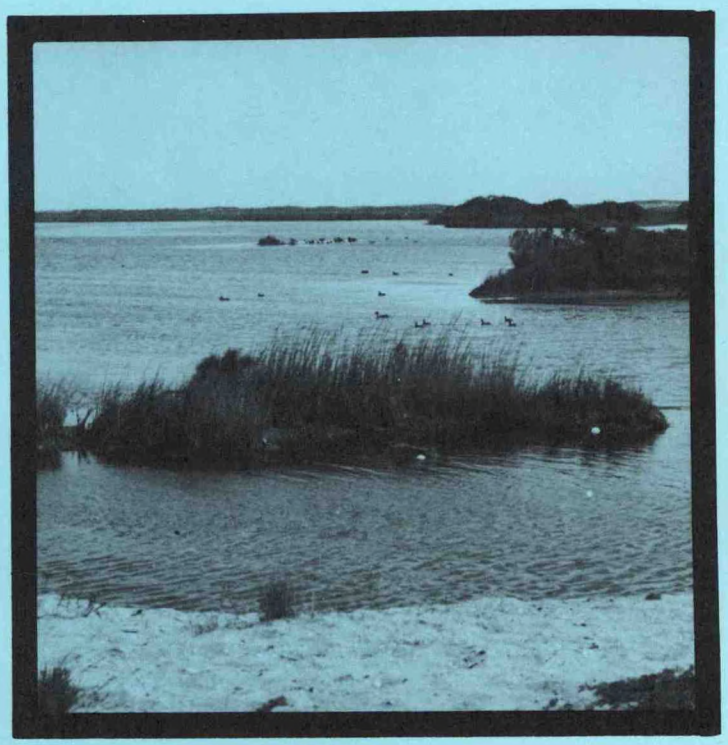
Marine Environmental Assessment

CHESAPEAKE BAY

SEPTEMBER–NOVEMBER 1983



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Assessment and Information Services Center

CLIMATE IMPACT ASSESSMENT
UNITED STATES

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 subscription queries to the Chief, Marine Assessment Branch, Marine Environmental Assessment Division, NOAA/NESDIS/AISC, E/AI32, 3300 Whitehaven Street, NW, Washington, DC 20235, or call (202) 634-7379.

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Salt Marsh - NOAA File Photo
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December 1983

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U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

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National Environmental Satellite, Data, and Information Service
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Assessment and Information Services Center
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CHESAPEAKE BAY MARINE ASSESSMENT

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.

Table 1. Climate impact summary, Chesapeake Bay, September - November, 1983.

EVENT	IMPACT SECTOR: FISHERIES							RECREATION					TRANSPORTATION					
	Finfish harvest activities (general)	Shellfish harvest activities (general)	Menhaden	Blooms	Reduced prevalence MSX disease			Park usage	Boating activity	Safety			Port operations	Cost to shippers				
High water temp.--September				+														
Mild air temperatures	+	+		+				+	+	+								
Low dissolved oxygen			-															
High streamflow--Spring 1983					+													
Tropical storm Dean	-	-						-	-	-								
Low incidence major storms	+	+						+	+									

+ Favorable

- Unfavorable

No identifiable effect, data unavailable, or not applicable

Chesapeake Bay Marine Environment

1. Highlights - General Events and Impacts

Finfish and shellfish harvest activities continued uninterrupted by weather during the September-November 1983 quarter, except during Tropical Storm Dean in late September.

Oysters were in very short supply following widespread mortalities from MSX disease last year, though prevalence of the disease has been greatly reduced following high streamflow in spring 1983 and subsequent lowered salinities. Other factors such as poor oyster reproduction during the 1970's and sustained high levels of harvesting also contributed to the decline in oyster stocks.

Above normal water temperatures and generally calm conditions in September provided favorable conditions for bloom organisms. Several fish kills (menhaden) were also reported in September, due probably to oxygen depletion. The widespread algal blooms on the Potomac River observed in summer 1983 continued into the fall quarter until cooler water temperatures and lower growth rates caused the floating mats of algae to gradually dissipate.

The low incidence of major storms and generally mild air temperatures were favorable for recreation in the Bay area for most of the quarter.

Shipping and related shore activities proceeded normally during the quarter.

2. Weather and Oceanography Summary

Weather

The precipitation deficit in late summer 1983 was followed by abundant rainfall in October and November compared to the same period in 1982 when dry conditions persisted longer into the fall quarter. Temperatures were slightly above normal for the quarter, though both high and low temperature records were established at several stations in September.

September:

Chesapeake Bay area temperatures ranged from well above normal during the first two-thirds of September to well below normal during the last third. Many of the 11 stations in the area (Figure 1) established new high temperature records during the first 20 days of the month, and shortly afterwards set low temperature records during the last 10 days. Monthly mean temperature departures ranged from 2.0 degrees above normal at Wilkes-Barre, Pa. to 1.9 degrees below normal a short distance west at Williamsport, Pa. The average departure from normal of the 11 stations in Figure 1 is +0.3 degrees (Table 2).

Precipitation totals for the month at the 11 stations ranged from 61 percent below normal at Harrisburg, Pa. to 24 percent above normal at Patuxent, Md. (Table 2). The average precipitation for all 11 stations was 21 percent below normal for the month.

A cold front at the beginning of the month brought moderate amounts of precipitation to most of the stations. Daily high temperatures, which had dropped into the mid 80's immediately after this front, returned to the 90's during the 5th, 6th, and 7th, setting new daily high temperature records at Baltimore and Patuxent River, Md. Temperatures dropped into the 80's over the 8th and 9th when a cold front moved through the Bay area. Temperatures again climbed into the 90's during the 10th, 11th, and 12th, setting daily high temperature records from Harrisburg, Pa. to Richmond, Va. A slow-moving cold front on the 12th and 13th dropped high temperatures into the 60's and brought thunderstorms, with rainfalls exceeding one inch, to most of the stations. Temperatures gradually returned to near 90 degrees or more by the 19th and 20th, again establishing new daily records at several of the stations near the Bay proper. A strong cold front on the 21st brought heavy rains to all Bay area stations and dropped temperatures by 30 degrees at some stations, setting new low temperature records at Patuxent River, Md. and Richmond, Va. on the 23rd. All 11 stations recorded their lowest temperature of the month between the 23rd and the 25th. Temperatures climbed into the upper 70's by the 27th and 28th, but then declined as tropical storm Dean moved into lower Chesapeake Bay over the 29th and 30th, bringing moderate rains and northeasterly winds of 25 to 35 mph to that region. Some minor tidal flooding and beach erosion accompanied tropical storm Dean in the Norfolk area.

Winds at Patuxent River, Md. on several occasions exceeded 20 mph from the 12th to the 14th and from the 20th to the 22nd following cold fronts and from the 28th to the 30th, when tropical storm Dean was near or in lower Chesapeake Bay. Northwest winds from 10 to 20 mph with gusts to 28 mph were recorded at Royal Oak, Md. following the cold front on the 22nd. High wind speeds from a northeasterly direction were noted there the 29th and 30th, when tropical storm Dean passed through the Lower Bay area.

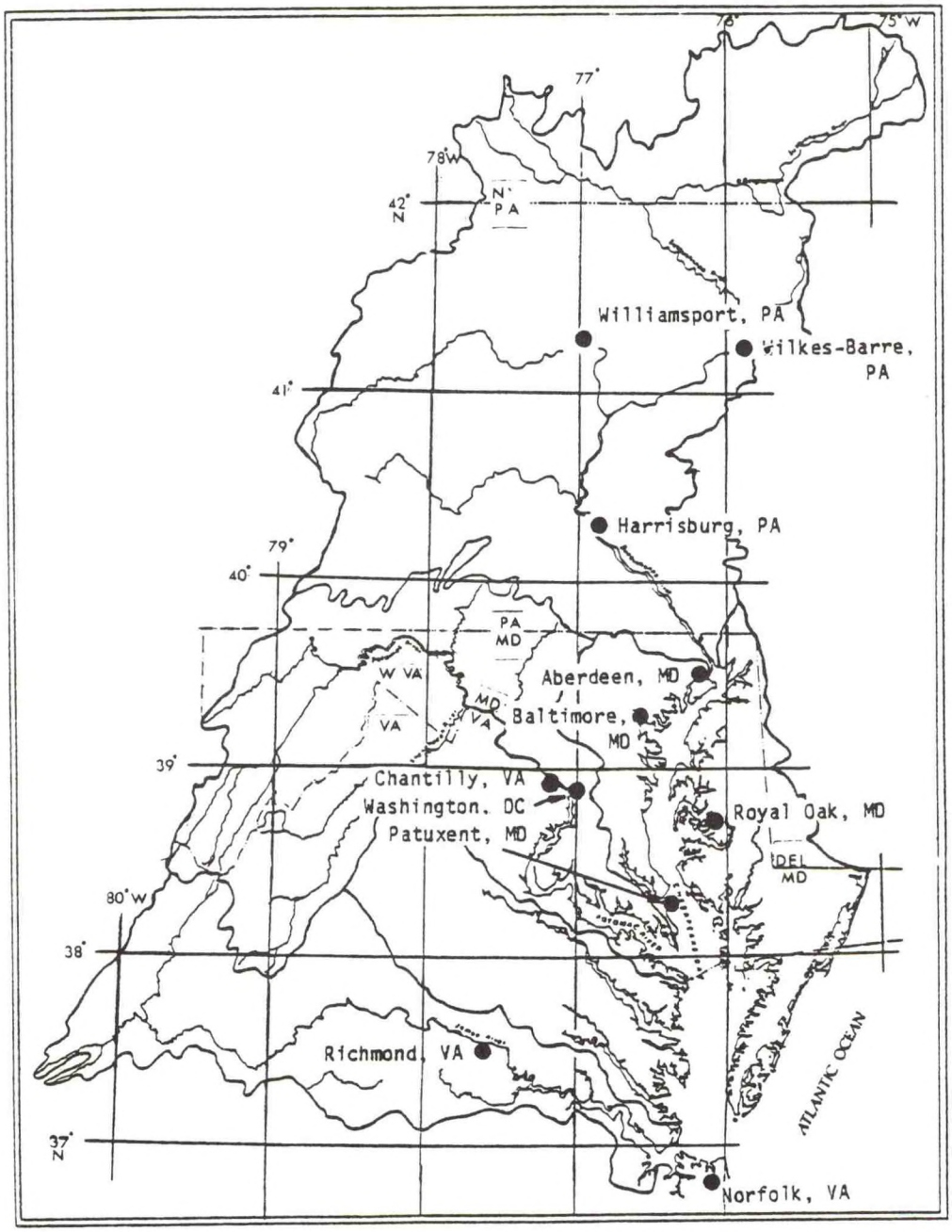


Figure 1. Selected meteorological stations, Chesapeake Bay watershed (Modified EPA map).

Table 2. Precipitation/temperature totals and anomalies, Chesapeake Bay watershed, September - November 1983.

Station	Total Precipitation (Inches) and Departure from Normal (Percent of Normal) Observed/*Anomaly			Air Temperature and Departure from Normal Observed/*Anomaly (Deg.F)		
	September	October	November	September	October	November
Williamsport, Pa.	1.88/-47%	3.01/-7%	5.89/+62%	62.0/-1.9	49.9/-2.4	40.1/-1.3
Wilkes-Barre, Pa.	2.12/-37%	2.73/-2%	3.71/+25%	64.8/+2.0	52.5/+0.8	42.8/+1.9
Harrisburg, Pa.	1.40/-61%	4.21/+54%	5.29/+63%	66.2/-0.7	53.6/-1.4	43.8/-0.1
Aberdeen, Md.	2.25/-32%	4.59/+66%	4.95/+39%	70.2/+1.8	57.7/-0.3	49.2/+2.9
Baltimore, Md.	1.76/-49%	3.58/+15%	5.02/+61%	69.5/+0.6	57.3/+0.4	47.1/+0.8
Washington, D.C.	2.90/-10%	4.87/+68%	4.99/+77%	72.6/+1.5	60.4/+1.1	50.3/+1.6
Chantilly, Va.	2.95/-10%	6.00/+99%	5.06/+69%	66.2/-1.2	54.7/-0.6	44.7/-0.1
Royal Oak, Md.	3.85/+4%	3.14/-9%	5.45/+46%	70.7/+0.4	60.0/+0.7	50.1/+1.2
Patuxent, Md.	3.97/+24%	5.14/+80%	4.53/+48%	72.4/+1.6	61.2/+1.2	51.1/+1.7
Richmond, Va.	3.05/-13%	4.02/+8%	5.63/+71%	68.8/-1.4	58.1/-0.5	49.0/+0.1
Norfolk, Va.	4.52/+4%	5.29/+55%	3.24/+13%	72.8/+0.6	62.7/+1.4	52.6/+0.7
Average	2.79/-21%	4.23/+37%	4.89/+52%	68.7/+0.3	57.1/ 0.0	47.3/+0.9

*Anomaly = departure from 30-year average for each month.

October:

October weather was marked by extended periods of rain or drizzle and cloudy weather. Rainfall in the Washington D.C. area was nearly twice the normal amount.

Precipitation among the eleven stations of Figure 1 during October was generally above normal averaging +37 percent (Table 2). Only three of the stations were below normal, yet none of these exceeded 10 percent below normal. Above normal precipitation occurred in two bands among the stations, the first extending from Harrisburg, Pa. to Aberdeen, Md. and the second from Chantilly, Va. to Norfolk, Va. Richmond, Va. and Baltimore, Md. were 8 percent and 15 percent above normal, respectively. Table 2 shows the monthly precipitation amounts and their percentage departures from normal.

Rain occurred frequently during the month. Royal Oak, Md., despite receiving 9.2 percent below normal precipitation, had rain on 12 occasions. Highest rainfall came from a low pressure system on a frontal occlusion moving out of the Gulf states on the 23rd. A warm front moving inland northwestward from the Atlantic on the 12th and a subsequent cold front on the 13th also brought precipitation amounting to an inch or more for many of the stations. Norfolk received an inch of rainfall from a cold front on the 5th while other stations received much smaller amounts.

October temperatures averaged exactly normal for the eleven stations (Table 2). Stations in the western portion of the region ended the month with average temperatures below normal while those in the eastern portion were above normal. Richmond and Chantilly, Va. and Aberdeen, Md. had below normal monthly average temperatures (Table 2). Norfolk, Va., Washington, D.C., and Patuxent, Md. had monthly average temperatures greater than a degree above normal, and Baltimore and Royal Oak, Md. and Wilkes-Barre, Pa. had temperatures less than a degree above normal for the month. (Table 2).

Along with the seasonal downward trend there were five cycles of rising and falling temperatures during October, the declines usually associated with cold fronts. Peak temperatures were reached by all the stations either on the 4th or the 5th when the first of the periodic crests occurred. Other temperature crests were reached on the 13th, 18th, 24th, and 28th. Following the warm spell of the 28th a strong cold front dropped temperatures to their lowest for most of the stations on the 30th or the 31st. Norfolk had its lowest temperature on the 28th. Royal Oak reported its first freeze on the 30th, 27 days later than its usual first freeze.

During October, Baltimore, Md. reported 8 days with winds greater than or equal to 20 mph and 29 days having gusts of 20 mph or better. Royal Oak, Md. reported wind gusts of 22 mph from the east on the 11th, gusts of 21 mph from the north on the 25th, gusts of 25 mph from the west on the 26th and 27th, and gusts of 22 mph from the south on the 28th. Norfolk, Va. reported that it experienced frequent northeasterly winds during October. Those on the 11th, 21st, and 25th raised tides 4.5 to 5.0 feet above mean low water causing minor flooding and beach erosion.

November:

November weather was wetter than normal and nearly a degree warmer than normal among the 11 stations in Figure 1. Monthly average temperature departures from normal ranged from 2.9 degrees above normal at Aberdeen, Md. to 1.3 degrees below normal at Williamsport, Pa. (Table 2). The combined departure from normal of the 11 stations was 0.9 degrees above normal.

Six major weather systems provided most of the precipitation in November. Precipitation ranged from 13 percent above normal at Norfolk, Va. to 77 percent above normal at Washington, D.C. (Table 2). The average total precipitation for the 11 stations was 52 percent above normal.

Temperatures reached 70 degrees or more during the first three days of the month, which were the highest temperatures for the month at all but three of the stations. A cold front on the 3rd caused sharply falling temperatures and light to moderate precipitation. Light precipitation and cool temperatures continued through the 6th, when stations on the upper Bay had their lowest temperatures for the month.

Temperatures rose to the high 60's in the upper Bay region on the 9th, when Wilkes-Barre and Harrisburg, Pa. recorded highest temperatures for the month. A complex frontal low pressure system developed on the 10th, bringing moderate to heavy rain to the entire region and some light precipitation during the following two days. Cold air in the rear of the low pressure system on the 10th brought the lowest temperatures of the month to the three Pennsylvania stations over the 13th to the 15th.

A third major frontal storm system moved through the area on the 15th and 16th, bringing nearly an inch of rain to stations near the Bay. Cold blustery northwesterly winds in the wake of this storm brought Washington, D.C. and Richmond and Norfolk, Va. their lowest temperatures for the month on the 18th. Warming followed over the next several days even though interrupted by a deep storm system centered in the north of the region. Rainfall from this storm ranged from 0.58 inches at Norfolk, Va. to 1.37 inches at Aberdeen, Md. Patuxent, Md. reached 73 degrees, a new record high temperature for the 22nd. Norfolk reached 78 degrees on the 24th, its highest temperature for the month and a new record for that date.

The warm temperatures experienced by Norfolk on the 24th preceded a cold front advancing across the entire area from the west. Rains which turned to light snow the morning of the 25th totaled more than an inch at many of the stations.

Slight warming occurred on the 26th and 27th followed by a cold front on the 28th which brought light to moderate rain to the area and caused temperatures to fall to their lowest values for the month at several stations in the middle Bay area.

Winds blew most strongly and persistently on the 25th following the cold front which brought traces of snow to most stations. Norfolk, Va. reported wind gusts up to 43 mph that day. Royal Oak reported northwest wind gusts equalling or exceeding 30 mph on the 4th, 12th, 17th, and 25th (40 mph), 28 mph on the 21st, and 23 mph from the west on the 30th following cold fronts or

storm systems. Wind gusts reached 28 mph from the east-northeast preceding the storm on the 10th.

Streamflow

Bay streamflow remained below normal in September and October, following three months of below normal flow during summer 1983 (Figure 2). October flow increased to closer to normal during a period of generally above average precipitation which continued through November. The September 1983 flow of 13,000 cubic feet per second (cfs) was the lowest during 1983 and well below the long-term September average of 29,878 cfs. Though September 1983 flow was lower than September 1982, October and November flows in 1983 were considerably higher than October and November in 1982. Cumulative streamflow has shown an excess since the record high flow of April 1983 (Figure 3). The September - November 1983 quarter ended with a 1.06 trillion gallon excess.

Oceanography

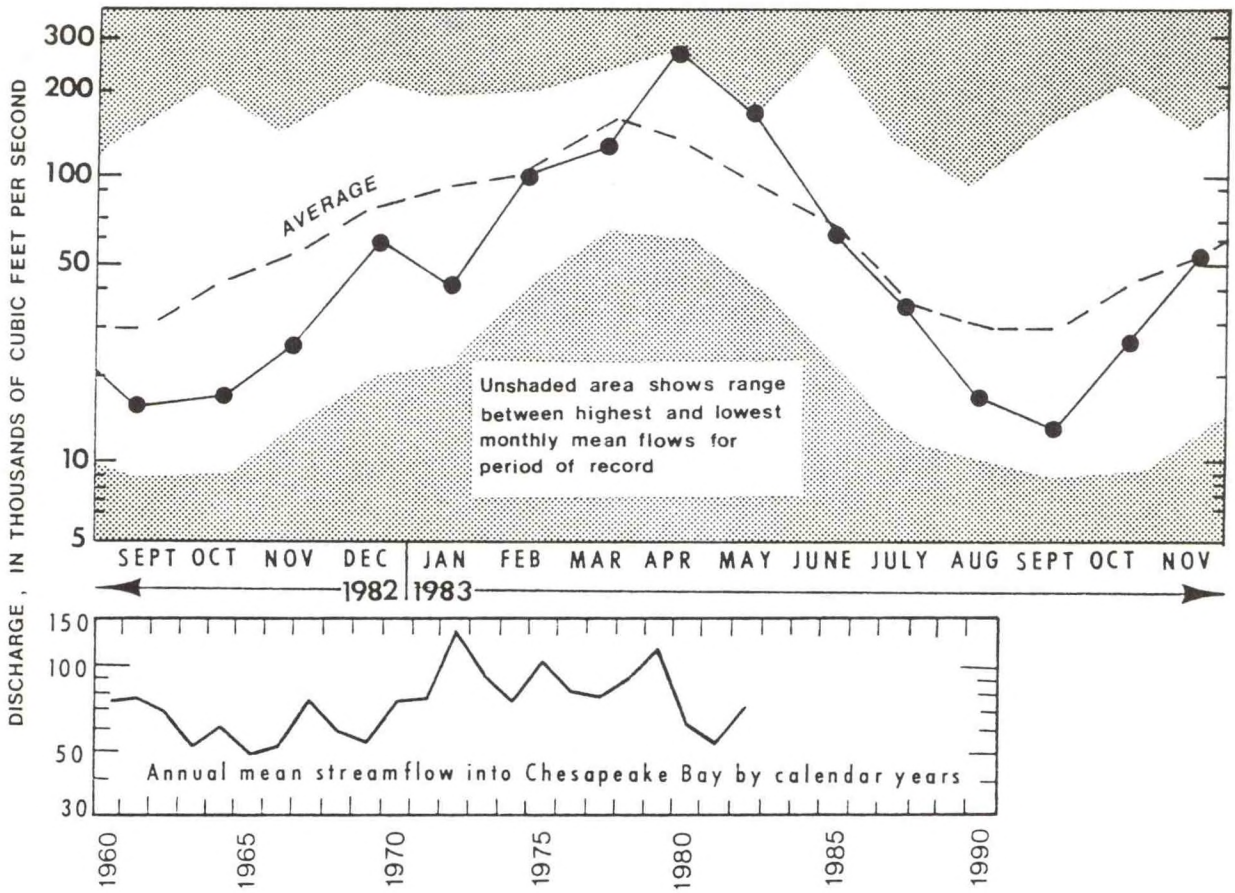
Salinities around the Bay were slightly above normal following five months of below normal streamflow. Water temperatures were above normal at all stations in September following very warm air temperatures in late summer.

Salinity:

Bay surface salinities showed a gradual return to normal in summer 1983 then increased to slightly above normal during the fall months (Table 3 and Figure 4). All stations showed positive salinity anomalies except in September when Kiptopeke, Va. salinity was slightly below normal at -0.1 parts per thousand. Positive salinity anomalies were highest in November, though streamflow rose to slightly above normal by the end of the quarter. Regional excesses in precipitation in October and November (Table 2) and the return to near normal streamflow suggest a lower salinity trend into the winter quarter.

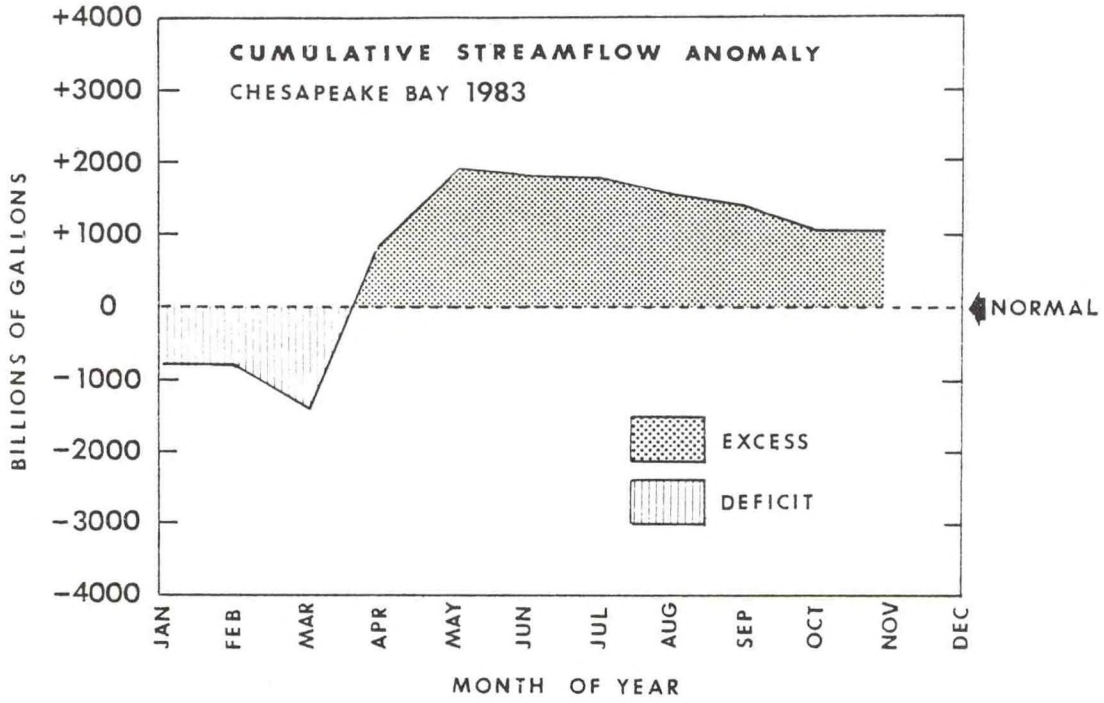
Water temperature:

Surface water temperatures were higher than normal at all stations in September following unusually high air temperatures in the Bay region in late summer (Table 3). Water temperatures returned closer to normal in October and November at most of the stations.



Streamflow was below normal in September and October and slightly above normal in November. Flow returned toward normal following the regional precipitation deficit in September. Data from U.S. Geological Survey.

Figure 2.--Monthly streamflow into Chesapeake Bay, September-November 1983, and annual mean flow 1960-82.



The cumulative streamflow anomaly (sum of negative and positive departures from normal) through November was a 1.06 trillion gallon excess. Below normal streamflow from June through October minimally reduced the large excess from very high streamflow during the spring 1983 quarter. Data from U.S. Geological Survey.

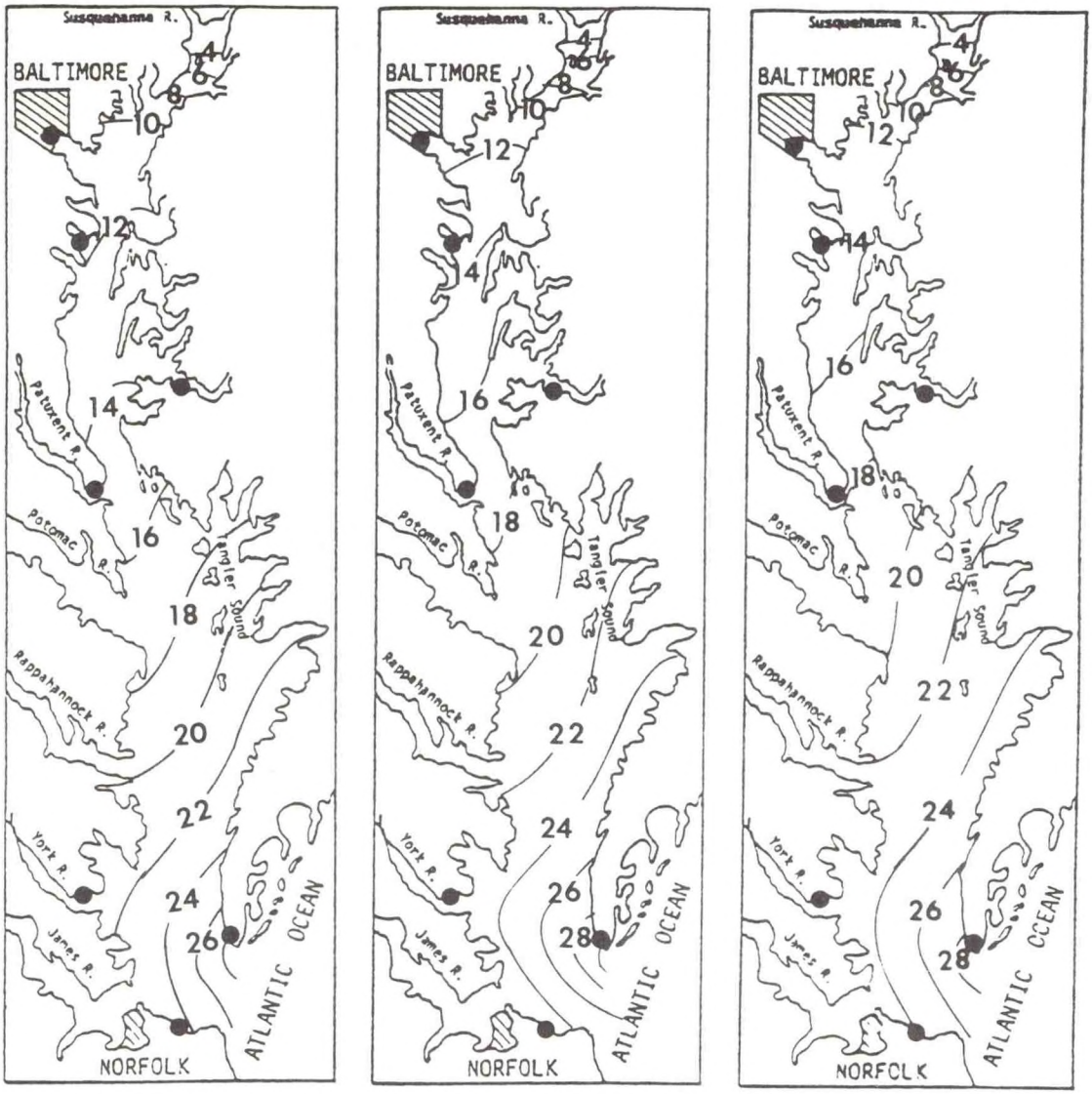
Figure 3.--Cumulative monthly streamflow anomaly, Chesapeake Bay, 1983.

Table 3. Bay surface salinities and surface water temperatures, September - November 1983.

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.	10.4/+0.7	10.8/+1.1	11.4/+0.3	76.1/+0.9	65.6/-0.1	53.9/-0.1
Annapolis, Md.	11.9/+0.3	13.4/+1.8	14.0/+2.4	75.7/+0.9	64.2/-0.7	53.2/+0.3
Solomons, Md.	----/----	----/----	----/----	77.7/+2.0	67.1/+1.4	55.0/+0.3
Kiptopeke, VA	27.3/-0.4	28.6/+0.9	27.9/+0.8	75.3/+1.5	65.6/+1.0	53.6/-0.2
Bay Bridge-Tunnel, Va.	24.5/+0.4	24.2/+0.1	25.1/+1.0	76.0/+0.6	67.2/+1.4	56.7/+1.5

*Anomaly = departure from long-term monthly averages.

All salinity data are provisional. Cruise data are used to supplement Solomons, Md. station which experienced instrument malfunction.



Isohalines (parts per thousand) are linearly interpolated from designated station data. Salinities around the Bay were slightly higher than normal during the fall quarter. November showed highest positive anomalies, though above normal precipitation and higher streamflow in October and November suggest lowered salinities in the early winter quarter. Data from National Ocean Service, NOAA.

Figure 4.--Mean surface salinity distribution, Chesapeake Bay, September-November 1983.

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

Fisheries

Shellfish:

Oysters were in short supply during the fall quarter. Ex-vessel prices (price paid to the harvester at dockside) reached a record high of $20 per bushel compared to a high of $16.25 in 1982. Prices early in the season ranged from $10 to $12 per bushel. By mid-November bushels routinely sold for $16 to $17. Prices varied according to location and oyster quality. The Maryland Department of Natural Resources estimates the average price for the 1983-84 season at $12 per bushel compared to $9.40 for the 1982-83 season.

Widespread mortality from MSX disease last year and poor oyster reproduction during the 1970's contributed to the shortage of oysters. Oysters of the good 1980 year class will reach the 3-inch harvest size later in the 1983-84 season, according to the Maryland Department of Natural Resources. Below average spat counts were reported in the upper Bay. Virginia Institute of Marine Science shellstring surveys for summer and fall 1983 show the James and Piankatank Rivers experienced exceptional spatset, while other Virginia Rivers were poor to average. The overall spatfall in Virginia was average to above average due to the high set in the James River, which, because of its extensive oyster bars, normally produces a large proportion of the overall spatfall.

With the exception of Cornfield Harbor, Md., MSX disease showed very low prevalence in oysters in Maryland and was not detectable in fall 1983 sampling by the Maryland Department of Natural Resources in most areas of the Upper Bay. High levels of MSX (40 percent prevalence of all stages of the disease) were detected in the Cornfield Harbor area of the lower Potomac River. Peak mortalities are normally observed in June, September, October, and early November. Areas such as Eastern Bay off Kent Island, Md., which experienced extensive mortalities in fall 1982, showed very low mortalities in fall 1983. Northern Chesapeake Bay, an area considered at high risk of MSX infection, showed low prevalence of the disease in August. Lower than normal salinities in June following the very wet spring may have contributed to the reduced prevalence of MSX which prefers salinities above 12 ppt. Studies by the Virginia Institute of Marine Science in summer-early fall show MSX activity was either non-existent or very low in sampled oysters in Virginia.

The seasonal decline in water temperatures brought an increase in quality of oyster meats in Maryland and Virginia. Oysters store increased amounts of glycogen as water temperatures cool, increasing meat yields. Watermen reported oysters of excellent quality which brought higher prices in late November.

Blue crab landings in September and October 1983 showed large increases over the same months in the 1981 and 1982 seasons (Table 4).

Table 4. Maryland blue crab landings (millions of pounds) by commercial trot-liners and potters, September - November 1981-83.

	1981		1982		1983	
	Trot-line	Pot	Trot-line	Pot	Trot-line	Pot
September	4.3	4.8	4.5	3.3	6.5	4.1
October	1.4	3.8	0.9	1.9	1.9	6.0
November	N/A	1.6	0.1	0.8	N/A	N/A

Data from Maryland Department of Natural Resources. Landings by trot-line include some recreational catch.

Landings in October 1983 by trot-line were one million pounds higher than October 1982, an increase of 111 percent. Landings in October 1983 by crab-pot were 4.1 million pounds higher than October 1982, an increase of 216 percent. October 1983 values are preliminary, and actual landings may be higher.

A combination of biological and economic factors contributed to the high October blue crab landings: blue crabs were in good supply during the fall 1983 quarter and harvesting effort increased. Because of the shortage of oysters and the abundance of blue crabs, many watermen continued crabbing longer into the quarter than in years of more plentiful oyster stocks. Blue crabs were of good quality and were abundant through mid-November. The abundance of blue crabs in late summer and in the fall quarter is the result of the good hatch and excellent survival of the 1982 year class.

Finfish:

The Maryland Tidewater Administration reports the relative abundance index for striped bass spawning success for 1983 in Chesapeake Bay is 1.4, compared to 8.4 in 1982. The relative abundance index is based on the average number of young-of-the-year (inch-long fry) captured per seine haul in Bay tributaries. The 1983 value is the second lowest on record, following the record low of 1.2, set in 1981. The record high is 30.4, set in 1970. Commercial striped bass landings in Maryland through mid-December 1983 were 255,000 pounds compared to 474,000 pounds landed in 1982. The 1982 value includes delinquent reports and complete December landings, though 1983 landings are not expected to exceed 300,000 pounds. The 1983 landings value is the lowest on record, continuing the dramatic decline in the striped bass fishery. Striped bass landings in Maryland exceeded 5 million pounds in 1961 and 1969. Landings have shown a steady decline since they last reached 5 million pounds in 1973. Fishing effort for striped bass was down during the fall 1983 quarter, reflecting the decline in available stocks. The relative abundance index for white perch was 9.0 in 1983, well below the long-term average (1964-83) of 20.0. White perch spawning success varies dramatically with location in Bay tributaries, and the 9.0 value is a Bay-wide average.

Watermen and Maryland Department of Natural Resources researchers noted the unusual occurrence of several southern species of higher salinity finfish such as channel bass and grunts well into normally freshwater areas of upper Bay tributaries. The occurrence of higher salinity species in upper portions of Bay tributaries usually coincides with a period of higher than normal Bay salinities.

Young-of-the-year croaker were abundant in Chesapeake Bay through the fall 1983 quarter. The mild winter of 1982-83 provided favorable conditions for stocks of overwintering juvenile croaker spawned in October 1982. The lowest limit of survivability for yearling croaker is a water temperature of 0.6°C. Yearlings spawned in October 1983 and the very successful 1982 year class are vulnerable to severe cold during the 1983-84 winter.

Blooms, Fish Kills:

Extensive blooms of blue-green algae in a 20-mile stretch of the upper Potomac River which began during summer 1983 continued through October. Persistent concentrations of the algae were observed in September and October in the same general areas as in the summer months with highest concentrations off Hallowing Point near Indian Head, Md. Concentrations declined in the fall months, coinciding with decreasing water temperatures and lower growth rates of the algae. Below average streamflow in September and October favored the continued presence of the algae. Concentrations decreased gradually and no sudden die offs of the algae were observed. Sudden die offs and decay of the algae can result in oxygen depletion and fish kills. No fish kills were observed associated with the algae.

The occurrence of phytoplankton blooms in the upper Bay in September was similar to late summer. Above normal water temperatures and generally calm conditions coincided with an above average number of reports of discolored water and odor. Fish kills occurred on September 11 at Back River and Spa Creek during a period of very warm air temperatures and little wind. The dominant species in both fish kills was menhaden, and the probable cause was low dissolved oxygen according to the Maryland Office of Environmental Programs. A normal incidence of localized, isolated blooms was reported for the Patuxent River, Kent Narrows, and Sandy Point areas during November.

Recreation

The low incidence of major storms and generally mild air temperatures provided favorable conditions for recreation in the Bay area for most of the September - November quarter. The National Weather Service issued 25 small craft advisories and 5 gale warnings in the fall quarter compared to 25 small craft advisories, 5 gale warnings, and one storm warning during the fall 1982 quarter (Figure 5 and Table 5).

Table 6 lists U.S. Coast Guard search and rescue (SAR) data for the fall 1983 quarter. Group Baltimore handled 139 cases in October 1983, higher than in October 1981 and October 1982. Twenty-two groundings contributed to the high caseload at Group Baltimore. Eleven boats ran aground over two days, October 28 and 29, during strong winds and low tides in the South River and Annapolis area. Group Norfolk reported an unusually high number of cases in late September and early October during a period of northeasterly winds associated with Tropical Storm Dean. The number of groundings and boats adrift (broken moorings) was higher than normal during this period.

Thirty-nine boating accidents occured in Bay waters in Maryland during the fall quarter, resulting in 4 deaths, 5 injuries, and $24,011 in property damage (Table 7). November totals are preliminary, and final figures may be higher. Fifty-eight vessels were involved in the accidents. The cumulative number of boating accidents in 1983 through October (216) is very close to the cumulative total for 1982 through October (207). Cumulatively, the number of injuries are down (53 in 1983 and 83 in 1982), fatalities are up (24 in 1983 and 20 in 1982), and property damage is down ($314,616 in 1983 and $565,919 in 1982).

Attendance and revenue for selected Maryland and Virginia state parks are listed in Table 8. Generally, attendance was near normal, though several parks experienced slightly higher than normal attendance in October. Attendance dropped abruptly during the last week in October at Point Lookout State Park, coinciding with an earlier than normal drop-off in recreational fishing. Recreational fishing, primarily for bluefish, normally extends into November at Point Lookout.

Virginia parks experienced generally good seasonal attendance levels throughout the quarter. Attendance was reduced on several rainy weekends including during Tropical Storm Dean in late September. Attendance was high at most of the Parks in November. Seashore State Park attendance showed increased day usage during periods of mild air temperatures in November.

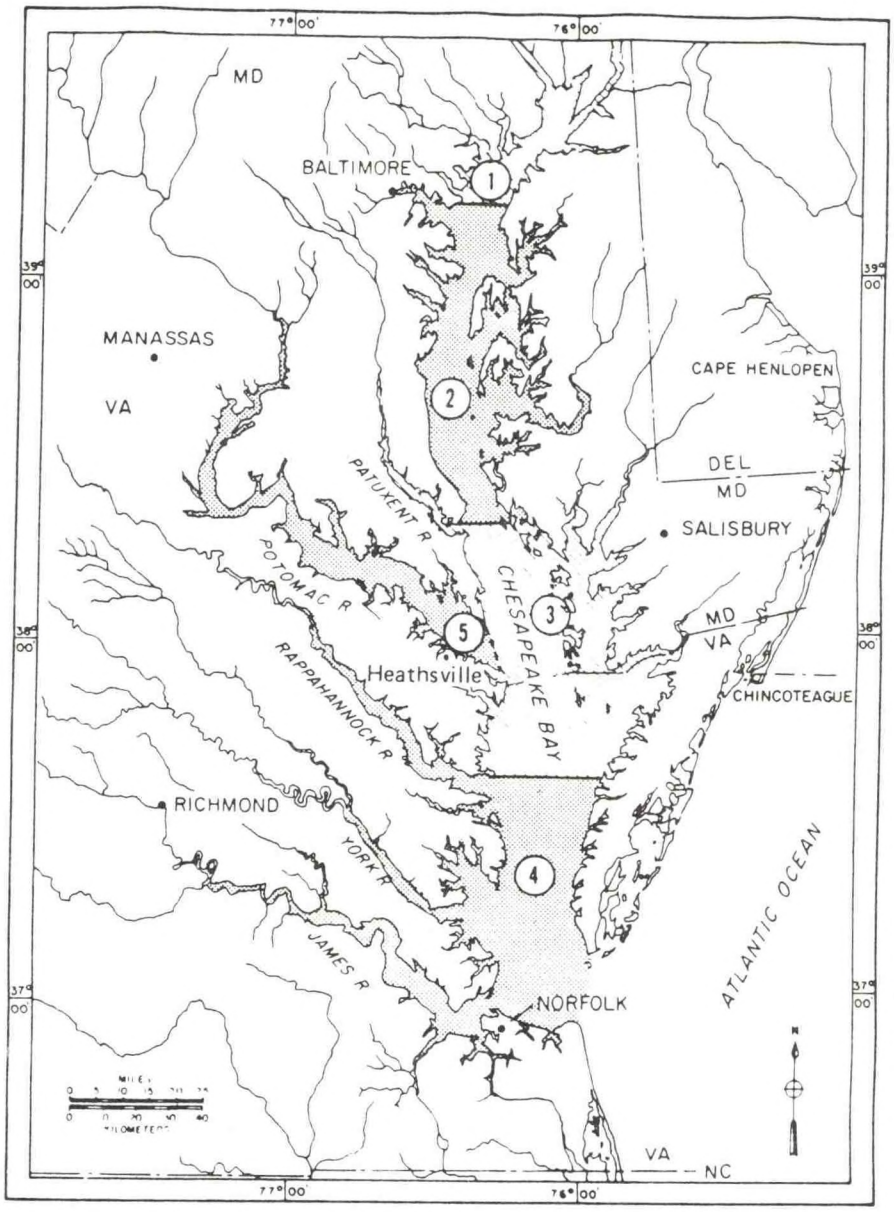


Figure 5. National Weather Service (NWS) forecast areas for Chesapeake Bay.

Key to forecast areas:

1 = North of Baltimore Harbor
2 = Baltimore Harbor to Patuxent River
3 = Patuxent River to Windmill Point
4 = South of Windmill Point
5 = Tidal Potomac River

Table 5. Marine advisories/warnings, Chesapeake Bay, September - November 1983 (National Weather Service data). For definition of areas see Figure 5.

	Date	Condition Report[1]	Location[2]
September	14	A	South of Windmill Point
	15	A	South of Windmill Point
	21	A	Entire Bay and Tidal Potomac River
	28	A	South of Patuxent River
	28	B	South of Windmill Point
	29	B	Patuxent River to Windmill Point
	30	A	Patuxent River to Windmill Point and north of Baltimore Harbor
	30	B	South of Windmill Point
	30	A	North of Windmill Point and Tidal Potomac River
October	10	A	South of Windmill Point
	10	A	North of Baltimore to Windmill Point
	20	A	South of Windmill Point
	20	A	Patuxent River to Windmill Point
	20	B	South of Windmill Point
	21	A	South of Windmill Point
	25	A	South of Patuxent River
	27	A	Entire Bay and Tidal Potomac River
	28	A	Entire Bay and Tidal Potomac River
November	3	A	North of Patuxent River and Tidal Potomac River
	4	A	South of Windmill Point
	10	A	South of Windmill Point
	11	A	Entire Bay and Tidal Potomac River
	12	B	Mouth of Chesapeake Bay
	12	A	Mouth of Chesapeake Bay
	15	A	South of Windmill Point
	15	A	North of Windmill Point and Tidal Potomac River
	17	A	North of Patuxent River and Tidal Potomac River
	20	A	Chesapeake Bay and Tidal Potomac River
	21	A	Chesapeake Bay and Tidal Potomac River
	24	A	Chesapeake Bay and Tidal Potomac River

[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 6. U.S. Coast Guard Search and Rescue (SAR) caseload, September - November 1983.

Month	Number of Search and Rescues		
	Group Baltimore	Group Eastern Shore	Group Norfolk
September	128	15	175
October	139	10	120
November	52	4	59
TOTALS	319	29	354

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

Table 7. Maryland marine accident statistics, September - November 1983.

Month	No. of Boating Accidents	No. of Injuries	No. of Deaths	Property Damage
September	23	3	1	$ 14,780
October	13	2	3	9,231
November	3	0	0	N/A
TOTALS	39	5	4	$ 24,011

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

Table 8. State parks attendance and revenue, selected Maryland and Virginia facilities, September - November 1983.

Facility	Month					
	September		October		November	
Maryland	Attendance	Revenue	Attendance	Revenue	Attendance	Revenue
Sandy Point	100,320	$20,577	62,482	$ 9,493	11,650	$ 375
Point Lookout	31,981	19,357	18,386	7,125	2,435	1,805
Virginia						
Westmoreland	13,465	$10,628	2,206	$ 1,959	1,696	$ 117
Chippokes	2,733	759	1,213	253	905	35
York River	7,675	480	2,690	123	3,175	45
Seashore	66,274	36,643	34,077	8,884	33,575	22

Data from Maryland Department of Natural Resources, Forest, Park, and Wildlife Service; and Virginia Department of Conservation and Economic Development, Division of State Parks. Revenue does not always reflect usage levels. Special scheduled activities, seasonal revenue changes, and equipment breakdown influence total revenue amounts.

Transportation

Shipping and related shore activities at Maryland and Virginia ports proceeded normally during the quarter. Fishing trawlers came into the Port of Hampton Roads for shelter during Tropical Storm Dean in late September. The presence of the trawlers had no effect on port operations.

Winds in excess of 40 mph shut down crane operations only twice at the Port of Baltimore during the fall quarter for a total of 6 hours and 55 minutes (Table 9). During the same period in 1982, winds shut down operations 7 times on 6 days for a total of 37 hours and 39 minutes productive time lost.

Table 9. Number of crane shutdowns and productive time lost due to wind in excess of 40 mph at Port of Baltimore, September-November 1983.

Date	Number of Shutdowns	Productive Time lost (Hours:Minutes)
October 13	1	3:20
November 25	1	3:35
Totals	2	6:55

Data from Maryland Port Administration.

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