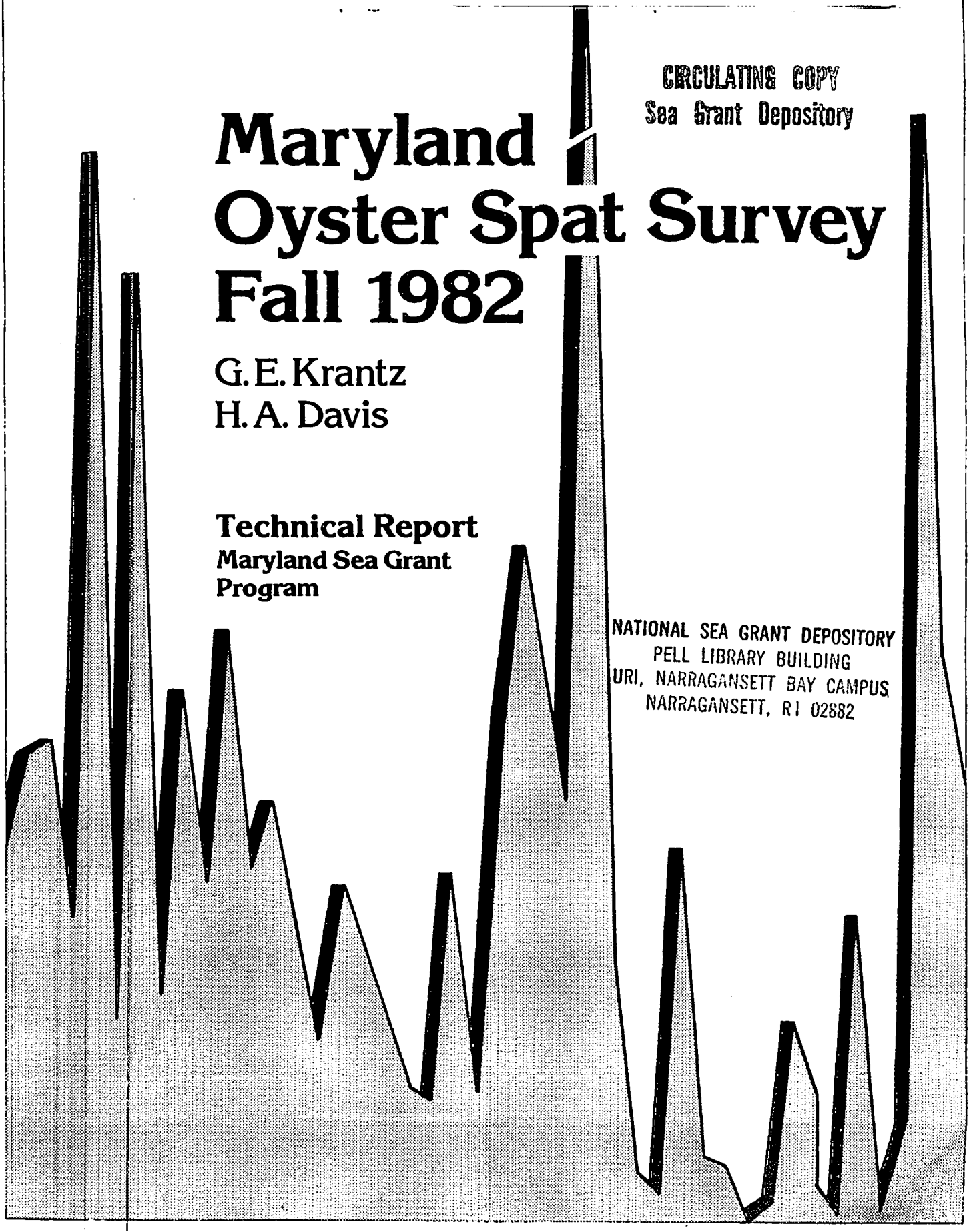
Maryland Oyster Spat Survey Fall 1982

G. E. Krantz
H. A. Davis

Technical Report
Maryland Sea Grant Program



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SURVEY OF MARYLAND'S OYSTER BARS
FALL 1982

The 1982 fall survey of natural and planted oysters bars in Maryland waters was conducted by personnel of the Maryland Cooperative Shellfish Aquaculture and Technology Laboratory (Department of Natural Resources and the University of Maryland Center for Environmental and Estuarine Studies) and the University of Maryland Marine Advisory Program. The project was jointly funded by Maryland Sea Grant and Maryland Department of Natural Resources.

Originally conducted October 11 through 15, 1982 by scientists aboard the research vessel *Aquarius*, the survey was continued during November and December by personnel of the Cooperative Shellfish Unit aboard the DNR vessel *Miss Kay*. At selected sample sites biologists employed an oyster dredge or patent tongs to collect bottom material from natural oyster bars, recent shell plantings and state seed areas. At each site they sorted a random sample of one-half a Maryland bushel of material to determine the number of market oysters, small oysters, oyster spat, dead oysters (boxes) and oyster shell (by percentage). These techniques were consistent with procedures employed since the mid-1930's by oyster biologists who have continuously observed the population dynamics of Maryland's most valuable natural resource--the American oyster, *Crassostrea virginica*.

The 1982 survey revealed significant levels of spat settlement on several of the State seed areas and on many of the Eastern Shore oyster bars (Figure 1). Spat settlement was found to be much lower on Western Shore oyster bars, in the Chester River, in Eastern Bay, and in the Upper Potomac and Upper Patuxent rivers. A significant level of spatfall occurred at the mouth of the Potomac River up to Piney Point. This area has received moderate to high levels of spatfall for over a decade. At the time of this report, all of the traditional survey locations have not been sampled, but preliminary analyses of the data indicate a Bay-wide average of about 75 spat per bushel on Maryland's natural

oyster bars. This is slightly lower than that found in 1981 (98.8 spat per bushel) and far below the near-record spat set of 1980 (191 spat per bushel). The 1982 spatfall lies near the median level of spatfall found in the past 45 years of biological data on Maryland oyster bars.

It should be noted that Bay-wide spatfall is an arithmetical average of many oyster bars and that vast areas of oyster bars on the Western Shore, in the Upper Potomac River, Patuxent and Chester rivers did not receive any detectable levels of spat settlement. Even though these areas are open for harvesting, they have not received significant levels of recruitment for over a decade, and stocks of oysters on these bars are now very low.

Other areas varied widely. While spatfall in the mouth of the Patuxent River, in the Potomac Little Choptank Rivers, and in Broad Creek and Tangier Sound has been fairly consistent for the past three years, during this period Eastern Bay and the mouth of the Choptank River have shown a steady decline--and in 1982 they received very little spatfall. For the past two years, the Lower Patuxent River (from Broomes Island to the Bay) and the Tred Avon River have received high spatfall, exceeding any previous levels recorded during the past 45 years.

State seed areas--especially those in Broad Creek, Little Choptank and Honga Rivers, Calvert Bay and near the Calvert Cliffs Power Plant--received a significant spat set that will be economically feasible to move in the spring of 1983. Unfortunately, seed areas in Eastern Bay, Harris Creek and Tangier Sound have not done so well. Of course, state shellfish management personnel will have more seed to move in the spring of 1983 than that found just on the seed areas. Many natural bars close to the seed areas in Broad Creek and in the Little Choptank contain an over-abundance of spat and could serve as additional sources of seed oysters. It is highly probable that the amount of seed moved in 1983 will be limited by oyster repletion funds rather than by the availability of high quality seed oysters.

Personnel of the Cooperative Shellfish Unit observed a small but significant increase in the number of oyster boxes during 1982 summer field work and on the fall survey. At the same time, Maryland watermen, especially oyster divers, reported unusually high levels of oyster mortality. Collectively, the summer and fall survey data show a significant increase in the percentage of boxes (dead oysters with the shells connected) at several locations throughout the Maryland portion of the Bay (Figure 2). Notably high levels of mortality were found in Eastern Bay and Miles River, the Choptank (at the mouth), Little Choptank, Upper Tangier Sound, Pocomoke Sound and at the mouth of the Patuxent River.* In previous fall surveys (1980 for instance) levels of mortality on oyster bars ranged from 1% to 5% over much of the Bay (Figure 3). Only a few areas of higher mortality were found in 1980. In Tangier and Pocomoke Sound, the 1982 mortality appeared to be related to "Dermo disease," caused by a very primitive life form that spreads from oyster to oyster (see Figure 4). Other areas of mortality had no obvious causes until laboratory test results recently became available. (See below).

An important part of the annual fall survey has been to monitor the presence of oyster diseases in the Maryland portion of the Bay. The Department of Natural Resources maintains a staff of pathologists who analyze samples collected from selected locations to determine if any pathogenic oyster disease organisms are present in the Bay. Of primary concern are the protistan parasites causing "MSX disease" and "Dermo Disease." "MSX disease" devastated the Delaware and Virginia oyster industry in the early 1960's and caused serious reductions in oyster harvests in Tangier Sound. The disease disappeared from Maryland's Baywaters in 1968 as suddenly as it appeared in 1963. "MSX disease" is still a deterrent to oyster culture in Delaware Bay and in Virginia waters of the Chesapeake Bay; it can kill up to 95% of a given year class of oysters by the time

*These are the heavily shaded areas (greater than 20%) shown in Figure 2.

they are three years old. "Dermo disease," which entered the Chesapeake Bay in 1959 and spread into Maryland waters a few years later, can have an equally devastating effect on oysters. "Dermo disease" staged a sudden recurrence in Tangier Sound in 1974 and has remained in that general area at an enzootic level. Both diseases are recognized to be restricted in growth to waters where the salinity remains above 15 parts per thousand (ppt).

Samples collected during the 1981 and 1982 fall cruises have supplied the material to demonstrate that "MSX" is involved in the high levels of mortality observed on the Eastern Shore of Maryland (Figure 1). "Dermo disease" appears to be contributing to the mortality in the Potomac River, Patuxent River and Tangier Sound. The sudden appearance of "MSX" throughout the Maryland portion of the Chesapeake Bay is thought to be related to the high salinity levels observed during the 1981 and 1982 cruises. Relatively dry summers and stable weather conditions permitted the salinity of Baywater to rise above 15 ppt as far north as the Chesapeake Bay Bridge. "MSX disease" will probably persist in these areas until a significant decrease in salinity (probably below 12 ppt) occurs in the future.

Samples of oysters throughout the entire range of the oyster bars in Maryland waters were delivered to the Maryland Department of Health and Mental Hygiene, which has monitored the oysters for the presence of heavy metals, chlorinated hydrocarbons and bacteria every fall since 1979. The combined data base on oyster population dynamics, changes in water quality, levels of oyster parasites and diseases, and the information collected by the Health Department are providing one of the most valuable data bases for the Chesapeake Bay environment. State and federal resource managers frequently use this information when assessing the ecological well-being of particular locations within the Bay.

Because of the variety of functions of the fall oyster survey, participating scientists and advisory personnel have made an effort to have watermen, legislators, members of the seafood processing industry, environmentalists and health officials accompany them on the cruises. Due to limited funding, the 1982 cruise could accommodate only forty-one individuals. These interested persons availed themselves of the opportunity to see sampling procedures and to discuss their observations with university scientists, state oyster biologists and resource managers. This participation was particularly helpful in defining areas of oyster mortality and in disseminating accurate and timely information concerning the probable causes of high levels of oyster mortality, shown in Figure 2. During recent weeks numerous requests for advisories on the condition of Maryland oysters have been received by the Department of Natural Resources, the Cooperative Shellfish Unit, University of Maryland scientists and Sea Grant personnel. Data collected during the annual fall survey has enabled them to respond in an intelligent and informed manner.

Figures

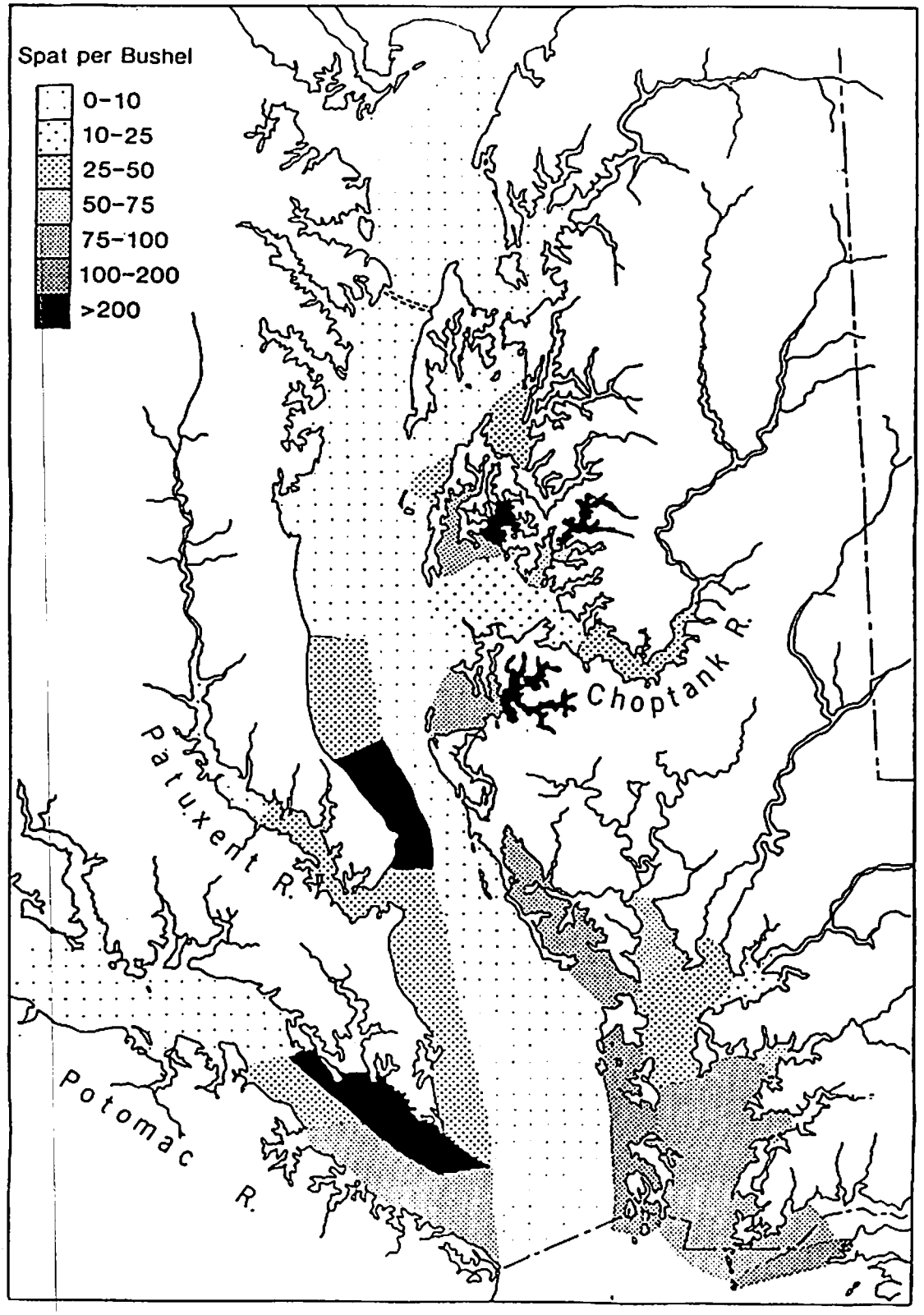

Figure 1 - Spat set per bushel of material removed from natural oyster bars in the Maryland portion of the Chesapeake Bay during the Fall of 1982.

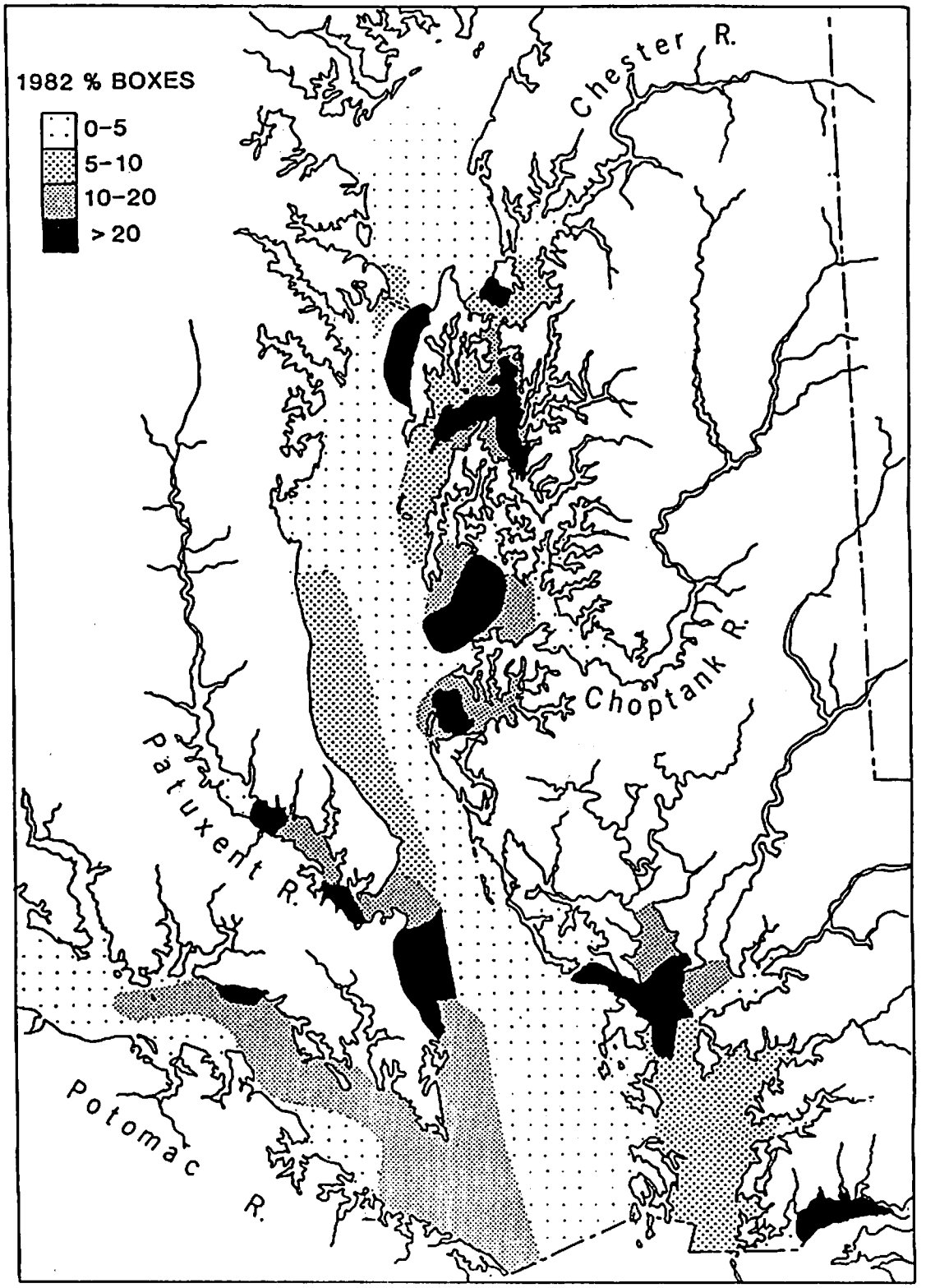

Figure 2 - The percentage of oyster mortality observed on Maryland oyster bars in 1982. Boxes are dead oysters with both shells attached.

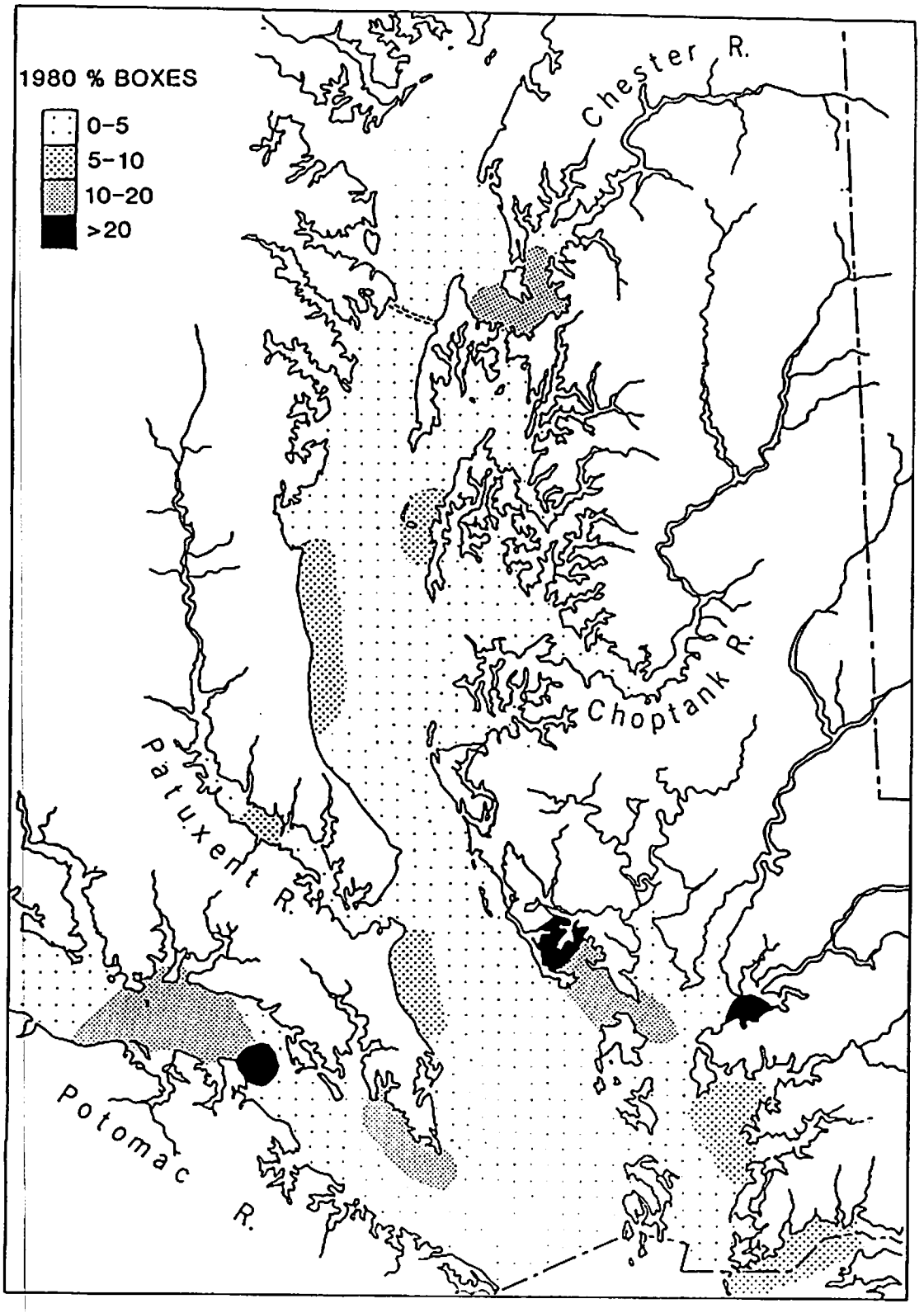

Figure 3 - The percentage of oyster mortality observed on Maryland oyster bars in 1980.

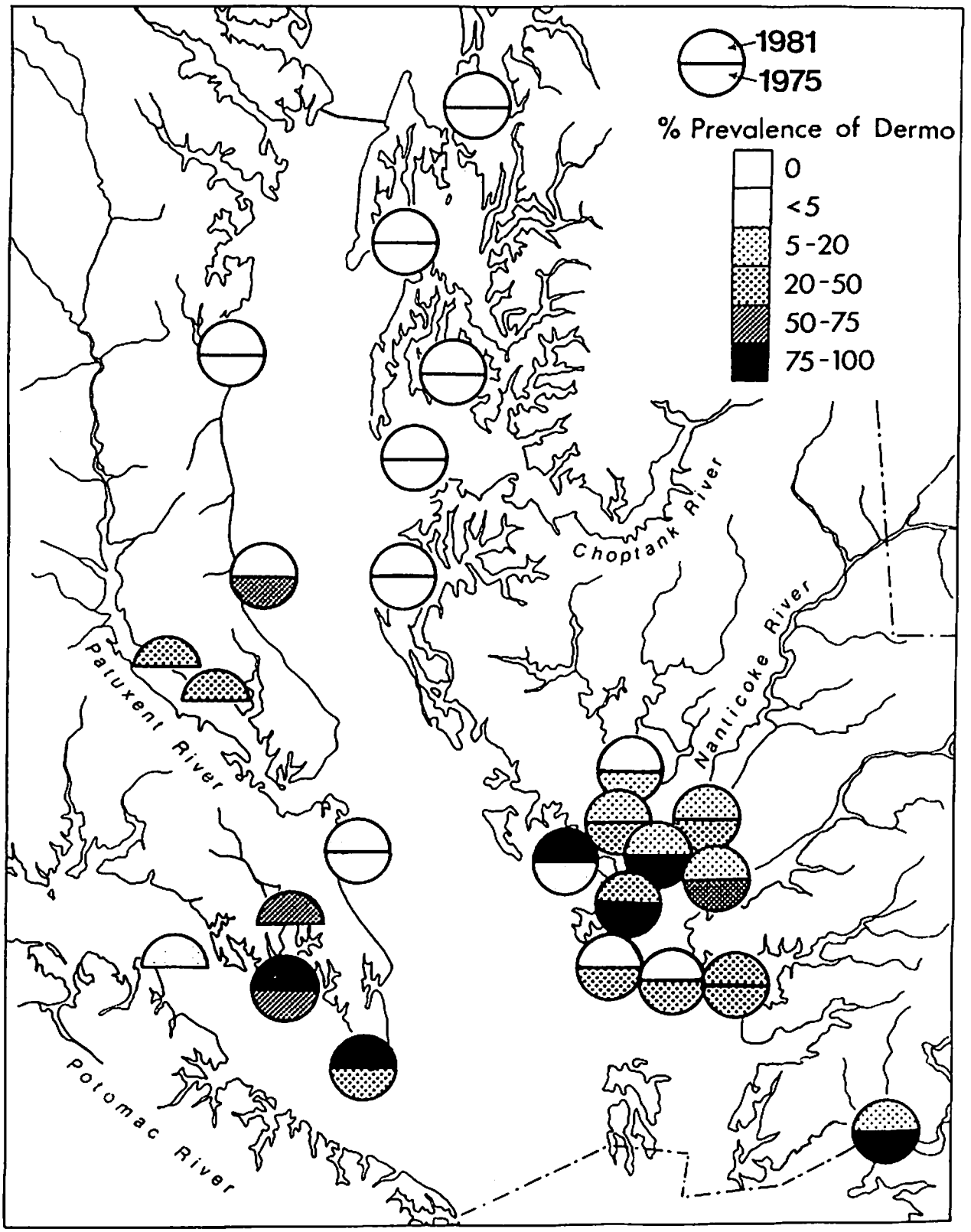

Figure 4 - A comparison of the geographical distribution of "Dermo Disease" in Maryland oysters between the epizootic of 1975 and 1981.

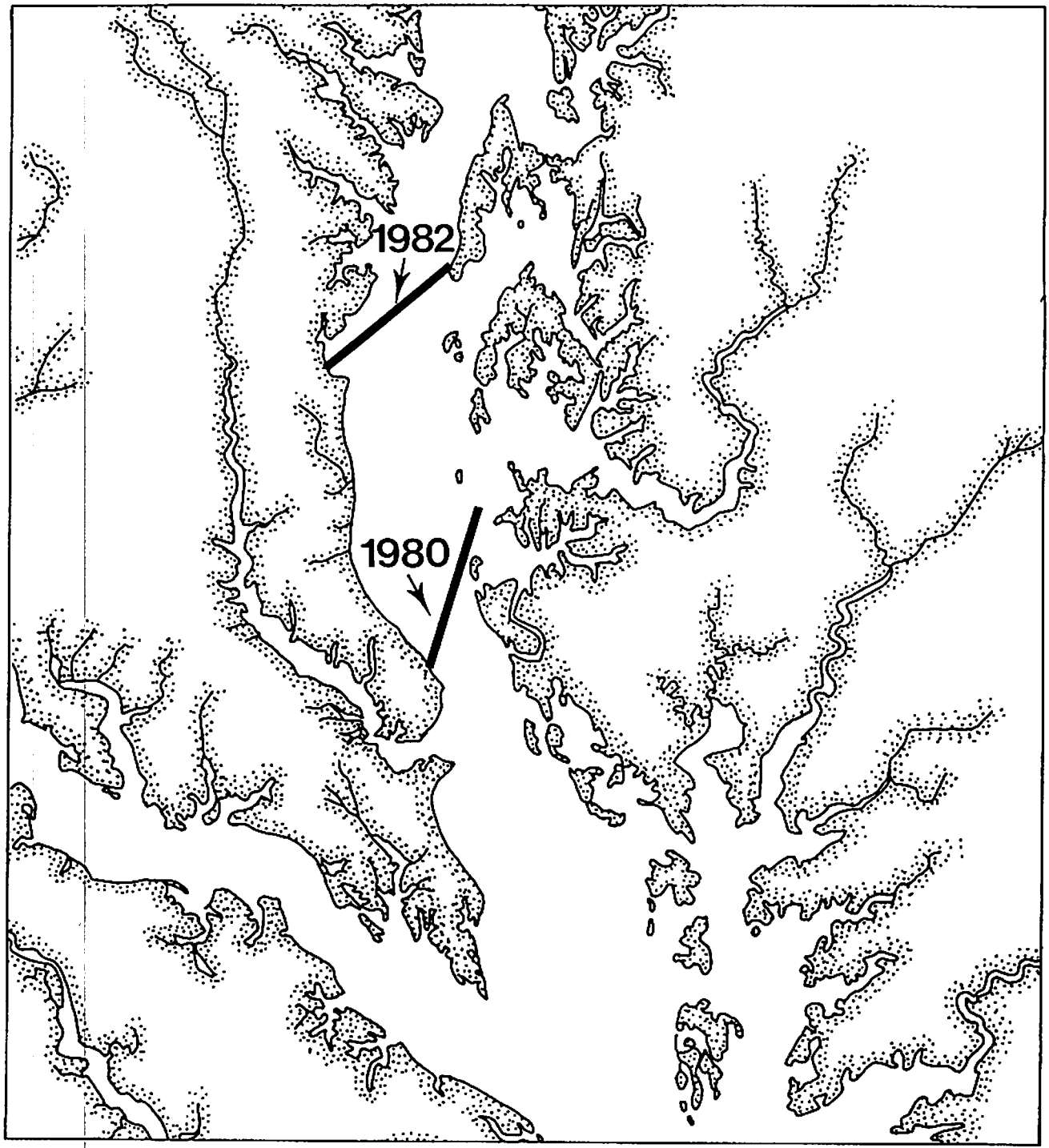

Figure 5 - Estimated northerly movement of higher salinity water (15 ppt) from 1980 to 1982. The 1982 line includes much of Eastern Bay.

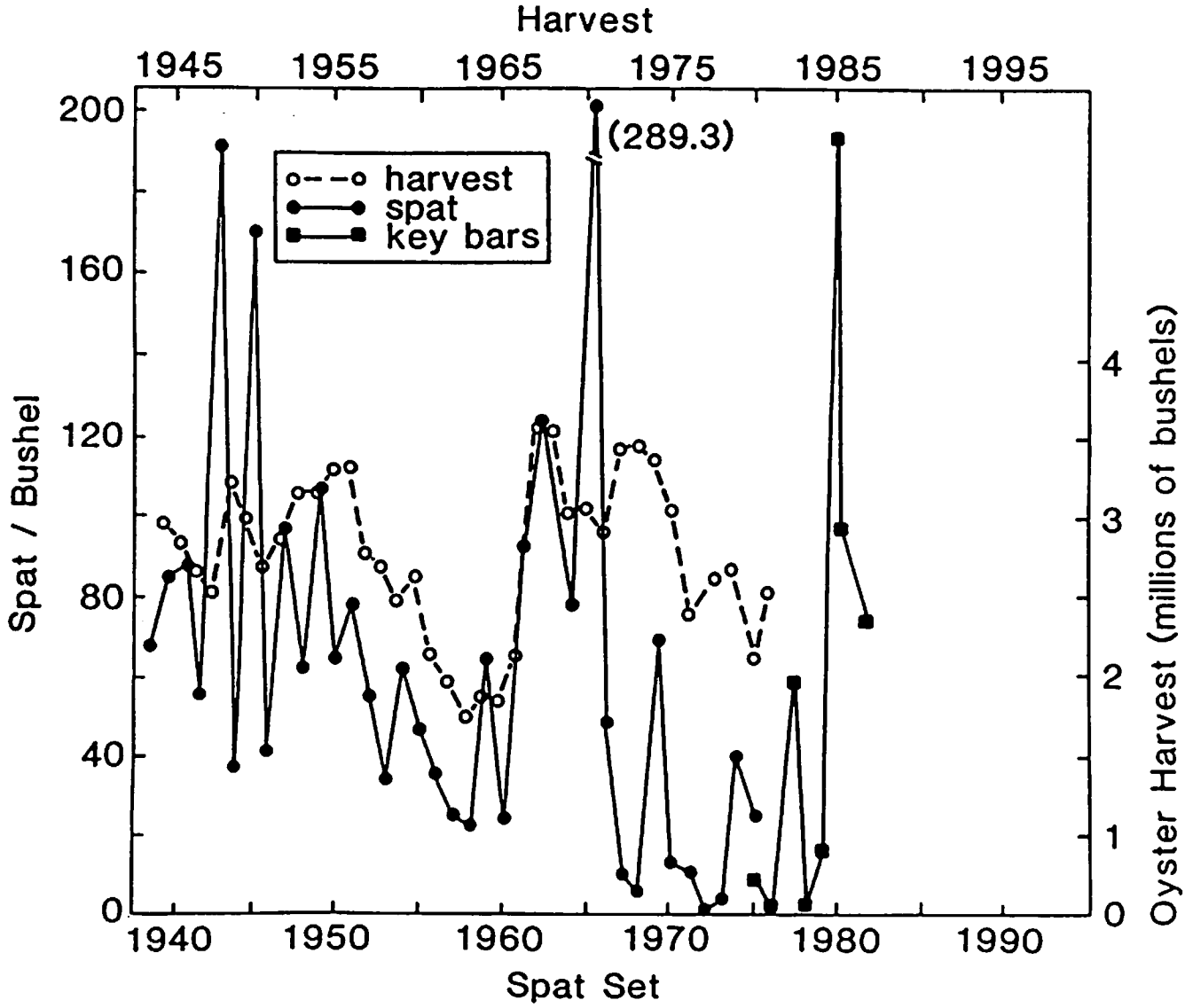

Figure 6 - Spat set on natural oyster bars and subsequent annual harvest (five-year lag) in Maryland waters.