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A first approximation of MSY for spiny dogfish in Subareas 5 and 6 and Division 4X¹

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Estimates of mean standing crop of spiny dogfish were made by direct expansion of stratified mean catch per haul figures from U.S. bottom trawl surveys from Cape Hatteras to Western Nova Scotia. All surveys were conducted by Albatross IV and used the standard #36 Yankee trawl, and results from spring and fall surveys for the period 1968-1970 (six surveys) were pooled. The mean total biomass estimates during this period ranged from about 170,000 tons to 225,000 tons depending upon estimates of wingspread used. This is probably a conservative estimate since the research trawl is not 100 percent efficient; on the other hand, dogfish appear highly vulnerable to bottom trawls at most times, and therefore an estimate of about 200,000 tons would seem to be a reasonable first approximation.

On the basis of studies on spur dog in the Eastern North Atlantic, it appears that no more than about 20 percent of the stock (on a total weight basis) can be harvested annually in order to achieve maximum sustainable yield and even this rate of exploitation may be too high (Holden, 1968). Although there have been no detailed assessment studies on spiny dogfish in the Northwest, it seems unlikely that sustained exploitation rates could exceed 20 percent in view of the low reproductive potential of dogfish.

Dogfish mature slowly (females maturing at about 7-8 years), have low fecundity (4-6 pups per female) and a long gestation period (about 2 years). Hence, only a small proportion of the total stock can be harvested on a sustained basis without impairing recruitment. There may be a possibility of increasing yield through selective harvest of males (since dogfish school by sex at certain times of year) but we do not have sufficient information yet to explore this potential.

At the 20 percent level of exploitation, the MSY for spiny dogfish would then be about 40,000 tons for the area under consideration. There appears to be growing interest in this species since reported dogfish landings were about 22,000 tons in 1972, which is already more than half of the estimated MSY level.

If we wish to achieve an MSY of dogfish, it is suggested that it would be prudent not to exceed annual harvests of 40,000 tons for several years, to allow sufficient time for an adequate assessment. There would be very little penalty in terms of lost dogfish production if we underestimated sustainable yield; this is because natural mortality appears low as suggested by the long life span of dogfish.

LITERATURE CITED

Holden, M. J. 1968. The rational exploitation of the Scottish-Norwegian stocks of spurdogs (Squalus acanthias L.). Ministry of Agriculture, Fisheries and Food, Fishery Investment Series II 25(8): 1-27.

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