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.*	M. LaVigne and D. Carlon were funded to install a monitoring platform including a pCO2 sensor "black box" system designed by Salisbury lab at UNH.	
	1.2. Expand monitoring of ocean acidification to establish its natural variability and to detect trends in water chemistry and related biological responses.	*M. LaVigne is leading a project funded by Maine Sea Grant which uses paleoceanographic methods to reconstruct pH over the past century from crustose coralline algae and arctica islandica clams. This project is in collaboration with D. Carlon (Bowdoin), Branwen Williams (Claremont), Al Wanamaker (Iowa State), Aaron Strong (Hamilton), Brittany Jellison (Bowdoin). B. Jellison is leading an experiment on mussels to evaluate the impact of*	

		pH on mussel/snail predator-prey interactions.	
	1.3. Develop new tools with which to assess and understand acidification and its impacts in Maine waters.		As part of the project described above, we are developing paleoceanographic proxies for reconstructing past pH changes in the gulf of maine.
	1.4. Determine the causes and relative importance of acidification in the waters and sediments of Maine.	*M. LaVigne has incorporated carbonate chemistry field studies and lab-based experiments into her teaching and student projects at Bowdoin. In collaboration with Kennebec Estuary Land Trust and Manomet, we have both surveyed both spatial and temporal variability in carbonate chemistry throughout different clam flats in the Kennebec Estuary, as well as performed experiments to investigate the impacts of shell buffering on sediment carbonate chemistry in the laboratory as part of a course project. Major results indicate that sediment texture, organic matter content, and evaporation play a large role in setting pH, alkalinity, and saturation state in sediment*	*M. LaVigne intends to include additional projects on these topics into her teaching and student research in future years.*

		porewaters.	
	1.5. Identify the impacts of acidified waters and sediments on Maine's commercial species.	*B. Jellison is leading an experiment on mussels to evaluate the impact of pH on mussel/snail predator-prey interactions.*	*Next year we plan to use data from the paleo archives to include a pre-industrial treatment in our experiments on commercially relevant species (mussels).*
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.*		
	2.2. Encourage key leaders and policymakers to synchronize in establishing a comprehensive and unified strategy to reduce carbon		

	dioxide emissions.		
	2.3. Expand actions at the state and local levels that may help in reducing CO_2 emissions.		

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.*		
	3.2. Assess the need for water quality criteria relevant to ocean acidification.		
	3.3. Ensure that state staff and other practitioners are working with the best information and most effective technology.		

	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.		
	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.*		
	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.	*M. LaVigne and E. Halliday Walker collaborated with Manomet to incorporate a shell buffering experiment into their class project for the course, Marine Biogeochemistry, which is taught each spring.*	
	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.*		
	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.		M. LaVigne, A. Strong, and collaborators on our Sea Grant proposal intend to engage in public communication of results of our paleoceanographic data and related Sea Grant results.

	5.3. Enhance the existing communication network of engaged stakeholders, state agency representatives and the research community.	*M. LaVigne regularly attends MOCA meetings.*	
	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.*		

YOUR NAME: Michèle LaVigne

YOUR ORGANIZATIONS NAME: Michèle LaVigne