

Sea Level Rise

Executive Summary¹

One consequence of climate change is a steady and accelerating rise in the level of the seas, which poses a threat to the physical, social, and financial well-being of coastal and island communities throughout the world. As the impacts of sea-level rise worsen and communities adopt new response measures, science about sea-level rise comes into play in legal arguments in courtrooms around the country.

Global sea level has risen about seven inches since 1900, and scientists report that the rate of this rise has been accelerating consistently since 1970. Global sea-level rise, caused by a change in the volume of water in ocean basins, occurs primarily in two ways—through addition of water to the oceans, as from melting of land ice, and expansion of ocean water by warming. Local sea-level rise, which determines how much sea-level rise is “felt” along a given coastline, can differ from the global mean due to factors such as ocean and atmospheric circulation, redistribution of seawater by gravity, and vertical land movement. Scientists can project future global and local sea-level rise using models that are informed by data on greenhouse gas emissions, ocean circulation patterns, ice-sheet dynamics, and other factors. The Intergovernmental Panel on Climate Change and the U.S. Global Change Research Program publish sea-level rise data and projections that are used to inform policies for building codes, disaster preparedness plans, coastal defense infrastructure, long-term real estate risk, and more.

Local sea-level rise often leads to more frequent and severe flooding and exacerbates damage from severe storms such as hurricanes. These impacts can result in social and economic disruptions due to the risks they pose to residents, critical infrastructure, public and private property, and ecosystems. The Congressional Budget Office estimates that the costs associated with hurricanes will grow more rapidly than the economy as sea-level rise accelerates. In response, governments and private citizens in coastal communities are implementing adaptation measures aimed at building resilience to the impacts. Scientists have determined with high confidence that a substantial fraction of global sea-level rise since 1900 is linked to human-caused climate warming, with models attributing roughly 70% of global sea-level rise to human greenhouse gas emissions.

The impacts and responses associated with sea-level rise are raising a host of legal issues, including litigation involving constitutional, statutory, regulatory, and tort claims. While these cases are diverse, the most common legal issues that have been adjudicated include issues related to justiciability, administrative decision-making, physical and regulatory takings, and shifting property boundaries. Other cases raise issues related to just compensation, relocation from rising seas, and disclosure laws. Regardless of the particular lawsuit, an

understanding of the science behind sea-level rise is essential for judges in order to navigate these claims and understand the context from which they emerge.

¹This is a summary of Sea Level Rise authored by Anna Ruth Halberstadt and Mark Nevitt.