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CRIEHAVEN HARBOR
AND
MATINICUS HARBOR

MAINE

APR 13 1951

SURVEY

(REVIEW OF REPORTS)

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION, BOSTON, MASS.

APRIL 13, 1951 23

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NOT FOR PUBLIC RELEASE

SURVEY (REVIEW OF REPORTS)

OF

CRIEHAVEN HARBOR AND MATINICUS HARBOR, MAINE

SYLLABUS

Criehaven Harbor

The Division Engineer finds that prospective benefits are sufficient to warrant the modification of the existing project for Criehaven Harbor, Maine, to provide for the extension of the existing breakwater. He recommends extending the stone breakwater 150 feet northerly, with a top width of 10 feet at an elevation of 15 feet above mean low water and side slopes of 1 on 1.5 on the seaward side and 1 on 1 on the harbor side, at an estimated cost of $160,000 for new work and $500 annually for maintenance, all subject to certain requirements of local cooperation.

Matinicus Harbor

The Division Engineer finds that prospective benefits are sufficient to warrant the modification of the existing project for Matinicus Harbor to include a new stone breakwater extending 300 feet northeasterly from the north end of Wheaton Island, having a top width of 10 feet at an elevation of 15 feet above mean low water, and side slopes of 1 on 1.5 as shown on the accompanying map, at a cost of $222,000 for new work, and $500 annually for maintenance, all subject to certain conditions of local cooperation.

NOT FOR PUBLIC RELEASE

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION
P. O. BOX 2316
BOSTON 7, MASS.

April 13, 1951

SUBJECT: Survey (Review of Reports) of Criehaven Harbor and Matinicus Harbor, Maine.

TO: Chief of Engineers, Department of the Army, Washington 25, D. C.

AUTHORITY

1. This report is submitted in compliance with the following resolutions adopted by the Committee on Public Works of the House of Representatives, United States Congress:

Criehaven Harbor — Resolution adopted May 27, 1947

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE HOUSE OF REPRESENTATIVES, UNITED STATES, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on Criehaven Harbor, Maine, published in House Document Numbered 310, Seventy-second Congress, First Session, with a view to determining if it is advisable to modify the existing project in any way at this time, particularly with a view to extending the breakwater."

A study of survey scope was authorized by the Chief of Engineers on June 16, 1947.

Matinicus Harbor — Resolution adopted April 13, 1948

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE HOUSE OF REPRESENTATIVES, UNITED STATES, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on the breakwater at Indian Ledge, Matinicus Maine, published in House Document Numbered 653, Sixtieth Congress, First Session, with a view to determining the advisability of extending the existing breakwater 350 feet."

A review report of survey scope was authorized by the Chief of Engineers on May 3, 1948.

REPORTS UNDER REVIEW

2. The reports under review for Criehaven Harbor, as published in House Document No. 310, Seventy-second Congress, First Session, consist of a Preliminary Examination Report and a Survey Report submitted by the War Department under the date of April 5, 1932. The survey report was favorable to the construction of a breakwater extending 300 feet northerly from Sunset Point, and is the basis of the existing project. The report under review for Matinicus Harbor, as published in House Document No. 653, 60th Congress, 1st Session, was favorable to the construction of a stone breakwater extending 450 feet from Youngs Point to Indian Ledge, in order to develop a small protected area in the upper part of the harbor for refuge during easterly storms. The existing project is based on that report.

DESCRIPTION

3. General. - Criehaven Harbor is located on the northwesterly side of Ragged Island, and Matinicus Harbor on the east side of Matinicus Island. These two small islands are part of a group of islands in the Atlantic Ocean, about 17 miles southerly of the mouth of Penobscot Bay, Maine. Matinicus Harbor is two miles northwesterly of Criehaven Harbor, measured in a straight line, but four miles by the course a boat would have to travel. The nearest mainland port is Rockland Harbor, 20 miles to the northwest. The islands lie directly in the path of coastwise traffic bound to northern Maine and New Brunswick, and in one of the most productive lobster grounds on the Atlantic coast. These harbors are further offshore than any other on the northern New England coast. The locality is shown on United States Coast and Geodetic Survey Charts Nos. 322 and 1203, and on the maps accompanying this report.

4. Criehaven Harbor. - Criehaven Harbor is entered between the end of the existing breakwater and Harbor Point. The entrance is about 475 feet wide at the high water line and about 350 feet wide at the mean low water

line. The harbor is about 1000 feet long by an average width of about 400 feet. The depth, at mean low water, varies from 22 feet at the entrance to about 7 feet near the head of the harbor. The mean tidal range is 9.1 feet and the spring range is 10.4 feet. The harbor is principally used by fishing craft having drafts from 2.5 to 4 feet. The harbor offers good protection from all storms except those from the northwest quadrant.

5. Matinicus Harbor. - Matinicus Harbor is a natural harbor, approximately 600 feet wide and 1500 feet long, with a mean tidal range of 9.1 feet, and a spring range of 10.4 feet. It offers a sheltered offshore harbor for small craft with drafts of from 4 to 7 feet. The harbor is reasonably safe from northerly, westerly, and southerly storms but imperfectly so from southeasterly or easterly storms.

TRIBUTARY AREA

6. Criehaven Harbor. - Ragged Island, which contains about 300 acres, is located in Knox County. It was settled in 1849 by Robert Crie. The village and Post Office are called Criehaven. It was a part of Matinicus Isle Plantation until 1897 when it was set off from Matinicus and organized as a plantation. Its organization was given up in 1925 and Criehaven became unorganized territory, the jurisdiction of which reverted to the State of Maine. In 1930, the latest available census in which it is listed separately, Criehaven had a population of 67. In the 1940 U. S. Census, Criehaven was listed with other islands of Knox County not belonging to any town, and was not listed separately. In 1947, there were 22 men living on the island who were interested in modification of the project which would indicate a population similar to that of 1930. It has been ascertained that 25 families lived on the island during the summer of 1950. Real estate had a valuation of $161,000 in 1947. Two new homes were built on the island in 1950. The principal industry of the community is lobstering, with the investment in the industry being approximately $110,000 for boats and gear.

7. Matinicus Harbor. - Matinicus Isle Plantation comprises the entire area of Matinicus Island and five small adjacent islands. In 1940, it has a population of 112, and a real estate value of $53,096. Since that time, the population has increased to about 190. The community's principal source of income is derived from lobstering, in which occupation there are 50 boats engaged, having a value, including equipment, of approximately $200,000.

8. General. - For communication with the mainland, the communities depend principally on a diesel powered 60-foot vessel which runs from Rockland to Criehaven, via Matinicus. This boat, carrying mail, passengers and general freight, makes three round trips per week during the spring, summer and fall period, April 1 to November 1, and two trips per week during the winter period from November 1 to April 1. Lobster smacks having a cargo capacity of about 20,000 pounds also operate between the islands and the mainland ports of Port Clyde, Tenants Harbor and Rockland. The communities depend on oil for heat, light and cooking, and on gasoline for the chief motor fuel for the lobster fishing fleet. Small coastal tankers deliver oil and gasoline from Rockland. The nearest railroad line is at Rockland, Maine. Charter plane service is also available from Rockland. Telephone connection with the mainland is available over a Coast Guard communication line.

BRIDGES

9. There are no bridges crossing the waterways within the area considered in this report.

PRIOR REPORTS

10. Criehaven Harbor. - Federal interest in the improvement and development of Criehaven Harbor extends back to 1912, at which time a study of the locality was authorized. The following is a list of prior reports submitted on the harbor.

Published In	Nature of Report	Work Considered
House Document No. 1454, 63rd Congress, 3rd Session - 1914	Unfavorable	Stone breakwater 325 feet long at Sunset Point.
House Document No. 310, 72nd Congress, 1st Session - 1932	Favorable	Stone breakwater 300 feet long at Sunset Point.

11. Matinicus Harbor. - Interest in the improvements of Matinicus Harbor was first indicated by the Federal Government in 1875, when an act of Congress appropriated money for a survey and study for development of the harbor. The following list comprises the reports on Matinicus Harbor.

Published In	Nature of Report	Work Considered
House Document No. 71, 44th Congress, 1st Session - 1876	Favorable	Construction of breakwaters for development of a harbor. Recommended.
Annual Report, Chief of Engineers for 1887 - Preliminary Examination	Unfavorable	Development of a harbor of refuge in Matinicus Roads between Matinicus Island and Ragged Island. Not recommended.
House Document No. 653, 60th Congress, 1st Session - 1908	Favorable	Construction of a stone breakwater 450 feet long from Youngs Point to Indian Ledge. Recommended.

EXISTING CORPS OF ENGINEERS' PROJECT

12. Criehaven Harbor. - The existing project, completed in 1935, was authorized May 28, 1935, under the Emergency Relief Appropriation Act of 1935 and by the River and Harbor Act, approved August 30, 1935, and consists of a riprap stone breakwater extending 300 feet from Sunset Point in a northerly direction with a top width of 10 feet, a top elevation of 15 feet above mean low water and side slopes of 1 on 1.5 on the seaward side and 1 on 1 on the harbor side. Total expenditures to date on the project amount to $40,775.99 for new work and $7,956.28 for maintenance.

13. Matinicus Harbor. - The existing Federal project was authorized by the River and Harbor Act of June 25, 1910, which appropriated $13,000 for the improvement of Matinicus Harbor. The improvement consists of a stone breakwater extending from Youngs Point to Indian Ledge, having a top width of 10 feet, at an elevation 15 feet above mean low water, with side slopes of 1 on 1.5. The project was completed September 23, 1911 at a cost of $14,000. Total expenditures to date have been $21,704.64, including $7,704.64 for maintenance.

LOCAL COOPERATION ON EXISTING AND PRIOR PROJECTS

14. The River and Harbor Act of August 30, 1935, required local interests to provide, without cost to the United States, the necessary rights-of-way for construction of the shore end of the breakwater at Criehaven Harbor. An instrument conveying the necessary rights-of-way was accepted as a satisfactory compliance by the Chief of Engineers, on August 14, 1935. Local cooperation was not required on the existing project for Matinicus Harbor, which is the only project authorized thus far in the development of Matinicus Harbor.

OTHER IMPROVEMENTS

15. There has been no improvements of Criehaven Harbor or Matinicus Harbor other than the existing Federal projects.

TERMINAL AND TRANSFER FACILITIES

16. Criehaven Harbor. - There are 6 wharves in the harbor, one of which is in very poor condition. Some are of timber and pile, and some of stone and crib construction. Two of the wharves have been constructed since 1947. The wharves serve the boats of the local lobstermen, lobster dealer, and mail and fuel boats. There is no public wharf and all commercial freight, mail, and passengers are landed at the lobster dealer's wharf, which is the largest in the harbor.

17. Matinicus Harbor. - There are 12 privately-owned wharves in the harbor, variously constructed of wood piles, stone, and crib work, and all are in fairly good condition. There is no publicly-owned wharf, but one private wharf is available for landing of mail, freight and passengers. The berths at these wharves are dry at low water. One wharf has facilities for boat repair work, being equipped with machinery for removing engines and general repairs. There is ample room available for expansion of terminal facilities when required.

IMPROVEMENT DESIRED

18. Criehaven Harbor. - At a public hearing held at Criehaven on September 30, 1947, it was indicated that the improvement desired by local interests is the extension of the existing breakwater for a distance of 150 feet in a northerly direction. The hearing was attended by representatives of the local lobster industry. Arguments advanced by local interests in favor of the proposed improvement were:

a. It will alleviate present difficulties experienced by boats during west and northwest storms. These storms cause considerable damage to boats anchored within the harbor.

b. It will provide additional safe anchorage so that additional boats will be based at the harbor.

c. It will make the harbor a place of refuge for fishermen using the adjacent fishing grounds which surround the island.

d. It will allow a greater development of the lobster industry now located on the island.

e. It will allow the mail, freight, passenger and fuel boats to dock at the island regularly. Under present conditions, docking is subject to storm conditions.

f. It will allow the establishment of a fresh fish industry on the island. Fishing at present is limited to the procurement of lobster

bait. (The principal proponent advocating the fresh fish industry has since removed from the island.)

g. It will make the harbor attractive to transient pleasure craft. Pleasure craft which normally would frequent the harbor because of the location do not do so because of existing navigation conditions.

19. Matinicus Harbor. - A public hearing was held at Matinicus, July 20, 1948, to determine the modification or improvements desired by local interests. The hearing was attended by local lobstermen and summer visitors. The hearing developed that the improvement desired is the construction of a new stone breakwater, extending 350 feet northerly from the north side of Wheaton Island. It was the unanimous opinion of local interests that the desired improvement would greatly benefit the harbor by providing additional protection from severe easterly and southeasterly storms. Navigation of the harbor is impossible during these storms, with the result that the maintenance of regular schedules by boats carrying commodities to the island is not possible, and in emergencies the Coast Guard is hindered in furnishing transportation to the island for medical aid. It was claimed by local interests that the provision of additional protection to the anchorage on the southerly side of the harbor during those storms would result in an expansion of the lobster fishing industry, thus enabling returning servicemen to enter this industry. At present, it is not practicable for additional men to enter the lobster industry, due to the extent of utilization of the existing anchorage. The improved anchorage would also serve as a harbor of refuge for fishing and pleasure craft which are now forced to make a hazardous 20 mile run to Rockland in the event of sudden storms. Summer visitors also claimed that more pleasure craft would frequent the harbor if safe protection from storms could be effected. Storms have caused considerable damage to boats, lobster cars, and waterfront installations, with their owners suffering a heavy monetary loss. It was claimed that the desired improvement would eliminate this loss.

COMMERCE

20. Criehaven Harbor.- There is no systematic collection of commercial statistics for Criehaven Harbor, due to the inaccessibility of its location and the extra added expense involved in collecting such data. Local interests report that the annual catch of lobsters is in excess of 200 tons. If the harbor conditions are improved, local fishermen as well as the lobster dealers anticipate as much as a 50 percent increase in the annual catch of lobsters.

21. Matinicus Harbor. - The compilation of complete statistical records of commerce in Matinicus Harbor was discontinued a number of years ago. Records that are available for 1948 indicate that 285 tons of gasoline, fuel oil and kerosene, and 249 tons of miscellaneous merchandise were received at the island and 10 tons of miscellaneous merchandise were shipped out. Information obtained at the public hearing in 1948, relative to the yearly lobster catch, placed the size of the catch at between 200 and 300 tons.

22. General. - The commerce of the islands is carried on principally with the mainland port of Rockland, which serves most of the islands in Penobscot Bay. Rockland is the shopping center for most of the island trade since supplies can be obtained by mail boat 2 or 3 times a week, depending on the season. This general commerce to the islands consists of commodities necessary for the operation of the local fleets and for the subsistence of the population.

VESSEL TRAFFIC

23. Criehaven Harbor. - There are 20 boats at Criehaven which are regularly engaged in lobstering. They range from 30 to 36 feet in length and have drafts of 2.5 to 4 feet. Approximately 10 other larger boats intermittently call at the harbor, these boats varying from 50 to 72 feet in length with drafts of 6 to 8 feet. In addition, a few pleasure craft visit the harbor, but do not stay any length of time due to lack of safe anchorage.

The proposed modification of the project would provide safe anchorage for several additional boats.

24. Matinicus Harbor. - There are 50 boats based in the harbor, ranging in length from 20 to 40 feet with drafts of 2.5 to 4 feet. An additional number of boats regularly visit the harbor to bring in freight, mail and passengers, the larger of these boats having lengths of 50 to 72 feet with drafts of 6 to 8 feet. Irregular trips, averaging 9 to 12 monthly, are also made by lobster buyers' boats which are 60 to 75 feet in length with a 5 to 7-foot draft. In addition to the above vessels, visiting pleasure craft call at the harbor during the summer months.

DIFFICULTIES ATTENDING NAVIGATION

25. Criehaven Harbor. - The entrance to Criehaven Harbor is partially exposed to northerly and westerly winds and fully exposed to northwesterly winds. Winds blow from the north, northwest and west about 40 percent of the time, and equally from the south, southwest and west. Local interests have stated that after a southeast storm has been blowing for about twelve hours, heavy southeasterly seas develop. With a sudden shift of the wind through south, southwest, west and finally to northwest, the seas are acted upon by the shifting winds which sweep them around the end of the existing breakwater and create excessive surge or undertow within the harbor. This condition is stated to make mooring difficult since the waves may be progressing in a direction different from the direction in which the wind is blowing. The surge or undertow prevails in the harbor for days after such a storm and prevents commercial boats from docking at the wharf to load or discharge cargo and passengers. Due to the extremely hazardous conditions created by storm winds from the exposed quarter, boats can then neither leave nor enter the harbor, nor can they be docked within the harbor. During these periods, the local fleet remains at anchor in the harbor using established heavy moorings.

26. Matinicus Harbor. - Matinicus Harbor is exposed to easterly and southeasterly storms which drive heavy seas off the north point of Wheaton

Island, directly into the harbor. The configuration of the harbor and location of the existing breakwater is such that only limited protection from such storms is afforded and considerable damage to boats, wharves, buildings and equipment is incurred. These storms occur spasmodically, varying in intervals from two or three in a year, to three in one month with durations of 24 to 72 hours. During these storms, it is impossible for boats to enter or leave. Trips into Matinicus are cancelled rather than risk the dangers involved in navigating the harbor. The mouth of the harbor is approximately 600 feet wide, bordered by Indian Ledge on the north side and Wheaton Island on the south. This entrance is reduced to approximately 450 feet at low tide. With heavy seas rolling off the end of Wheaton Island, boats attempting to negotiate the entrance are driven toward Indian Ledge.

WATER POWER AND OTHER SPECIAL SUBJECTS

27. The waterways are tidal. Matters of water power or flood control are not pertinent to this report. The proposed improvement would have no adverse effect on shellfish or wildlife.

PLAN OF IMPROVEMENT

28. Criehaven Harbor. - The only plan of improvement for Criehaven Harbor considered herein is the extension in a northerly direction of the riprap breakwater, as desired by local interests. The plan is based upon results of a hydrographic and topographic survey made in September 1948. The proposed extension is 150 feet long and of the same type of construction and cross-section as the existing structure.

29. Matinicus Harbor. - The plan found most feasible for modification of the existing project consists of the construction of a stone breakwater, extending 300 feet in a northeasterly direction from the north end of Wheaton Island, having a top width of 10 feet at an elevation of 15 feet above mean low water and side slopes of 1 on 1.5. The structure would be

located as desired by local interests, but would be 50 feet shorter than requested, the shorter length being selected because excessive depths of water would be encountered in the additional 50-foot reach.

AIDS TO NAVIGATION

30. The United States Coast Guard has been consulted on matter of aids to navigation and has advised that it will be necessary to relocate the light on the existing breakwater at Criehaven Harbor to the outer end of the desired extension. The Coast Guard has estimated that this can be accomplished at a cost of $7,500, with no additional maintenance cost. The Coast Guard has advised that no additional aids to navigation will be required for Matinicus Harbor.

SHORE LINE CHANGES

31. The shore line in the vicinity of both harbors is generally exposed ledge. The proposed construction will not have any effect upon the configuration of these adjacent shores.

ESTIMATES OF FIRST COSTS

32. The estimated first costs of the improvements considered are as follows:

Criehaven Harbor	
Extension to Breakwater	
16,000 tons of stone at $10.00	$160,000
Total Construction Cost	$160,000
Aids to Navigation	7,500
TOTAL PROJECT COST	$167,500
Matinicus Harbor	
Stone breakwater, 300 feet long, 22,200 tons at $10.00	$222,000
TOTAL PROJECT COST	$222,000

The unit price reflects costs prevailing in March 1951 for the type of work involved, and includes allowance for engineering and overhead.

ESTIMATES OF ANNUAL CHARGES

33. The estimated annual carrying charges have been computed on an assumed life of 50 years for the improvements, with all work being accomplished by the United States Government, and using interest rates of 3 percent. Estimates of annual costs of maintenance are based upon experience in maintaining the existing structures.

Crichaven Harbor

a. Federal Investment

Construction (by Corps of Engineers)	$160,000
Aids to Navigation (by Coast Guard)	7,500
TOTAL FEDERAL INVESTMENT	$167,500

b. Federal Annual Carrying Charges

Interest on Investment	$ 5,000
Amortization	1,500
Estimated Annual Maintenance	
Breakwater Extension	500
Aids to Navigation	0
TOTAL FEDERAL ANNUAL CARRYING CHARGE	$ 7,000

Matinicus Harbor

a. Federal Investment

Construction Cost (Corps of Engineers)	$222,000
TOTAL FEDERAL INVESTMENT	$222,000

b. Federal Annual Carrying Charges

Interest on Investment	$ 6,700
Amortization of Investment	2,000
Maintenance	500
TOTAL FEDERAL ANNUAL CARRYING CHARGE	$ 9,200

ESTIMATES OF BENEFITS

34. The benefits that will result from the proposed improvements will be the creation of additional protected anchorage, and improved

protection of the existing harbor areas. The breakwater construction will provide improved harbors of refuge, and will reduce damages sustained by the local fleets and shore property, and losses to commercial boats which transport mail, passengers and commodities to and from the islands. The creation of additional protected anchorage will result in the enlargement of the local lobster fleets, thereby increasing the lobster catch. The increase in the size of the local fleets will largely be by transfer of lobstermen now based on the mainland, resulting in elimination of costs presently incurred traveling the additional distance from the mainland ports to the lobster grounds. At present, there is no fresh fish industry at either harbor although the islands are in good fishing grounds. A former lobster dealer contended that a fresh fish business could be developed on Criehaven Island. There is no indication that such a business is now under consideration by others. The prospect of such a venture being realized is remote since the market as well as all needed fishing supplies is located at Rockland, one of the leading fishing ports of New England. The primary benefit that will be realized by the extension of the Criehaven Harbor breakwater is the creation of additional anchorage, and a secondary benefit is some improvement in the degree of protection afforded. On the other hand, the construction of a breakwater extending northerly from Wheaton Island will primarily improve the degree of protection afforded Matinicus Harbor, and to lesser extent increase the harbor area. The advantageous location of the harbors in good lobster grounds insures capacity use as lobster fishing bases.

35. It is considered that the additional anchorage area provided by the proposed breakwater extension at Criehaven Harbor will result in an increase of ten in the size of the local fleet from the present 20 craft to 30 lobster boats. It is considered that the major number of this expected increase in the local fleet will be due to transfer from mainland

bases not located as closely to the fishing grounds. It is considered that three of the ten additional boats to be based at Criehaven Harbor will be new members of the fishing industry. The remaining seven boats are considered to be transfers from other ports. The increase expected in the size of the Matinicus fleet is more moderate in percentage and total numbers, as the primary benefit at that harbor is improved protection of harbor area, and a secondary benefit is some increase in harbor area. However, it is anticipated that five additional boats will base at Matinicus Harbor, increasing the size of the fleet from 50 to 55 craft. Again, the larger part of the increase is expected to be by transfer of lobster boats from more distant mainland ports. It is estimated that three of the five additional craft will be transfer boats and two will be new entries in the industry.

36. Data obtained concerning lobster fishing in this area indicate that the ex-vessel price of lobsters from this area at the time of this report is $0.35 per pound. This ex-vessel price is the selling price at the fisherman's level and represents the gross return to the fisherman. In offshore areas such as Criehaven, where the depth of water is great and the tidal currents are strong, experienced lobstermen consider the cost of catching lobsters is one-third of the amount grossed. This would indicate hourly operating cost between $1.50 and $2.00 which is considered reasonable. Data developed concerning lobster fishing in the area indicate an average individual annual catch of about 15,000 pounds. Based on this average catch, the fishermen would gross $5,250 per year, and would net two-thirds of that amount. Therefore, the new entries in theindustry, estimated as three additional boats in the fishing fleet at Criehaven and two at Matinicus, represent annual benefits respectively of $10,500 and $7,000. Those are increases in the annual net value of the national fish industry and food supply, a general benefit.

37. It is considered that seven lobster boats now based on the main-

land will transfer to Criehaven and three to Matinicus. These boats now travel an average of 16 nautical miles additional distance each way between their present home port and the fishing grounds. At eight knots, and an hourly operation cost of $2.25 exclusive of any remuneration to the operator, the cost per round trip from the mainland ports averages $9.00. The lobster fishing season in this area extends from April through June and from September through December, and the actual number of working days in that season have been found to average as follows:

	Days
April	15
May	22
June	6
September	22
October	19
November	18
December	12
Total	114

About two trips per month are made to the mainland during the fishing season, or a total of 14 trips, which would be on working days. Therefore, basing at the islands saves each fisherman 100 trips per season to and from the mainland, or $900 a year. The seven boats transferring to Criehaven and the three to Matinicus represent annual benefits of $6,300 and $2,700, respectively. These benefits do not represent an increase in the national food supply, but represent a decrease in production costs, which is a general benefit.

38. The present breakwaters at Criehaven Harbor and Matinicus Harbor provide a considerable degree of shelter, permitting use of the harbors for refuge from storms. The harbors, due to their opposite exposures, are supplementary, each enjoying certain advantages. Criehaven Harbor is protected from the major percentage of storms, but during severe northwesterly

storms the harbor can safely accommodate only local boats having established heavy moorings. The provision for a slightly greater degree of shelter during northwesterly storms, and a greater area of shelter during all storms, by extension of Sunset Point Breakwater, will make Criehaven Harbor a more satisfactory place of refuge. Similarly, Matinicus Harbor is protected from the major number of storms, but is largely exposed during southeasterly storms. Greatly increased degree of shelter from these storms, and slightly increased harbor area, would be afforded by construction of a breakwater projecting northerly from Whoaton Island. Since the islands are located about 20 miles offshore in important lobster and ground fish territory, additional and improved refuge is of considerable value. Similarly, the improvements will provide suitable offshore refuge for pleasure craft frequenting the Maine coastal waters during the summer season. There is no available data on which a monetary evaluation of this benefit can be made, although the benefit is considered to be real and of great general value.

39. Reduction or prevention of boat damage and shore property damage has also been advanced as an anticipated benefit from the proposed improvements. No definite data have been furnished pertaining to Criehaven Harbor as to exact nature or amount of damages sustained annually. Lack of available data as to details and extent of damage may be interpreted that, although undoubtedly existent, boat and property damage in Criehaven Harbor is not a major factor. The proposed extension to Sunset Point Breakwater, although tending to provide more protection to the harbor, particularly in reduction of surge and undertow, will not modify greatly the degree of shelter from storm damage. Therefore, no benefits have been evaluated for elimination of boat and property damage at Criehaven Harbor.

40. Information obtained from local interests at Matinicus Harbor indicates average annual damages of $6,000 to boats, equipment, buildings

and wharves. It is considered that the proposed breakwater will reduce the damages suffered by at least 50 percent. This reduction in damages represents a reduction in costs of production of the national food supply and is, therefore, a general benefit of $3,000 per year.

41. Under present conditions, it is reported that commercial vessels carrying mail, freight, fuel and passengers are unable to dock at Criehaven Harbor during westerly or northwesterly storms, and at Matinicus Harbor during southeasterly storms. In some cases, scheduled trips are cancelled and in others, the trip is made and the boat has to return without discharging or taking on cargo or fares at the port. Besides the inconvenience, there is an economic loss due to the delay in the receipt and shipment of mail, supplies and freight, and the movement of passengers. The improvement of docking conditions at both harbors will result in primary benefits equal to the losses eliminated. At a minimum, the loss would equal the operating cost of the vessels delayed. It has been ascertained that the oil boat makes ten ineffective trips to the islands during the lobster season because of its inability to dock or to remain at the wharf long enough to pump out. At Criehaven, this is largely because of the undertow within the harbor under certain weather conditions, and at Matinicus, it is because of direct exposure to wave attack. The operational cost of each trip has been determined as $30.00. If the breakwater improvements are constructed, it is considered that harbor conditions would be bettered so that the number of trips lost would be reduced by at least half. The savings which are a general benefit, being a reduction in transportation costs of fuel, would amount to $30.00 per trip, or $150 annually, half of which would be attributable to each project. Conditions are the same for the lobster smacks which transport the lobsters to the mainland. It is believed that the reduction of lost trips would at least equal those of the fuel boat and would have the same trip cost. The saving would, therefore, amount to $150 annually, a reduction in distribution costs

of the national food supply and, therefore, a general benefit. This benefit also would be equally divided between the two projects. The mail boat misses one trip annually, but the operator does not now, nor even if the breakwaters are improved, intend to enter the harbors in heavy weather. The mail boat, due to its high freeboard, is harder to handle in winds than either the oil boat or the lobster smacks. The oil boat usually enters loaded while the lobster smacks have wet wells which increase their draft and reduce their freeboard. Since no particular change in present procedure is anticipated, no saving is claimed for the mail boat.

42. The improvement of the harbors for added protection from storms would allow commercial vessels to call on schedule, thereby eliminating inconvenience to passengers and in some cases, directly aiding the welfare of the islands when there are shortages of supplies. An important aspect of the islands' welfare is that the Coast Guard, at present, is forced to land doctors or remove patients by small boats to larger craft during storms. Added breakwater protection would reduce the frequency of such situations. The improvement of the harbors would also allow visiting vessels to remain overnight, which they now do not do because of the hazard involved. This would particularly result in savings to fishermen in adjacent waters, and be of benefit to yachtsmen cruising in the area. Benefits of these types are general benefits to all navigation, but because of their intangible nature are not evaluated in monetary terms.

43. The evaluated benefits to be realized by the breakwater improvements may be summarized as follows:

Criehaven Harbor

Increase in catch due to 3 new lobster boats	$ 10,500
Savings in operation costs of 7 transfer boats	6,300
Commercial boat lost time eliminated	150
	$ 16,950

Matinicus Harbor

Increase in catch due to 2 new lobster boats	$ 7,000
Savings in operation costs of 3 transfer boats	2,700
Prevention of damage to boats and shore property	3,000
Commercial boat lost time eliminated	150
	$ 12,850

COMPARISON OF BENEFITS TO COSTS

44. The ratio of annual benefits to annual costs is as follows:

Criehaven Harbor

Annual benefits	$ 16,950
Annual costs	7,000
Ratio benefits to costs	2.4 to 1.0

Matinicus Harbor

Annual benefits	$ 12,850
Annual costs	9,200
Ratio benefits to costs	1.4 to 1.0

Additional general benefits derived from the development of harbors of refuge for fishermen and pleasure craft, and improvement of the harbors to allow overnight stays by visiting craft would, if susceptible to ready evaluation, result in higher benefit-cost ratios.

PROPOSED LOCAL COOPERATION

45. The evaluated benefits to be derived from the proposed improvements pertain to the provision of additional and improved protected anchorages which are expected to result in an increase in the local lobster fleets. This increase in the local fleets is expected to result in an increase in the food supply of the nation and in reduction of costs presently incurred in the fishing industry. Evaluation has also been made of the prevention of storm damages to boats and harbor property, as well as the reduction in costs due to lost time of shipping at the harbor. The unevaluated benefits pertain to

the safeguarding of life and property by the provision of an improved harbor of refuge. It is considered that the benefits are sufficiently general in character to warrant the construction of the improvements at the expense of the United States. Local interests should be required to furnish all lands, rights-of-way, and easements necessary for the work, and to hold and save the United States free from claims for damage arising from the accomplishment of the projects.

COORDINATION WITH OTHER AGENCIES

46. All Federal, State, and local agencies having interests in the development and use of waterways were notified of the hearings held at Criehaven September 30, 1947, and at Matinicus July 20, 1948, on the proposed improvements. All agencies that expressed interest in the harbors were in favor of the desired plans of improvement. Subsequent to the development of the plans of improvement proposed herein, local interests have been consulted and have expressed general agreement with the plans.

DISCUSSION

47. General. - Criehaven Harbor is on the northwest side of Ragged Island, and Matinicus Harbor on the east side of Matinicus Island. These two small islands are part of a group of islands lying in the Atlantic Ocean about 17 miles south of the mouth of Penobscot Bay. The two harbors are only two miles apart, measured in a direct line, but are four miles apart by navigation courses. The islands lie in the path of coastwise traffic to northern Maine and New Brunswick, and in one of the most productive lobster grounds on the Atlantic Coast. Both harbors are natural indentations of the rocky shores, partially protected by Federal breakwaters. The harbors have opposite exposures; Criehaven Harbor offering protection from all storms except those from the west and northwest, and Matinicus Harbor from all storms except those from the east and southeast. Both Harbors serve as base ports for lobster fishing, the sole industry of the inhabitants of the islands. The lobster catch is shipped by rail, truck, and air over the entire country, and forms a part of the national food supply.

48. Criehaven Harbor. - Criehaven Harbor is about 9 acres in total area. The protected harbor area is limited by the extent of the breakwater projecting northerly 300 feet from Sunset Point on the west side of the harbor. This breakwater does not extend as far north as Harbor Point on the east shore of the harbor mouth. Criehaven Harbor is, therefore, subject to considerable surge and undertow from southerly and westerly seas sweeping around the end of Sunset Point Breakwater and being deflected from Harbor Point. The harbor exposure to the west and northwest is slightly modified by the lee afforded by Matinicus Island. The local lobster fleet is limited to 20 vessels by the size of the presently protected harbor area. Use of the harbor as a refuge during storms, or as an overnight anchorage for outside fishing boats or transient pleasure craft, is handicapped by the present anchorage limitations. Commerce at the harbor, consisting of lobster shipping, mail, passengers, fuel and supplies is often impeded or delayed due to lack of adequate protected harbor area.

49. Criehaven interests desire a 150-foot extension to the existing Federal breakwater to alleviate storm damage in the harbor and to enlarge the protected anchorage area, thus enabling an increase in the size of the local lobster fleet and affording a refuge for fishing and pleasure craft in the area. Extension of the breakwater will unquestionably provide additional harbor area. Some improvement in harbor protection will also be afforded, largely by reduction of wave and surge sweeping around the end of the breakwater in its present position.

50. The doubling in size of the local fleet as a result of the improvement, anticipated by local interests, is considered to be somewhat optimistic. However, the undoubted economies in production costs afforded by the advantageous location of the harbor insure expansion of the fleet by at least ten boats. If all ten of these boats were transfers from other less advantageously located bases, the annual benefits to be realized by the transfer

would be $9,000 annually, or about 1.3 times the total annual cost of the project. It is more probable that at least three of the additional fleet would be new entries in the industry, representing a net increase of about ten percent in the total fishing fleet of the area for the life of the project. Annual benefits computed on this determination of the future fishing fleet composition are $16,800, or about 2.5 times the annual costs of the project. Benefits evaluated due to reduction of delays and shipping costs as a result of improved harbor conditions are moderate, being estimated at $150 per year. Benefits that are anticipated by provision of adequate protected area to serve as a refuge for fishing and pleasure boats of the area have not been given a monetary value. The benefits are considered to be general in nature.

51. Matinicus Harbor. - Matinicus Harbor is a natural small boat harbor of approximately 14 acres in area. It is well protected from storms on all sides, except those originating in the east and southeast. A partial protection on the easterly side is afforded by a Federal breakwater, extending southeasterly 450 feet from the main island at Youngs Point to Indian Ledge, a small point of ledge near the main channel entrance. This breakwater provides an anchorage of about 2 acres in area, with depths of 6 to 7 feet at mean low water. The remainder of the harbor is exposed, and includes an area of approximately 5 acres with depths of 20 to 25 feet at mean low water. Protected anchorage, at present, is thus limited to boats with drafts up to 7 feet.

52. The proposed plan of improvement consists of the construction of a stone breakwater, extending 300 feet northeasterly from a point on the north side of Wheaton Island, having a top width of 10 feet, and side slopes of 1 on 1.5. Comparative studies of various lengths and locations for the desired improvement indicated that the location proposed by local interests is the most suitable. However, it was determined that a length of 300 feet,

in lieu of the 350-foot length desired by local interests, offered practically the same amount of protection with a resultant decrease of 40 percent in the first cost of the improvement.

53. The construction of the breakwater will provide access to the harbor at practically all times, by the elimination of the navigational hazards now encountered in times of easterly and southeasterly storms. It will make possible the maintenance of regular schedules by commercial supply boats which carry all commodities to the island, and which, at present, cannot reach the harbor in adverse storms. It will also make possible the rendering of medical aid to the island, which in emergencies is furnished by the Coast Guard in cooperation with private interests. Added protection will be provided for the anchorage in the lee of the existing breakwater, allowing greater use of the anchorage, particularly along the southerly and southwesterly sides. Additional protection to about 4.5 acres of the anchorage will be provided in the lee of the proposed breakwater at the southerly end of the harbor where there are depths of 10 to 25 feet at mean low water. The enlarged protected area of the anchorage will allow some expansion of the lobster boat fleet, and provide a place of refuge for larger draft vessels which now shun the harbor because of the shallowness of the existing protected area. It is expected that the local lobster boat fleet will be increased by five new vessels.

54. The principal primary benefits comprise benefits to the lobster fishing industry through local fleet expansion, and savings in costs by transfer of lobster boats from other less economical bases, and benefits to the existing fleet and shore installations in the harbor through reduction of the average annual damage incurred in storms. Other primary navigational benefits, namely those afforded transient and pleasure boats by the provision of a readily accessible harbor of refuge 17 miles offshore, are not readily susceptible to monetary evaluation but are believed to be considerable. The ratio of evaluated benefits to costs is 1.4 to 1.0.

55. The benefits are sufficiently general in character to warrant the entire cost being borne by the Federal Government. However, local interests should be required to furnish all land and easements necessary for the prosecution and future maintenance of the work.

CONCLUSIONS

56. The further development of the harbors at Criehaven and Matinicus will serve to increase the protected anchorage areas, reduce damages to existing craft, provide places of refuge for fishing and pleasure craft, allow more dependable transport of passengers, mail, supplies, fuel and lobsters to and from the islands, and encourage the expansion and improvement of the fishing industry. The modification of the existing projects to provide added breakwater protection is warranted. The harbors are mutually supplementary, each serving its own island population, each offering refuge under opposite storm conditions. Criehaven Harbor is expected to benefit more from increase in size of its fishing fleet, whereas Matinicus, although fleet expansion to a lesser degree is anticipated, will benefit more from prevention of damages.

57. The proposed breakwater construction will afford the desired harbor improvements at costs as follows:

Criehaven Harbor	$167,500 (including $7,500 for aids to navigation)
Matinicus Harbor	$222,000

The ratios of evaluated benefits to annual costs are 2.4 to 1.0 for Criehaven Harbor, and 1.4 to 1.0 for Matinicus Harbor. Unevaluated but real benefits by provision of havens of refuge reinforce the justification of the projects above indicated.

58. The nature of the benefits, which pertain to general navigation and to basic sources of food supply, warrant the construction of the breakwater improvements at the expense of the United States. If the projects

are authorized, funds for each improvement should be appropriated in one fiscal year to secure economical prosecution of the work.

RECOMMENDATIONS

59. Criehaven Harbor. - It is recommended that the existing project at Criehaven Harbor, Maine, be modified by extending the present riprap stone breakwater 150 feet northerly, with a top width of 10 feet at an elevation 15 feet above mean low water, and side slopes of 1 on 1.5 on the seaward side and 1 on 1 on the harbor side, generally as shown on Plate 1, at an estimated cost of $160,000 exclusive of costs of aids to navigation, and at an estimated cost of $500 for annual maintenance.

60. Matinicus Harbor. - It is recommended that the existing project at Matinicus Harbor, Maine, be modified by constructing a new stone breakwater on the north end of Wheaton Island, extending 300 feet northeasterly, having a top width of 10 feet, a top elevation of 15 feet above mean low water, and side slopes of 1 on 1.5, all as generally shown on Plate 2, at an estimated cost of $222,000 for new work, with $500 annually for maintenance.

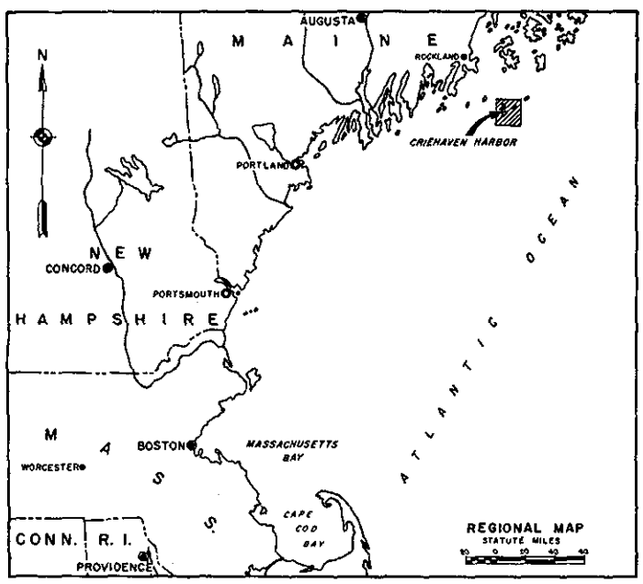
61. Modification of the projects is recommended subject to the conditions that local interests:

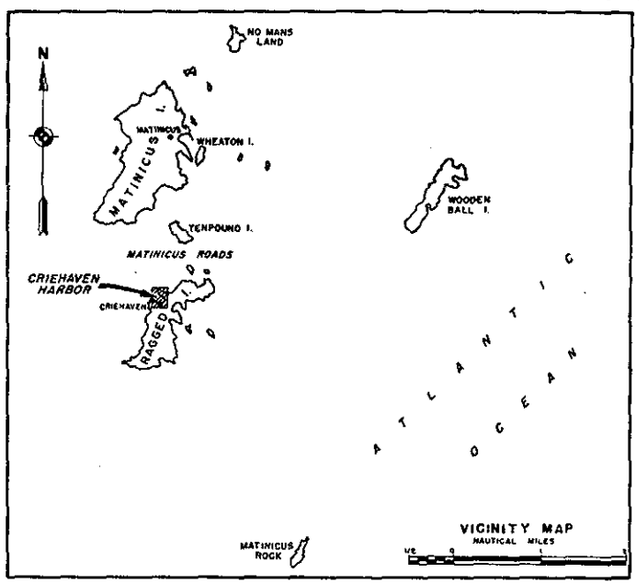
a. Provide without cost to the United States, all lands, easements, and rights-of-way necessary for the modification of the existing project, and for subsequent maintenance when and as required.

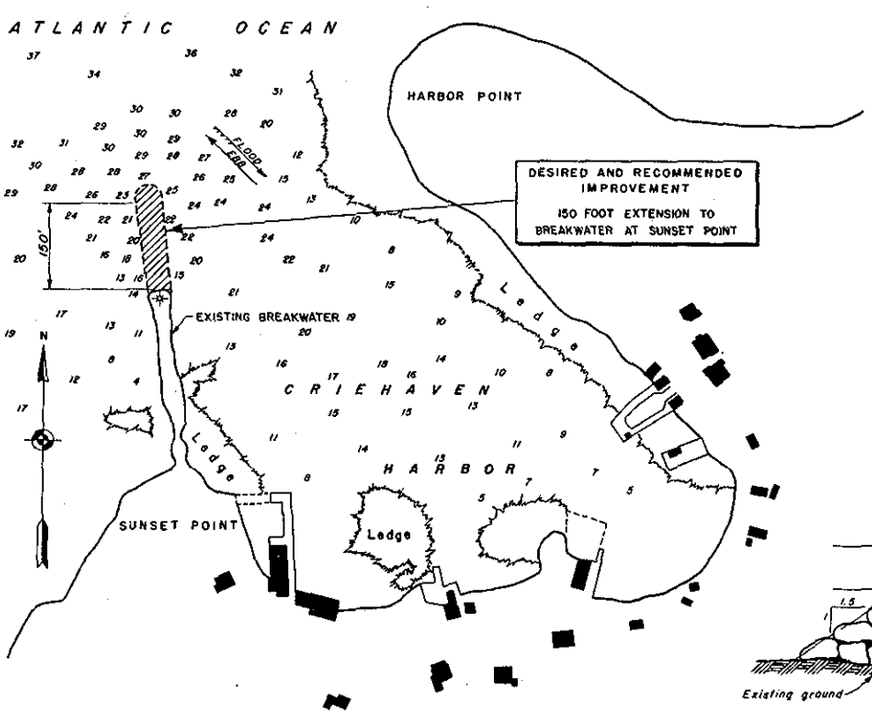
b. Hold and save the United States free from claims for damages resulting from the construction and the improvement.

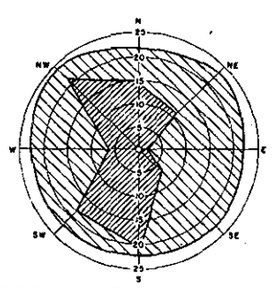
H. J. WOODBURY
Colonel, Corps of Engineers
Division Engineer

2 Incls:
1- Plate No. 1 - Criehaven Harbor
2- Plate No.2 - Matinicus Harbor







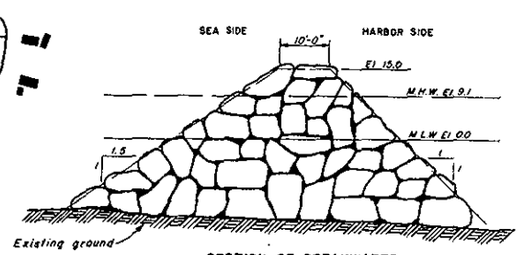


WIND DIAGRAM FOR PORTLAND, MAINE

LEGEND

AVERAGE VELOCITY IN M.P.H.

DURATION IN PERCENT OF TIME



SECTION OF BREAKWATER AT SUNSET POINT

SCALE 1" = 10'

NOTES:

Soundings are in feet and are referred to the plane of Mean Low Water.

Desired improvement shown thus: ▨

CRIEHAVEN HARBOR, MAINE

IN 1 SHEET — SCALE IN FEET

NEW ENGLAND DIVISION, BOSTON, MASS. SEPT. 12, 1949

APPROVED: CHIEF, ENGINEERING DIVISION

APPROVED: CHIEF OF ENGINEERS

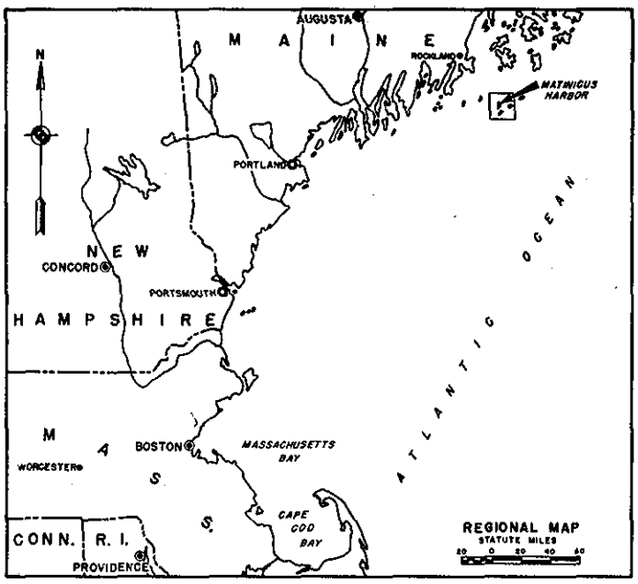
SUBMITTED: CHIEF, PLANNING AND REPORTS BRANCH

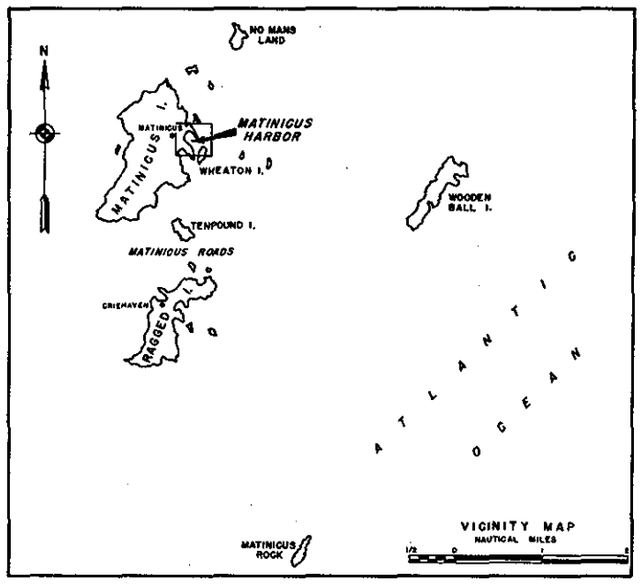
CHIEF, RIVER & HARBOR SECTION

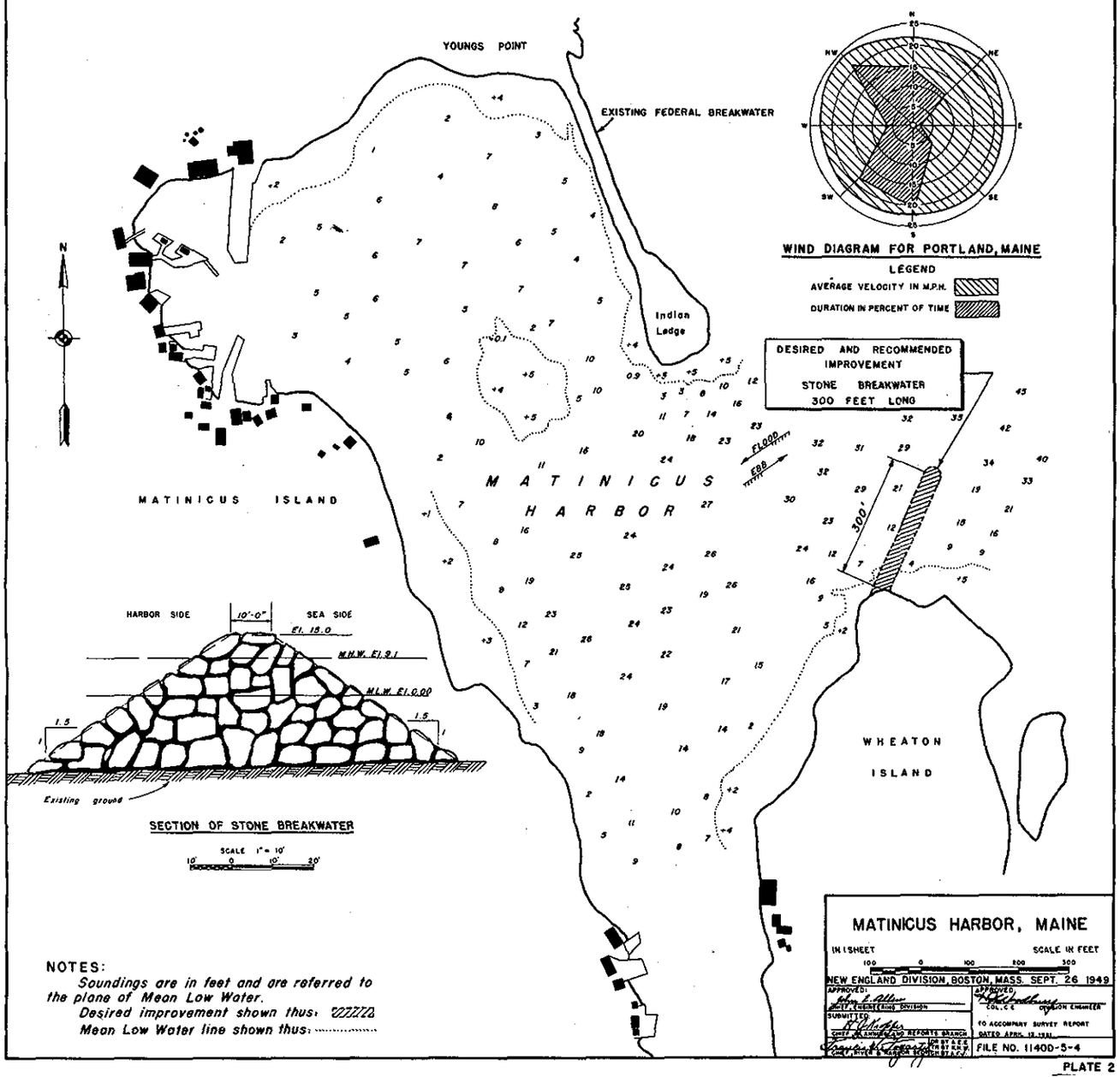
TO ACCOMPANY SURVEY REPORT DATED APRIL 13, 1951.

FILE NO. 1137D-5-3

PLATE I







NOTES:

Soundings are in feet and are referred to the plane of Mean Low Water.

Desired improvement shown thus: ▨

Mean Low Water line shown thus: ·····