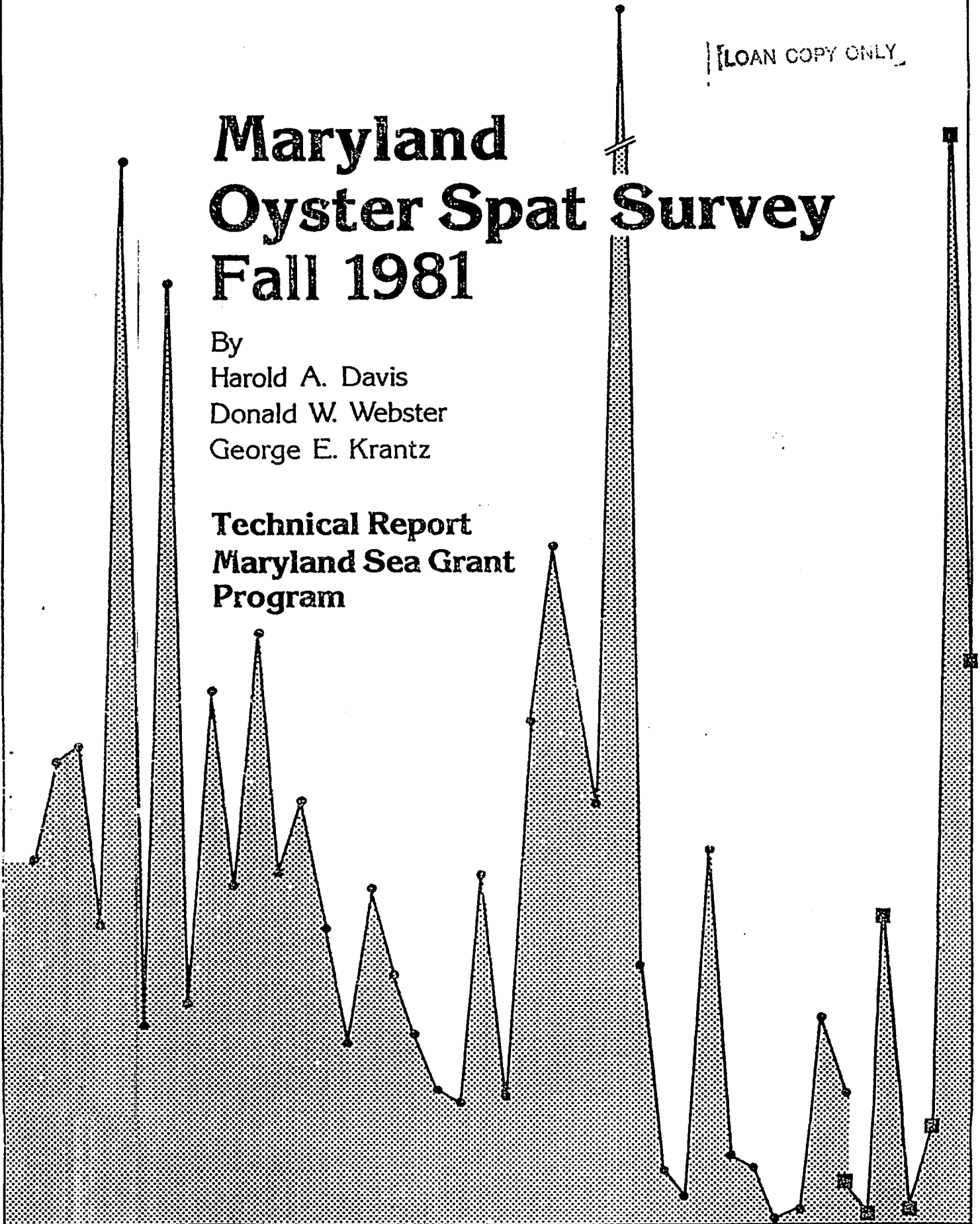


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Maryland Oyster Spat Survey Fall 1981

By
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Technical Report
Maryland Sea Grant
Program



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Introduction

The 1981 Fall Survey of Natural oyster bars and planted oyster shell in the Maryland portion of the Chesapeake Bay revealed an encouraging level of spat settlement on many of the productive oyster bars and state seed areas. Spat settlement on some of the natural bars of the Eastern Shore and of the lower Western Shore was almost as high as that observed in 1980, which was one of the three highest spatfalls recorded since 1931 (Figure 1). In 1980, the average Bay-wide spatfall was 191 spat per Maryland bushel of material. In 1981, the Bay-wide average spatfall was 98.8 spat and was slightly above the 45 year average on a Bay-wide basis. Shell planted on state seed areas and on natural bars received above average spatfall. State seed areas in Broad Creek, Little Choptank, Honga River, Tangier Sound and Calvert Bay received between 436 and 755 spat per bushel of shell. These densities of spat make movement of seed to growing bars economically feasible. Oyster repletion funds should be adequate to move most high-count shell from these areas during April and May of 1982.

Gathering the Data

The 1981 Fall Survey was a cooperative effort by personnel from the Tidal Fisheries Division, Department of Natural Resources, the University of Maryland Marine Advisory Program, and the University of Maryland Center for Environmental and Estuarine Studies. Investigators from these agencies used the University of Maryland research vessel AQUARIUS to conduct studies during the first two weeks of October. Biologists employed field assessment techniques used by oyster scientists since the 1930's. During the nine-and-a-half day cruise, samples were collected from 187 sites and the vessel covered over 1,000 nautical miles of the Bay. At each sample site, an oyster dredge was used to collect bottom material from the natural oyster bar, shell planting or state seed area. Biologists sorted a random sample of one-half bushel of material to determine the number of market oysters, small oysters, oyster spat and shells—as well as mortality and oyster meat condition—and made a qualitative assessment of the fouling community. Biologists of the Maryland Department of Natural Resources recorded these observations and retain the original field sheets in

the Department.* The field observations on the fall survey cruise formed the statistical basis for determining the number of spat per bushel of material from natural bars as well as the amount of seed oysters that would be found on shell planted in selected areas by the Department of Natural Resources. The combination of natural set and available seed oysters will be used in planning the 1982 planting of seed oysters, dredged shell and fresh shell.

Data used to determine the mean Bay-wide spatfall from 1975 to 1982, shown in Figure 1, was based on 52 selected "key" oyster bars. These "key bars" are equally distributed throughout the major river systems and are used to give a statistically unbiased sampling of spatfall trends from 1939 to the present time. Prior to 1975, Bay-wide spatfall data was based on a wide range of sample sizes, some of which were concentrated in different portions of the Bay on a yearly basis.

Bay Oyster Spat Distribution

Collectively, the 1981 fall survey data help to determine the geographical distribution of the 1981 spat set on natural bars in the Maryland portion of the Bay (Figure 2) and on planted shell (Figure 3). The relatively large quantity of spat found on natural bars and on state "shell plantings" in 1980 and 1981 should begin entering the harvest by 1983 or 1984. Spatfall over these past two years was highest in Broad Creek, the Tred Avon River, the Little Choptank River, around Smith Island and in the waters near the mouth of the Potomac River (Figure 4). For two consecutive years, the Tred Avon River and Broad Creek had high spatfall while the adjacent waters of Harris Creek received only a light sprinkling of spat later in the summer. The 1981 spat set in Eastern Bay registered lower than most years during the past decade. Distribution of the 1981 spatfall (Figure 4) can be easily compared to recent historical records of spatfall from 1975 to 1979 (Figure 5). Figure 5 illustrates how spatfall on natural bars sustains the Maryland oyster harvest for two to three years after a change in the spat distribution pattern. Presently, predominant sources of market

*This information is available to those who desire more detail on the specific oyster bars included in this summary report.

oysters in the Maryland portion of the Bay lie in upper Tangier Sound, in the Choptank River and its tributaries and in the Eastern Bay/Miles River Complex. This pattern will change when the 1980 and 1981 spat set--which was relatively high at the mouth of the Potomac River and in Tangier Sound--begins to enter the harvest.

Figures 4 and 5 show areas of the Chesapeake Bay that have long periods without adequate spatfall to sustain natural oyster bars: the Western Shore above Holland Point, the area above the Chesapeake Bay Bridge, the Chester River, the upper Potomac River and the upper Patuxent River. The two successive dry summers of 1980 and 1981 produced salinities above levels needed for successful spawning and reproduction of oysters on all of Maryland's natural oyster bed; however, specific areas remained without spatfall.

In 1981 (Figure 4), there were also some areas of the Bay which had a dramatic change in spatfall from 1980. Eastern Bay and the Miles River received a very light and somewhat spotty spatfall in 1981, after having a relatively good spat set in 1980. Certain portions of the Choptank River--especially the grounds devoted to sail-dredging by the skipjack fleet--received a relatively light spatfall. In Tangier Sound, the 1981 spatfall was relatively uniform and widespread, with almost all sample stations receiving a significant level of spat settlement. For the last 15 years, spatfall in the Potomac River has dropped off precipitously above Ragged Point, and there has been virtually no natural recruitment above St. Clements Island for several years. The oyster fishery of the Potomac River is being maintained by a very ambitious seed-planting and shell-planting program from the lower Potomac River into the middle Potomac River, which has excellent oyster-growing grounds.

During the 1981 fall survey, there was an effort to sample as many oyster bars and seed areas planted with fresh and dredged shell as possible. In previous years, the fall sampling effort concentrated on natural bars with minimal effort toward assessing the state shell-planting program. In 1981 samples were collected from 41 spots that had been planted with oyster shell. Table 1 is a comparison of spat settlement on fresh or dredged shell on various locations in the Bay and spat set on a nearby natural oyster bar. In almost all cases, planted shells received a higher spatfall than those on natural bars. The question of whether dredged or fresh shell is the superior setting substrate continues among many watermen, biologists and administrators. Data com-

paring the two substrates do not show any major differences, and either type of shell could be an excellent substrate when placed on a specific oyster bar under favorable environmental conditions. Management decisions concerning which type of shell should be planted on a given bar depend on many factors, including past history of set on dredged and fresh shell at the site, firmness of the bar and distance fresh shell must be moved before planting.

Some of the locations shown in Table 1 are state seed areas that will be used as a source of seed for transportation in spring of 1982. There seems to be a good-to-fair spat set on Mulberry Point (Broad Creek), Town Point in the Little Choptank, Cedar Point and Calvert Bay seed areas, as well as on the Jones Shore seed area for exclusive use in the Potomac River. There were 1,021,165 bushels of shell planted on the state seed areas in 1981. Not all of this shell can be recovered in the spring of 1982, but it is important to note that there will be adequate seed to fill Maryland management needs.

Due to the extremely heavy spatfall in 1980, and again in 1981, there are several areas in the Bay (Harris Creek, Broad Creek, Little Choptank) that contain oyster bars where market-sized oysters are densely covered with spat and small oysters. These bars are extremely crowded and will become more so as 1980 and 1981 spat begin to grow. These natural bars should be thinned by hand tongs as part of the 1982 seed program to help increase the growth on the natural bars and to allow transported oysters to reach market size in a shorter period of time. This thinning should do no harm at all to the natural bars.

Monitoring Oyster Disease

While samples from the natural bars were being collected to study spatfall, live oysters were also obtained to describe the geographical extent and prevalence of oyster diseases and parasites in the Maryland waters. This effort is a continuation of a survey that was begun in 1958 by the National Oceanographic and Atmospheric Administration Lab in Oxford, Maryland. Today, the Maryland Department of Natural Resources is conducting similar studies on an annual basis. Emphasis was placed on determining the distribution of "dermo disease" and "MSX disease," which are dangerous pathogens of oysters in Maryland. During the 1960's, both diseases killed

large numbers of oysters in Tangier Sound--then both diseases disappeared. In the mid-1970's, "dermo disease" reappeared with frequency in specific parts of Tangier Sound and at the mouth of the Potomac River. To date, only a few oysters infected with MSX have been found, and MSX disease did not reappear in Maryland waters during the high salinity years of 1980 and 1981, contrary to what some oyster biologists predicted. The dynamics of these diseases, the duration of infections and the effects of these diseases on oyster populations are being watched as topics of special scientific interest. This information should provide management information necessary for reducing the spread of disease to unaffected portions of the Bay.

Representatives of the Maryland of Health and Mental Hygiene were on the cruise and collected oysters in order to determine the presence of heavy metals, chlorinated hydrocarbons and bacteria over the entire range of the Maryland portion of the Bay. Similar data had been collected annually since 1979, and the changes in water quality in the Bay are providing invaluable information to the Maryland management agencies responsible for protecting the Bay environment. Results from some of the previous studies are available from the Maryland Department of Health and Mental Hygiene.

Outreach Effort

For the past three years the Fall Oyster Bar Survey has included a well-planned effort aimed at bringing together watermen, members of the seafood processing industry, resource administrators, legislators, elected officials and other persons interested in the Bay's welfare. The research vessel AQUARIUS accommodated approximately 15 guests while the biologists conducted the survey described above. This year the cruise hosted 13 watermen, 6 DNR administrators and approximately 20 interested citizens and biologists from other agencies. We encouraged this group to observe and to participate in the survey so they would develop a better understanding of field oyster research. At the same time, these individuals had an opportunity to discuss with University of Maryland scientists, state oyster biologists and state management officials pertinent issues concerning management of the Maryland oyster industry and viability of the resource.

Some scientists and interested citizens who joined on the cruise represented groups active in environmental education and Bay research. Several investigators

were studying effects of water quality and currents on spat set during 1980 and 1981. Researchers also examined geographical distribution of the boring sponge and distribution of some of the smaller invertebrates and other animal life that inhabit specific parts of the Bay. For example, data were collected on the geographical distribution of sea nettles in an effort to increase our understanding of how this noxious pest proliferates in Bay waters.

Guests on the cruise all expressed sincere thanks for a unique firsthand experience; and many of them felt they had participated in the management effort aimed at making Maryland's oyster bars more productive. Members of the survey crew welcomed the response, interest and input from guests and found the exercise enriched by the numerous, and sometimes diverse, viewpoints they offered.

Figures

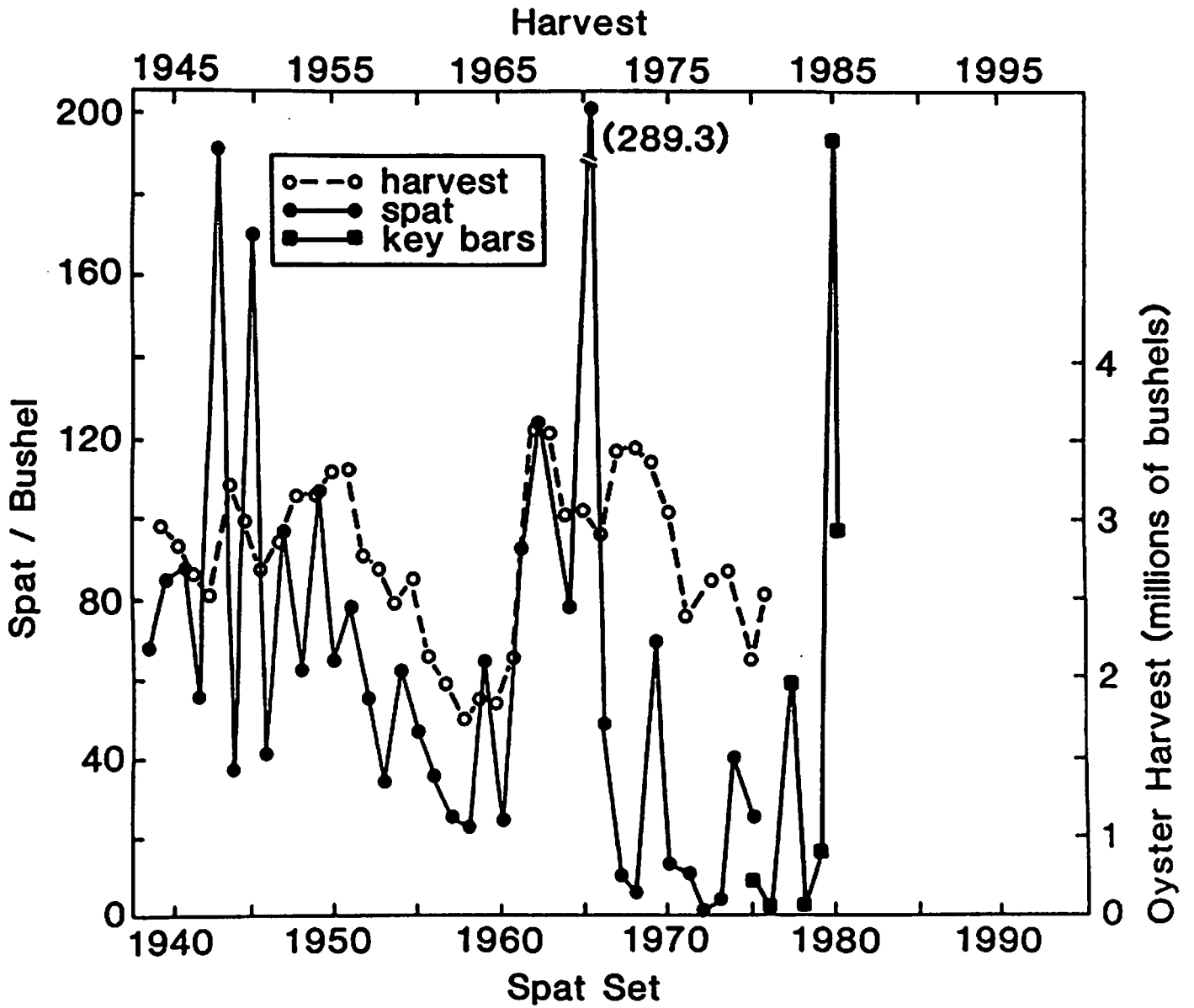


Figure 1. Spat set on natural oyster bars and subsequent annual harvest in Maryland waters.

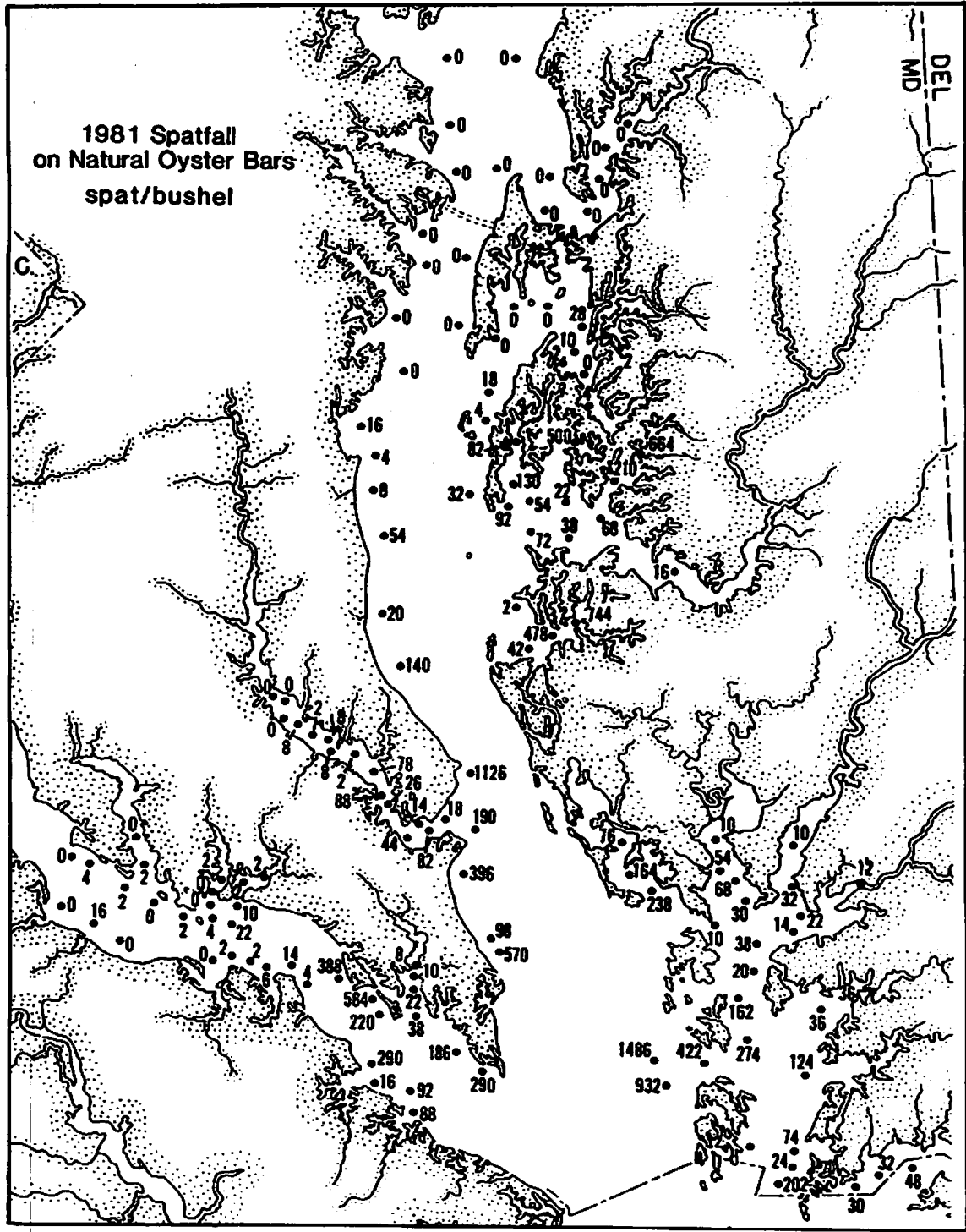


Figure 2. The 1981 spatfall on natural oyster bars in Maryland waters.

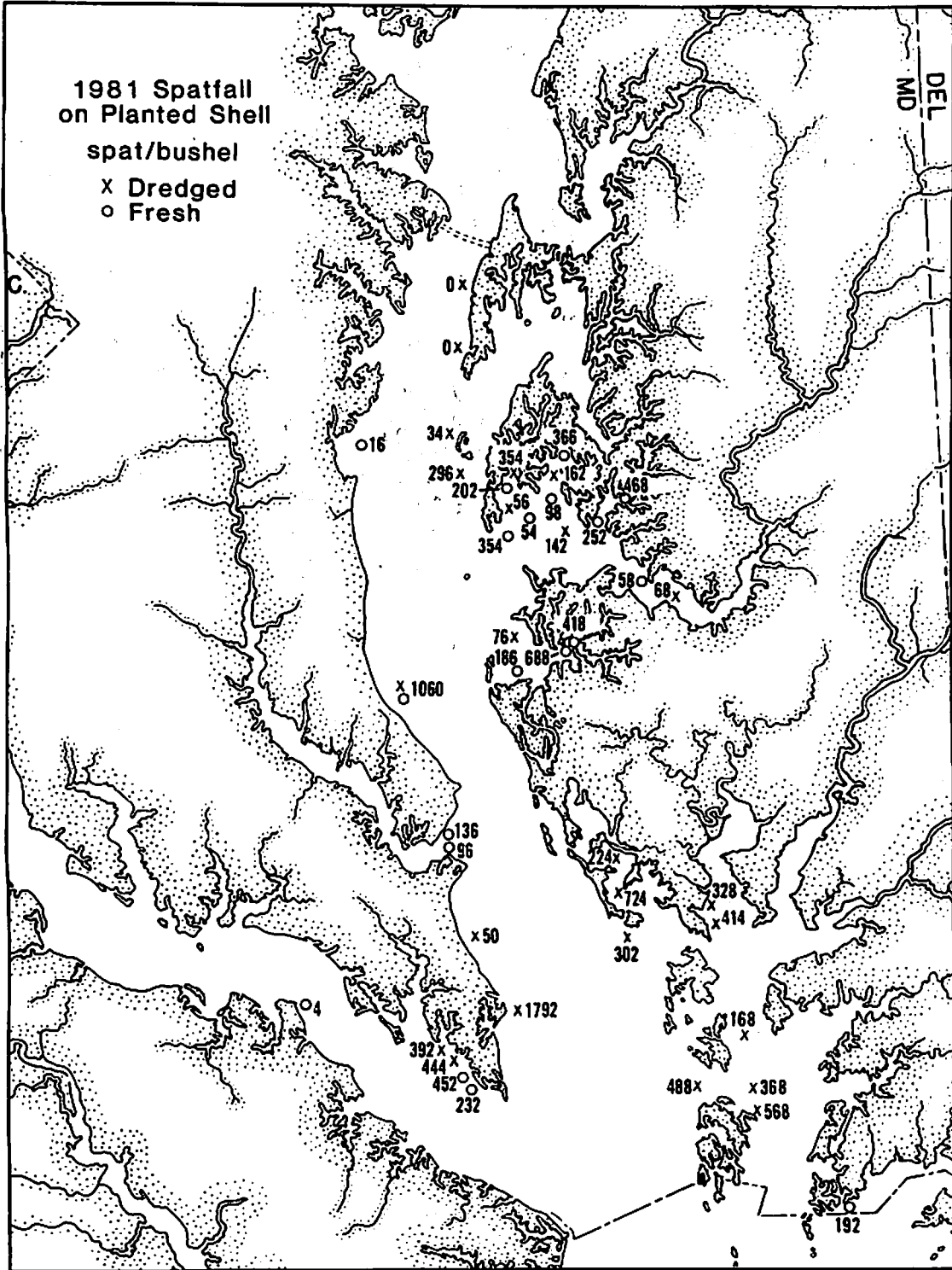


Figure 3. The 1981 spatfall on planted oyster shell.

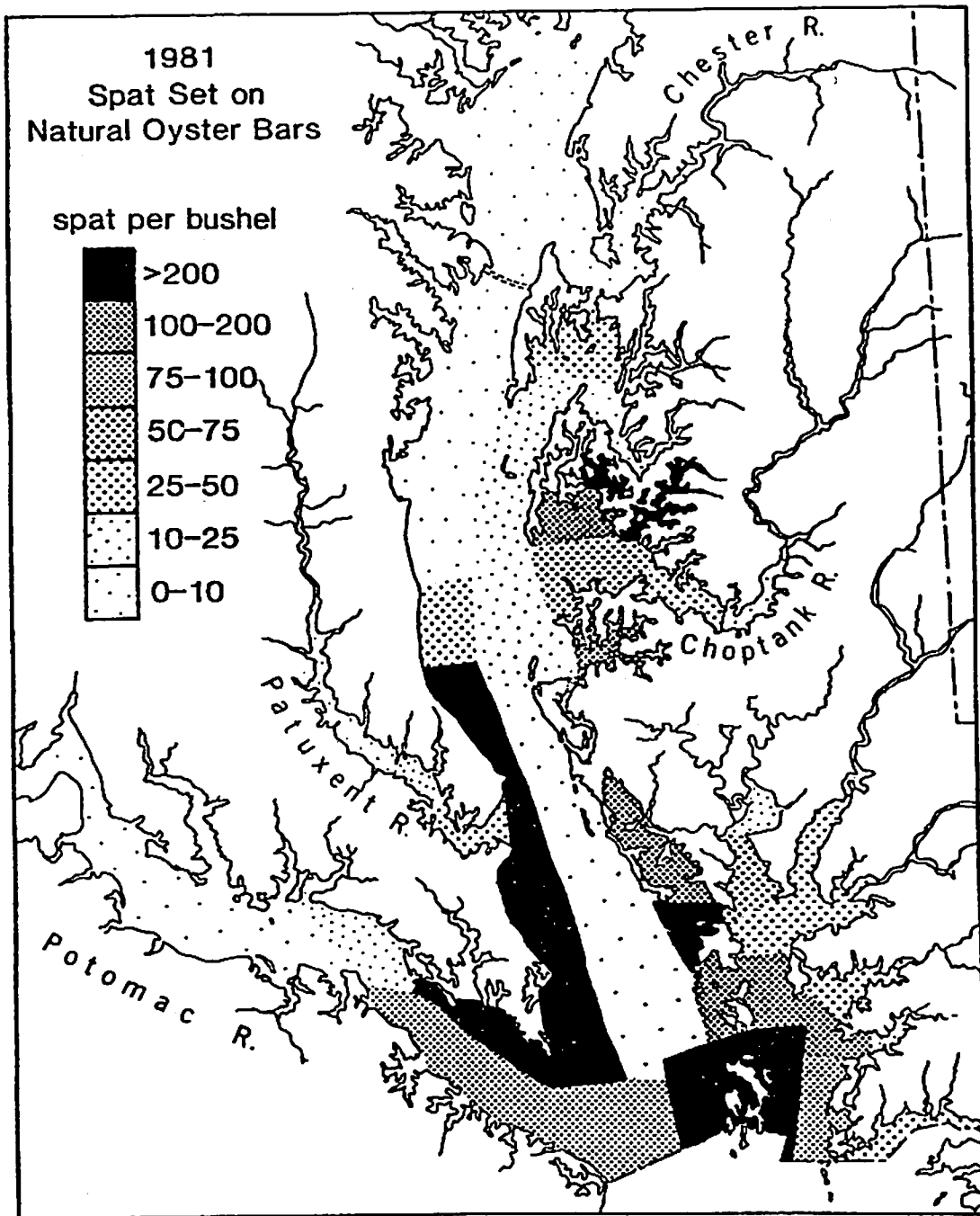


Figure 4. Geographical distribution of 1981 spatfall on natural oyster bars in the Maryland portion of the Chesapeake Bay.

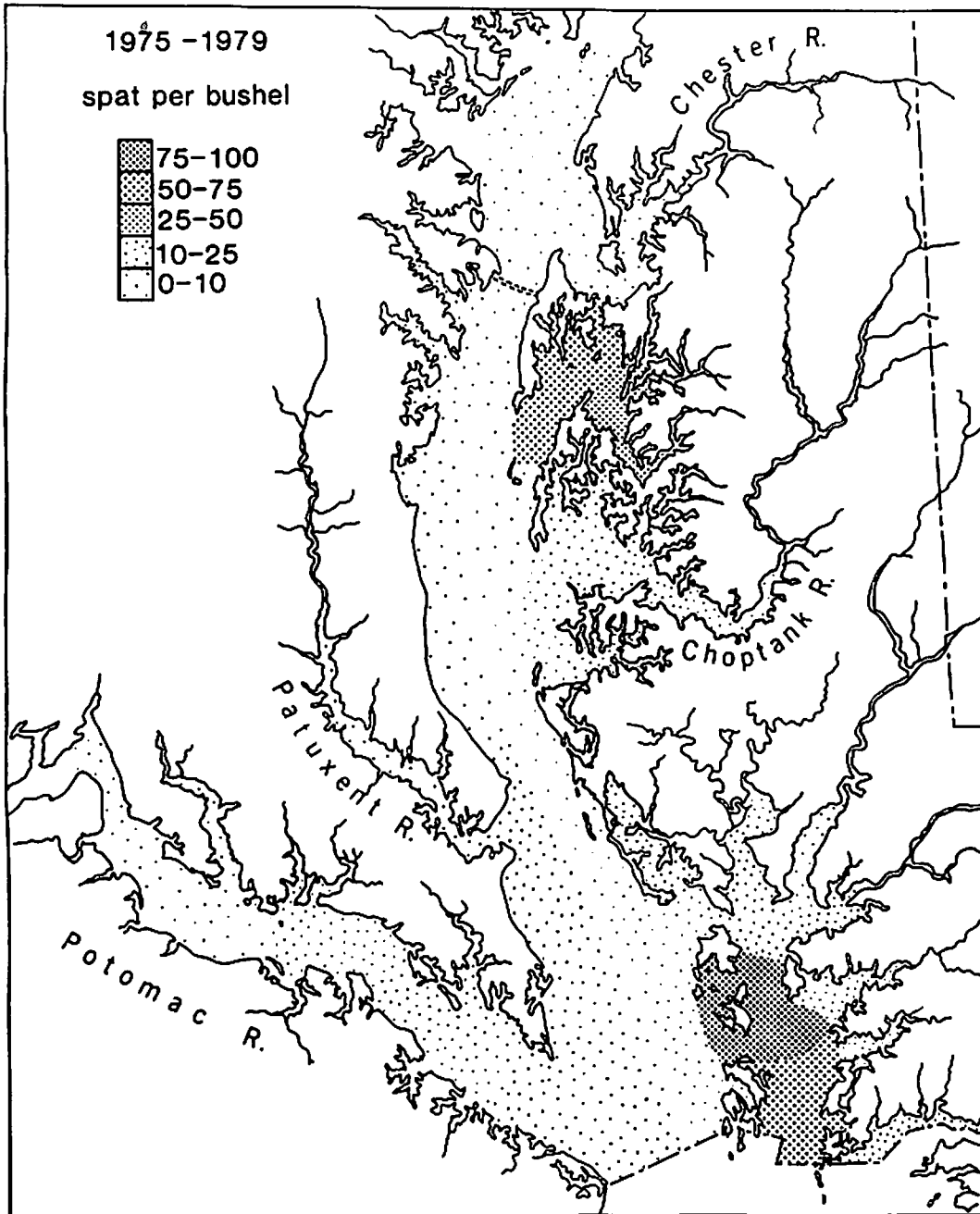


Figure 5. Distribution of spatfall on natural oyster bars between 1975 and 1979. This level of recruitment is presently sustaining Maryland's oyster harvest.

TABLE I

Comparison of the 1981 spat set on fresh oyster shells, dredged oyster shell and on an adjacent natural bar. Significant differences shown by an asterisk.

<u>AREA/BAR</u>	<u>80-81 FRESH SHELL</u>	<u>80-81 DREDGED SHELL</u>	<u>ADJACENT NATURAL BAR</u>
UPPER BAY			
Brickhouse	-	0	-
Gum Thicket	-	0	-
Long Bar	16	-	2
Popular Island	-	34	32
Strong Bar	-	296*	32
CALVERT SHORE			
Flag Pond	-	1060*	140
PATUXENT RIVER			
Carrol Muds	96*	-	18
SE Middleground	136	-	82
Hawks Nest	-	40	88
LOWER BAY			
Rocky Beach	-	50	98
Butlers	-	1792*	570
Holland Island	-	488	442
CHOPTANK RIVER			
Howell's Point	58	68	16
Royston	-	142	130
France	-	54	54
Great Marsh	-	98	22
Tilghman Island	-	56	130
Sands	-	354*	92
Harris Creek	202	22	82
BROAD CREEK			
Great Bar	-	366	508
Brown	-	296	508
Mulberry Point	-	882	508
TRED AVON			
Fox Hole	252	-	210
Louis Cove	468	-	664
LITTLE CHOPTANK			
Ragged Point	186	76*	2
Town Point	-	418	744
Cedar Point	-	688	478
HONGA RIVER			
Lakes Cove	-	724	164
Dark Point	-	224	76
HOOPERS STRAITS			
302			
FISHING BAY			
Ware Sands	-	414	54

<u>AREA/BAR</u>	<u>80-81 FRESH SHELL</u>	<u>80-81 DREDGED SHELL</u>	<u>ADJACENT NATURAL BAR</u>
TANGIER SOUND			
Chain Shoal		168	162
Back Cove		560	-
POCOMOKE SOUND			
Terrapin Lead	192	30	
POTOMAC RIVER			
Jones Shore	452	-	186
St. George Island	220	-	388
Calvert Bay		444	38
BRETON BAY			
Blue Sow	10	-	2
N	7	15	19
MEAN	141	308	198