2025 Fish Kill Summary

Maryland Department of the Environment
Water and Science Administration
Bioregulatory Monitoring and Response Division
Fish Kill Investigation Section

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Purpose

A special responsibility mandated by Environmental Article Section 4-405C requires management and control agencies to investigate the occurrence of damage to aquatic resources, including, but not limited to, mortality of fish and other aquatic life. The investigations should determine the nature and extent of each occurrence and endeavor to establish the cause and sources. If appropriate, findings should be made to require the reparation of any damage done and the restoration of the affected water resources, to the degree necessary to protect the best interest of the State.

Until 1984, fish kill investigations in the state were the responsibility of the Department of Natural Resources. In 1984, this function was transferred to the Office of Environmental Program's Division of Water Quality Monitoring within the Department of Health and Mental Hygiene. Effective July 1, 1987, the Office of Environmental Programs became part of the Maryland Department of the Environment (MDE).

The MDE Bioregulatory Monitoring and Response Division coordinates an on-call interagency staff to ensure that all fish kill reports are promptly addressed. While MDE attempts to investigate all reported events, reports with fewer than 25 dead fish and those for which there is prior information or incidents that are reported more than 72 hours after they occurred are not always investigated. Information obtained by interviewing the complainant, knowledge of fisheries, scientific activity, and historical data from the vicinity occasionally eliminates the need to investigate reports.

A summary report on fish kills is prepared annually. A database has been established for all reported incidents occurring since 1984.

Acknowledgements

Many organizations and individuals contribute to the efforts necessary in the field and office to bring this report to completion each year. To those inadvertently not cited, your efforts are greatly appreciated.

2025 After Hours fish kill duty roster: Chris Luckett, Nick Kaltenbach, Jeff Carter, and Barbara Sikorski.

Others who participated in 2025 investigations:
Kate Ansalvish (MDE- WSA-CP), Dave Bramble (LMA-AFO-CP), Brett Coakley (DNR-FBS), Nick Ford (MDE- FSP), Tim Groves (DNR-FBS), Jacob Haglund (MDE-WSA-CP), Charlie Hatfield (MDE-WSA-CP), Byron Madigan (CCG-BRM), John Matticks (MDE-WSA-CP), Tyler Puffenberger (MDE-WSA-CP), Pete Resh (MDE-WSA-CP), Allison Samuel (MDE- FSP), Jasper Sirk (WSSC-Water), Kenny Wampler (DNR-FBS), Ross Williams (DNR-FBS)

Cooperating agencies in 2025:

MDE-	Water and Science Admin-Compliance Program (MDE-WSA-CP)
	Water and Science Admin-Field Services Program (MDE-FSP)
DNR-	Fishing and Boating Services (DNR-FBS)

Carroll County Government, Bureau of Resource Management (CCG-BRM)
Land and Materials Administration, AFO Compliance (LMA-AFO-CP)
Washington Suburban Sanitary Commission (WSSC-Water)

A thank you also goes to the concerned citizens of Maryland for alerting us and providing vital information regarding fish kills throughout the state and to any individual or agency inadvertently omitted from this list.

Summary

This report contains a summary of fish kills reported to MDE in the calendar year of 2025. After the completion of investigations and/or communications with witnesses or knowledgeable officials, a probable cause is usually determined for fish kills. The data presented was gathered from field investigations and discussions with reporting persons and officials.

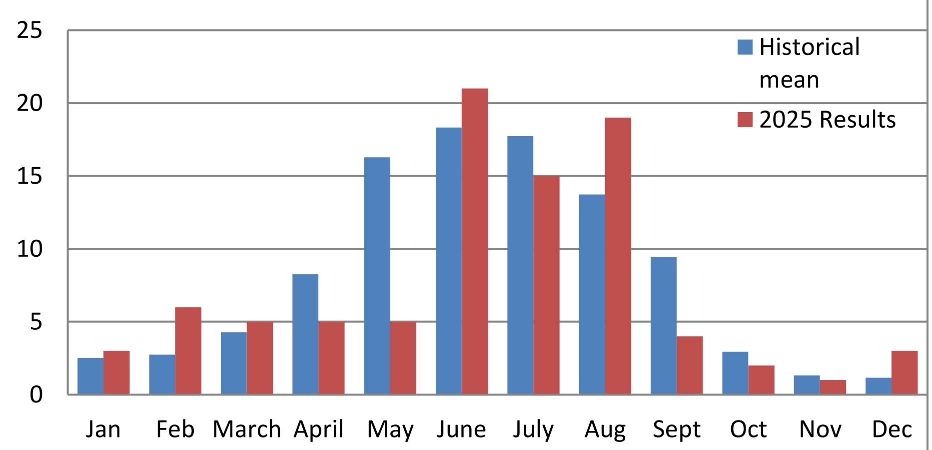
MDE received a total of 89 reports in 2025, with 80 of those reports classified as fish kills and nine reports identified as non-kills. Fifty-nine of those reports warranted an on-site investigation. Anne Arundel County had the greatest number of reports at 17, Calvert County had the second highest number at 10, and Baltimore City had the third highest number at seven.

Fish kills were divided into four aquatic habitats: 54 reported events occurred in estuarine waters, 19 reports were in impoundments, 15 reports were in streams, and there was one kill that occurred in coastal waters. Kills attributed to “natural causes” were identified in 48 events with 28 of these events due to low dissolved oxygen. Total reported fish mortality in 2025 was approximately 273,353 fish. A major event(s) that killed over 200,000 fish was due to low dissolved oxygen, which coincided with a large sulfur bacteria bloom (“Pistachio Tide”) in the Inner Harbor and West Channel of the Patapsco River in Baltimore City. MDE received multiple reports of dead fish related to this bloom in the Harbor area over the course of two months.

Number of Events

Fish kill events typically vary from year to year depending on rainfall, water quality, temperature, ice cover, variations in fish populations, and disease outbreaks. The 89 total fish kills reported in 2025 represents the sixteenth-lowest number of reports received for a year since 1985 and was 88% of the historic average of 100.58 reports per year. Most fish kills occur in tidal waters during warmer months when waters become warm and stratified, and hypoxia becomes more common. In 2025, 72% of reported kills occurred during the five-month period between May 1 and September 30 (Figure 1). Seventy-four percent occurred during the six-month period of May 1 through October 31. Fish kill reports from March through June were above and below historic averages (dependent upon month), while combined reports in September and October fell below the historic average. While most fish kill reports still occur in the warmest months, the total number of events have been well below average for the past ten years.

Figure 1. Fish kill reports received by month.



Chesapeake Bay (Tidal) Water Quality

In most years, periods of intense heat, cold, drought, or heavy precipitation (resulting in nutrient inputs) create conditions that help explain adverse effects on aquatic life, including fish kills. MD DNR's extensive tidal monitoring network provides an excellent dataset of water quality conditions throughout much of the State. The data is publicly available on their "Eyes on the Bay" page.

Maryland weather in 2025 was unusually dry, except for the month of May. This resulted in above-average salinities in most tidal waters early in the year through the spring, but high rainfall in May had widespread effects on tidal salinities. According to DNR, "Maryland received 7.81 inches of rainfall in May, the highest in the past 131 years." Because of this rain, salinities for the state dropped to below the historical monthly average from June through August. By September, in most tidal tributaries and the Chesapeake Bay, salinities were above average; they remained above average until December.

Water temperatures were above average in most tidal waters in March. In the lower Middle Bay to Lower Bay, temperatures reached their historic monthly maximum in June and July. August and September water temperatures were equal to the historic average, but by October, water temperatures rose above the historic monthly average; in general, throughout the Chesapeake Bay, October water temperatures were either above the historic average or at the historic monthly maximum. Water temperatures for November through December were below average.

Dissolved oxygen in the Chesapeake Bay and its tidal tributaries began slightly above average in the early months but were about below average throughout most of late spring and summer. Several locations experienced below average dissolved oxygen in the fall.

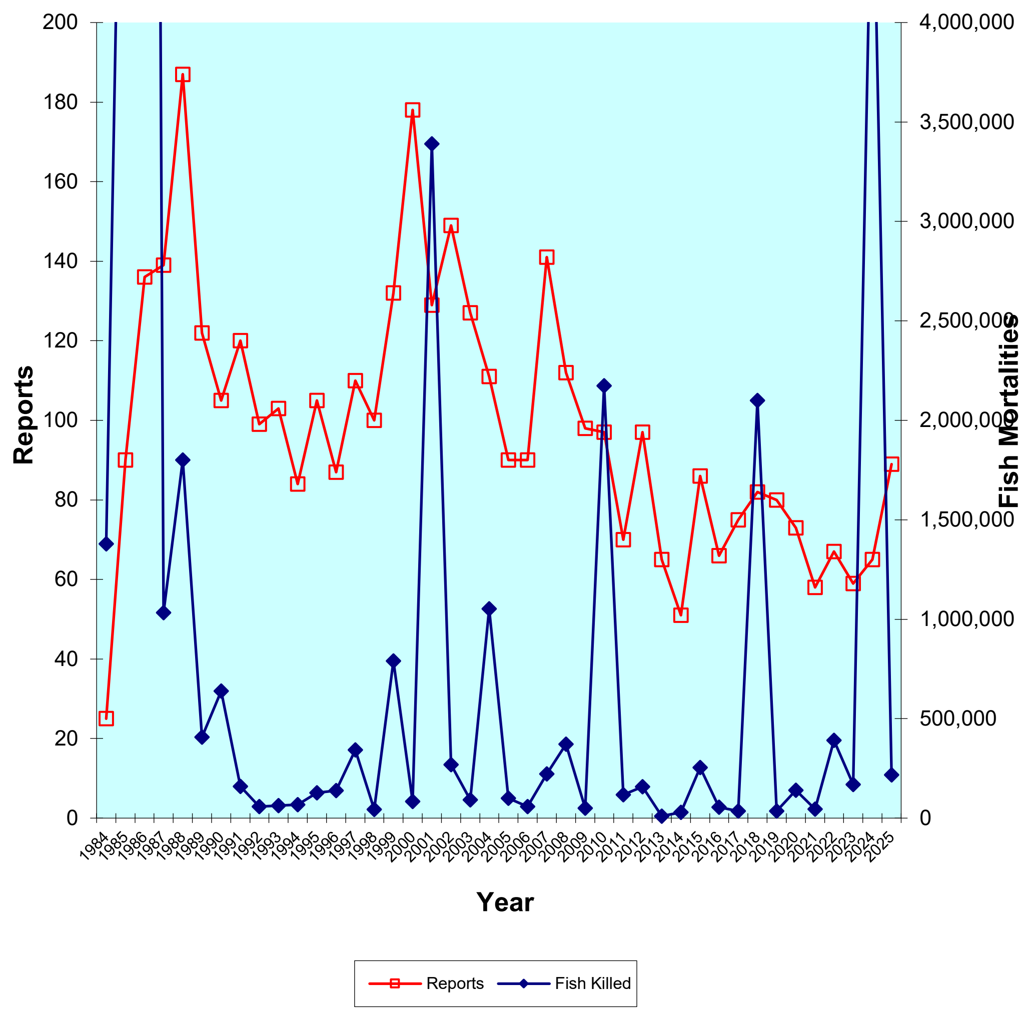
By the end of 2025, the annual summary of the Chesapeake Bay hypoxia performed by DNR (with Old Dominion University) concluded that the volumes of hypoxia varied through the warm months at slightly below average in early June and September to above average from late June to early August (MD DNR, Eyes on the Bay 2025). The hypoxic volume was larger than average and ranked 31st over the past 41 years.

Magnitude of Events

MDE estimates the number of fish and other animals involved in each event. Single, distinct exceptional events may dominate the total number of mortalities in a year (Figure 2). For instance, in the 1980s, large schools (in the millions) of young-of-year menhaden were involved in several very large kills because of corralling in shallow, oxygen depleted headwaters. These events strongly skew the long-term average. As menhaden schools became smaller and less plentiful in the Chesapeake Bay, the number and magnitude of these kills fell, until a sharp increase again in 2024. Similarly, the sudden icing over of shallow wetlands in the winter of 2017-18 resulted in large mortalities of shoreline fish species that dominated the yearly totals for this period.

After several years of below average total mortality, the total fish mortality in Maryland for 2024 (5,011,045 Atlantic menhaden) reached the third highest annual total recorded since 1984. However, in 2025 menhaden kills dropped significantly to 249,034 total fish, which ranks 19th historically.

Figure 2. Reports and Fish Mortalities



Distribution of Fish Kills

Every county, except Howard, Somerset, and Talbot, was affected by fish kills in 2025 (Table 1). Anne Arundel County had the highest occurrence with 17 reports. Calvert County had the second highest occurrence with 10. Baltimore City had the third highest with seven. Cecil County had Kent County tied for the fourth highest occurrence with six reports. Baltimore County had the fifth highest with five reports. Of these six jurisdictions, four rank in the top ten in number of historical reports. Anne Arundel County has had the most reported kills at 756 reports since 1984. Baltimore County ranks second highest with 418. Counties with abundant tidal shoreline and high population densities experience the most fish kill reports. These factors increase the likelihood of reports being made and typically exemplify localized anthropogenic impact. Additionally, Anne Arundel County historically has been at the center of the highest densities of toxic dinoflagellates (e.g., *Karlodinium veneficum*) with 15 historical incidents. Fish kills attributed to Karlotoxin (either alone or in concert with low dissolved oxygen or high salinity) have accounted for 38 fish kills since 2002. No fish kills attributable to *Karlodinium veneficum* were observed in 2025.

Table 1: Fish Kill Reports by County.

County	# Reports (2025)	# Reports (1984-2025)
Allegany	1	41
Anne Arundel	17	756
Baltimore	5	418
Baltimore City	7	133
Calvert	10	211
Caroline	1	84
Carroll	2	110
Cecil	6	229
Charles	4	145
Dorchester	5	84
Frederick	1	129
Garrett	2	52
Harford	2	191
Howard	0	86
Kent	6	144
Montgomery	4	183
Prince Georges	1	172
Queen Anne's	2	186
Somerset	0	72
St. Mary's	2	230
Talbot	0	111
Washington	2	68
Wicomico	2	117
Worcester	4	129
TOTAL*	86*	4081*

**Totals do not include three kills reported out of state or statewide events.*

Figure 3 shows the geographical distribution, magnitude, and causes of tidal water fish kills that occurred in 2025.

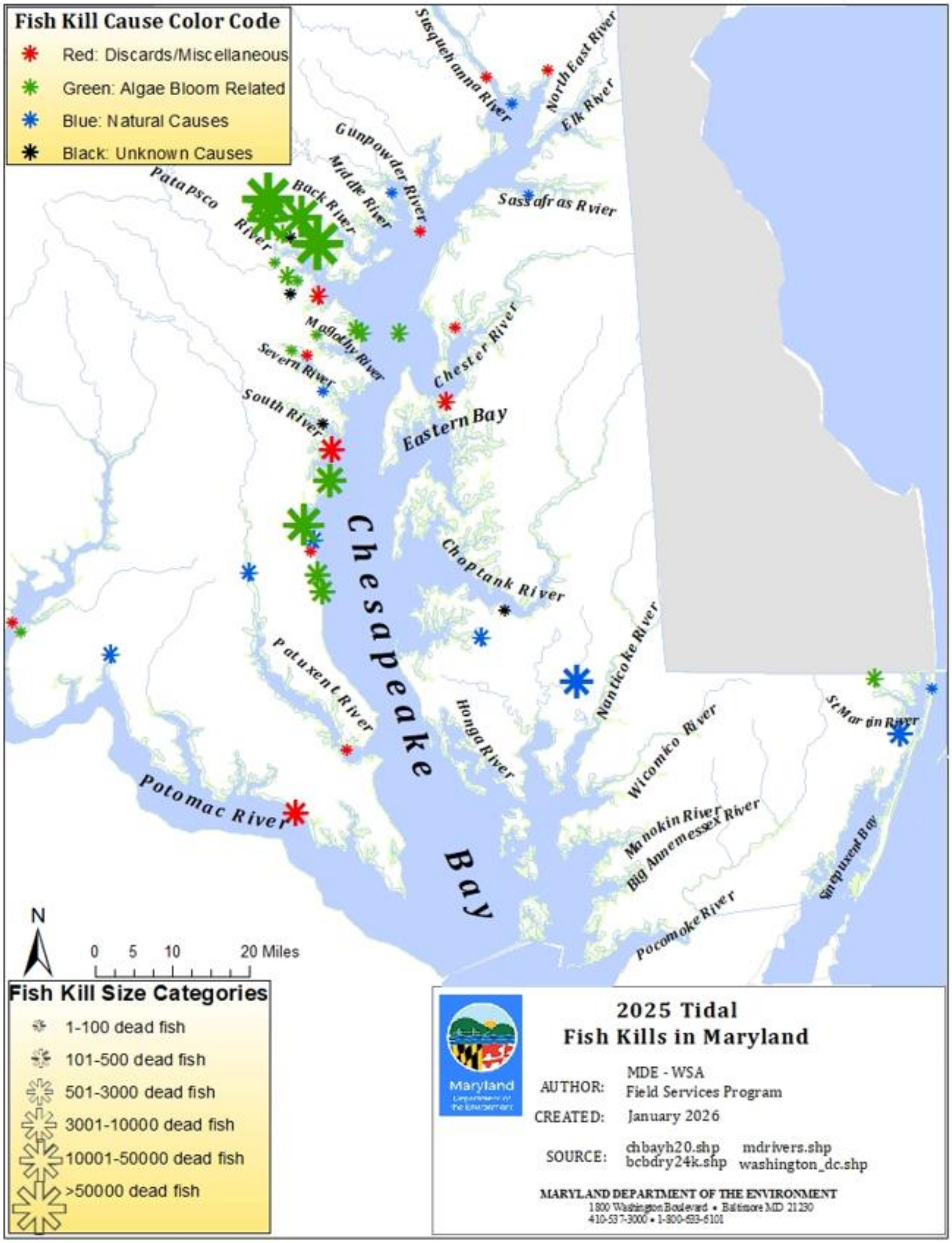
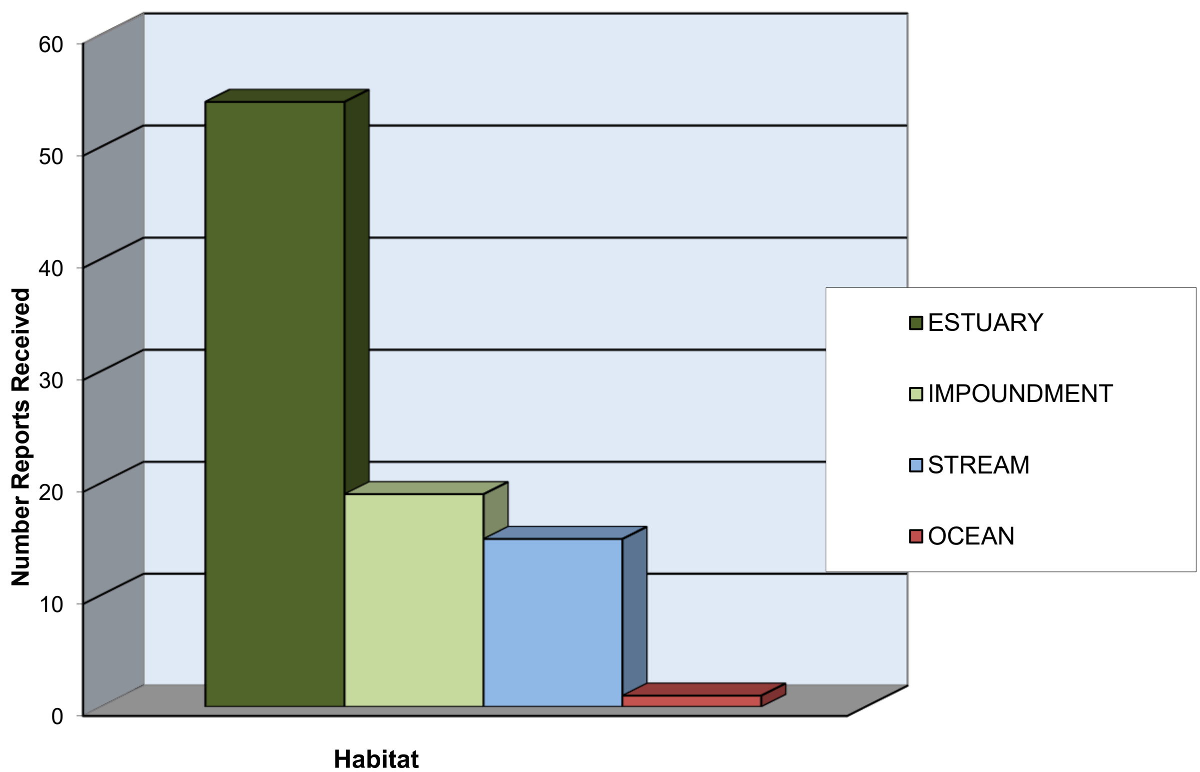


Figure 3: Distribution of fish kills throughout Maryland tidal waters.

MDE keeps track of fish kills by aquatic habitat type. In 2025, the 54 reported fish kills in estuarine waters were three below the historic average. The 19 reported impoundment fish kills were nine below the historic average and the 15 free-flowing stream fish kills were one above the historic average. The one reported ocean fish kill in 2025 hints at the historic rarity of reported fish kills in Maryland coastal waters.

Figure 4. 2025 Fish Kill Reports by Environment



Causes of Fish Kills

Of the 89 events reported, 80 were classified as fish kills, and nine were determined to be non-kills or insignificant events where no dead fish were found.

Probable cause was determined in 68 of the 80 fish kills (Table 2). Natural causes were implicated in 48 events, including 28 cases of oxygen depletion, 11 cases of seasonal or spawning stress, and eight cases of stranding. The remaining events included 10 cases caused by fishing discards, five cases of entrapment in man-made structures, and five pollution cases. There were 12 cases where the cause was undetermined.

Table 2: Probable causes of fish kill reports, 2025.

Probable cause	2025 Only	*Percent of Annual Total*	# of Reports 1984-2025	*Percent of Historic Total*
Natural	48	53.93%	1698	40.93%
Disease	1		243	
Low dissolved O_2	28		991	
Seasonal / Spawning stress	11		268	
Stranding	8		101	
Salinity/Osmotic shock	0		9	
Thermal shock/Freezing	0		41	
Toxic algae bloom	0		22	
Toxic algae/water quality synergism	0		16	
Storm surge	0		1	
Lightning Strike	0		1	
Predation	0		5	
Pollution	5	5.62%	328	7.91%
Agriculture	2		36	
Municipal sewage	1		49	
Industrial discharge	0		63	
Swimming pool discharge	0		22	
Fuel/Oil spills	1		33	
Unidentified source	0		60	
Construction	0		15	
Municipal discharge	1		35	
Pond Management chemicals	0		15	
Miscellaneous	15	16.85%	895	21.57%
Discards	10		646	
Entrapment	5		173	

Stocking stress, pond Mgmt.	0		67	
Scientific discards, exotic species control	0		9	
Unknown	12	10.11%	915	22.05%
Non-kill	9	13.48%	313	7.54%
TOTAL	**89**		**4149**	

In 2025, no fish kills were attributed to toxins produced by the dinoflagellate, *Karlodinium veneficum*. This alga is a long-term resident of Chesapeake Bay. Although previously thought to be non-toxic, a.k.a. *Gyrodinium estuariale*, it was associated with fish kills for many years. Around 2002, researchers at the University of Maryland (UM) corrected the misidentification and isolated potent ichthyotoxins (e.g., Karlotoxins) released by *K. veneficum*. Bioassay experiments performed at UM demonstrated the specific dose response associated with Karlotoxin. Since then, this office has worked to combine pertinent data from fish kill investigations (phytoplankton identification and enumeration, water quality, and UM Karlotoxin analysis and dose response data) to diagnose kills caused by Karlotoxin. Since then, 38 Karlotoxin-associated kills have involved 479,028 fish mortalities. No known human health effects are associated with these phenomena.

Other nuisance algae species (e.g., *Prorocentrum minimum, Levanderina fissa (*formerly *Gyrodinium uncatenum and G. instriatum*)) are not known to be toxic in Maryland but occasionally bloom to high enough levels resulting in fish kills caused by high biochemical oxygen demand (BOD). In 2025, five fish kills were attributed to low dissolved oxygen caused directly by an algal bloom, with excess nutrients being a major contributing factor.

Events by Number of Fish Involved

Approximately 273,353 fish mortalities were confirmed in 2025. An additional 6,373 various invertebrates and other aquatic animals also died, totaling 279,726 organisms for the year.

In an average year, approximately five fish kills of more than 10,000 fish occur. In 2025, there were *five* events of this magnitude.

The largest kill, #2025076, occurred on August 27th in the Northwest Harbor (or Inner Harbor) of the Patapsco River southwest of Hull Street Park near the corner of Key Highway East (Baltimore City). Approximately 120,005 fish, almost exclusively Atlantic menhaden, died due to low dissolved oxygen during this Pistachio Tide event. There were several striped bass that died in this event, as well.

The second largest kill, #2025074, occurred on August 23rd in the Inner Harbor of the Patapsco River from Rash Field Park to Pier 6 (Baltimore City). Approximately 61,010 fish died due to low dissolved oxygen; again, these were almost exclusively Atlantic menhaden. Gizzard shad, an American eel, 7 unidentified fish, and an additional 400 blue crabs were observed. This fish kill was during the Pistachio Tide event that occurred during the summer months near the Inner Harbor.

The third largest kill, #2025083, occurred on September 22nd in the Patapsco River along the Baltimore Waterfront Promenade closest to Aliceanna Street (Baltimore City). Approximately 25,008 fish died; about 99% of the fish that were present were Atlantic menhaden. Striped bass were also found on the scene. This is a continuation of the Pistachio Tide event that hit the Patapsco River from the Inner Harbor to Canton to the Under Armor facilities.

The fourth largest kill, #2025060, occurred on August 1st in Herring Bay (Anne Arundel County). Approximately 23,000 Atlantic menhaden, 10 white perch, and 50 blue crabs. The menhaden became disoriented in the marina enclosure and consumed or exhausted the dissolved oxygen, causing the fish to die.

The fifth largest kill, #2025049, occurred on July 4th in the Inner Harbor near Pier 3 (Baltimore City). About 10,000 Atlantic menhaden and eight blue crabs died. This was the first of a series of Pistachio Tide events that persisted for the next two months.

Pollution-Caused Events

Intense local pollution or other direct anthropogenic causes were implicated in five Maryland events that totaled approximately 335 fish, 10 crayfish, and 3,000 various invertebrates. An average of eight pollution-caused fish kills occur each year. All pollution related events are referred to the appropriate enforcement agencies for follow-up procedures.

- #2025089 occurred on December 29th in an unnamed tributary of the Potomac River in Williamsport (Washington Co). Approximately 168 fish (at least six species) several frogs and 3,000 various invertebrates died due to a discharge of 500 gallons of Fluorosilicic acid from a cracked pipe at a nearby water treatment plant. All the aquatic life in the 0.38-mile impacted unnamed tributary died (except for two crayfish) because of this spill.
- #2025079 occurred on August 31st in Basin Run in Colora (Cecil Co). Approximately 80 fish (four species) died due to a manure spill. The source of the pollution was a dairy farm between Colora Road and Firetower Road

bridge and the discharge impact occurred downstream to at least the Frist Road bridge.

- #2025015 occurred on April 8th in a private pond in Whispering Pines (Cecil Co). Approximately 70 fish (three species) died because of a manure spill. Cow manure was spread onto nearby fields, and a rain event caused it to run off into the private pond.
- #2025080 occurred on September 9th in the Upper Potomac River on the West Virginia side. Approximately 5 bluegill and 10 crayfish died from a natural gas leak that occurred within the stream. The possible cause of this is due to a road collapse nearby and the heavy equipment that is being used to fix the road.
- #2025016 occurred on March 31st in Georges Run in Manchester (Carroll Co). Approximately 12 fish (unidentified to species) died from a sewage overflow from the Manchester Wastewater Treatment Plant.

Fish Kills of Special interest

Pistachio Tide has become significantly more common within the last three years in Baltimore's Inner Harbor during the fall. What exactly is a Pistachio Tide? A Pistachio Tide is not an algal bloom, but rather a green sulfur bacterial bloom. What makes that so interesting? Green sulfur bacteria do not undergo oxygenic photosynthesis (like vascular plants, algae, and cyanobacteria; oxygen being one of the byproducts), but rather anoxygenic photosynthesis, where oxygen is <u>not</u> a byproduct of the reaction. Oxygenic photosynthesis turns carbon dioxide, water, and sunlight into glucose, oxygen, and water. Anoxygenic photosynthesis turns carbon dioxide, an electron donor, such as water, hydrogen sulfide, elemental hydrogen, etc., and sunlight into carbohydrates and water (and the oxidized electron donor; none if hydrogen is used). When hydrogen sulfide is the donor, elemental Sulfur is the product.

When temperatures are cool at night and warm during the day, this causes the water column to invert, meaning the cold, surface water sinks and the warm, hypoxic water moves to the surface. This bottom water contains sulfur bacteria and hydrogen sulfide from decomposition, explaining the rotten egg smell. The temperature inversion causes low dissolved oxygen for aquatic life. Unfortunately, this can cause fish and crabs to suffocate.

In 2025, July 4th was the start of the Pistachio Tide that hit the Inner Harbor and the West Channel of the Patapsco River in Baltimore City. August 22nd, August 23rd, August 27th, and September 22nd were reports that followed. A total of approximately 216,573 dead organisms (216,080 Atlantic menhaden, 13 striped bass, seven unidentified fish, two gizzard shad, one American eel, and 470 blue crabs) were observed.

Species Involved in Fish Kills

Fish kills in 2025 affected at least 36 species of fish, representing 19 families and 12 orders (Table 3). Non-piscine species affected included blue crabs, shore shrimp, horseshoe crabs, crayfish, insect larvae, sea turtles, diamondback terrapins, and an eastern newt. Approximately 586 fish were not identified to species.

Table 3: Species and Numbers of Individuals Affected by Fish Kills in 2025.

Arthropoda	
Decapoda	
Cambaridae – crayfish sp.	**13**
Portunidae	
***Callinectes sapidus* – blue crab**	**3,076**
Palaemonidae	
***Palaemonetes* sp. – shore shrimp**	**2**
Xiphosura	
Limulidae	
***Limulus polyphemus* – horseshoe crab**	**8**
Unidentified insect larvae	**3,000**
Chordata – Amphibia	
Salamandridae	
***Monophthalmos viridescens* – Eastern newt**	**1**
Chordata – Reptilia	
Testudines	
Emydidae	
***Malaclemys terapin* – diamondback terrapin**	**3**
Superfamily Chelonioidea – sea turtle	**2**
Chordata – Chondrichthyes	
Myliobatiformes	
Rhinopteridae	
***Rhinoptera bonasis* – cownose ray**	**266**
Chordata – Osteichthyes	
Unidentified bony fish	**586**
Acanthuriformes	
Sciaenidae	
***Bairdiella chrysoura* – silver perch**	**6**
***Cynoscion regalis* – weakfish**	**2**
***Leiostomus xanthurus* – spot**	**32**
***Micropogonias undulatus* – Atlantic croaker**	**4**
Anguilliformes	
Anguillidae	
***Anguilla rostrata* - American eel**	**229**
Atheriniformes	
Atherinopsidae	
***Menidia menidia* – Atlantic silverside**	**2**
Carangiformes	
Achiridae	
Trinectes maculatus – hogchoker	**27**
Clupeiformes	
Alosidae	
***Brevoortia tyrannus* - Atlantic menhaden**	**249,034**
Dorosomatidae	
***Dorosoma cepedianum* - gizzard shad**	**2,518**

Engraulidae	
***Anchoa mitchilli* – Bay anchovy**	**1,500**
Unidentified shad sp.	**5,000**
Cypriniformes	
Cyprinidae	
***Carassius auratus* – goldfish**	**1**
***Cyprinus carpio* - common carp/koi**	**528**
Catostomidae	
***Catostomus commersoni* - white sucker**	**8**
Leuciscidae	
***Exoglossum maxillingua* – cutlip minnow**	**1**
***Rhinichthys atratulus* - blacknose dace**	**68**
***Semotilus atromaculatus* – creek chub**	**3**
***Semotilus corporalis* – fallfish**	**40**
Unidentified minnow sp.	**200**
Cyprinodontiformes	
Fundulidae	
***Fundulus diaphanus* – banded killifish**	**24**
Poeciliidae	
***Gambusia holbrooki* – Eastern mosquitofish**	**12**
Perciformes	
Centrarchidae	
***Lepomis cyanellus* – green sunfish**	**20**
***Lepomis gibbosus* - pumpkinseed**	**800**
***Lepomis macrochirus* – bluegill**	**1,241**
***Lepomis sp*.- unidentified sunfish**	**40**
***Micropterus salmoides* - largemouth bass**	**283**
***Pomoxis nigromaculatus* - black crappie**	**93**
Moronidae	
***Morone americana* - white perch**	**7,560**
***Morone saxatilis* - striped bass**	**95**
Percidae	
***Etheostoma olmstedi* – tessellated darter**	**8**
***Perca flavescens* – yellow perch**	**36**
Salmoniformes	
Salmonidae	
***Oncorhynchus mykiss* – rainbow trout**	**1**
Siluriformes	
Ictaluridae	
Unidentified catfish	**40**
***Ameiurus catus* – white catfish**	**1**
***Ameiurus natalus* – yellow bullhead**	**52**
***Ameiurus nebulosus* – brown bullhead**	**258**
***Ictalurus furcatus* – blue catfish**	**300**
***Ictalurus punctatus* – channel catfish**	**1**
Tetraodontiformes	
Tetraodontidae	
***Sphoeroides maculatus* – Northern puffer**	**1**

References

- Chesapeake Bay Monitoring Shows Hypoxia Conditions Near Average for 2025
  https://news.maryland.gov/dnr/2025/12/03/chesapeake-bay-monitoring-shows-hypoxia-conditions-near-average-for-2025/
- Chesapeake Bay Monitoring Shows Hypoxia Increased in June After Rainy May
  https://news.maryland.gov/dnr/2025/07/16/chesapeake-bay-monitoring-shows-hypoxia-increased-in-june-after-rainy-may/
- Current Conditions Yearly Table View (Bottom DO vs Historical Avg; Salinity vs Historical Avg; Water Temp vs Historical Avg)
  https://eyesonthebay.dnr.maryland.gov/eyesonthebay/currentconditionstable.cfm
- Photosynthesis and the Importance of Light
  https://bio.libretexts.org/Courses/Manchester_Community_College_(MCC)/Remix_of_Openstax%3AMicrobiology_by_Parker_Schneegurt_et_al/07%3A_Microbial_Metabolism/7.05%3A_Photosynthesis_and_the_Importance_of_Light
- Pistachio Tides: An Explainer
  https://aqua.org/stories/2023-03-20-pistachio-tides-an-explainer
- The Pistachio Tide Phenomenon poster
  https://x.com/MDSeaGrant/status/1954907636119359881/photo/1