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THE NORTHWEST ATLANTIC HERRING FISHERIES:
THE NEED FOR CONSERVATION AND MANAGEMENT

by

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INTRODUCTION

The coastal herring fishery of the United States has declined drastically during the past 10 years, while at the same time the herring fishery in other areas of the Gulf of Maine, both offshore and inshore, has grown so rapidly as to produce a fivefold increase over the 1960 herring catches of Maine and Canada. For the United States, the chief immediate problem is why, in the face of this overall expansion, today's U.S. catch of herring is but half of what it was in 1960, even though Massachusetts fishermen are now bringing in about 20 million pounds annually from the offshore fishery at Jeffreys Ledge. The fishery of western Maine has dwindled through lack of herring, the loss only partially and temporarily mitigated by an increase in the fishery of eastern Maine.

DEVELOPMENT OF THE NORTHWEST ATLANTIC HERRING FISHERIES

The catch history of the herring fishery in the Northwest Atlantic from 1920 through 1970 is shown in Figure 1. The catches were stable at less than a half-billion pounds (Ca. 227,000 metric tons) until the USSR developed its Georges Bank fishery beginning in 1961. Since then, the catches have risen to a peak of just under 2 billion pounds in 1968. The U.S. catches are contrasted with the total Northwest Atlantic herring landings in Table 1. The herring fisheries of Georges Bank, Newfoundland, and the Bay of Fundy have increased remarkably in recent years while the Maine fishery has declined. Within the U.S., Maine is the chief producer of herring. Until now Maine's poorest recent record was in 1961 with 24 million metric tons. In 1970 Maine's catch dropped to 17 million metric tons. Although 1951 and 1961 were poor years, no sustained period of low level catches occurred between 1944 and 1964. In contrast, Maine's landings of herring have been below average in all years since 1964.

THE GULF OF MAINE AND BAY OF FUNDY HERRING FISHERIES

Much of our biological evidence favors the belief that the stocks of herring within the Gulf of Maine and Bay of Fundy are independent of those on Georges Bank, in the Gulf of St. Lawrence, and in Newfoundland. Our evidence has been drawn from a variety of methods that include tagging, meristics, serology, biochemistry, age composition, and larval distribution. Evidence for the complete solution of this problem is still being gathered. Since our immediate concern is with the inner Gulf of Maine and Bay of Fundy area, the remainder of this report will deal mainly with ICNAF subareas 5Y (Gulf of Maine) and 4X (Bay of Fundy and Southern Nova Scotia). The stock structure within those subareas appears to be complex, and although our understanding of it is incomplete, we believe that two major spawning groups, Southwest Nova Scotia and Jeffreys Ledge, are involved, as well as a number of smaller groups which spawn along the northern coast of New England.

The decline of the Maine fishery began in 1964 at the same time the Fundy fishery began an increase that peaked at 226,000 metric tons in 1968 (Figure 2). The increase is attributable primarily to a purse seine fishery which was developed to supply fish meal plants. The herring landings reported by ICNAF for subareas 5Y and 4X are listed in Table 2. Although other countries have fished in those areas, the major catches have been made by Canada and the United States.

DETAILS OF THE MAINE SARDINE FISHERY

In the United States, the immediate problem is the serious decline of the coastal sardine fishery, which for nearly 100 years was the chief U.S. user of herring. The decline in Maine herring landings began in the western part of the state, and since 1964 has gradually shifted eastward across the entire coast. The age composition and production figures in Table 3 provide convincing evidence that the decline in Maine's herring landings is not the result of a decrease in demand for Maine sardines. With the increasing scarcity of the coastal resource, the industry has been forced to import more and more herring from Canada, and to adapt its production to fish that are older and larger than the preferred 2-year-olds.

With the growing scarcity of the desirable 2-year-old herring, it has become necessary to use more mobile and far-ranging purse seines to seek out the remnants of the dwindling resource. In western Maine, not only has the catch declined since 1962, but the effort (number of stop seines fishing) and the catch per stop seine has decreased. In the eastern section, where the major gear has traditionally been the weir, the catch per weir increased in 1965 and 1966 but declined again in 1967 and 1968.

FISHERIES FOR ADULT HERRING IN SUBAREA 5Y

For the past 20 years or so, the traditional fisheries for herring in subarea 5Y have been mainly inshore fisheries for juvenile herring conducted by United States fishermen. Since 1966, and especially since 1968, fisheries for adult herring have increasingly been conducted by Canadian, United States, and European vessels in offshore areas of subarea 5Y. These areas include Jeffreys Ledge, Jeffreys Bank, Platts Bank, Stellwagen Bank, and several minor areas. There are several reasons for believing that the statistics for this developing fishery are inaccurate: first, the fishery is largely carried out in areas contiguous to the border of subareas 5Y and 5Ze, thus attribution of the catches to the proper subareas is difficult; second, a large part of the catch has been imported by way of carrier vessels directly into the United States, thus the fishing nation may not have the possibility for checking reported figures; third, a large part of the catches were made by Canadian vessels and Canadian national statistics are based on port of landing rather than catch area, further complicating the problem. Minimal estimates are presented in Table 2. Age composition data on samples taken from this area (see Boyar and Perkins ICNAF Res. Doc. this meeting "Age, length and maturity of adult herring in ICNAF subareas 4 and 5, 1970") indicate that no good year class has been recruited to the area since 1961.

THE NEED FOR CONSERVATION AND MANAGEMENT

The herring resources in the Northwest Atlantic urgently need conservation and management. Effective measures must be based upon an understanding of the causes of the decline, upon a full assessment of various stocks within this resource, and upon a continuing program of monitoring that will allow prediction of the abundance of the year classes that will be recruited into the fishery. The National Marine Fisheries Service has conducted research toward these goals for several years and is now broadening the scope of its research to include a more thorough study of larval distribution and dispersal. Because of the wide fluctuations in abundance of year classes, ideal management should be based upon year class abundance rather than on some theoretical equilibrium yield.

As important as we consider continuing efforts at understanding and assessment to be, we believe that conservation measures cannot wait, but must be instituted as soon as possible.

Table 1. Total U.S. and NW Atlantic Herring Catches - 1960-1970

	TOTAL U.S. CATCH 1000 METRIC TONS	TOTAL NW ATLANTIC CATCH 1000 METRIC TONS
1960	70	180
1961	26	179
1962	72	344
1963	70	285
1964	28	302
1965	34	263
1966	33.6	431
1967	32.3	594
1968	42.0	866
1969	30.7	826*
1970	28.5	757*(provisional)

*ICNAF Convention Area Only. Does Not Include Sub-area 6.

Table 2. Landings (in metric tons) of herring by countries from subareas 5Y and 4X.

YEAR	COUNTRY	Sub-Areas	
		5Y	4X
1961	Canada	-	57,875
	USSR	-	32
	USA	26,488*	
	TOTAL	26,488*	57,907
1962	Canada	144	67,319
	USSR	-	377
	USA	71,678*	
	TOTAL	71,678*	67,696
1963	Canada	-	63,558
	USSR	227	87
	USA	69,885	-
	TOTAL	70,112	63,645
1964	Canada	636	90,259
	USSR	-	2,060
	USA	27,716	-
	TOTAL	28,352	92,319
1965	Canada	30	123,683
	USSR	-	8
	USA	33,634	-
	TOTAL	33,664	123,691
1966	Canada	47	188,278
	USSR	-	450
	Poland	-	190
	USA	29,365	-
TOTAL	29,412	188,918	
1967	Canada	5,226	189,983
	USSR	-	11
	USA	31,158	-
	TOTAL	36,384	189,994
1968	Canada	21,497	226,371
	Poland	-	246
	USSR	-	119
	USA	41,447	-
TOTAL	62,944	226,736	
1969	Canada	7,395	140,782
	Germany	10,446	1,010
	Poland	-	262
	USSR	-	23
	USA	28,654	-
TOTAL	46,495	142,077	

*May contain small amounts landed from subarea 5Z.

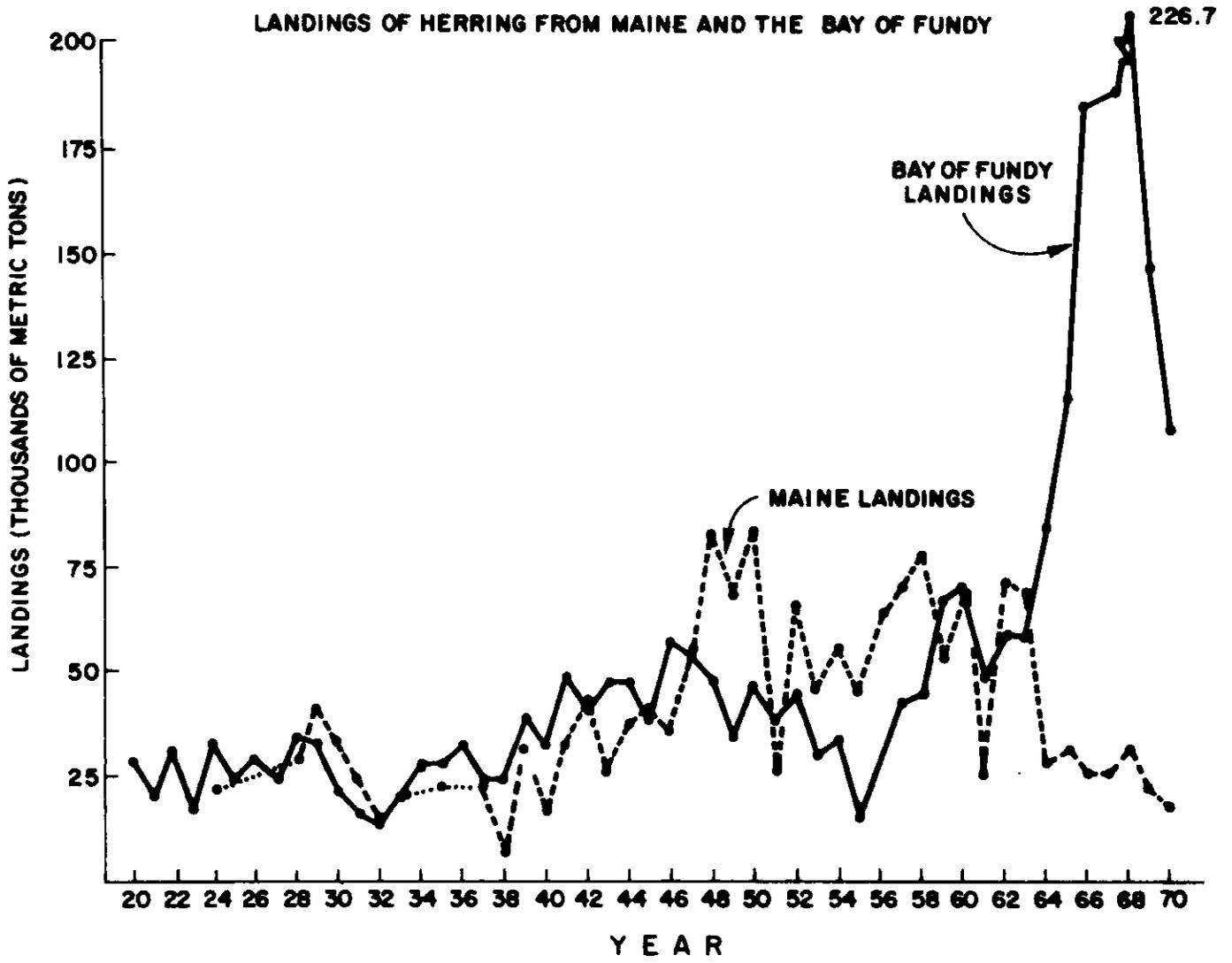


Fig. 2

Table 3. Age composition of herring processed by Maine sardine industry 1960-1970.

Year	Herring used lbs X 1 million	Cases packed X 1 million	Percentage imported from Canada	Percentage Composition by age groups				
				I	II	III	IV	IV+
1960	133	2	15	10	84	6		
1961	56	0.75	15	22	54	23	1	
1962	127	2	9	3	96	0.5	0.5	
1963	96	1.5	12	12	50	36	2	
1964	60	0.8	14	12	72	6	8	2
1965	75	1.2	27	4	89	6	1	
1966	77	1.3	40	5	42	49	2	2
1967	97	1.3	44	9	51	22	15	3
1968	126	1.6	48	3	82	14	1	
1969	84	1.0	41	4	56	38	1	1
1970	64	.7	47	9	71	9	8	3

Table 4. Estimated adult herring landings 5Y
(1,000 Metric Tons)

	1968	1969	1970
Canada (ICNAF Reports)	21.5	7.4	--
Canada (Imports into U.S.)	16.5	5.1	14.0
Iceland (Imports into U.S.)	.2	7.6	--
(ICNAF Reports)	--	(12.8 in 5Ze)	--
Norway	--	(1.2 in 5)	--
Germany	--	10.4	--
U.S.A.	10.0	2.5	10.0
Estimated Total	31.7-47.2	20-34	24

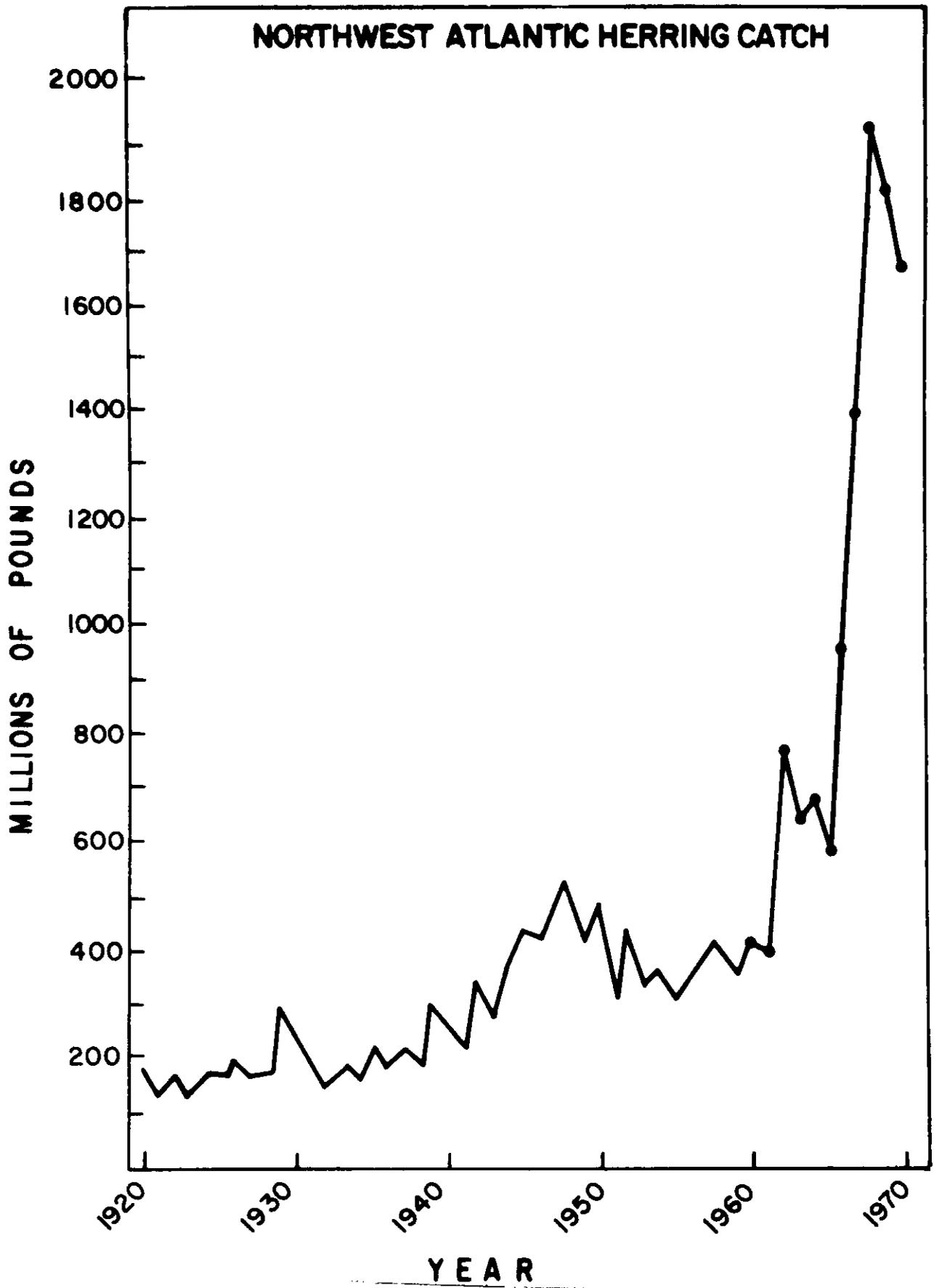


Fig. 1