

# Maryland Ocean Acidification Action Plan 2020



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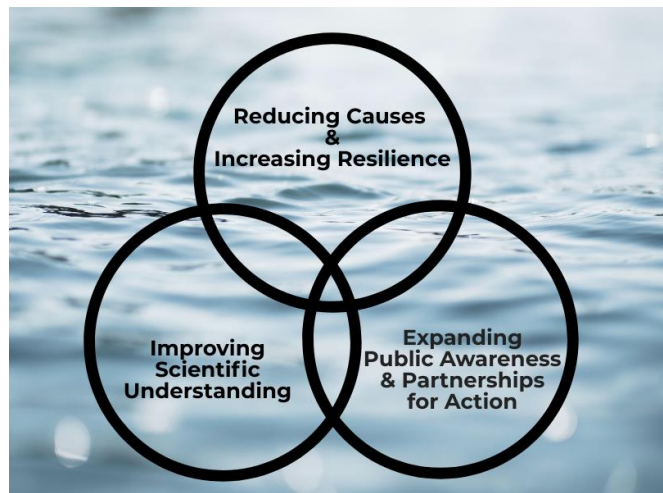
## Summary

Maryland recognizes that ocean acidification (OA) is an increasing threat, not only to the open-ocean waters, but also to coastal and inshore waters like the Chesapeake Bay. At stake for Maryland are not only the ecological integrity of our coastal and inshore aquatic ecosystems, prized seafood resources and economic assets, but also a cultural heritage anchored in healthy waters.

Maryland’s commitment to being a global leader in combating ocean acidification is reflected in this science-based plan with three components: 1) reducing the causes and increasing resilience, 2) improving scientific understanding and, 3) expanding public awareness and partnerships for action.

The OA Action Plan summarizes what is at stake for the State, socially and economically, and the current understanding of the impacts of OA on natural resources. The Action Plan highlights how Maryland’s Greenhouse Gas Reduction Act plan and Chesapeake Bay nutrient reduction strategy form the foundation for reducing two primary causes of acidification, atmospheric CO<sub>2</sub> and excessive nutrient enrichment.

The Action Plan commits to establishing two new coordinating bodies focused on scientific research and communications. These two bodies will be institutionalized within the Maryland Commission on Climate Change to ensure their vital work is sustained. The actions of these bodies will be guided by the principles of this Action Plan and more detailed future plans, overseen by the Commission.





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## Maryland Ocean Acidification Action Plan

**Region:** State of Maryland, USA

**Miles of Coastline:** 7,719 mi<sup>1</sup>

**Regionally Significant Marine Resources:** Maryland is home to the largest and one of the most productive estuaries in the United States - the Chesapeake Bay - as well as the network of Atlantic Coastal Bays and their valuable resources. Coastal waters in Maryland are host to a diverse collection of ecologically and commercially important aquatic species including - but not limited to - the Eastern Oyster, Blue Crab, and Striped Bass. Maryland is home to the Port of Baltimore, one of the largest

shipping ports in the North Atlantic, and many coastline parks, residences, industries, and marine activities. Recreational and commercial fishing and hunting are common in Maryland, supporting key cultural resources that include tribal lands and historic fishing communities.

**Status of Action Plan:** Final

**Key statistics on ocean economy:** Maryland's Ocean Economy made \$3.9B and employed 104,064 people in 2016 ([USDOC](#), 2020). The commercial fishing sector in Maryland provides 12,084 jobs, \$1.24B in sales, \$335M in income, and \$504M value added impacts ([NOAA Fisheries](#), 2018). Recreational fishing provides an additional 7,608 jobs, \$785M in sales, \$327M in income, and \$513M in value added impacts ([NOAA Fisheries](#), 2018).

### I. What is at Stake for Maryland?

#### Maryland's Connection to the Chesapeake Bay

Throughout our state's history, Maryland tidal waters have provided a livelihood and sustenance for many of its citizens, and are ingrained in the State's cultural identity. As a result, the Bay has also become the focal point of environmental stewardship given the long history of human-induced stress. One representation of stress on the Bay is the decline in Chesapeake Bay oysters - a keystone species - over the last century and even in recent years. For example, Figure 1 depicts changes in oyster harvest from 1980 to 2017. The oyster decline coincided with widespread losses of submerged aquatic vegetation (SAV) and more severe dead zones, that is, areas with low oxygen; both of these conditions are associated with a natural system in decline.

When the degrading health of the Bay became widely known in the 1960s and 1970s, Congress directed the Environmental Protection Agency to conduct a major study of causes of the Bay's decline. That led to the creation of the well-known federal-state Chesapeake Bay Program Partnership, which has sustained decades of science-driven Bay restoration.

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<sup>1</sup> A 2003 Maryland Geological Survey (MGS) study on erosion rates cites 7,719 miles of tidal coastline in Maryland. The estimate is based on air photos flown between 1988 and 1995. The NOAA *Coastline of the US, Maryland* cites 3,190 miles of shoreline, based on a 1961 confirmation of estimates made in 1939-40. As of 2013, the NOAA coastline estimate still had some legal and regulatory standing (DNR, 2013).

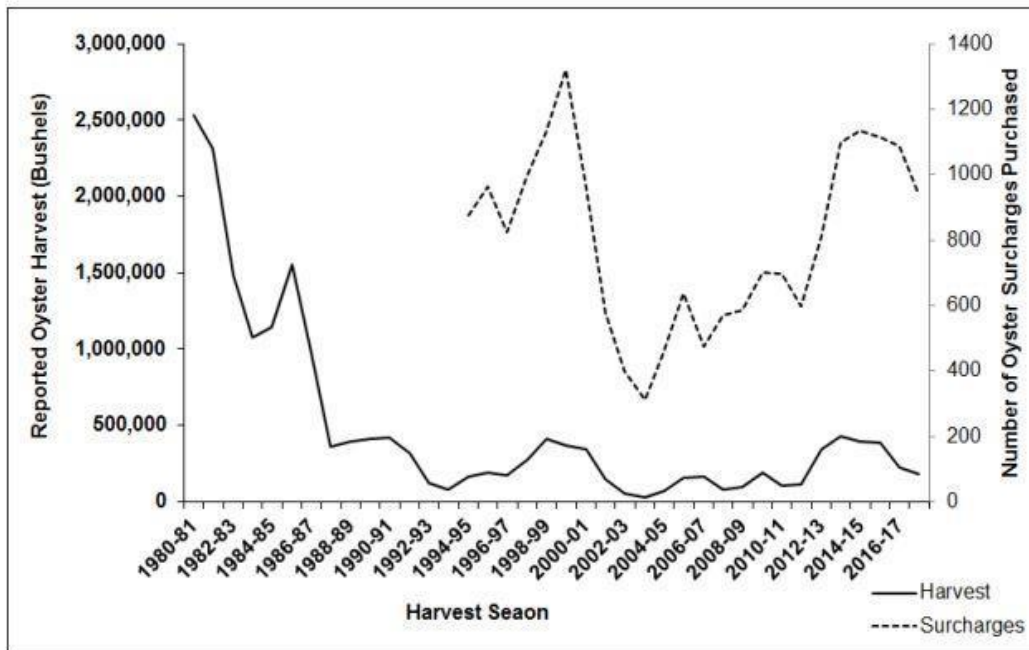


Figure 1 – Maryland oyster harvest (bushels) since 1980 for each harvest season as reported by dealer buy tickets. The number of oyster surcharges (commercial licenses) purchased by oyster harvesters annually since 1994. (Maryland Chesapeake Bay Oyster Management Plan and Maryland Department of Natural Resources, 5/16/2019)

Decades of Bay science-based management has supported the idea that multiple stressors drive water quality and fish and shellfish health. Today, Maryland works to reduce excessive nutrient deposits into the Bay from urban runoff, wastewater treatment effluent, fossil fuel emissions and agricultural pollution. Research continues to show that excessive nutrients fuel eutrophication and contribute to low dissolved oxygen, harmful algal blooms, loss of submerged vegetation, and increased acidification. A degraded habitat impacts fisheries and imparts risk and vulnerability to local economies.

Ocean acidification is a condition where the pH of coastal waterways, which are typically slightly basic, moves towards a more acidic condition. This altered water chemistry can make it more difficult for calcifying aquatic organisms like oysters to make their shells, can change chemical processes that regulate nutrient availability, and can negatively impact a variety of other organisms living in tidal waters. Acidification of Maryland’s coastal waters results from two primary causes: increasing nutrient pollution and increasing carbon dioxide in the atmosphere. Increased nutrients cause acidification of deep and shallow waters, because the same processes that nutrients stimulate to consume oxygen also produce carbon dioxide. Excess carbon dioxide reduces the pH, a measure of more acidic waterways. Increased carbon dioxide in the atmosphere associated with fossil fuel combustion is absorbed by water directly, which also increases the acidity of water.

### Maryland’s Fisheries and Coastal Economy

Marine resources, particularly oysters, blue crabs, and striped bass, contribute 2.1% of the State’s annual GDP in (USDOC, 2020). Communities in Maryland depend economically, and identify culturally,

with the harvesting and processing of natural resources. Oyster aquaculture is a growing industry in Maryland, and our waters host the largest oyster hatchery on the East Coast of the United States. In Maryland, the number of harvested bushels of aquaculture oysters grew from about 3,000 in 2012 to 74,000 in 2017<sup>2</sup>. In that same year, oyster aquaculture alone was credited with adding nearly \$8M to Maryland’s economy ([van Senten, J., et al., 2019](#)). The Maryland wild oyster fishery, with a lower per bushel value, landed 225,000 bushels between 2016-2017 at \$10.6M (Figure 3).

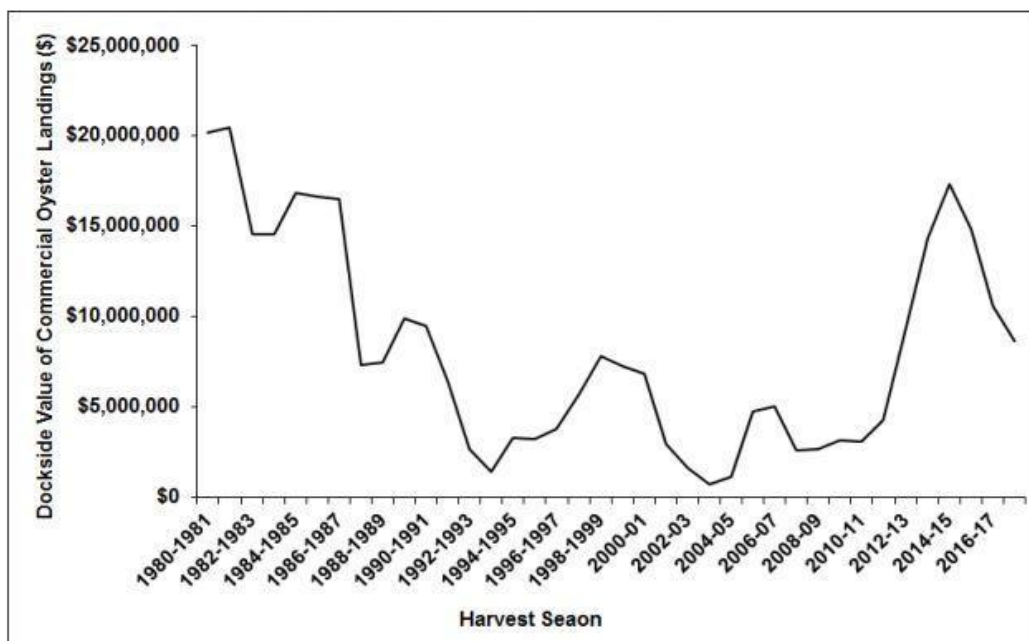


Figure 3- Docksides value of the commercial harvest of oysters in Maryland’s portion of Chesapeake Bay. (Maryland Chesapeake Bay Oyster Management Plan, Maryland Department of Natural Resources, 5/16/2019)

### Maryland Investments in the Environment

For more than 40 years, Maryland has worked with farmers, industry, and local jurisdictions to reduce nutrient pollution to the Chesapeake Bay. Since 1985, this work has resulted in a decrease of nearly 30-million pounds of nitrogen pollution, saving waterways from nutrient stress and building a resilient ecosystem.

Since 2000, Maryland has spent approximately \$11 billion on Chesapeake Bay restoration activities, \$4.7 billion of which has been appropriated within the last five years (JCR 2019). This includes funding for activities that reduce nutrient and sediment inputs to the Bay (e.g., cover crops and wastewater treatment plant upgrades), activities that support improving our understanding of the Bay (e.g., monitoring, education, outreach), and activities that prevent or minimize future degradation of the Bay (e.g., land conservation).

<sup>2</sup> A decline in 2018 is attributed to record annual rainfall.



Maryland has met federally mandated milestones for nutrient reduction through the efforts of private citizens, farmers, businesses, communities, nongovernmental organizations (NGOs), local governments, State agencies and federal government partners to install Best Management Practices (BMPs), which lower pollution inputs throughout the Bay. Plans in place today are projected to meet 2025 targets to prevent 45.78 million pounds of nitrogen and 3.68 million pounds of phosphorus from entering the Bay. These goals mitigate ocean acidification, reduce low dissolved oxygen zones and improve submerged vegetation.

Several in-water restoration investments provide noteworthy examples of success. Ten Chesapeake Bay tributaries have been undergoing oyster reef restoration since 2011, five by Maryland and five by Virginia. This initiative is one of the largest oyster restoration projects in the world. Between 2011 and 2019, 788 acres of oyster reef have been restored in Maryland at a cost of \$57 million ([CBP](#), March 2020). Ocean acidification poses a risk to this investment, given the sensitivities of oysters to acidification, especially the larvae produced in these restored reefs.

Maryland has also invested in the recovery of submerged aquatic vegetation (SAV) habitats. Active efforts to improve water clarity through the reduction of sediment runoff and direct SAV planting efforts have resulted in a gain of more than 25,000 acres of SAV, putting the state at 50% of the 79,800 acre SAV recovery goal set for 2025 ([MD DNR](#), July 2019). In 2013, the Chesapeake Bay Program invested nearly \$8M to restore SAV abundance in the Chesapeake Bay ([CBP](#) 2013). While SAV has been identified as an essential habitat for many key Bay species, SAV beds have also been shown to sequester carbon to combat climate change and to enhance calcification, a buffer against acidification.

Maryland's General Assembly has expressed concern that hard fought gains in the health of the Bay, like oyster reef recovery and the expanding aquaculture industry, could be undermined by ocean acidification. This concern was expressed, in part, by the establishment of an Ocean Acidification Task Force by State legislation in 2014.

### Existing Ocean Acidification Concerns in Maryland

In 2015, the [Maryland Ocean Acidification Task Force](#) published a [report](#) detailing possible ocean acidification impacts in the Chesapeake Bay. Concerns identified by the Task Force cover the three aquatic environments of the open-ocean, coastal waters, and inshore waters like the Chesapeake Bay. The concerns include the following:

- In open ocean waters, increases in atmospheric CO<sub>2</sub> concentrations are causing acidification effects similar to those occurring in most of the world's oceans.
- In Maryland's near-shore ocean environments, physical oceanographic processes, such as mixing, may be having additional impact, but as yet are not fully understood.
- In the Chesapeake Bay and parts of the Coastal Bays, acidification, eutrophication-induced hypoxia, and increased temperatures and/or freshwater inputs may have compounding effects on aquatic organisms.
- Acidification may cause a range of impacts to fish and shellfish and their prey. Reduced reproductive success, more susceptibility to disease and predation, reduced growth due to increased energy expenditures, and increased mortality are all potential concerns.



Through decades of building environmental awareness and education, citizens understand the threats that face the bays and coastal waters and the need for science driven solutions. In this regard, Maryland is a fertile ground for a plan to study and mitigate coastal acidification.

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## II. Policy Framework for OA Action Plan

### Origin of Maryland's Ocean Acidification Action Plan

In 2014, the Maryland General Assembly adopted legislation to appoint a *Task Force to Study the Impact of Ocean Acidification on State Waters* ([OA Task Force](#), 2015). The 2015 Task Force report to the Governor and General Assembly identified Maryland's strategic priorities. In 2019, Maryland became a member of the International Ocean Acidification Alliance. By joining the OA Alliance, Maryland has endorsed the [Call to Action](#) (IACO, 2016) and committed to broadly support the five goals within the Call, as reflected in this Action Plan. This Action Plan was developed and adopted under the leadership of the secretaries of the Maryland Departments of Environment and Natural Resources in partnership with the University of Maryland Center for Environmental Science (UMCES). The plan also relies heavily on the guidance of the International Ocean Acidification Alliance and the foundational work of Maryland's original Ocean Acidification Task Force.

### Maryland's Ocean Acidification Action Plan Framework

This Ocean Acidification Action Plan depends on other initiatives that focus on reducing the causes of Ocean Acidification include:

- [Maryland's 2015 Ocean Acidification Task Force Report](#): Developed as a partnership between state government, academia, and industry, the report records scientific background, concerns and offers important recommendations, the most primary of which are cited in this Action Plan.
- [Maryland's Chesapeake Bay Watershed Implementation Plan](#): Initiated to reduce nutrient loads and take other actions with ocean acidification mitigation benefits, this report has helped lead the restoration of Bay grasses and limiting the generation of oxygen consuming and CO<sub>2</sub> producing materials.
- [Maryland's Greenhouse Gas Reduction Act Plan \(GGRA\)](#): Facilitated by the Maryland Commission on Climate Change (MCCC)<sup>3</sup> in 2009, this plan requires MDE to prepare and publish an updated inventory of statewide greenhouse gas emissions in a three-year cycle. A revised plan in 2019, with the goal of "40 percent reduction by 2030", is in the final stages.

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<sup>3</sup> The [Maryland Commission on Climate Change](#) was first established by executive order in 2007, then codified by law in 2015.



### III. Priority Action Areas

Maryland’s priority action areas build on the recommendations of Maryland’s Ocean Acidification Task Force report of 2015.

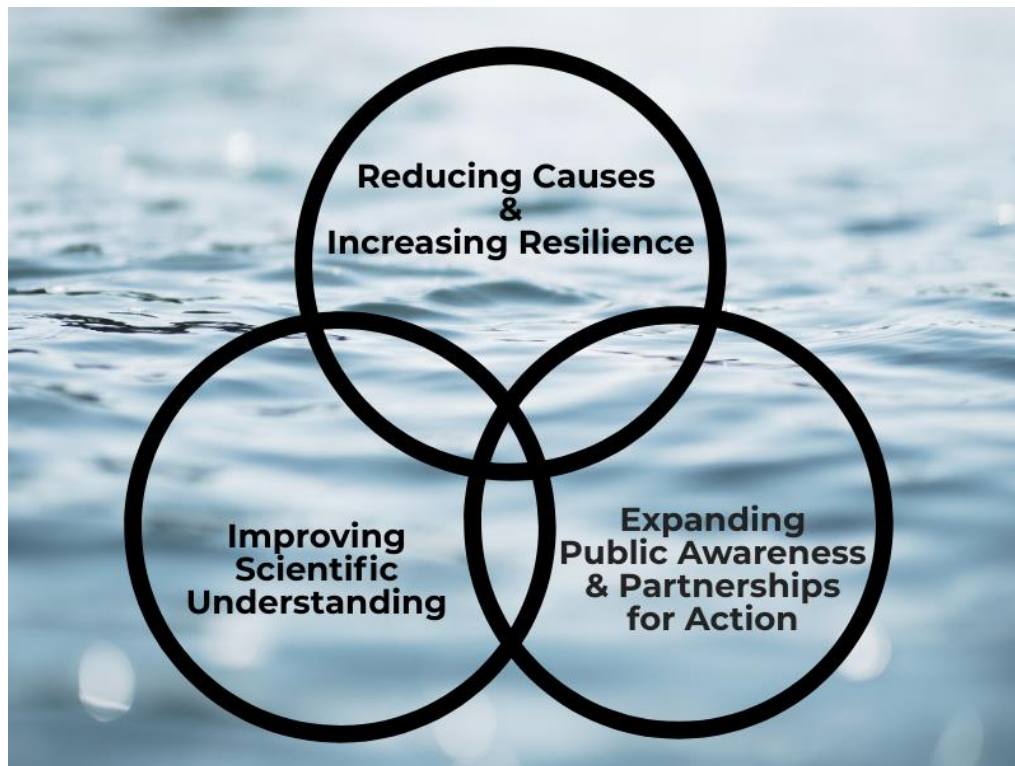


Figure 4 – Three key components of Maryland’s Ocean Acidification Action Plan

#### Three Key Components of Maryland’s Ocean Acidification Action Plan

- 1. Reducing Causes & Increasing Resilience:** Take actions to prevent or slow the causes of ocean acidification by reducing atmospheric emissions of CO<sub>2</sub>, reducing inputs of land-based pollutants, or other measures and assist coastal communities, industries, and marine ecosystems in mitigating increasing acidity in marine waters.
- 2. Improving Scientific Understanding:** Improve understanding within the region, using existing monitoring programs to guide research about the chemistry and ecosystem impacts. Continuing the use of science to develop practical strategies to address acidification.
- 3. Expanding Public Awareness & Partnerships for Action:** Highlight the link between OA and efforts to reduce greenhouse gas and nutrient pollution. Collaboration of experts with partnerships must be sustained to combat OA. Use existing communication entities to support broader awareness of acidification.

### Reducing Causes & Increasing Resilience

**Reducing Causes:** Maryland’s Action Plan to combat the causes of ocean acidification is led by two focused strategies: Reducing greenhouse gases (GHG) and reducing nutrient inputs to the Chesapeake and Coastal Bays.

Atmospheric carbon dioxide is a key driver of acidification, accounting for about half the occurrence of elevated pH in the Chesapeake Bay; nutrient pollution accounts for the other half in deeper waters (Shen, C. et al. 2020; Su, J., et al. 2020). Therefore, reducing atmospheric CO<sub>2</sub> through carbon emission reductions and sequestration is essential to alleviating acidification. MDE released a [draft plan](#) required by the Greenhouse Gas Reduction Act (GGRA). The draft GGRA Plan provides a strategic direction for many sectors, which are working to reduce carbon dioxide and other greenhouse gasses (carbon dioxide equivalents – CO<sub>2</sub>e) (Figure 5).

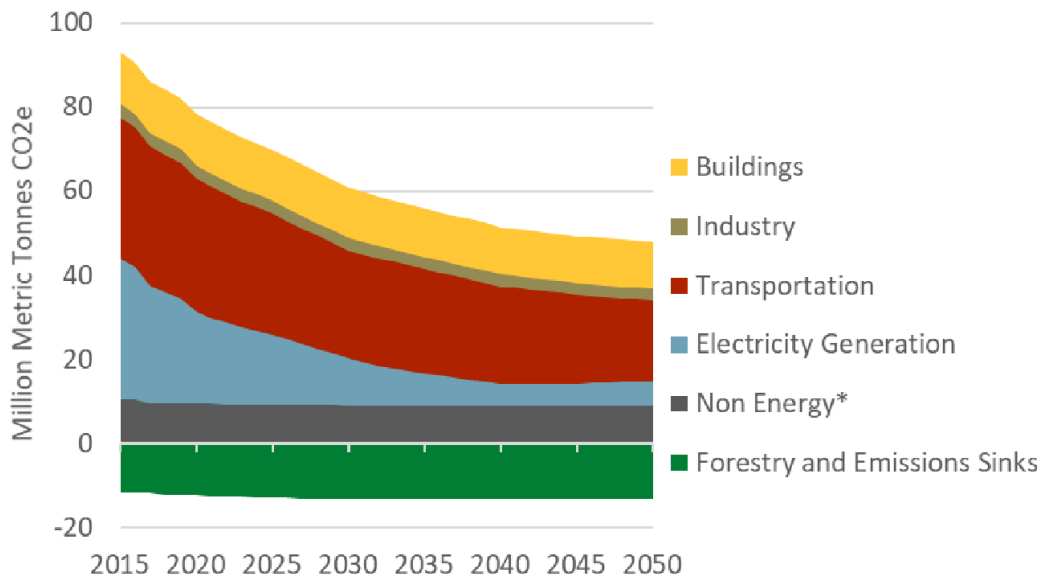


Figure 5 - Carbon Dioxide reductions from key sectors in Maryland’s Greenhouse Gas Reduction Act Plan will help alleviate coastal acidification.

In addition, the GGRA plan includes strategies that sequester carbon. The agricultural sector, which manages about 2 million acres of cropland in Maryland, plays an important role in sequestration ([USDA](#)). Maryland’s cover crop incentive program, which provides a cost share to farmers to plant cover crops, helps to sequester carbon, in addition to taking up nitrogen, holding soils in place and making soils healthier and thus more resilient to climate change stressors. This farming practice benefits both CO<sub>2</sub> reductions and nutrient reductions, and so controls coastal acidification.

Maryland’s other important plan for reducing the causes of ocean acidification has been its [Chesapeake Bay Nutrient Reduction Strategies](#). In Maryland’s latest strategy, the [2019 Phase 3 Watershed Implementation Plan \(WIP\)](#) (MDE, August 2020), significant attention is given to the anticipated effects of climate change.

Maryland’s Phase 3 WIP strategy includes new insight about best management practices (BMPs) that have co-benefits of carbon sequestration and nutrient reduction. Multiple interests may be served



when investing in just one or several well planned mitigation or adaptation measures. This insight has positive implications for garnering the support of decision makers who must prioritize limited financial resources.

**Increasing Resilience:** Resilience to OA will be targeted based, in part, on assets of greatest social and economic benefit. Areas of special concern include wild oysters reefs and sanctuaries, the oyster aquaculture industry, blue crabs, striped bass, and vulnerable elements of the ecosystem food chain. Targeting also considers geographic considerations. Evidence is emerging that it is possible to boost resilience to acidification in localized areas. One approach is to increase the amount of aquatic plants, which buffer acidification. Public and private SAV restoration efforts in Maryland inherently provide acid buffering benefits, and co-location of oyster restoration projects is being considered to further restoration success and buffering capacity of waters. Recent research, conducted in the upper Chesapeake Bay area known as the Susquehanna Flats, suggests that sea grasses may also contribute to larger scale acid neutralization ([Borunda, A. 2020](#)). Maryland is protecting those sea grasses and other valuable ecological assets to restore the Bay, combat climate and mitigate OA. As aquatic plants provide only one source of natural buffering and their effects may be location-specific, other efforts that involve direct restoration interventions to alleviate acidification will be explored.

### **Increase Scientific Understanding**

Solutions for OA will be driven by two major research areas: natural ecosystem dynamics and mitigation. Research is targeted to prevent ecological breakdowns and to build resilience in support of commercial, cultural and equity resources.

**Research of Natural Ecosystems:** Ecosystem monitoring and modeling will examine the complex relationship between species impacted by acidification and overall health and resilience of the marine and estuarine system. Oysters are a species of special concern due to their known vulnerability to OA at particular life stages. Research should highlight OA impacts on various life stages, genetic stocks (e.g., diploid versus triploid), and the interaction of OA with other stressors (temperature, low oxygen).

Extensive state water monitoring networks exist in Maryland, and are conducted by DNR and MDE, with supporting efforts from federal and NGO partners. Applying advances in monitoring technologies will improve monitoring reliability and affordability. Past efforts in the Chesapeake Bay demonstrate strong cooperation between research, monitoring and management communities to guide positive restoration and mitigation outcomes.

Maryland DNR conducts water quality monitoring to assess the habitat for living resources, guide management actions, and determine progress toward nutrient reduction goals via a roughly 35-year sampling effort at long-term fixed station monitoring sites throughout the Chesapeake and Coastal Bays. DNR also conducts temporally and spatially intensive water quality monitoring efforts in shallow water habitats as well as the assessment of harmful algal blooms. DNR maintains specialized continuous water quality monitoring efforts within oyster restoration and sanctuary areas such as Harris Creek, the Tred Avon River, and in the near future, St. Mary's River.

Maryland Department of the Environment maintains a vast monitoring network specifically targeted on water quality parameters for shellfish growing areas. These networks have extensive records of pH,



water temperature and other variables, but have not historically included all of the necessary parameters to study long-term changes in acidification of state waters. If deemed of scientific value, the equipment for sampling  $p\text{CO}_2$  at DNR and MDE shellfish monitoring sites could be added in the future. A short term study involving the collection of  $p\text{CO}_2$  was initiated in 2020 at a subset of shellfish monitoring sites in collaboration with the National Aeronautics and Space Administration (NASA).

**Research of Mitigation Methods:** One component of mitigation research will focus on improving cost-effective ways to reduce the causes of OA. This research will align with Maryland's GGRA and Chesapeake Bay Phase III WIP. Opportunities for co-beneficial actions, like natural buffers that both reduce nutrients and sequester carbon, are important areas of investigation. Maryland is recognized for its preferred use of living shorelines as a coastal erosion solution. Additionally, the State is developing financing methods both public and private to support mitigation approaches.

Maryland is exploring the co-beneficial intersection of methods for reducing causes and building resilience to acidification. An example is localized shoreline and shallow water systems that sequester carbon and nutrients while also neutralizing acidification. Aquaculture facilities and oyster habitat areas are logical locations for investigating these methods.

Research into fisheries management strategies to adapt to changing local or regional water chemistry conditions is another focus area. This can help mitigate secondary effects of OA such as unbalancing predator and prey relationships and altered growth and survival rates.

**OA Research and Monitoring Coordinating Body:** Maryland recognizes that sustained action necessitates embedding those actions within strong institutions. To this end, at the direction of the Maryland Commission on Climate Change (MCCC), the Science and Technical Working Group will serve as a coordinating body for the Ocean Acidification Action Plan. The OA coordinating body will help synthesize appropriate information about ocean acidification and communicate important scientific outcomes with partners. When appropriate the body will provide guidance to help with decision making.

### Expanding Public Awareness & Partnerships for Action

**Expanding Public Awareness:** The Education and Outreach workgroup of the Climate Change Commission (ECO)<sup>4</sup> will support the Climate Commission with communications tools for OA. ECO will consider the following:

- **Key Audiences:** Maryland's communications strategy will focus on potentially impacted parties, decision makers and influencers.
- **Institutional Grounding of the Communications Strategy:** The Maryland Commission on Climate Change (MCCC) will oversee the OA Communications Strategy with its ECO workgroup. Beginning in 2020, the MCCC Annual Report will more explicitly include ocean acidification highlights on communications that are outcome-oriented.

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<sup>4</sup> ECO assists with the Commission's public outreach and meetings on climate change as well as educating Marylanders on what the State is doing to address climate change causes and impacts. Members represent State agencies, private sector, academia and non-governmental organizations.

- **Communications Evaluation:** ECO members include communications professionals who will develop and evaluate the effectiveness of OA communications.

**Partnerships for Action:** Maryland is an active partner in several organizations aimed to understand and take action on ocean acidification. The State is committed to protecting its coastal environments and the social and economic benefits they provide. Due to the interconnected nature of the Chesapeake Bay, and the regional importance of Maryland’s Coastal Bays, Ocean City and Assateague Island National Seashore, Maryland’s work to protect the environment has been inherently interstate.

Several state representatives from Maryland’s natural resource management and academic institutions participate in the Mid-Atlantic Coastal Acidification Network (MACAN). MACAN is a regional platform aimed to develop research and local adaptation strategies for the mid-Atlantic region, co-coordinated by the Mid-Atlantic Regional Council on the Ocean (MARCO) and the Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS).

Maryland has a long history of working with the Chesapeake Bay Program Partnership (CBPP), which is recognized internationally for its leadership on complex regional aquatic ecosystem management. This partnership brings together vast technical resources in combination with a governance framework that operates at the highest level of decision making among state and federal government. In doing so, it represents an effective science-based framework for action that will support Maryland’s OA Action Plan.

The US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), the US Environmental Protection Agency (EPA), the US Department of Agriculture (USDA), the US Department of Interior, and the US Geological Survey (USGS) are important federal partners. Maryland will draw upon these and numerous other partnerships to enable the success of this Plan.

Maryland continues to be invested in efforts to mitigate climate impacts, in fact, the State leads the nation in reducing CO2 emissions while growing GDP (Saha and Jaeger, 2020).

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## IV. Challenges and Measures of Success

### Challenges Encountered Drafting the OA Action Plan



An innate challenge that comes with the creation of a Maryland Ocean Acidification Action Plan is the recognition that this is not merely a statewide issue, but is also influenced by processes at the watershed, regional, national, and global scale. The Chesapeake Bay watershed consists of six states and the District of Columbia, and coordinating those multiple jurisdictions is a challenge. It is important for all states in the watershed and region to collaborate to foster conservation and restoration investment and action. Each state faces its own social, economic and political challenges in tackling environmental issues. With challenges comes opportunity; cooperation by states provides value-added benefits. For example, Virginia’s water quality monitoring programs align with Maryland’s, making assessment of the Chesapeake Bay ecosystem more accurate and comprehensive.



## Measures of Success of the Three Key Components of the Plan

### Reducing Causes & Increasing Resilience

- Maryland will have achieved its core Chesapeake Bay nutrient reduction commitments by 2025 and will be on a path to make additional reductions that account for anticipated impacts of climate change.
- Maryland anticipates it will be 85% towards its “40 by 2030” greenhouse gas reduction goal by 2025.
- Maryland will meet its 2025 restoration target of 79,800 SAV acres and be on track to meeting its share of the Bay-wide ultimate goal of 185,000 acres.

### Improve Scientific Understanding

Maryland will have completed the near-term actions identified in an *Ocean Acidification Research and Monitoring Action Plan* developed as a commitment of this OA Action Plan. These near-term actions will:

- Put in motion monitoring strategies to resolve key questions about OA,
- Identify additional targeted adaptation and resilience opportunities, and
- Determine whether additional targeted actions are viable for reducing the causes of OA.

### Expanding Public Awareness & Partnerships for Action

The MCCC ECO workgroup is charged with assembling and directing resources to realize the following outcomes within five years:

- Effective platforms of information sharing and outreach will have been identified and created. Ocean acidification will be a commonly understood concern by Maryland’s general public. Survey data will demonstrate that a large segment of Maryland’s population understands and supports the key goals of Maryland’s OA Action Plan.
- Vulnerable communities, central influencers and principal decision makers will be informed about key messages concerning ocean acidification.
- Maryland will have institutionalized governance of the OA Action Plan into an existing structure that supports leadership oversight and decision making.

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## V. How Does OA Action Support Maryland’s Existing International and Domestic Climate Commitments?



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By going on record with commitments to combat ocean acidification, this Action Plan further affirms Maryland's international and domestic leadership on mitigating the causes of climate change and building resilience to buffer its impacts. Institutionalizing the science and communications of this OA Action Plan will have positive effects beyond ocean acidification because it bolsters existing plans and emphasizes the integration of environmental restoration and climate mitigation.

Maryland's two major strategies for reducing atmospheric CO<sub>2</sub> and reducing nutrient over-enrichment of coastal waters are affirmed by more explicitly connecting them to ocean acidification. In addition to the direct benefits of these strategies, the linkage highlights common interests among parties that have not routinely joined forces. Such a coalition will help overcome the dilemma that knowledge of solutions alone is insufficient for solving problems that confront resistance from the status quo. Opportunities that move beyond the existing mitigation approaches should be considered in the future.

Bringing oversight of this Plan under the Maryland Commission on Climate Change will more likely sustain the Plan commitments. In return, this topic can bring new energy and urgency to the Commission's mission of leading Maryland in its efforts to mitigate the causes of and build resilience to climate change.

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