

# WATER FACTS

## Homer, Alaska: Identifying and Becoming More Resilient to Impacts of Climate Change



Cities across the United States should anticipate significant water-related vulnerabilities based on current carbon emission trends because of climate change, ranging from water shortages to more intense storms and floods to sea level rise. To help cities become more resilient to the rising threats of climate change, NRDC reviewed more than 75 scientific studies and other reports to summarize the water-related vulnerabilities in 12 cities—including Homer. Although there may still be some uncertainty about what particular impacts threaten cities and how quickly or severely they might occur, action at the local level is the most effective method of reducing, mitigating, and preventing the negative effects of water-related climate change outlined in this fact sheet. NRDC urges cities to prepare for coming challenges relating to water resources. Fortunately, there are steps cities are already taking to become more resilient.

Homer is located on the Kenai Peninsula in south-central Alaska, on the shores of Kachemak Bay to the east and Cook Inlet to the west. While there is a fair amount of climate change information for Alaska’s larger urban areas and its geographic regions, there is not much specific information for small towns such as Homer. Thus, NRDC drew on regional information from south-central Alaska to assess the water-related impacts of climate change on Homer.

Summary of water-related climate changes and impacts in Homer throughout the 21st century	
	Increased annual precipitation
	Increased impacts to fisheries
	Increased erosion
	Water supply challenges due to drier conditions

● Highly likely    ● Likely    ● Possible

Source: NRDC



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## SEA LEVEL CHANGE

Unlike many coastal cities, sea level rise predictions for sites in the Cook Inlet area, including the Kenai Peninsula, suggest that at least parts of the region are not particularly vulnerable to the effects of sea level rise over the course of the 21st century. Coastal uplift of the local landmass, predicted to be about 2.3 to 3.6 feet (0.7 to 1.1 meters), will counterbalance much of the effect of rising seas, predicted to be 1.3 to 6.6 feet (0.4 to 2 meters). Even if sea level change occurs at the higher end of the estimated range, marshlands will likely keep up with sea levels as they capture sediment and grow vertically.

## PRECIPITATION AND STORM EVENTS

Overall annual precipitation is projected to increase in Alaska by 20 to 25 percent throughout the 21st century. Further, Alaska has already witnessed an increase in extreme precipitation events in the last 50 years. Storm severity may increase over the course of the 21st century, and correspondingly, these extreme precipitation events may increase.

## EROSION

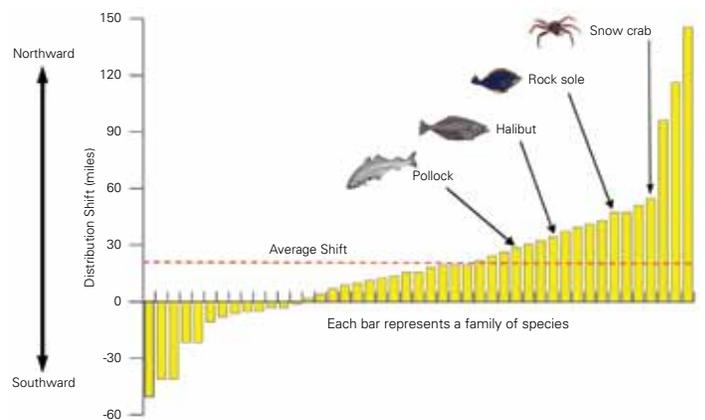
The glacially deposited bluffs common along the Cook Inlet and Kachemak Bay coastlines are susceptible to erosion particularly during high tide storms when heavy rain saturate and liquefy unstable soil and clay layers. For instance, in October and November of 2002, heavy rains caused slope failures and debris slides in various parts of Homer and the storm surge flooded Homer Spit. More intense storms and sea level rise may exacerbate hazards such as erosion and beach ice—which can potentially be carried into open waters by high tides, posing as a hazard to ships.

## INCREASED TEMPERATURES

Since the mid-20th century, Alaska has warmed at nearly twice the rate of the rest of the country. Over the past 50 years, average temperatures in Alaska have increased 3.4°F (1.9°C), and winter temperatures have risen by 6.3°F (3.5°C). The temperature increase could be as much as 15.3°F (8.5°C) for the Kenai Peninsula by 2100.

As a result, increased temperatures pose a threat to the region's fisheries and other marine species, which are important both to the economy and as a food supply. Warmer air and water temperatures have already resulted in a shift northward of species important to the region, with implications for the ecosystem and local communities. Higher temperatures can also increase the incidence of disease in fish and can cause higher and earlier peak flows which can further disturb fish habitats by killing incubating eggs.

## Alaska's marine species shift northward, 1982 to 2006



As air and water temperatures rise, Alaska's marine species shift northward. On average, by 2006 the center of each range had moved 19 miles north of its 1982 location.

Source: U.S. Global Change Research Program ([www.globalchange.gov](http://www.globalchange.gov))

## DRIER CONDITIONS

Warmer temperatures over the course of the 21st century will expand the growing season and thus expand the time frame in which moisture is extracted from local soils. In the second half of the 21st century, summertime precipitation in the Homer area is not expected to keep up with evapotranspiration rates, thus leaving soils drier than historic values.

## ACTION

In spite of its relatively small population, the city of Homer has made substantive efforts to mitigate and adapt to climate change. The town has taken steps in long-range planning by including climate change considerations into the City of Homer Comprehensive Plan and Comprehensive Economic Development Strategy. Both of these long-term plans advocate for smart growth policies that take greenhouse gas emissions and environmental sustainability into account. An example of these implemented practices is the recent adoption of Ordinance 10-56 that provides for development standards on steep slopes and coastal bluffs. Homer also created a Sustainability Fund and a Revolving Energy Fund to support implementation of its action plan, addressing the often overlooked component funding for mitigation and adaptation work. These and other ongoing efforts by the city should serve as an inspirational example to cities and states across the United States (including Alaska)—large and small.