

Warming threatens state's coast, scientists say

David Perlman, San Francisco Chronicle, 6-4-10

Northern California's two great marine sanctuaries and nearby coastal regions will be severely threatened by the planet's changing climate over the next several decades as the sea level rises, the ocean water warms, marine animals migrate and coastal storms and erosion intensify, a panel of scientists warned Thursday.

The scientists, who have been studying the issue for the past two years, said in a report that sea level at the mouth of San Francisco Bay has already risen nearly 8 inches in the past century and noted that the most recent estimates of global warming's impact on the ocean off the California coast indicate a sea level rise of 29 inches in the next 40 years and 75 inches by the end of the century.

"The effects of this rise will play out everywhere," said John Largier, a UC Davis oceanographer and chairman of a scientific advisory council that prepared the report for the Gulf of the Farallones and Cordell Bank national marine sanctuaries.

Some ocean species are already adapting to warming waters off the coast by moving northward, the scientists found. For example, gray whales, which normally give birth in the warm lagoons of Baja California, are beginning to move calving grounds northward. Some whales have been observed giving birth as far north as the waters off Monterey County, the scientists noted.

"There is more and more evidence of rapid adaption by marine life to changes in the climate so far," Largier said, "but as changes grow greater, adaptation will end, and how much we will lose along the way we can't predict precisely."

Increased temperatures

Aside from sea level rise, the climate changes Largier refers to include warmer ocean surface temperatures and increasing ocean acidity as carbon from greenhouse gases change the sea's composition.

The report predicts that as the ocean warms, changes will occur in the complex pattern of currents off the California coast. Meanwhile, the report said, storms of greater intensity will hit the state, increasing runoff from the state's rivers and causing huge swaths of land to erode into the ocean in the next several decades. The effects will be felt at least from Point Arena in Mendocino to Monterey, the scientists said.

Marin County, for example, will lose nearly 5 square miles of cliffs and sand dunes to erosion by the end of the century; erosion will claim 3.2 square miles of cliffs and dunes in San Mateo County; and rocky Mendocino's shoreline will lose more than 8 square miles of cliffs and dunes, the report predicts.

Marshes at risk

The coast along this entire region is marked by tidal marshes like Elkhorn Slough in Monterey County, and the scientists predict that sea level rise will increase the salinity of those marshes and either result in killing their plant life or in pushing more marshes inland.

Marine mammals are likely to be especially affected by changes in ocean temperatures, the scientists noted.

Many fish species and plankton already are, but the migration of the gray whales northward is troubling, the scientists said.

"Giving birth outside the sheltered Baja California lagoons present greater risk of storm stress to newborn calves, as well as increased risk of predation by killer whales and large sharks," they wrote in their report.

The scientists also focused their forecast on the effects of climate change on seals and sea lions that need low-lying coastal areas to haul out, give birth, and - for some species - to mate.

"Low slope beaches and intertidal sand bars where harbor seals breed are especially at risk to erosion," the group warned.

What about fish?

Fish of all kinds will be affected by the changing climate in the years to come, the scientists predicted. Coho salmon and steelhead, for example, are severely threatened by loss of their natural habitat and reduced stream flows in the rivers where they have thrived. If climate change results in increased stream temperatures, salmon growth rates may decline while the vulnerability to predators increases, they said.

Some of the effects can be forestalled or delayed by reducing some of the "stressors" that add to the harmful effects of climate change - like pollution and changes in coastal land use, the scientists concluded. They proposed a greatly increased effort to inform the public about the effects of global warming on the complex ecology of a region where life in the ocean and on land interact.