocation. Access is good since the area is criss-crossed and paralleled by several roads. A single track railroad will require relocation as will segments of two highways, one of which is the north-south State Route 12. The old Howarth Mill is located on the dam site. The 1955 flood destroyed the old mill dam, but the mill has continued operation. Although there are no water-use industries on the site, the valley above and below is heavily industrialized, with such important mill towns as Webster, Massachusetts located about 4 miles below the site and Putnam, Connecticut a few miles further downstream. The site is poorly suited to agriculture.

#### PROJECT PLAN

8. The Project will consist of a rolled earth fill dam 1,140 feet long and 55 feet high. The reservoir pool at spillway elevation 501 will have a surface area of 790 acres and store 12,750 acre-

feet of water. An additional 410 acres may be acquired above elevation 501. The spillway will be 100 feet wide and will be located on the right abutment. The top of the dam will be at elevation 517. Peak discharge rate will be 13,600 cubic feet per second. Outlet works consisting of three, three and one half by five-foot control gates will be located in the center of the dam. There will be three earth dikes, one located on the west and the other two on the east perimeter of the reservoir. The dikes will total 1,800 feet in length and have a maximum height of 18 feet. At present there is no land clearing proposed other than at the dam, dikes and other structure locations.

9. The entire reservoir capacity will be allocated to flood storage, since no provision is being made for a permanent pool. The flood frequency expectancy table discloses that on an average of twice each year about 1,400-acre feet may be impounded, creating a 310-acre pool at elevation 480. Every second year stored waters may reach elevation 485 and form a 430-acre pool, while a 530-acre pool may be formed every fifth year at elevation 490. Through the fifth to the fiftieth year the increase in pool elevations will be in small increments with a correspondingly small surface acreage increase with each expected pool. Flooding to the upper elevations will be infrequent and roughly 250 acres can be expected to be relatively free from inundation. Stored flood waters will be released as downstream conditions permit. Table I reveals the frequency and stages of reservoir storage.

TABLE I

Frequency of Filling					
FREQUENCY IN YEARS	POOL ELEVATION (m.s.l.)	AREA (ACRES)	APPROXIMATE MILEAGES OF STREAMS INUNDATED		STORAGE (ACRE-FEET)
			French R. Wellington B.		
1/2	480	310	2.5	.7	1,400
2	485	430	2.6		3,250
5	490	530	2.7	.9	5,600
10	492	575	2.7†		6,750
20	495	625	2.7†	1.2	8,600
40	499	720	2.7†		11,250
50	501*	790	2.8	1.8	12,750

\*Spillway Crest

#### FISHERY SECTION

##### Without the Project

10. The present fishery on the reservoir site is of no value.

Before the flood of 1955 eliminated Howarth Mill Pond a low-to-moderate value fishery existed in the pond. Species formerly taken included chain pickerel, yellow perch, brown bullheads and bluegills. Stumpy Pond, the only remaining pond on the site has no fishery values and, although Wellington Brook waters are of good quality, the associated fishery is of little importance. A few warm-water fish exist in the French River, but these attract no fishing. Pollution has rendered these waters poor as fish habitat and the river has not been stocked for many years.

With the Project

11. The project will cause no significant changes in the fishery values on the project area. It is not likely that the construction and operation of the project will do anything to improve the fishery situation.

WILDLIFE SECTION

Without the Project

12. Woodland covers 52 per cent of the project site. The composition is mixed hardwoods and softwoods, with mixed oaks predominating in the hardwood group. White pine is a prominent softwood and it is found in small solid stands. Wooded swamps, comprising about 17 per cent of the area, are characterized mainly by red maple, with an understory of alder, blueberry, dogwood, arrow-wood and other wetland brush species. A dense, 25-acre, white cedar swamp and several small dense brushy bogs are included on the site. There is little timber of saw-log size on the site. However, at the present time a small portable sawmill is operating in a young white pine stand in North Oxford where some selective cutting is being done. Figure 1 shows the distribution of the cover types on the site and adjacent lands.

13. Open grass marsh or open wet meadow is found on the old Howarth Mill Pond and Lower Pope Pond flowages and on the wide flat at the junction of French River and Wellington Brook. This vegetative type is characterized mainly by soil waterlogged to its surface

or within a few inches of its surface, supporting mixed wetland grasses and weeds with little, if any, brush in the association. A considerable amount of gravel moved by the 1955 flood overlays a large portion of open meadowland in the North Oxford area.

14. Agriculture is unimportant and there is only one 6-acre hay field on the site. The remaining acreages are composed of homesites, comprising about 50 acres, most of which are new developments; wasteland, chiefly gravel pits; fallow land and upland brush. Of four ponds previously included within the maximum flow line only one, Stumpy Pond, remains. This pond is clear, spring fed and extremely shallow, supporting a lush growth of submerged and floating aquatic vegetation. It is filled with numerous large stumps.

15. The long drainage ditches and channel improvements that were installed on the flats in North Oxford for the purpose of improving runoff in the vicinity of a large housing development have changed the character of the wetlands. The ditches, varying in width from about 8 feet to more than 30 feet, with water depths varying from a few inches to several feet, have created considerable water surface where meadow and brushy, wooded wetland formerly were found. Much of this work has the character of level ditching, holding water at a high level with little appreciable movement. This condition is particularly striking along the lower reach of Wellington Brook. Above Route 12 the channel improvement on Wellington Brook accomplishes its designed purpose. Along this upper reach the flow has been improved to the point where it has caused the destruction of most of the shallow water marsh that existed on the flowage of Lower

Pope Pond. A long ditch was also dug paralleling the French River. This is an older ditch with vegetation established on the spoil banks as well as in the ditch. The following table summarizes the cover types on the site while the attached cover type map reveals the distribution of these types. Figures 7 through 11 and 14 show the ditching and channeling in North Oxford.

TABLE II

Cover Types on the Hodges Village Project Site				
TYPES	SPILLWAY CREST ELEVATION 501		TWO-YEAR FLOOD POOL ELEVATION 485	
	Acreage	Per cent	Acreage	Per cent <sup>1/</sup>
Wooded Upland	410	52	150	19
Wooded Swamp	135	17	135	17
Marsh, Open Wet Meadow	78	10	60	8
Home Sites	50	6	5	
Bottomland Brush	40		20	
Fallow, Old Field	30		20	
Wasteland	25	15	19	10
Upland Brush	11		10	
Agricultural Land	6		6	
Pond	5		5	
TOTAL	790	100	430	54

16. Several game animals make use of the site. Deer range the area, but since it is located in a region of the state supporting a

<sup>1/</sup> Per cent - Refers to percentages of total areas of types inundated by the two-year flood pool.

low deer population, use by the species is light. Habitat suitable for grouse is extensive, covering a large portion of the site. The mast-producing oaks, uneven-aged woodland and much edge type are habitat features important in maintaining a grouse population. Suitable cover for cottontails is less extensive and for the most part is confined to the lower slopes and flatland. Much of the oak and white pine on the upper slopes is unsuited to cottontail occupancy because of the general lack of understory and ground cover. Gray squirrels are well distributed over the oak-covered slopes and some cover suitable for woodcock is located along French River and Wellington Brook.

17. Suitable muskrat habitat exists along slow flowing meandering segments of the French River, along a short reach of Wellington Brook and in portions of drainage ditches. In addition to the muskrats, minks and otters occasionally range the site. Raccoons and foxes range freely through the section.

18. Waterfowl make use of the slow flowing portions of the French River and are beginning to make use of the drainage ditches. The main stem lacks a marshy or feathery edge and is also deficient in floating and submerged vegetation. Brush bank cover is generally heavy. The newly constructed drainage ditches are as yet not sufficiently vegetated to attract much waterfowl use. There is considerable human activity in the vicinity of all the ditches so that ducks are disturbed constantly. Stumpy Pond offers a small amount of suitable waterfowl habitat. Several acres of waterfowl habitat existed at the upper end of Howarth Mill Pond before the dam was breached.

Wood duck nesting boxes that had been erected in the shallow marsh are now on wet meadow. Before the drainage project several acres of good shallow waterfowl and muskrat marsh were found on Lower Pope Pond flowage.

#### With the Project

19. It is not possible to define precisely just what vegetative changes may be expected to occur during the operational period of the project, but inundation will upset the normal course of succession and much of the area will go through a disturbed vegetative cycle. Inasmuch as effects will be influenced by such details as time of year waters are held, length of holding time, amount of water retained, silt load deposited, topography and species of vegetation present, effects may vary considerably from reservoir to reservoir in the Northeast. However, some general deductions may be made from observations made on operating dry-bed flood control reservoirs in this region.

20. If no clearing of the basin is accomplished beyond that which is presently proposed, roughly 430 acres extending to about elevation 485 and containing mostly swamp woodland and the open flowage of the old Howarth Mill Pond will be exposed to the effects of frequent submergence. Should inundation extend to elevation 480 about twice each year and to about 485 every second year, some drowning of woody vegetation can be expected. It has been observed that species such as aspen, gray birch, yellow birch, hemlock, sugar maple, elm, white pine, willow, alder, elderberry and hardhack may

suffer severely as a result of being inundated for several days during the impoundment of summer flood waters. Tree and shrub kill will diminish towards the upper limits of flowage areas, but trees such as white pine and aspen may be killed when only partially submerged. Grasses and forbs also suffer injury from flooding and some replacements in the ground cover complex can be expected, particularly throughout the frequently flooded areas. Overall, flooding will cause an ecological change, mostly in the lower basin, which, in turn will influence use by wildlife species.

21. The project will be operated as a dry-bed type reservoir, impounding waters only during periods of high runoff. It is expected that on an average of twice each year waters may be impounded up to elevation 480, thus frequently denying wildlife the use of about 310 acres, or the major portion of the bottomland. About every second year approximately half of the area, or 430 acres, will be flooded, while the five-year flood may cover as much as 530 acres. The most significant effects on wildlife will fall in the area well below the five-year flood line, perhaps within the scope of the two or three-year expected flood, since within this limit flooding will be sufficiently frequent to lower the value of the area for wildlife. From about the five-year flood line up to the spillway crest flooding will be so infrequent it will have little detrimental effect on wildlife. The overall damaging effect of the project on wildlife will not be critical since values within the maximum flow line are not high and the existence of any one of the species in the vicinity of the project will not be jeopardized.

## DISCUSSION

22. Since the planning agency does not propose to hold a permanent pool at this reservoir we might expect some wildlife values to be retained on the lower portion of the reservoir area; that area frequently flooded but exposed between floodings to possible use by terrestrial wildlife species. However, a large portion of this area up to elevation 480 is flat swampland. Because of the nature of this swampland, its cover and terrain, it may remain waterlogged for extended periods following drawdowns, presenting a habitat that may be unattractive to upland wildlife species such as grouse, cottontails and deer. In any case, it can be expected that wildlife will be denied the use of much of the bottom land for significant periods.

23. On the site at the present time there are about 25 acres of open water suitable for waterfowl use. This acreage is distributed in Stumpy Pond, French River, Wellington Brook and in the recently completed ditches and channels in North Oxford. By taking advantage of development possibilities a minimum of 60 acres of suitable habitat could be developed, increasing the total to 85 acres. Although none of the open water or marsh units proposed for development would be particularly large, the units would be closely associated and collectively would provide benefits to waterfowl and muskrats.

24. The ~~largest~~ single unit could be achieved by maintaining a shallow permanent pool on the flowage of the old Howarth Mill Pond. A low permanent pool, held somewhat lower than the original pond level, would create 25 acres or more of shoal water that would benefit waterfowl. The optimum surface elevation of such a pool, from

the standpoint of waterfowl habitat establishment, could best be determined by manipulating the pool level until the desired shoals are created. The wildlife value of such a pool would be much greater were it not located in the extreme lowest portion of the reservoir site and controlled by the main dam, since this pool would be subjected to frequent flooding, a particularly unfavorable feature. However, in the case of this proposed pool, where no additional cost is involved and where an extremely small percentage of the designed reservoir storage capacity would be affected, incidental waterfowl benefits should be sufficiently important to justify the maintenance of such a pool. Figures 3, 4 and 5 show the flat flowage of the old mill pond.

25. By taking advantage of the re-impoundment possibilities that exist on the Lower Pope Pond flowage additional waterfowl benefits could be provided at low cost. Restoration of the shallow water marsh that existed on the old flowage could be accomplished rather easily by utilizing the old mill dam which is a sound structure except for the channel breach through the old spillway portion of the dam. A control structure and dam roughly 40 feet long and 4 to 6 feet high would adequately restore the dam and impound sufficient water to shallowly reflood the wetland. The surface elevation of this proposed sub-impoundment would be in the vicinity of elevation 484, or very close to the expected two-year flood level. It would be an advantage to have a wildlife pool at this upper elevation where it would be subject to less frequent flooding. Figures 18 through 20 show the wetland and old dam. The combined storage of the

permanent pool and the Lower Pope Pond pool would probably not be much more than 100-acre feet.

26. Another small shoal marsh could easily be constructed on Wellington Brook immediately below Route 12. An access road between two points of high land is presently impounding a small amount of water. The fill for this access road could be used as a base for a dike and improved to impound a controllable level subimpoundment. As much as 18 to 20 acres could be flooded at little expense. Figure 13 shows the access road and its relationship to Wellington Brook Swamp and North Oxford Swamp. This impoundment would be adjacent to the Wellington Brook ditching and only a short distance below Lower Pope Pond dam. Other small waterfowl development possibilities exist on the old flowage of Upper Pope Pond and on a small brook immediately south of Old Charlton Road on the west side of the rail bed. Figures 26 and 27 show portions of the Upper Pope Pond area.

27. The Division of Fisheries and Game of the Massachusetts Department of Natural Resources has an interest in the water development plan for the Hodges Village Project and would be interested in acquiring a license for the purpose of managing the fish and wildlife resources on the area. The State is interested in a shallow permanent waterfowl pool on the Howarth Mill Pond flowage, redevelopment of Lower Pope Pond as well as other waterfowl development possibilities.

28. The State is desirous of establishing a managed upland game public hunting area in this south-central portion of the State. This project would partially fulfill a need for an area in this section. The upstream half of the reservoir area, from Rocky Hill Road to North

Oxford, would fit into a public hunting plan of this type. Basic information is still lacking in relation to the amount of land to be acquired by the Corps of Engineers as compared to the amount to be leased. Since there would likely be considerably less than 400 acres involved in the desired area it would be advantageous to extend the taking line to elevation 501 to facilitate management of the resource by the Division of Fisheries and Game. 504

29. Little, if any, improvement in fishery values can be anticipated in the French River until such time that there is effective control of upstream pollution. Inasmuch as Wellington Brook possesses low fishery values, no importance can be attached to the effects of flooding.

#### RECOMMENDATIONS

30. It is recommended that:
- a. A General Plan, pursuant to Section 3 of the Act of August 14, 1946 (60 Stat. 1080), be entered into by the Corps of Engineers, the Massachusetts Division of Fisheries and Game and the Secretary of the Interior to provide for administration of appropriate portions of the project lands and waters for wildlife-management purposes.
  - b. A shallow permanent pool be maintained on the flowage of the Old Howarth Mill Pond for the establishment of suitable waterfowl habitat.

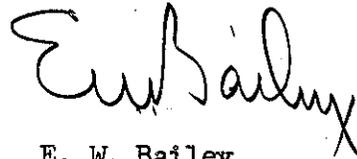
- c. If "b" is not acceptable, then the Lower Pope Pond dam can be restored to create an impoundment with a surface at elevation 484.
- d. After agreement has been reached on which of the above alternate recommendations are to be accomplished, such lands be acquired in fee title as the Massachusetts Division of Fisheries and Game, and the Bureau of Sport Fisheries and Wildlife, in consultation with the Corps of Engineers, may determine are necessary to fulfill the intent of the recommendations.
- e. Leases of Federal land in the project area stipulate the right of free public access for hunting and fishing.

*Who pays?*  
*How much will it cost?*  
*What are the benefits?*  
*Who pays?*  
*What are the benefits?*  
*If land is condemned can't do this.*

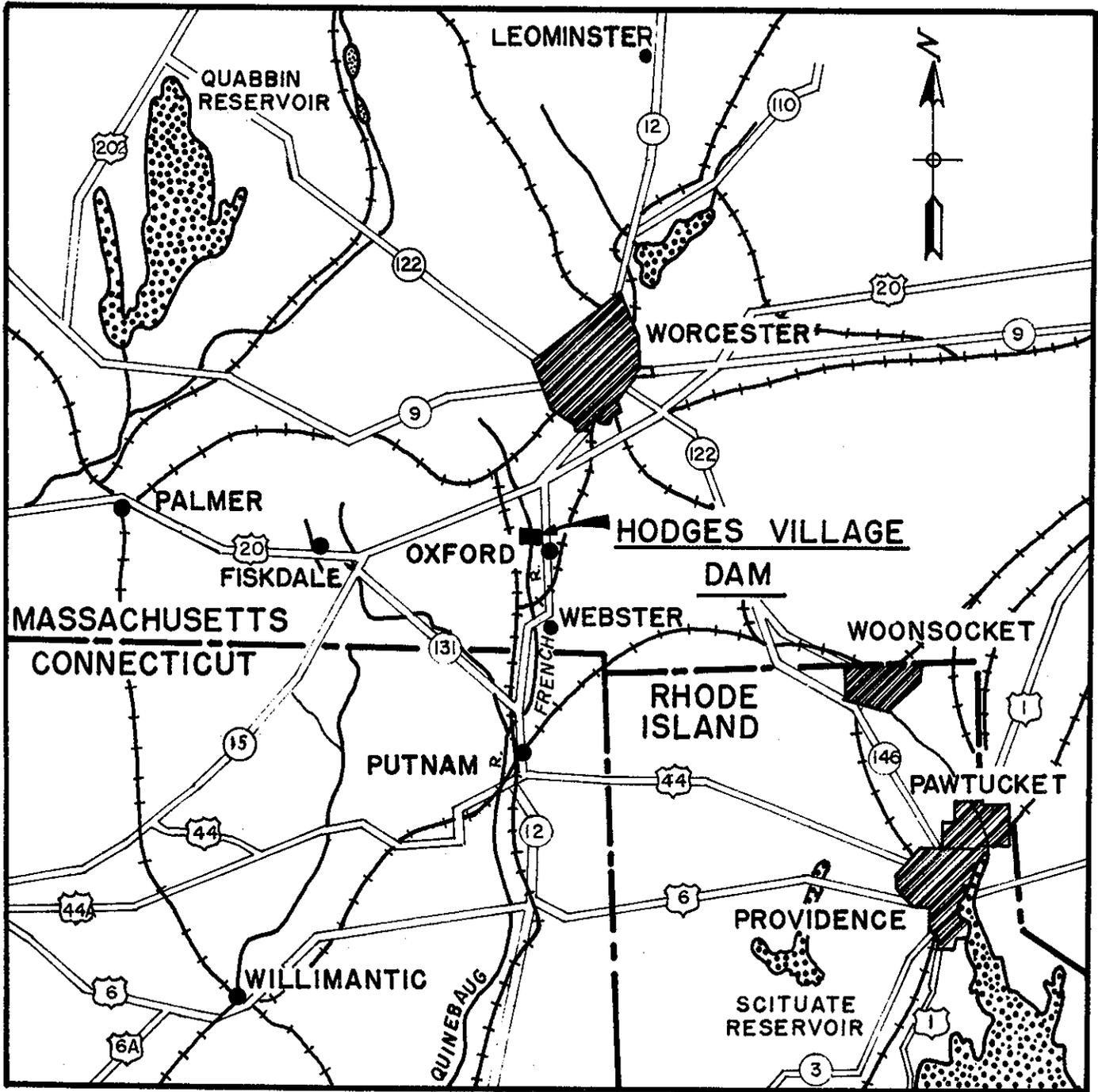
CONCLUSIONS

31. Hodges Village Reservoir project, as planned, would cause losses to wildlife, mainly the aquatic fur animals, cottontails and woodcock, the principal inhabitants of the flat bottom land areas. Lesser damages may be suffered by other game species such as grouse and squirrels. No further damages can be anticipated for the present unimportant fishery interests nor can any benefits be expected to accrue in the French River until upstream pollution is effectively controlled. Adequate mitigation of wildlife losses are possible through habitat developments either on the flowage of the old Howarth Mill Pond or on the Lower Pope Pond flowage.

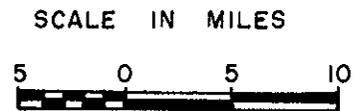
32. This report is based on data for development of Hodges Village Project, dated June 15, 1956. The Fish and Wildlife Service should be advised of any change in plans for structures or methods of operations, so that a new report may be prepared if deemed necessary.



E. W. Bailey  
Acting Regional Director  
March, 1958



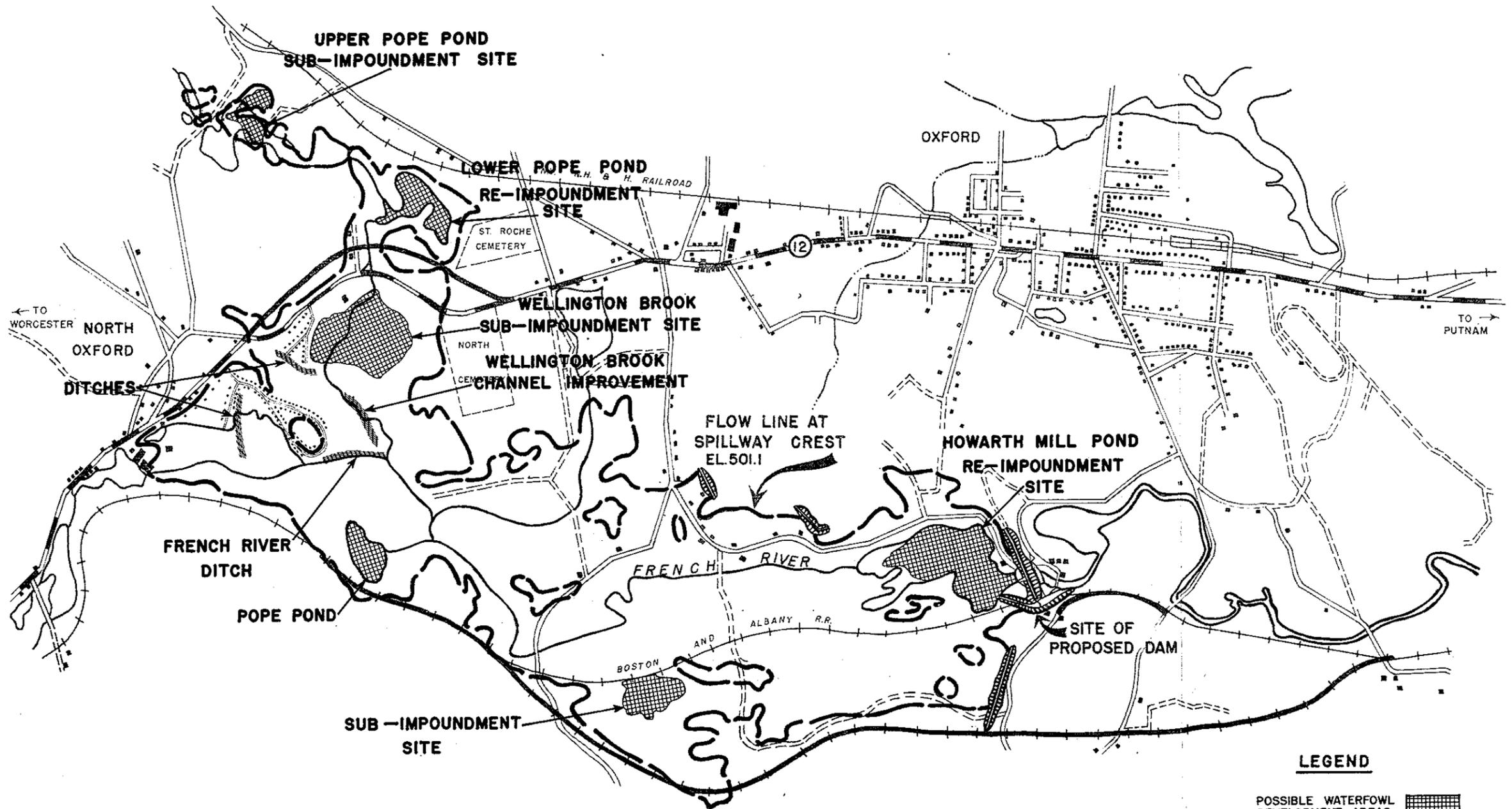
**INDEX MAP**



# HODGES VILLAGE DAM LOCATION PLAN

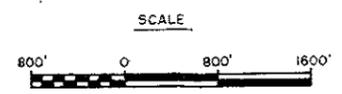
ALSO SHOWING

VARIOUS WATERFOWL DEVELOPMENT POSSIBILITIES



### LEGEND

- POSSIBLE WATERFOWL DEVELOPMENT AREAS
- U.S. AND STATE ROADS
- SURFACED ROADS
- UNIMPROVED ROADS



# COVER TYPE MAP HODGES VILLAGE RESERVOIR AREA WORCESTER COUNTY

U.S. FISH AND WILDLIFE SERVICE — BRANCH OF RIVER BASINS  
BOSTON, MASSACHUSETTS  
SEPTEMBER, 1957

## LEGEND

SYMBOL	TYPE	ACRES
	UPLAND WOODLAND	410
	SWAMP WOODLAND	135
	MARSH, OPEN MEADOW	78
	HOME SITES	50
	BOTTOMLAND BRUSH	40
	FALLOW, OLD FIELD	30
	WASTELAND	25
	UPLAND BRUSH	11
	AGRICULTURAL LAND	6
	WATER	5
	DITCHING, CHANNEL IMPROVEMENT	

