GOALS	RECOMMENDATIONS	Action to Date	Future Action
1. Invest in Maine's Capacity to Monitor and Investigate the Effects of Ocean Acidification and Determine Impacts of Ocean Acidification on Commercially-Important Species and the Mechanisms Behind Those Impacts	*1.1. Enhance monitoring and create a database sufficient to support the development of regulatory and non-regulatory approaches to reduce and limit nutrients and organic carbon from sources that are contributing significantly to acidification of Maine's marine waters. Enhanced monitoring should begin in one or more pilot estuaries where impacts are presently occurring.*	DEP's Marine Unit conducts water quality monitoring under the Marine Environmental Monitoring Program, including some OA parameters, on an on-going basis, but due to staff constraints is limited to where monitoring can occur. Focus is usually on areas with wastewater discharge licenses coming up for renewal to determine if there is reasonable potential for a discharge to cause a water quality impairment. Casco Bay has been a focus for monitoring in recent years. All monitoring data are kept in the Department's Environmental and Geographic Analysis Database. DEP also participates every five years in the National Coastal Condition Assessment funded by EPA, which entails physical, chemical and biological monitoring at probabilistically selected sites throughout Maine's coastal waters.	The Marine Unit has proposed an on-going monitoring program that annually rotates through five coastal regions for assessing eelgrass, the benthic infaunal community as well as water quality parameters that would include OA indicators. An additional four staff positions at DEP are needed to implement such a monitoring and data management effort. Effort underway through the New England Governors and Eastern Canadian Provinces via the Adaptation Working Group to identify indicators. DEP is engaged in this effort. The group will present findings in 2021 to the governors and premiers of best practices/examples across the region to then further promote and utilize. Any work on OA could potentially be incorporated. Working group is also identifying best practices for adaptation. This action task might overlap by gaining input via outcomes of goals 2, 3, 4, and 5.
	1.2. Expand monitoring of ocean acidification to establish its natural variability and to detect trends in water chemistry and	Same as 1.1. above.	Same as 1.1. above.

	related biological responses.		
	1.3. Develop new tools with which to assess and understand acidification and its impacts in Maine waters.		
	1.4. Determine the causes and relative importance of acidification in the waters and sediments of Maine.		

	1.5. Identify the impacts of acidified waters and sediments on Maine's commercial species.		
2. Reduce Emissions of Carbon Dioxide	*2.1. Strengthen coordination and continue participation with existing national, state, and regional initiatives regarding the reduction of atmospheric CO_2 levels.*	DEP continues to oversee Maine's participation in the Regional Greenhouse Gas initiative (RGGI), a multi-state cap and invest program designed to reduce CO2 emissions from the power sector. DEP is also participating in the development of the Transportation Climate Initiative (TCI), a multi-state cap and invest program directed at the transportation sector. Other initiatives include the California Low Emission Vehicle program, which includes GHG standards and the ZEV mandate, and programs under the Volkswagen Consent Decree settlement.	The DEP is currently updating its RGGI rules to reflect a more stringent regional GHG emissions cap for this program; this rule making is scheduled for completion by the end of 2019. TCI program development activities are expected to conclude by the end of 2019. If Maine commits to TCI participation, rulemaking and program development activities would take place in 2020-2021, with the program beginning in 2022.
	2.2. Encourage key leaders and policymakers to synchronize in establishing a comprehensive and unified strategy to reduce carbon dioxide emissions.	The Maine Climate Council will consist of commissioners and key state leaders, science and technical experts, non-profit leaders, and representatives of climate-impacted industries, among others. The climate	DEP will play a key role in staffing and program development under the Climate Council. Likely areas where OA overlap may exist are in the Science and Technical Subcommittee and the Coastal and Marine Working

		council is charged with developing an action plan to meet Maine's goals of a 45% reduction in GHG emissions (from 1990 levels) by 2030, and an 80% reduction by 2050. The plan, initially due December 1, 2020 and updated every four years, must identify strategies for greenhouse gas mitigation and adaptation and resilience, as well as report on the latest information on climate change effects on sectors, ecosystems and communities. DEP is responsible for developing monitoring, reporting and compliance rules by July 1, 2021.	Group; however, other groups may also decide to take up OA. The council is to begin meeting no later than October 1, 2019, with supporting committees and groups to also convene and continue through development of the 2020 plan.
	2.3. Expand actions at the state and local levels that may help in reducing CO_2 emissions.	Efficiency Maine is launching an EV rebate program to promote the sale of more fuel-efficient battery and plug-in electric vehicles. Using the VW settlement funds, Efficiency Maine is administering the contract for installation of DC fast electric vehicle charging as well as Level II charging on Maine's designated alternative fuel corridors.	Maine DOT is considering expanding the use of biodiesel in their fleet. Maine Fleet Services will purchase six EV passenger cars. Maine DEP is considering joining the ZEV Task Force which will include a public awareness campaign to purchase fuel-efficient electric vehicles.

3. Identify and Reduce Local Land-Based Nutrient Loading and, Organic Carbon Contributions to Ocean Acidification and Freshwater Runoff by Strengthening and Augmenting Existing Pollution Reduction Efforts and Making Groundwater Recharge a Land Use Priority.	*3.1. Identify and reduce nutrient loading and organic carbon from point source and nonpoint discharges determined to cause or contribute to ocean acidification.*	DEP's Division of Environmental Assessment's Engineering Unit has conducted modeling of nutrient inputs (point and nonpoint) as part of its review of point source license applications. Several permittees have implemented nitrogen reduction measures voluntarily and/or are monitoring effluent nitrogen. DEP's Stormwater Rules focus on reducing impacts of runoff through use of BMPs that often promote infiltration. Recent concerns for chlorides in urban stream watersheds have caused some projects to not promote infiltration due to high chloride levels measured in base flow.	
	3.2. Assess the need for water quality criteria relevant to ocean acidification.	DEP has been collecting data to assess nitrogen impacts and the need for numeric nitrogen criteria. Focus has been on Casco Bay.	Data collection will continue, with broader and more comprehensive efforts occurring coastwide with additional resources (see 1.1).
	3.3. Ensure that state staff and other practitioners are working with the best information and most effective technology.	Working with partners, including UMaine, Casco Bay Estuary Partnership and Friends of Casco Bay to assess high resolution	Establish key partnerships to improve technical capabilities and to improve grant writing success.

		nitrogen concentrations in Casco Bay	
	3.4. Investigate incentive programs for pollution and freshwater runoff reduction.		
	3.5. Support and reinforce current planning efforts and programs that address the impacts of nutrients and organic carbon and freshwater runoff into coastal waters.	Participated on CBEP's Nutrient Council (see Nutrient Council Report, June 12, 2019) Administer NPS Program, including annual competitive grants to restore impaired watersheds.	
	3.6. Enhance education and outreach programs that provide landowners with information about best practices for reduction of nutrient pollution.		

4. Increase Maine's Capacity to Mitigate, Remediate and Adapt to the Impacts of Ocean Acidification	*4.1. Preserve, enhance and manage a sustainable harvest of kelp, rockweed and native algae in bivalve areas and adjacent shoreline, and preserve and enhance eelgrass beds.*	Mapping focused areas of Maine's coast for eelgrass distribution. Conducting long term monitoring since 2018 of 3 eelgrass beds in vicinity of East End in Portland. Assisting with establishing long term monitoring site in Portsmouth Harbor in 2019.	Seeking funding to support on-going monitoring of eelgrass in 5 coastal regions on an annual rotating basis (LD 559 in Maine Legislature carried over).
	4.2. Encourage bivalve production to support healthy marine waters.		
	4.3. Spread shells or other forms of calcium carbonate ($CaCO_3$)in bivalve areas to remediate impacts of local acidification.	DEP is currently part of the pilot project, Maine Mollusk Shell Recycling Program for Coastal Acidification Remediation. This builds directly on recommendation 4.3 of the COA Commission's report. EPA is providing to DMR, in partnership with the Casco Bay Estuary Partnership (CBEP), local researchers, and DEP, funding for a pilot demonstration shell recycling	The Maine Mollusk Shell Recycling Program for Coastal Acidification Remediation project will include production of a white paper about the effectiveness of remediation at a study site and the ability to scale up a program.

		program to beneficially re-use the oysters and test the effect of its use in Casco Bay tidal flats on acidification. The purpose of the project is to gain practical experience and document lessons learned to facilitate scale up and institutionalization of a recycling program.	
	4.4. Increase the capacity of the fishing and aquaculture industries to adapt to ocean acidification.		
	4.5. Identify refuges and acidification hotspots to prioritize protection and remediation efforts.		
	4.6. Encourage the enhancement and creation of research hatcheries.		

5. Inform Stakeholders, the Public, and Decision-Makers about Ocean Acidification in Maine and Empower Them to Take Action.	*5.1. In addition to providing the commission's report, its key findings should be communicated to the Governor, Maine's legislative leaders, Maine's Congressional delegation, the press and the general public in a series of briefings by commission members.*	Cross reference 2.2	
	5.2. Continue efforts to increase the understanding of ocean acidification among key stakeholders, targeted audiences and local communities to help implement the commission's recommendations.	EPA has an on-going effort to to provide training to existing monitoring networks in Maine and the region to incorporate monitoring for OA. Builds on guidance developed by EPA ORD.	

	5.3. Enhance the existing communication network of engaged stakeholders, state agency representatives and the research community.		
	5.4. Develop, adapt and use curricula on ocean acidification in K-12 schools and institutes of higher education and increase interdisciplinary university programs to equip young leaders with the skills to find solutions to complex multidisciplinary problems such as ocean acidification.		

6. Maintain a Sustainable and Coordinated Focus on Ocean Acidification.	*6.1. Create an on-going ocean acidification council.*		

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