

# **Biology and Management of Exploited Crab Populations under Climate Change**

**25th Lowell Wakefield Fisheries Symposium**

**EDITORS**

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## About the Proceedings Book and the Symposium

Twenty-seven peer-reviewed research and review papers are included in this proceedings volume; all were presented at the symposium *Biology and Management of Exploited Crab Populations under Climate Change*, held March 10-13, 2009, in Anchorage, Alaska.

The symposium was convened to look closely at what fisheries researchers have learned about crab population dynamics, resiliency to fishing, climate effects, and the role of habitat in worldwide crab stocks and fisheries, many of which have fluctuated and collapsed due to shifts in climate, fishing, and ecological interactions.

For example, the collapse of red king crab (*Paralithodes camtschaticus*) fisheries in Alaska in the early 1980s led to much speculation about the roles of a climate regime shift from cool to warm conditions in the late 1970s, associated changes in ecosystem structure including increases in groundfish predators, and overfishing or habitat alterations by large fleets of fishing vessels. Despite 25 years of closed fisheries in the Gulf of Alaska, most stocks of red king crabs have not recovered. Progress into understanding the causative mechanisms has been frustratingly slow, prompting recent initiation of a pilot multiagency king crab stock enhancement and rehabilitation effort. For more information on this program, see the AKCRRAB website, [http://seagrant.uaf.edu/research/projects/initiatives/king\\_crab/general](http://seagrant.uaf.edu/research/projects/initiatives/king_crab/general).

Fisheries for Dungeness crabs (*Cancer magister*) along the U.S. west coast and blue crab (*Callinectes sapidus*) along the U.S. east coast provide contrasting examples. For many decades, large, fluctuating catches of both species seemed sustainable, despite extremely high exploitation rates by overcapitalized fishing fleets. Whereas this situation generally remains the case for Dungeness crabs, much concern exists for blue crabs following sharp declines in stock abundance and catches along most of the Atlantic coast in the last decade.

Common threads among the papers in this proceedings are the effects of fisheries and climate on crab abundance, both observed in the past and forecasted into the future. Species addressed include snow, blue, king, and other crabs. Specific topics include crab abundance and distribution related to climate variability and future climate change, stock assessment and fishery management, effects of stock size and environmental variability on recruitment, considerations of reproductive biology and reproductive potential, role of disease and other environmental stressors, predation and habitat considerations, and the utility of stock enhancement programs for rehabilitation of depleted crab stocks.

The symposium was coordinated by Sherri Pristash, University of Alaska Fairbanks, Alaska Sea Grant College Program, Fairbanks, Alaska. Steering committee members were:

- Gordon H. Kruse, chair, University of Alaska Fairbanks, School of Fisheries and Ocean Sciences, Juneau Center, Juneau, Alaska
- Ginny Eckert, University of Alaska Fairbanks, School of Fisheries and Ocean Sciences, Juneau Center, Juneau, Alaska
- Robert Foy, NOAA Fisheries, Alaska Fisheries Science Center, Kodiak Laboratory, Kodiak, Alaska
- Romuald N. Lipcius, Virginia Institute of Marine Science, Gloucester Point, Virginia
- Bernard Sainte-Marie, Fisheries and Oceans Canada, Maurice Lamontagne Institute, Mont-Joli, Quebec, Canada
- Diana Stram, North Pacific Fishery Management Council, Anchorage, Alaska
- Doug Woodby, Alaska Department of Fish and Game, Juneau, Alaska

Symposium sponsors were:

- Alaska Sea Grant College Program
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- NOAA Fisheries (National Marine Fisheries Service)
- North Pacific Fishery Management Council
- Wakefield Endowment (University of Alaska Foundation)

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## **The Lowell Wakefield Symposium Series and Endowment**

The Alaska Sea Grant College Program has been sponsoring and coordinating the Lowell Wakefield Fisheries Symposium series since 1982. These meetings are a forum for information exchange in biology, management, and economics of various fish species and complexes, as well as an opportunity for scientists from high-latitude countries to meet informally and discuss their work.

Lowell Wakefield was the founder of the Alaska king crab industry. He recognized two major ingredients necessary for the king crab fishery to survive—ensuring that a quality product be made available to the consumer, and that a viable fishery can be maintained only through sound management practices based on the best scientific data available. Lowell Wakefield and Wakefield Seafoods played an important role in the development and implementation of quality control legislation, in the preparation of fishing regulations for Alaska waters, and in drafting international agreements for the high seas. In his later years, as an adjunct professor of fisheries at the University of Alaska, Lowell Wakefield influenced the early directions of Alaska Sea Grant. The Wakefield Symposium series is named in honor of Lowell Wakefield and his many contributions to Alaska's fisheries. In 2000, Lowell's wife Frankie Wakefield made a gift to the University of Alaska Foundation to establish an endowment to continue this series.