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Alewife and blueback herring in the Gulf of Maine Area

by

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Abstract

The fisheries for alewives (Alosa pseudoharengus) and blueback herring (A. aestivalis) in the Gulf of Maine area (NAFO Divisions 4X and 5Y and Subdivision 5Ze) are reviewed. Marine exploitation is presently minor relative to freshwater exploitation. Marine statistical boundaries are, in this case, a poor choice for management of these anadromous species, which are best managed on a river system basis.

Résumé

Le présent document étudie les pêches de gaspareau (Alosa pseudoharengus) et d'alose d'été (Alosa aestivalis) du secteur du golfe du Maine (Divisions 4X et 5Y et subdivision 5Ze de l'OPANO). L'exploitation en mer étant actuellement minime par rapport à l'exploitation en eau douce, l'utilisation des zones statistiques marines ne convient pas à la gestion de ces espèces anadromes. La gestion selon les rivières paraît ici plus appropriée.

Commercial fisheries for anadromous alewives (*Alosa pseudoharengus*) and blueback herring (*A. aestivalis*), collectively referred to as gaspereau in Canada and river herring in the United States, occur in marine, estuarine and freshwater environments in the Gulf of Maine area (NAFO Divisions 4X and 5Y and Subdivision 5Ze; Fig. 1). Prior to the 1960s, management and regulation of these species during their marine phase was nonexistent because there were no domestic, directed fisheries for them, they were infrequently taken as by-catch, and they had a low economic value. The boundaries of the previous ICNAF (International Commission for Northwest Atlantic Fisheries), now NAFO (Northwest Atlantic Fisheries Organization), statistical areas are not relevant to the biology of these species and can be considered marine management areas only insofar as they are administrative limits for the collection of catch statistics. In Division 4X, estuarine and freshwater catch statistics are obtained for 35 Fishery Statistical Districts, of which four are inland on the Saint John River. The four inland districts are excluded from the compilation of Division 4X alewife catch statistics. The boundaries of the Fishery Statistical Districts were also presumably set for administrative convenience (many follow county lines) and have no biological meaning. In Division 5Y, freshwater catch statistics are obtained for individual river systems and then summarized by county.

The unit stock for anadromous species exploited in freshwaters is preferably based on the biological population because of the ability to home to a parent stream. The homing ability of salmonids is well documented [see the reviews by Leggett (1977) and Hasler and Scholz (1983)]. Amongst the anadromous clupeids, American shad (*Alosa sapidissima*) have been shown capable of returning to a home stream and to a natal tributary (Walburg and Nichols 1967; Carscadden and Leggett 1975). Homing by alewives is implied by the numerous successful restockings of barren streams (Rounsefell and Stringer 1943; Bigelow and Schroeder 1953; Havey 1961) and by studies of interpopulation variation in morphometrics and meristics (Messieh 1977). Olfaction is important in the stream selection process for salmonids (Hasler and Scholz 1983); American shad (Dodson and Leggett 1973) and probably also for alewives and blueback herring. Thunberg (1971) has demonstrated that alewives can select the "home" water when given a choice. Where alewives and blueback herring cohabit, the unit stock will usually include both species because both enter freshwater within a short time of each other, both may be widely distributed throughout the river system and a distinction between species is not made by fishermen or catch statistics.

During the marine phase of their life history, alewives and blueback herring undertake extensive seasonal migrations along the Atlantic coast (Neves 1981; Jessop, unpublished data) much as do American shad (Dadswell et al. 1983). Within the Gulf of Maine Area, marine fisheries are believed to harvest fish of mixed origins but the degree of intermixing is unknown. Blueback herring may not migrate as far north or south from their home rivers as do alewives.

Marine exploitation of alewives and blueback herring in the Gulf of Maine Area is minor relative to freshwater exploitation, with the exception of the period between the late 1960s and 1970s when eastern bloc fishing fleets harvested large quantities from Subdivision 5Ze (and 5Zw; Table 1). Since then, marine catches of these species have declined at least partly in response to regulations imposed on the foreign fleets by Canada and the United States subsequent to the declaration by each country of extended economic jurisdiction zones. In Canadian

waters, the marine harvest of gaspereau by foreign vessels is now limited to a by-catch that must not exceed the greater of 2,500 kg or 10 percent of the weight of all fish on board the vessel. The nature of domestic fisheries is such that few gaspereau are expected to be caught, except perhaps in the herring purse-seine fishery. Separation of the by-catch from the target species in this case would be difficult. Variable, usually small, quantities of gaspereau are also harvested in the herring-weir fisheries of the lower Bay of Fundy and the weir fisheries of Minas Basin. In American waters, foreign fleets are limited to an annual by-catch quota of 100 t; domestic fishermen are not restricted and no records are maintained of domestic by-catch, which is believed to be small. A potential for interjurisdictional conflicts exists for marine gaspereau fisheries.

The accuracy of freshwater and marine catch statistics for gaspereau has often been questioned, e.g., Richkus and DiNardo (1984). Various methods are used to catch gaspereau in freshwater, some of which do not have their catches reported or recorded. For example, the often substantial catches made by recreational and bait dip-net fishermen go unrecorded in Divisions 4X and 5Y. Landings in Fishery Statistical Districts may be recorded where sold, i.e., at a fishplant in another district, rather than where caught. Doubt also exists about the reliability and meaning of the catch records maintained for or by the towns or their designated agents for the fisheries of individual rivers in coastal New England states (Rounsefell and Stringer 1943; Richkus and DiNardo 1984). Market factors may also influence fishing effort and subsequent catch. Consequently, reported landings of gaspereau may not accurately represent stock abundance. Inaccuracies in freshwater landings will be carried over into the ICNAF/NAFO statistics for Divisions 4X and 5Y.

The ICNAF Statistical Bulletin lists catches prior to 1973 for alewives only. Both alewives and blueback herring were considered distinct from alewives for record purposes but identification was either infrequently or incorrectly made in the field and no blueback herring entries occur in Subarea 4 and few occur in Subarea 5 (specifically Areas 5Ze and 5Zw). The blueback herring catches that occur in Areas 5Ze are reported by the foreign fishing fleet. Catches made in freshwater are not separated by species and the nominal heading of alewives often includes large quantities of blueback herring. For example, the gaspereau catch of the Saint John River may consist of 20 to 40% blueback herring (Messieh 1977; Jessop, et al. 1982, 1983).

Unit stocks of alewives and blueback herring in freshwater are best defined on a home river system basis unless evidence for tributary substocks is available. In marine waters, the unknown degree of stock mixing and minimal information on the seasonal distribution of each species permits the use of arbitrarily defined boundaries such as the existing ones for statistical and managerial purposes.

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TABLE 1. Annual landings (t) of alewives in NAFO (ICNAF)¹ Statistical Areas for the Gulf of Maine, 1954-1982.

Year	4X	5Y	5Ze
1954	2,107	-	-2
1955	-	-	-
1956	-	-	-
1957	-	-	-
1958	-	-	-
1959	-	-	-
1960	-	-	-
1961	1,543	8,645	-
1962	1,608	2,778	-
1963	1,264	5,615	-
1964	1,056	2,485	-
1965	500	4,534	-
1966	877	3,944	-
1967	798	3,579	-
1968	633	958	541
1969	1,330	1,183	8,430
1970	714	1,332	4,126
1971	7,315	986	2,825
1972	4,943	1,006	4,761
1973	4,496	1,473	1,554
1974	5,127	1,577	1,213
1975	1,475	2,466	1,801
1976	2,922	1,540	185
1977	2,688	1,573	16
1978	1,994	1,267	2
1979	1,631	1,050	-
1980	1,661	1,200	1
1981	608	1,056	-
1982	656	683	-

¹ ICNAF statistics became NAFO statistics in 1979.

² Dash indicates no record or no catch.

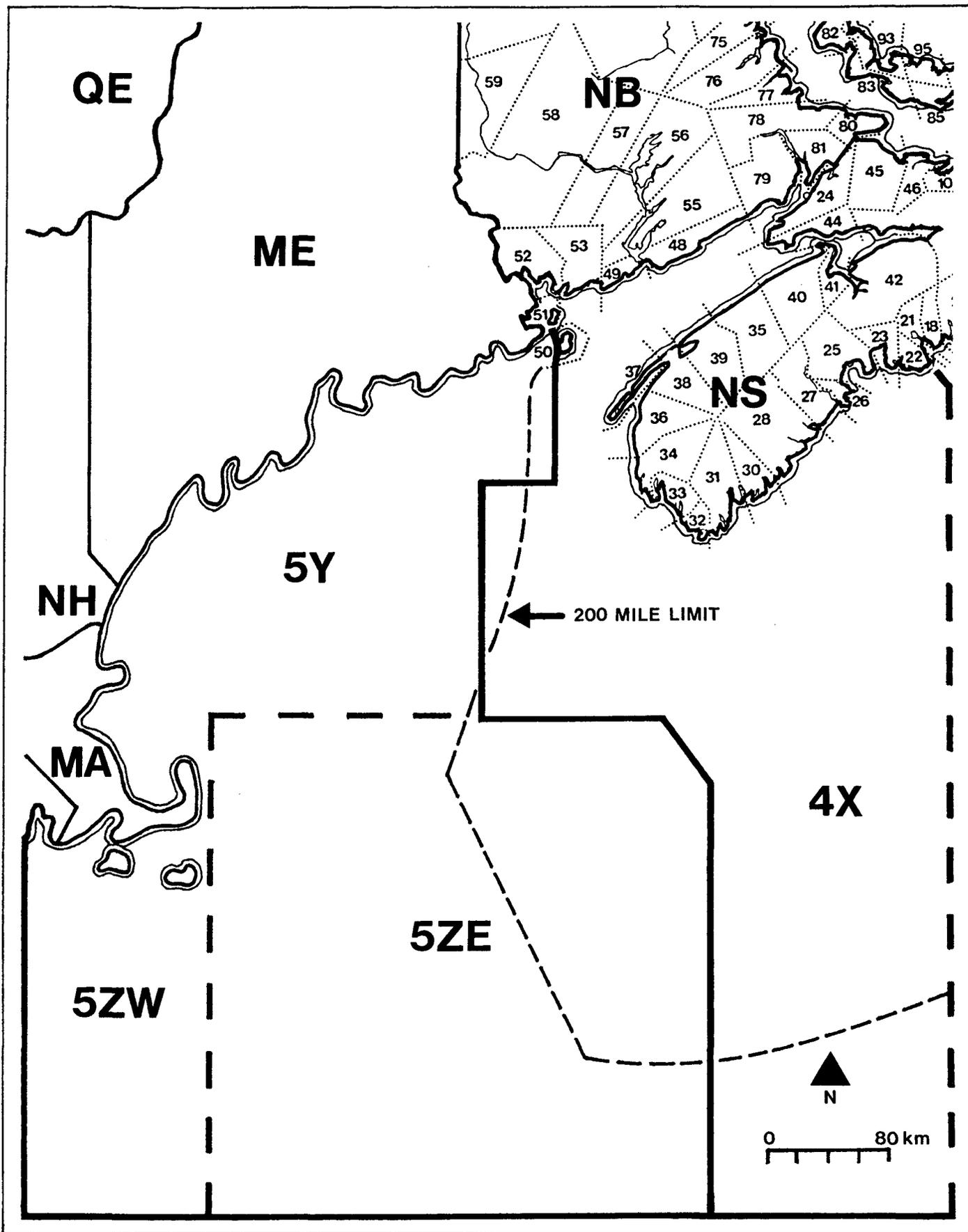


FIG. 1. NAFO marine statistical areas and provincial Fishery Statistical Districts in the Gulf of Maine area.