

Areal Distribution of the offshore surf clam,
Spisula solidissima, and ocean quahog,
Arctica islandica, resources of the Middle
Atlantic Bight: 1979.

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Laboratory Reference No.: 79-44
11 October 1979

ABSTRACT

Recent trends in the areal distribution and relative abundance of offshore surf clam, *Spisula solidissima*, and ocean quahog, *Arctica islandica*, populations in the Middle Atlantic Bight are reviewed. Areas containing the highest abundance of commercial size (>12 cm, shell length) surf clams as indicated from NMFS shellfish surveys generally correspond to locations frequented by fishing vessels. Abundant pre-recruit surf clam resources occur coincidentally with commercial sizes off Delmarva and Southern New Jersey. Significant quantities of pre-recruits are also distributed off Northern New Jersey, where few large clams are found.

Directed fishing effort for ocean quahog is presently concentrated off Southern New Jersey and Delmarva. Research survey data indicate the greatest quantities and densities of quahogs are off Northern New Jersey and Long Island, thus recent fishing effort has been disproportionate to relative resource abundance.

Introduction

Synoptic surveys of the offshore surf clam, *Spisula solidissima*, and ocean quahog, *Arctica islandica*, resources of the Middle Atlantic Bight (Cape Cod to Cape Hatteras) have been conducted intermittently during the last 15 years by the National Marine Fisheries Service and its predecessor, the Bureau of Commercial Fisheries (Parker 1966; Murawski and Serchuk 1979a; 1979b). Various sampling gears were used and areal coverage of specific survey cruises adjusted to meet immediate priorities, nevertheless the surveillance program did monitor the distribution and relative abundance of resources both geographically and temporally. In this report I review the status of offshore clam resources in various sub-areas based on recent survey information. Trends in commercial fisheries for the two species are reviewed and projected in light of research survey findings.

The modern fishery for surf clams began in the 1950's, off the Northern New Jersey Coast, in response to increased demand for, and declining yields of, traditional clam resources (Ropes 1967; Serchuk et al. 1978). As the accumulated stocks of this relatively long-lived mollusk (Jones et al. 1978) declined, new recruitment could not maintain the fishery; catch per standardized effort and survey abundance indices declined off New Jersey (Serchuk et al. 1978; Ropes 1972). During the early 1970's fishing effort shifted to an area east of the Chesapeake Bay entrance to take advantage of virgin resources first detected during the 1969 research vessel cruise of the R/V ALBATROSS IV (Serchuk et al. 1978; Ropes and Ward 1977). The resulting catches and catch per effort attained record levels, however the resources could not sustain the rates of exploitation and resources off southern Virginia - North Carolina declined drastically during the mid-1970's. Over 90% of the offshore surf clam landings during 1978 were derived from

waters of the Delmarva Peninsula (Murawski and Serchuk 1979a). Fishing for offshore surf clams is presently concentrated in areas east of Ocean City, Maryland, and southeast of Chicoteague, Virginia (NMFS logbook data 1979).

Declines in Middle Atlantic offshore surf clam populations, exacerbated in 1976 by a massive kill of the stocks in the New Jersey fishing areas, stimulated increased fishing pressure on deeper dwelling ocean quahog resources. The average landings of ocean quahog from 1967-1976 were 687 mt of meats, however catches increased to 8,412 mt in 1977 and over 9,163 mt in 1978 (Murawski and Serchuk 1979b). Presently, directed fishing effort for ocean quahog is concentrated at two offshore locations: 38°55'N, 74°30'W, east of Cape May, N.J.; and 38°00'N, 74°30'W, SE of Ocean City, Md. A third area of intense fishing effort is located inshore, north of Block Island, R.I. (NMFS logbook data 1979).

RESOURCE DISTRIBUTION: 1979

Research vessel surveys of offshore clam resources have been conducted each year since 1976 with the R/V Delaware II (Murawski and Serchuk 1979a). Sampling gear for the 1976, 1977, and two 1978 cruises was a 48" wide commercial-type dredge, modified to retain small clams. During January 1979 a 60" wide model with submersible pumping system was used. A standard sample consisted of a 4 minute (1976-1978) or 5 minute (1979) dredge tow at stations in a grid pattern (1976-1977) or at stratified random locations (1978-1979). Clams caught in each survey haul were enumerated and a sub-sample measured for length frequency analysis.

Locations of sampling stations, from which data were used to produce species abundance maps, are plotted in Figure 1. The relative abundance of surf clams expressed as numbers per survey tow during December, 1978 and January, 1979 cruises is summarized in Figures 2 and 3. Data are presented for both commercial sizes (>12 cm, shell length) and pre-recruits

(≤ 12 cm, shell length). Since relatively few stations were occupied in New England waters, information is probably most reliable between Montauk Point, N.Y., and Cape Charles, Va.

Offshore commercial size surf clams are located in a continuous band from southern New Jersey through southern Virginia (Figure 2a), however, greatest concentrations appear east of Ocean City, Md., and southeast of Chincoteague, Va. Relative commercial fishing effort for all three vessel classes (1-50, 51-100, 101+GRT) was greatest off the Delmarva Peninsula during 1978 reflecting the concentration of resource in that area (Murawski and Serchuk 1979a). Preliminary analyses of 1979 logbook records indicate the same areal distribution of fishing effort as exhibited in 1978. Minor concentrations of commercial sized clams southeast of Atlantic City and Point Pleasant, N.J. support small catches from those areas. Harvestable resources off the south coast of Long Island, N.Y., have remained relatively unexploited (Figure 3a).

The distribution and abundance of pre-recruit sized surf clams generally coincides with commercial sizes off southern New Jersey and the Delmarva Peninsula (Figure 2b). A significant pre-recruit resource exists in the Northern New Jersey area (Point Pleasant-Atlantic City), the region that sustained massive mortalities of clams during the anoxic conditions of 1976. Pre-recruits off the New York and New England coasts are generally not abundant, however survey coverage of the area east of Montauk Point was not as intense as that further to the south.

The ocean quahog resource of the Middle Atlantic region remained stable in both distribution and relative abundance during 1965-1977 (Murawski and Serchuk 1979b). Distribution maps for ocean quahog are based on the synoptic region-wide survey of 1977 since sampling intensity during 1978 and 1979

cruises was concentrated on inshore surf clam strata, and locations where quahogs are presently being fished. Areas of high quahog density are scattered throughout the Middle Atlantic Bight (Figure 4), the largest being off the Long Island Coast. Approximately 46% of the standing stock of harvestable resource from Montauk Point to Cape Charles exists off Long Island; the New Jersey stocks account for 44%; Delmarva 10%. High density areas off southern New Jersey and Delmarva have yielded most of the quahog catches since 1976.

TRENDS IN AREAL DISTRIBUTION OF CATCHES

The history of the surf clam fisheries has demonstrated that the fleet is highly mobile and capable of taking advantage of localized high density areas in response to the vagaries in recruitment exhibited by the offshore clam resources. The intensive, short-lived fishery off the entrance to Chesapeake Bay during the mid-1970's was probably the result of a discrete settlement of clams in the area. Average shell lengths of clams landed from this location were 135 mm and 132 mm in 1973 and 1974, respectively, barely the minimum commercially usable size (Ropes and Ward 1977). Murawski and Serchuk (1979a) reviewed recent survey information relative to the sizes of clams inhabiting the various assessment areas. The modal shell length of pre-recruit clams of Northern New Jersey was about 65 mm, significantly larger than pre-recruits off Delmarva. Small clams off Northern New Jersey should recruit to the fisheries sooner than those off Delmarva, probably in 1981 or 1982 (Jones et al. 1978; Murawski and Serchuk 1979a). An effort shift to Northern New Jersey is thus anticipated since the industry has shown the ability to extensively utilize newly recruited surf clams. Significant increases in the sizes of harvestable stocks off both Northern New Jersey and Delmarva should occur during the early 1980's if natural mortality remains constant, and the impact of fisheries on small clams remains minimal until then.

The offshore quahog fisheries are most intensively prosecuted on high-density beds located nearest to the ports of Cape May, N.J., and Ocean City, Md., (Figure 4a). However, the greatest abundance and relative densities of quahogs occur off Long Island and Northern New Jersey (Figure 4b; Murawski and Serchuk 1979b) thus the distribution of fishing effort and landings is disproportionate to stock abundance. Localized declines in quahog populations will probably result from present fishing patterns, however, the long-term impacts of these reductions in harvestable stock size are speculative. The relative absence of small quahogs in the areas presently being fished and the presumed slow growth rate of the species imply resource recovery will be slow. However, the effects of density dependent regulatory mechanisms, if any, are not precisely known (Murawski and Serchuk 1979b). Landings in 1978 accounted for less than 1% of the estimated standing stock in the area from Montauk Point to Cape Charles.

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