

Addressing Ocean Impacts in New Climate Legislation

Our oceans face a variety of threats, including pollution, poorly planned coastal development, habitat degradation, invasive species, and unsustainable fishing levels and practices. These stresses have resulted in depleted populations of many forms of marine life, degraded habitats, altered ecosystem structure and function, and significantly diminished ability of our coastal and ocean ecosystems and resources to recover from disturbance. Increased atmospheric concentrations of greenhouse gases are placing, and will continue to place, significant additional strain on our already overtaxed ocean systems.

Impacts of Greenhouse Gas Emissions on Oceans Ecosystems

Our oceans are affected by increased emissions of greenhouse gases in two ways: global warming and ocean acidification. Higher atmospheric concentrations of greenhouse gases result in increased air temperatures, which in turn lead to warmer ocean waters and changes in sea level, salinity, currents, and nutrient dynamics. Marine organisms will face a period of nearly unprecedented environmental change as the result of these impacts.

The second set of effects includes large scale ocean acidification caused by elevated atmospheric concentrations of carbon dioxide. Increased carbon dioxide in the air results in increased carbon dioxide in the ocean, which when combined with ocean water forms carbonic acid and increases ocean acidity (i.e., lowers pH). Many forms of marine life are susceptible to increased acidity, particularly those with carbonate shells or other exterior structures, such as tropical and cold water corals. This change in pH will directly affect many organisms at the base of marine food chains as well as organisms that provide critical habitat for other forms of marine life. Increased acidity may also have direct physiological effects on vulnerable juvenile stages of other types of marine organisms, such as fish and squid.

It is becoming increasingly clear that the combined impacts of greenhouse gas emissions and other environmentally damaging activities threaten the varied marine ecosystem services that we have come to rely on. Strong legislation establishing a multi-sector cap-and-trade program that significantly reduces U.S. greenhouse gas emissions out to mid-century is necessary to help prevent and minimize oceans impacts from these emissions. Additionally, four provisions specific to ocean related concerns and needs should be included in any global warming legislation. These are detailed below.

Require a Carbon Cap Look Back That Takes into Account the Impacts of Warming and Acidification on Ocean Ecosystems

In the last decade, scientific documentation about the effects of greenhouse gas emissions on marine ecosystems has grown steadily. From increased ocean acidity, higher temperatures, and relative sea level rise, to changing currents, salinity levels, and nutrient dynamics, we know much more than we did even ten years ago, yet more research is required to understand the full scope of the risks of specific carbon levels on the oceans. Climate legislation should require a reassessment of the carbon cap based on scientific input that explicitly incorporates new information about the impacts of warming and acidity on coastal and ocean resources and ecosystems.

Exclude Ocean Biological Sequestration from Sanctioned Carbon Offset Methods

Climate change will likely result in further demands on already stressed ocean systems. Recent proposals have emerged to use our oceans as places to sequester carbon and then to sell this “increased sequestration” as offsets in either legislatively created or voluntary carbon markets. Ocean biological sequestration—including ocean iron fertilization, injection of urea, and fields of upwelling pumps—should not qualify as a sanctioned carbon offset at this time because of significant concerns about its efficacy as well as potentially profound impacts on marine ecosystems and resources.

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Require Ocean Adaptation Policies—and Include Standards and Funding

Priority should be placed on preventing and minimizing the impacts of warming and acidification on ocean ecosystems and resources. However, impacts are already occurring and will continue to occur even if emissions are capped (though at less dramatic levels than under a business as usual scenario). Because of this reality and because of the already degraded state of our ocean and coastal resources, Federal and state agencies must adjust their management and conservation strategies to maximize resiliency and to promote the ability of coastal and marine resources to adapt to ongoing and projected impacts.

Ocean adaptation language could be incorporated into a natural resource adaptation title. Such a title should establish a national policy to protect, maintain, and restore United States natural resources, habitats, ecosystems, and ecological processes so that they are more resilient and better able to withstand the additional stresses associated with global warming, including sea level rise and ocean acidification. This policy should form the basis of a presidential level, national strategy to be drafted with input from all federal agencies, scientists (possibly including a science advisory board established by the legislation), and the public. Funding from the sale of carbon allowances should be made available to federal agencies, to be allocated in such a fashion and for such purposes as articulated in climate legislation, consistent with the national strategy and the national policy.

Each state should also develop a state level strategy that is consistent with the national strategy and the national policy and that would be approved by the chair of the Council on Environmental Quality. Governors should direct the development of a state's strategy, with input from state agencies, scientists, and the public. A portion of the funds from the sale of carbon allowances, as specified in climate legislation, should be made available to states for plan development and implementation should they choose to develop a plan. Funding for plan implementation should be allocated across state agencies, consistent with the priorities and projects articulated in an approved state strategy.

Improve the Science on the Impacts of Global Warming and Ocean Acidification on Marine Ecosystems and How Best to Minimize Them

Research addressing the impacts of global warming and ocean acidification on coastal and ocean resources and ecosystems is fragmentary and incomplete. Climate legislation should establish a National Academy of Sciences panel both to evaluate the likely impacts of warming and acidification on coastal and ocean resources and ecosystems and to provide recommendations for appropriate adaptation strategies. The panel should also identify data gaps that need to be addressed to more fully assess relevant impacts and then recommend additional research. Requirements should be included in the legislation that will link these findings to the reassessment of the cap and to the development and refinement of Federal and state adaptation strategies.