

IMPACTS OF CLIMATE CHANGE TO THE GULF OF MAINE

Sea level rise – The Intergovernmental Panel on Climate Change, an international body responsible for assessing the science related to climate change, has developed regional sea level rise scenarios for the Gulf of Maine that are based on local data trends from the Portland tide gauge. The predictions range from 1.2 ft. to 10.9 ft. increases by 2100 based on varying assumptions about greenhouse gas emissions in the future,¹ though we have the highest probability of seeing the “intermediate” (3.3ft) or “high-intermediate” (5ft) scenarios play out.² Sea level rise is a result of two main driving forces: thermal expansion of the oceans with higher temperatures and increased melting of mountain glaciers, icecaps, and the Antarctic and Greenland ice sheets.³ On Maine’s coast, this means that our coastal communities are at risk of tidal or long-term flooding. The Maine Geological Service provides a tool to show areas that may flood under different sea level rise scenarios that can be used for community planning.⁴

More intense storms and nuisance flooding – Warmer air in the atmosphere is changing the frequency and types of storms in New England. We will experience more precipitation as rain rather than snow, which will impact coastal communities as increased flooding and may lead to higher rates of erosion.⁵ Over the past 50 years, New England storms have been more intense leading to large-scale flood events,⁶ but also the seasonality of storms has changed leading to more drought conditions in the summer.⁷ In our coastal communities, we’ll need to plan for extremes on both sides to change. These changes will affect our infrastructure and fish and wildlife communities found in coastal Maine. More precipitation and flooding may make it hard for migrating fish to reach their spawning grounds, and drought conditions may cause die-offs due to warm and low water and lack of prey.

Warmer and more acidic ocean water – Fish, marine mammals, sharks, and other animals that live in oceans are sensitive to changes in water temperature and chemistry. Over the last decade, the Gulf of Maine has warmed faster than 99 percent of the global ocean.⁸ Increasing water temperature can make some fish species like the summer flounder develop into single gender populations,⁹ deplete oxygen from water and stress fishes, and force marine animals to change their migration patterns and home-bases in search of colder water or cold-water adapted prey.¹⁰ Ocean chemistry changes as more carbon is absorbed into the water out of the air. This process called ocean acidification can lead to declines in shellfish like clams, blue mussels, and oysters by making it harder to grow their shells or making shells brittle and more susceptible to predation by invasive green crabs and other predators.¹¹ These changes will in turn affect our coastal fisheries and may force fisherman to change their practices and target species.

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