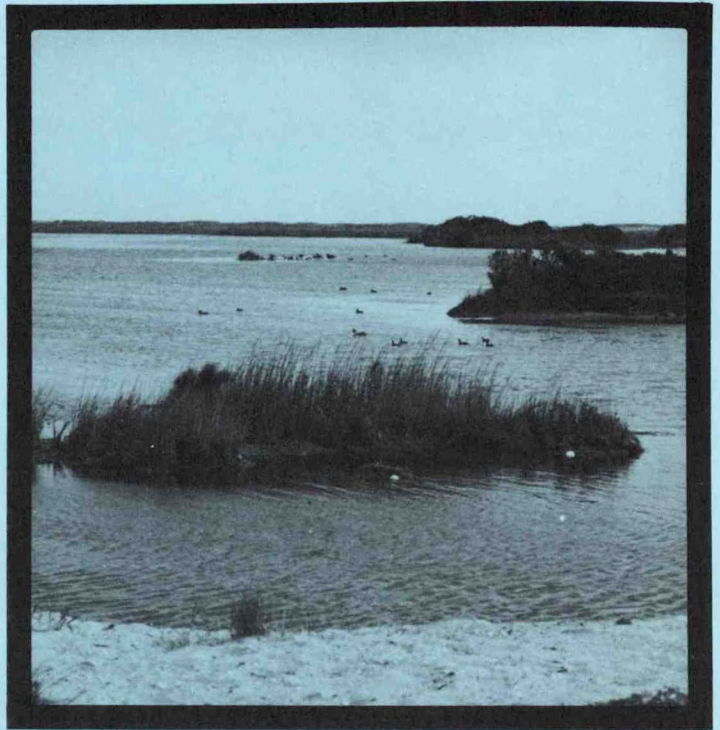


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1982  
Sep.-  
Nov.

# Marine Environmental Assessment

CHESAPEAKE BAY 1982  
SEPTEMBER - NOVEMBER



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
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The name of the Center for Environmental Assessment Services (CEAS) has been changed to the Assessment and Information Services Center (AISC) because of NOAA reorganization and the consolidation of CEAS with the Environmental Science and Information Center.

The AISC/ Marine Environmental Assessment Division (MEAD), Marine Assessment Branch (MAB), produces periodic assessments of weather impacts on economic sectors of marine environmental activity. From September 1981 through March 1982, MAB issued monthly assessments of Chesapeake Bay in the economic sectors of fisheries, recreation, and transportation. The Chesapeake Bay region served as a prototype for assessment development. We now issue quarterly assessments in order to extend the service to other marine areas within existing resource limitations.

Please send any comments or questions regarding Assessment and Information Services Center marine assessments to the Branch Chief, NOAA/NESDIS/AISC, Marine Environmental Assessment Division, 3300 Whitehaven Street, NW, Washington, DC 20235, or call (202) 634-7379.

Front Cover Photographs

Wave Damage Coastline - Star News Photo by J Nesbitt  
Beach Scene - EPA Documerica - Hope Alexander  
Salt Marsh - NOAA File Photo  
Catch on Fishing Boat - NOAA Photo by M. Dowgiallo



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1982

## CHESAPEAKE BAY MARINE ASSESSMENT

At present the Assessment and Information Services Center (AISC) limits marine assessment coverage to Chesapeake Bay. The marine ecosystem exhibits many complex interrelationships which are difficult to measure. Climatic events do not often produce an obvious immediate response in the marine environment. The extended intervals that frequently exist between a climate event and the observed impact present a problem different from the land oriented assessment AISC produces. This difference necessitates relating changes in climatic variables to marine environmental changes on a quarterly basis. For Chesapeake Bay, June through August covers the warm, relatively stable summer months; September through November covers the dynamic fall period of decreasing temperatures and water column turnover and vertical mixing; December through February covers the cold winter period; and March through May covers the dynamic spring period of increasing temperatures and nutrient enrichment.

The Assessment and Information Services Center effort in Chesapeake Bay is a first step toward providing operational marine assessments for major water bodies within and adjacent to the United States.

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Table 1. Climate impact summary, Chesapeake Bay, September - November, 1982.

	FISHERIES						RECREATION			TRANSPORTATION					
	Oysters	Crabs	Hard clams	Soft clams	Finfish	Diseases	Noxious animals	Boating	Park Usage	Safety	Port operations	Vessel traffic			
High Salinity		+		+	+	+									
Low rainfall	+	+		+	+	+		+	+	+	+	+			
Low runoff	+	+		+	+	+		+		+					
Warm air temperature		-						+	+	+					
Warm water temperature		-						+	+	+					
High number of windy days								-		-					

LEGEND:



Favorable



Unfavorable



No abnormal effect, data unavailable, or not applicable

## Chesapeake Bay Marine Environment

### 1. Highlights - General Events and Impacts

Higher than normal salinities, below normal rainfall, and mild temperatures characterized the September - November quarter.

Watermen reported good catches of blue crabs far upstream into rivers and tributaries, although overall Bay landings of blue crabs were below normal for the quarter.

Low rainfall during September and October provided favorable conditions for recreational activities on the Bay, although a high number of windy days affected boating activities. Warm air and water temperatures favored all categories of Bay recreation.

Table 1 summarizes impacts on climate events by economic sector.

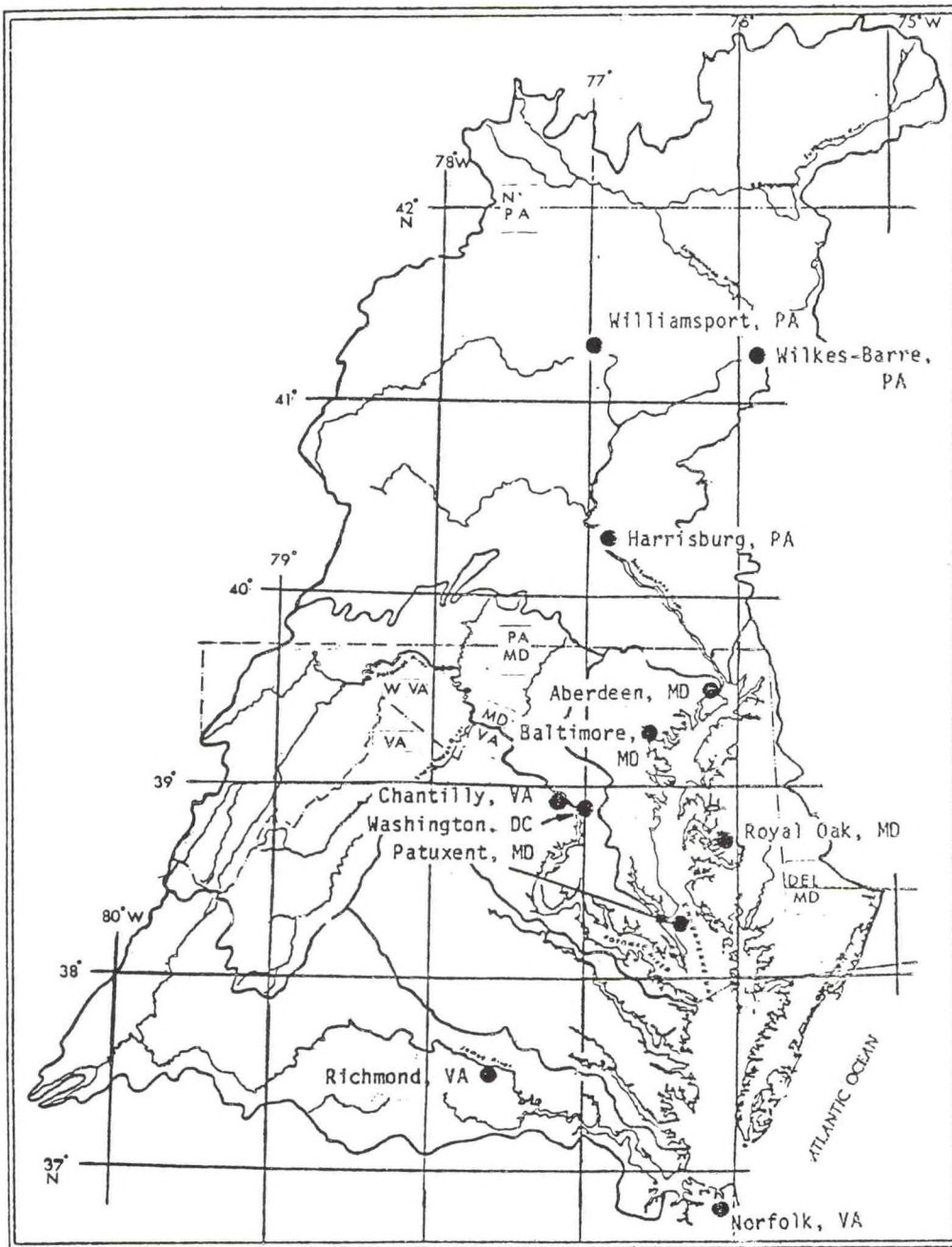


Figure 1. Selected meteorological stations, Chesapeake Bay watershed (Modified EPA map).



## 2. Weather and Oceanography Summary

### September 1982:

Temperatures at the eleven stations in Figure 1 averaged slightly below normal for the month, and precipitation totals averaged nearly ten percent below normal (Table 2).

A cold front brought showers and thundershowers to northern portions of the Bay watershed during the first three days of the month. Pleasant weather prevailed for the next 15 days except for light showers on the 7th, 16th, and 18th accompanying cold frontal passages. Precipitation fell over most of the region from the 20th through the 23rd, the result of a stationary low pressure system. Precipitation exceeding one inch fell at southern Bay stations the 26th and 27th from a developing coastal low center.

Precipitation totals fell below normal at all stations except Patuxent, Baltimore, Harrisburg, and Chantilly. Wilkes-Barre received only 39% of normal precipitation, making September 1982 the fourth driest September on record.

### October 1982:

Below normal precipitation continued through October. Temperature for the eleven stations (Figure 1) averaged below normal for the third month in a row but with smaller departure than in September (Table 2).

In early October, the remnant of an upper low pressure system brought trace amounts of precipitation to lower Chesapeake Bay. Pleasant weather and high pressure prevailed from the 2nd to the 8th. A warm front advanced northeastward over the region the 9th and 10th bringing trace amounts of rainfall to most stations, however Richmond received .37 inches on the 10th. A cold front on the 12th lingered through the 14th bringing widespread rain to the region over the three day period. Norfolk received 1.61 inches from this system on the 14th. Cold Canadian air pushed through with 20 mph northwest winds on the 16th accompanied by light precipitation. Cool temperatures followed for three days. A cold front on the 21st brought widespread light precipitation to the area. High pressure dominated the area until a low pressure center developed off North Carolina maintaining 20 mph winds over the southern Bay area. This low pressure system developed into a coastal storm on the 25th which brought rainfall of one to two inches to most stations south of Pennsylvania. High pressure and cool temperatures continued from the 27th through the end of the month.

Among the eleven stations in Figure 1 only Norfolk received above normal precipitation in October. Other precipitation amounts departures ranged from normal at Richmond to 2.61 inches below normal at Williamsport, where October ranked as the driest October since 1963.

Monthly mean temperatures averaged below normal at all stations except Washington and Chantilly which had 0.4°F and 1.4°F above normal, respectively. Maximum departures were 1.3°F below normal at Williamsport and 1.5°F below normal at Norfolk.

Table 2. Precipitation/temperature totals and anomalies, Chesapeake Bay watershed, September-November 1982

Station	Total Precipitation and Departure from Normal Observed/*Anomaly (Inches)			Air Temperature and Departure from Normal Observed/*Anomaly (Deg.F)						
	September	October	November	September	October	November				
Williamsport, PA	2.59	-0.44	3.00	-0.74	63.1	-0.9	52.0	-1.3	43.8	+2.3
Wilkes-Barre, Scranton, PA	1.10	-1.72	3.44	+0.43	62.4	-0.5	52.3	-0.3	44.3	+3.5
Harrisburg, PA	2.87	+0.21	3.37	+0.18	65.3	-1.7	55.1	-0.7	47.6	+3.8
Aberdeen, MD	2.25	-1.05	4.04	+0.48	67.9	-0.5	57.2	-0.8	50.2	+4.1
Baltimore, MD	3.63	+0.51	3.13	0.00	67.3	-1.2	56.3	-1.1	48.4	+2.3
Washington, DC	1.71	-1.37	2.96	+0.06	70.6	0.0	60.2	+0.4	51.8	+3.8
Chantilly, VA	4.22	+0.93	2.86	-0.20	66.9	0.0	57.3	+1.4	48.4	+3.7
Royal Oak, MD	2.79	-0.93	6.35	+2.27	68.4	-1.3	59.1	-0.7	51.4	+2.3
Patuxent, MD	5.46	+2.25	4.43	+1.36	69.8	-1.2	59.6	-0.7	52.1	+3.1
Richmond, VA	2.55	-1.03	2.70	-0.50	69.8	-0.2	59.2	-0.1	51.9	+2.9
Norfolk, VA	3.63	-0.57	3.43	+0.49	70.0	-1.8	60.2	-1.5	51.9	+2.8
Average	2.98	-0.29	3.61	+0.38	67.4	-0.8	57.1	-0.5	49.5	+3.1

\*Anomaly - departure from total precipitation and temperature normals for the period 1941-1970.

## November 1982:

November brought generally greater than normal precipitation and record warm temperatures (Table 2).

Five cold fronts, two warm fronts and the strong influence of a deep upper air low pressure system over the Mississippi Valley late in the month provided frequent rainfall in the Bay region. Wilkes-Barre reported a record 80°F on November 2nd. A cold front on the 5th with scattered thundershowers produced over one inch of rainfall at four stations. Mild weather lasted until cold fronts on the 13th and 15th brought widespread precipitation. Temperatures warmed inland from a strong northward flow of Gulf air, but temperatures remained low with cloudiness, fog, and scattered light precipitation over the Bay area. Cloudiness, scattered fog, and drizzle persisted over the area until a cold front on the 29th brought heavy rains and clearing.

Precipitation was above normal for the month at eight stations. Williamsport, Chantilly, and Richmond along the Western portion of the Bay area were below normal. Royal Oak with 2.27 inches above normal received the greatest rainfall for the month among the 11 stations (Table 2).

Air temperatures for the Bay region averaged more than 3°F above normal for the month. Departures ranged from 2.3°F above normal at Williamsport, Baltimore, and Royal Oak to 4.1°F above normal at Aberdeen.

## Salinity

Salinities in the September to November quarter in 1982 were not as high as in the same quarter of 1981, when they reached as high as 5.6 parts per thousand above normal. Precipitation deficits throughout the Bay region since June 1982 raised salinity levels to 1.9 parts per thousand above normal (Table 3 and Figure 4).

## Water Temperature

Surface water temperatures at the six stations in Table 3 were below normal in September and October, but were above normal in November. Water temperature departures in November ranged from 1.4°F above normal at Annapolis to 3.2°F above normal at Norfolk.



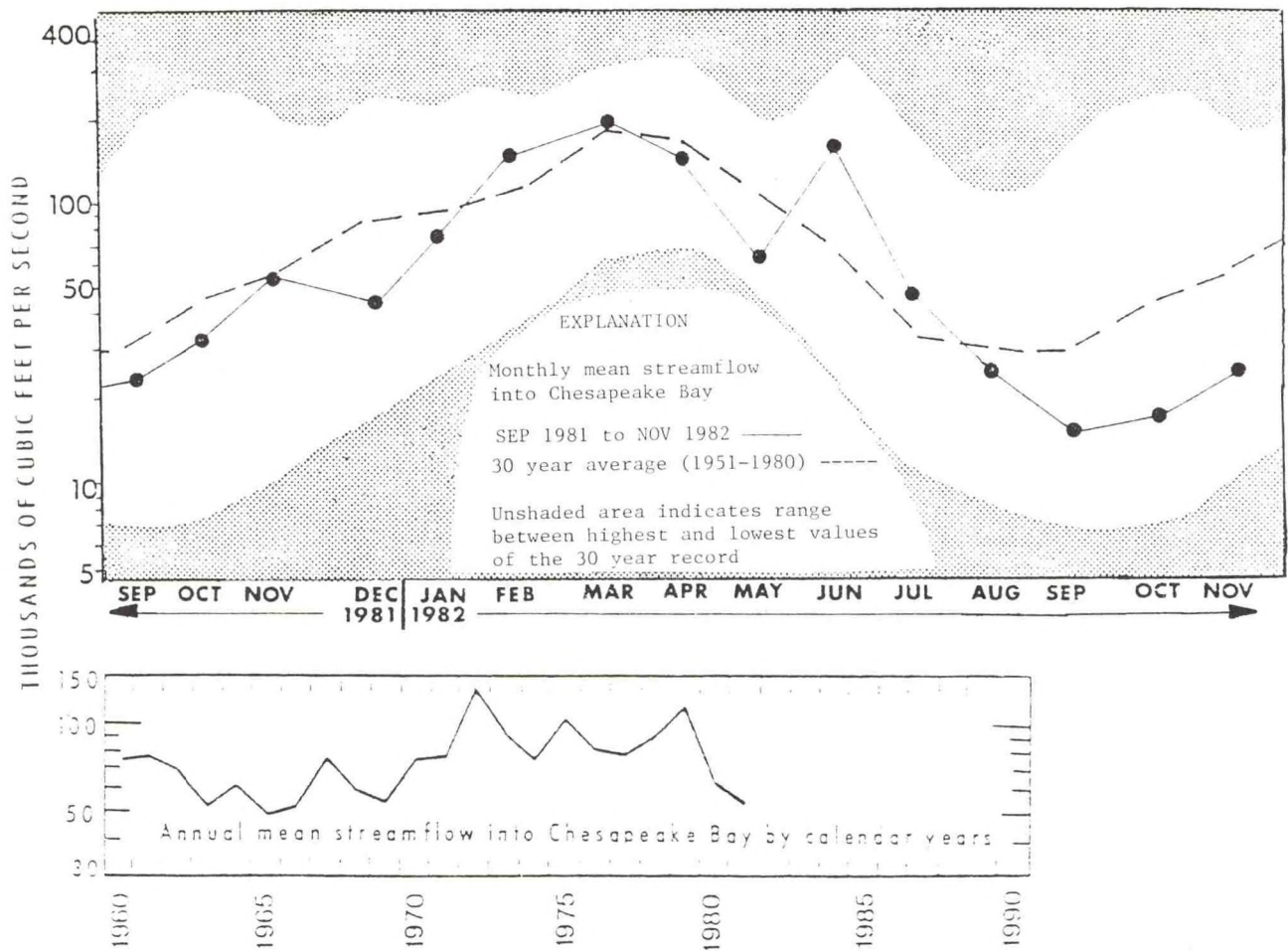


Figure 2. Streamflow into Chesapeake Bay.

Streamflow is below normal for the fall quarter (Sep., Oct., Nov.), 1982. Freshwater discharge has been below average since August, 1982 after above normal streamflow in June and July, 1982. This reflects the Chesapeake Bay drainage basin experiencing below normal precipitation in September, October, and November. Fall 1982 streamflow is lower than streamflow in the Fall 1981. Data from U.S. Geological Survey.

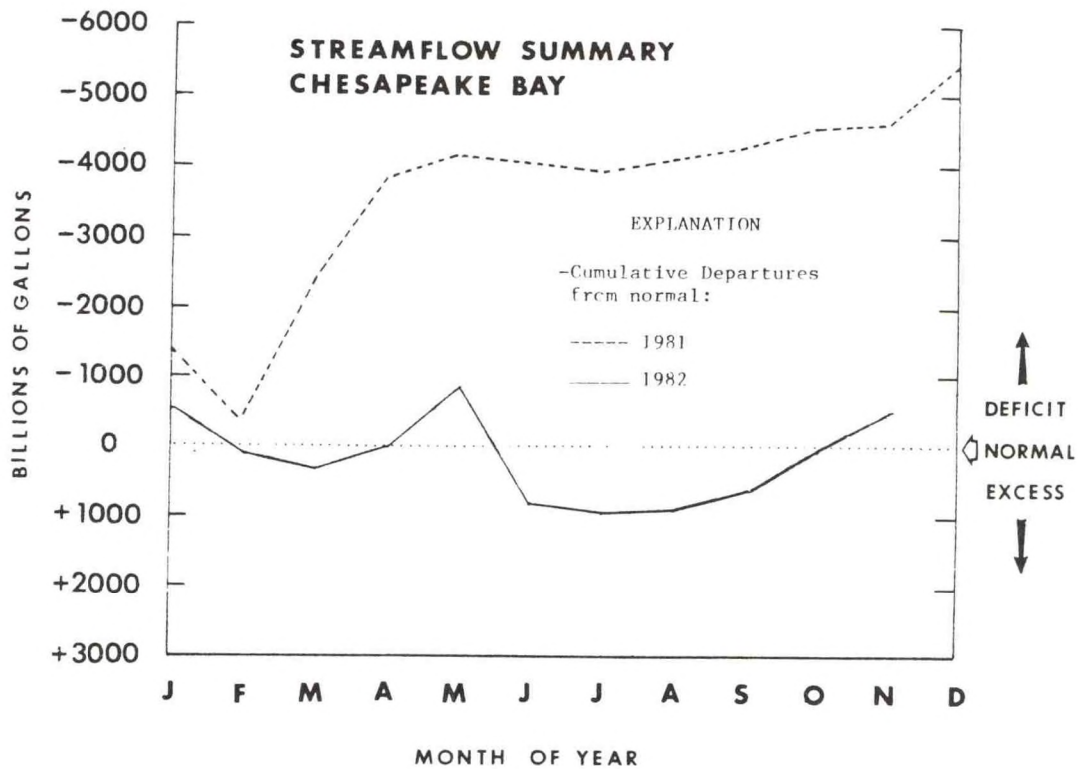


Figure 3. Cumulative streamflow (billions of gallons), Chesapeake Bay tributaries, 1981 and 1982.

Below average streamflow discharges into the Bay during the fall quarter resulted in cumulative below-normal streamflow for 1982 to date. Cumulative departures from normal in 1982 are not as negative as were the cumulative departures for 1981. Data from U.S. Geological Survey.

Table 3. Bay Surface Salinities/Water Temperatures and Anomalies\*  
Selected Stations, September-November 1982

Station	Surface Salinity and Departure from Normal Observed/*Anomaly (PPT)			Surface Water Temperature and Departure from Normal Observed/*Anomaly (Deg.F)		
	September	October	November	September	October	November
Baltimore, MD	10.5 +0.8	11.7 +0.9	10.9 -0.2	73.2 -2.0	64.8 -0.9	56.4 +2.4
Annapolis, MD	12.2 +0.6	13.4 +0.3	14.6 +1.0	73.5 -1.3	63.3 -1.6	54.3 +1.4
Solomons, MD	14.5 +0.3	16.2 +0.2	18.0 +1.4	75.3 -0.4	65.9 +0.2	56.5 +1.5
Washington, DC	0.7 +0.4	0.0 -0.2	1.9 +1.9	74.1 -2.4	62.4 -2.5	54.2 +1.5
Kiptopeke, VA	27.7 0.0	28.7 +1.0	29.0 +1.9	72.9 -0.9	64.9 -2.5	54.8 +2.0
Bay Bridge - Tunnel, VA	24.4 +0.3	25.8 +1.7	25.2 +1.9	73.1 -2.3	66.8 +1.0	58.4 +3.2

\*Anomaly = departure from long term averages for each month.  
November salinity at Washington, D.C. station is for one reading only on November 30.



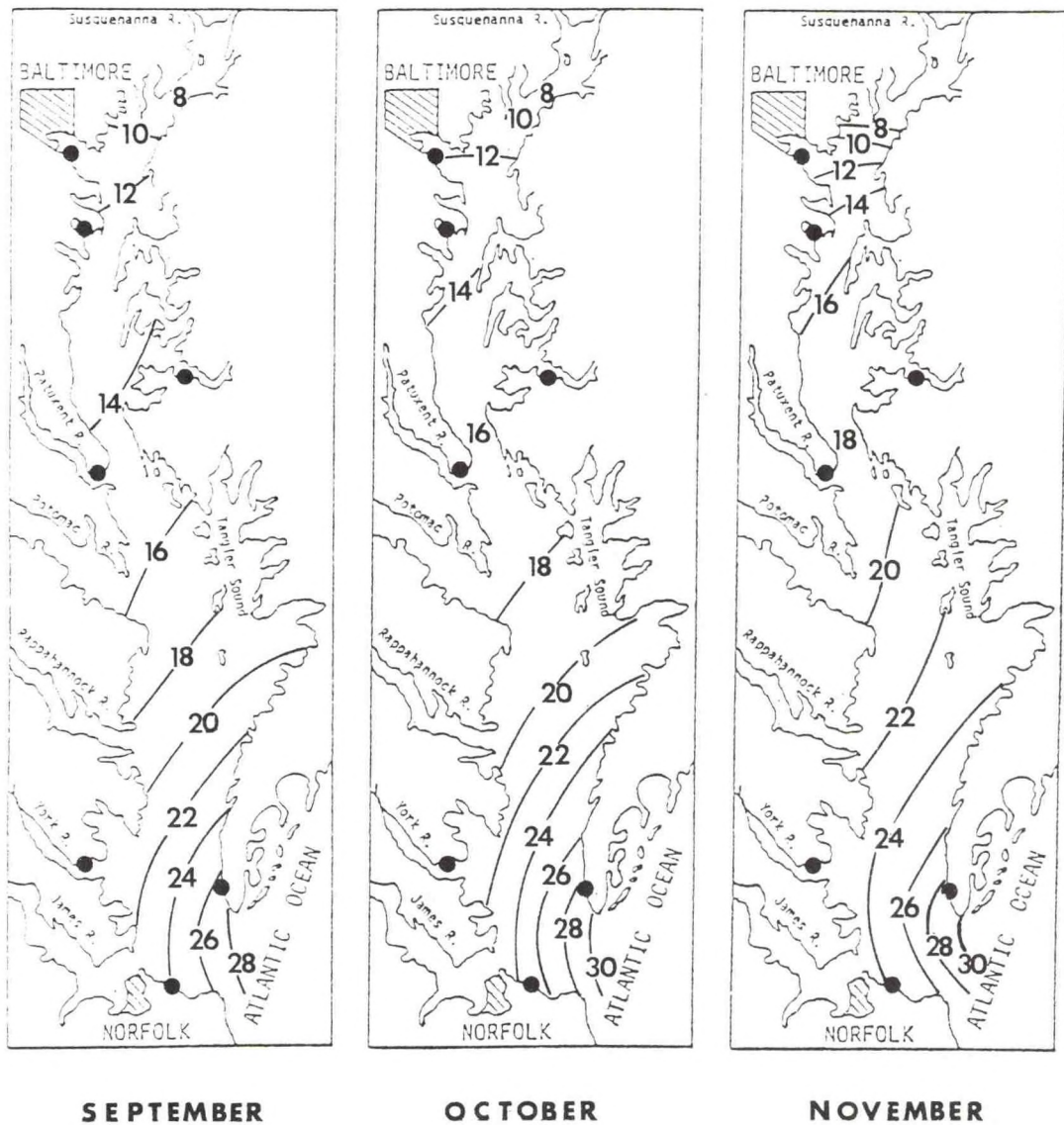


Figure 4. Mean surface salinity distribution, Chesapeake Bay, September - November, 1982

Isohalines (parts per thousand) are linearly interpolated from designated station data. Salinities throughout the quarter September - November 1982 are higher than normal with anomalies up to 1.9 parts per thousand. Data from National Ocean Survey, NOAA.

### 3. Impact of Climate/Weather on Bay Fisheries, Recreation, and Transportation

#### Fisheries

Commercial fishing activities continued uninterrupted by weather in Maryland and Virginia throughout the quarter September-November 1982.

Seasonal changes in harvesting proceeded normally although crabbers experienced two to three weeks of unusually low landings in November. Higher than normal water temperatures possibly contributed to large scale movements of blue crabs out of areas normally productive by trapping. Overall, crabs were in short supply throughout the quarter. The shortage contributed to high market prices, especially in November. Watermen reported good landings in upper portions of rivers, probably a result of higher than normal salinities.

Softshell clams have re-established beds in the middle Potomac River. Beds once depleted by high freshwater inflow from Hurricane Agnes in 1972 are being restored by extended periods of higher than normal salinities over the past several years.

Watermen reported large areas of discolored water in the Potomac River in late November. These areas of "brown water" were identified as an algal bloom.

Unusually high numbers of "boxes" (oyster shells without meats) were reported in Maryland and Virginia oyster landings. The cause of the higher than normal mortality rate is presently undetermined. Environmental factors or salinity dependent diseases are possible contributing causes.

Reservoirs at Havre de Grace, Maryland in the upper Bay reported high salinities contaminated drinking water supplies in areas with normally fresh water.

#### Recreation

Unusually mild weather during the quarter September-November provided favorable conditions for all categories of Bay recreation, although periodically strong winds made conditions unsafe for small boaters.

Small craft advisories were in effect for 24 days in the quarter (Table 4 ). Figure 5 shows National Weather Service general forecast areas for Chesapeake Bay. No storm activity disrupted Bay recreation although a storm warning was issued October 25 for the Bay mouth.

Maryland Department of Natural Resources Marine Police reported 36 boating accidents, 18 injuries, four deaths and \$82,661 property damage for recreational boating (Table 5). The U.S. Coast Guard conducted 699 Search and Rescue (SAR) operations during the quarter (Table 6).

Marine accident statistics, Search and Rescue caseload and State park activity levels all showed the expected seasonal decline from September to November. The U.S. Coast Guard conducted an unusually high number of Search and Rescue operations during the first part of September. The Coast Guard logged 50 cases in the upper Bay during the first eight days of the month, 40 cases during the

first four days out of a total of 149 for the month. Clear, pleasant weather during Labor Day weekend accounted for high numbers of recreational boaters. The combination of pleasant onshore conditions and persistent winds and rough seas offshore contributed to the high number of SAR cases.

Table 7 shows attendance and revenue statistics for four major State recreational facilities on Chesapeake Bay in Maryland and Virginia.

The use of the Maryland recreational facilities in September and October of 1982 is greater than for the same time period of 1981. Sandy Point usage in 1981 was 99,800 in September, and 11,500 in October. Point Lookout had an attendance totals of 21,505 in September, and 11,728 in October. The increase of park usage in 1982 may be attributed to favorable weather in September and October.

### Transportation

Shipping and related shore activities at Maryland and Virginia ports proceeded normally during the quarter.



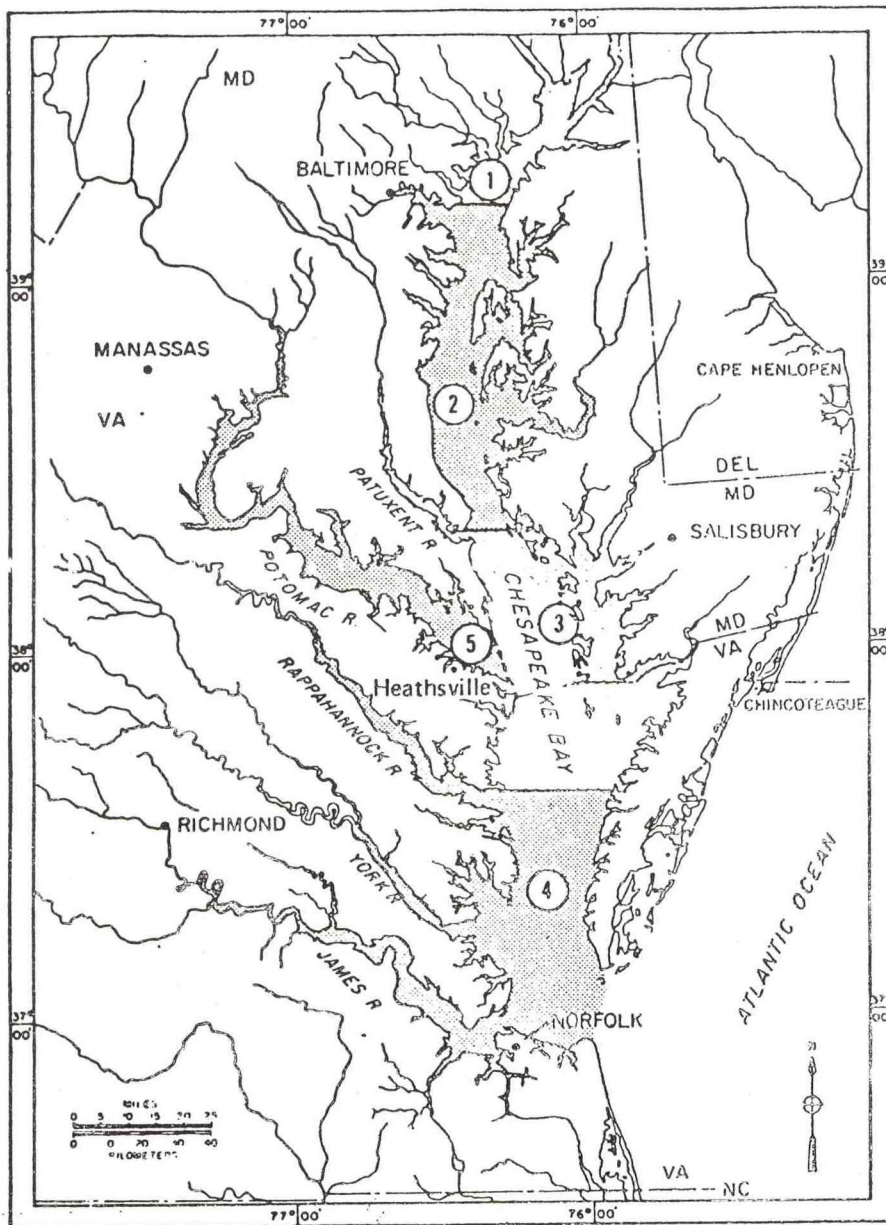


Figure 5. National Weather Service (NWS) forecast areas for Chesapeake Bay.

Table 4. Marine advisories/warnings, Chesapeake Bay,  
(National Weather Service data)

<u>Date</u>	<u>Condition Report(1)</u>	<u>Location</u>
September 26	A	Bay, south of Windmill Point
26	A	Entire Bay
27	A	Entire Bay
30	A	Bay, south of Windmill Point
October 2	A	Bay, south of Windmill Point
9	A	Bay and Tidal Potomac River
10	A	Bay, north of Windmill Point and Tidal Potomac River
15	A	Bay and Tidal Potomac River
16	A	Bay and Tidal Potomac River
17	A	Bay and Tidal Potomac River
20	A	Bay, north of Patuxent River
21	A	Bay, north of Patuxent River
23	A	Bay, south of Patuxent River and Tidal Potomac River
24	B	Bay, south of Windmill Point
25	B	Mouth of Chesapeake Bay
25	C	Bay, north of Windmill Point
25	A	Bay, south of Windmill Point
25	A	Bay, south of Windmill Point
26	A	Bay, north of Windmill Point
November 26	B	Bay, north of Windmill Point
12	A	Bay and Tidal Potomac River
12	B	Bay and Tidal Potomac River
13	A	Bay, north of Windmill Point and Tidal Potomac River
13	B	Bay, south of Windmill Point
13	A	Bay and Tidal Potomac River
14	A	Bay and Tidal Potomac River
15	A	Bay and Tidal Potomac River
23	A	Bay and Tidal Potomac River
23	A	Bay, north of Windmill Point
25	A	Bay, south of Windmill Point

(1)Key to Condition Reports:

- A = Small Craft Advisory (Wind 25-34 knots)
- B = Gale Warning (Wind 34-47 knots)
- C = Storm (Wind 47-64 knots)
- D = Special Marine Warning (Unusual weather phenomena)

(2)Windmill Point = North side of Rappahannock River

Table 5. Maryland marine accident statistics for the quarter, September-November 1982.

Month	No. of Boating Accidents	No. of Injuries	No. of Deaths	Property Damage
September	18	15	1	\$48,861
October	16	3	2	33,500
November	2	0	1	300
TOTALS	36	18	4	\$82,661

Data Source: Maryland Department of Natural Resources Marine Police. All categories are for recreational boating. Includes Potomac River to Virginia shoreline. November statistics are preliminary and subject to revision.

Table 6. U.S. Coast Guard Search and Rescue (SAR) caseload for the quarter, September-November 1982.

Month	Number of Search and Rescues		
	Group Baltimore	Group Eastern Shore	Group Norfolk
September	149	34	151
October	130	14	106
November	48	3	64
TOTALS	327	51	321

Group Baltimore - most of Upper Bay  
 Group Eastern Shore - lower central portion of Eastern Shore  
 Group Norfolk - most of Lower Bay



Table 7. State parks attendance and revenue, selected Maryland and Virginia facilities

Month	Maryland State Parks		Virginia State Parks	
	<u>Sandy Point</u>	<u>Point Lookout</u>	<u>Seashore</u>	<u>Chippokes Plantation</u>
	Usage	Revenue	Usage	Revenue
September	114,007	\$20,984	30,599	\$12,039
October	54,273	4,717	13,203	9,591
November	*N/A	N/A	N/A	N/A
=====				
<u>Totals</u>	168,280	\$25,701	43,802	\$21,630
			104,332	\$40,793
			13,482	\$246

\*N/A = not available

Data Source: Maryland Department of Natural Resources, Forest and Park Services and; Virginia Department of Conservation and Economic Development, Division of State Parks.