Warming oceans imperil iconic marine species

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With a warming ocean along the East and West Coasts of the United States, many well-known marine species – important culturally and economically – face a dicey future, according to a new Cornell study in Oceanography magazine.

"Climate warming has been wreaking havoc with North America's marine ecosystems," said Charles H. Greene, Cornell professor of oceanography in the Department of Earth and Atmospheric Sciences. "The resulting demise of many of North America's most iconic marine species provides yet another warning to society that a changing climate will leave future generations with an ocean much different than the one we grew up with."

Although lobsters now thrive in the Gulf of Maine, continued rising temperatures, could soon lead to a disease outbreak that will decimate the Gulf's lobster population. Greene points out that bacterial Epizootic Shell Disease, which thrives in warmer waters, has been steadily shifting northeastward along the New England coast and now has lobsters in the Gulf of Maine in its crosshairs.

With water temperatures rising, certain fish stocks are also increasingly stressed. "Cod stocks … like those in the Gulf of Maine, fare poorly under warming conditions, exhibiting … greater susceptibility to overfishing," he said.

Warming waters also threaten the northern right whale. The whale's

primary food sources – the copepod Calanus finmarchicus – is abundant in the Gulf of Maine, but if the Gulf's rapid warming continues, the copepod's habitat will shift northward, forcing the whales to shift their foraging grounds or alter their diets, Greene said.

"The extensive ocean warming along the West Coast poses similar threats to several iconic species of salmon, marine mammals and starfish," said Greene, who explained that the Chinook salmon stock in California is suffering from nutritional stresses associated with warm coastal conditions. In fact, if conditions persist, this salmon stock may face local extinction in the not-too-distant future.

Oceanography magazine also highlighted research from the lab of Drew Harvell, professor of ecology and evolutionary biology, that shows this summer's warm temperatures have worsened the epidemic of sea star wasting disease, which causes lesions and gnarls on sea stars' rays. In addition to impacts on domestic shores, the unprecedented global reach of warming from the 2016 El Nino caused massive mortality on the world's coral reefs.

More information: Kristen Thyng et al. True Colors of Oceanography: Guidelines for Effective and Accurate Colormap Selection, *Oceanography* (2016). DOI: 10.5670/oceanog.2016.66

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