Warming Antarctic May Allow Threatening King Crabs to Expand Range

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Greg Watry, Digital Reporter
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In the past 50 years, the western Antarctic Peninsula warmed over four times faster than the average rate of the Earth’s overall warming, according to the Antarctic and Southern Ocean Coalition. These temperature fluctuations, according to an international group of scientists, threaten species that thrive in frigid waters with negligible variation in seasonal sea temperatures.

However, it’s not solely the temperatures that are threatening, it’s the spindly legged crustaceans following the temperatures.

“Because other creatures on the continental shelf have evolved without shell-crushing predators, if the crabs moved in they could radically restructure the system,” said Richard Aronson, a professor with Florida Institute of Technology’s Dept. of Biological Sciences and lead author of the paper appearing in Proceedings of the National Academy of Sciences.

According to the researchers, the top predators in the studied Antarctic shelf environment are sea stars and nemertean worms, who may have lived in the area for tens of millions of years without the threat of skeleton-breaking predators.

In a 2010-2011 survey, the researchers found 468 individuals of the king crab species Paralomis birsteini occupying the continental slope off Marguerite Bay. Overall depth range of the survey was from 841 to 2,266 m. The crabs “were found at temperatures ranging from 0.43 C at the deepest surveyed depth of 2,266 m on the continental rise to 1.16 C at 1,039 m on the slope,” the researchers write. “The shallowest record was of two individuals at 841 m in an ambient temperature of 0.9 C.”
Typically, bottom-walking decapods can’t survive in water below 1°C, but adults of more cold-tolerant taxa can survive down to 0.4°C, according to the researchers.

Observations suggest a reproductively viable population is present, as juveniles, discarded molts and precopulatory behavior were seen.

“Although the history of this population is unknown, its contemporary ecology supports the idea that bathyal lithodids could expand upward within a few decades,” the researchers write. “Depth profiles of water temperature, salinity, sedimentary composition and the availability of prey, as well as the general absence of predators, indicate conditions favorable to upward expansion of *P. birsteini* in this location, at least as shallow as the lower depths of the continental shelf.”

Author James McClintock of the Univ. of Alabama at Birmingham said further evidence king crabs are expanding their range can only be supplied through tracking and long-term monitoring of the population.

According to the researchers, if king crabs expand to shallow Antarctic waters, biodiversity of the seafloor populations will be threatened.