Scientists say the Pacific Coast “blob” is to blame for whale entanglements

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New research unravels the perfect storm of complex environmental factors that contributed to the rash of whale entanglements in recent years, providing crab fishermen and conservationists with new tools to prevent future incidents.

The study, published in January in Nature Communications, shows how the persistent, multi-year marine heatwave known as the “blob” flooded California’s productive coastal zones between 2014 and 2016, upsetting the complicated food webs that whales typically rely on. The increased temperature also spurred a prolonged burst of toxic algae in 2015, causing an unprecedented six-month delay in the state’s commercial Dungeness crab season. The setback forced financially starved fishermen to ramp up efforts in the spring, when coastal whale numbers were at their peak.

“It was like throwing gasoline on the fire,” said Jarrod Santora, an ecosystem scientist with the National Oceanic and Atmospheric Administration and lead author of the study. “It totally amplified the co-occurrence of whales and crab gear right at a time when the whales are coming back to an environment that’s extremely stressed.”

Cold, nutrient-rich water was limited in the warm years of the blob, causing populations of krill — the primary food source for many whales — to crash. But unlike other whales, humpbacks switch to small fish like anchovies when krill populations are low, which draws them closer to shore where crab fishing occurs.

The warm water squeezing their habitat led to whales and fishing gear crossing paths like never before.

The outcome was gruesome: 71 entanglements were reported in 2015, a historic peak challenged only by the 62 recorded the following year, according to annual reports from NOAA. And while entanglements aren't always lethal, before 2014, the average was below 10 per year.

"We want thriving whale populations. We want thriving fishing communities," Santora said. "But climate change and climate variability is throwing a wrench in that."

When aerial imagery revealed whales concentrating near California's coast in November of last year, commercial crab fishermen decided to delay the season six weeks until mid-December, missing the lucrative Thanksgiving holiday.

"We gave up quite a bit of time and money to make a good decision that has resulted in no entanglements," said Dick Ogg, a 68-year-old crab fisherman from Bodega Bay.

Santora said the delay stemmed from the Risk Assessment and Mitigation Program, or RAMP — a protocol to determine the risk of entanglements, informed in part by the ecosystem factors outlined in his study.

"We're not waiting until after the entanglements are happening, we're preventing them beforehand," said Geoff Shester, a scientist from the advocacy group Oceana and representative with the working group that developed RAMP.

Shester compared RAMP with the fire danger signs posted near forested areas.

"We have a dashboard of all the different things going on in the ocean — when that dashboard shows us we're getting in the red zone, it's based on this science," he said, referring to the study.

RAMP grew out of the California Dungeness Crab Fishing Gear Working Group, a collaboration between fishermen, scientists, and conservationists working across state and federal agencies, including the California Department of Fish and Wildlife.

"It's taken a very well put-together scientific paper to confirm what we've thought all along," said John Mellor, a crab fisherman out of San Francisco's Fishermen's Wharf who is involved with the working group.

Mellor, 56, has been fishing for the last 40 years. He said he could tell that ocean conditions were different in the early years of the blob. The color was a “pukey” green, he said. And he witnessed schools of anchovies washing up on shore, suffocating because of low oxygen content in the water.

“We were fishing crabs off Point Reyes in 2014,” Mellor said. “I just remember telling my crew, ‘Guys, we’re screwed. This does not look good.'”

Following the flurry of entanglements in 2015 and 2016, the Center for Biological Diversity filed a lawsuit with CDFW to put pressure on the state to prevent future incidents. After the settlement in March 2019, the state cut short last year’s crabbing season by three months. It may also require reduced seasons in subsequent years if whale populations are sufficiently high.

With the looming threat of shortened seasons, fishermen like Ogg and Mellor say they’re making careful decisions based on the recommendations from RAMP.

“I just want people to know how hard the fishermen are working to try and make this work out,” said Ogg. “We’re trying to do everything we can to reduce our interaction (with whales) and continue to fish safely and productively.

Santora said the blob and its multitude of harmful impacts are a prelude to future ocean conditions — a new normal that has no historical analogue on record.

In the fall of 2019, scientists noticed a pattern of warm water in the Pacific that appeared to be mimicking the blob. While that heatwave has weakened slightly and avoided California’s coast, it persists, casting a shadow of uncertainty over the crabbing industry that is just starting to recover.
“We’re going to see increasing frequency of heatwaves and these climate warming anomalies into the future,” Santora said. “It’s not a question of if, it’s a question of when.”

But with science-based tools like RAMP, conservationists and fishermen agree that, for now, a thriving whale population can co-exist with the crab industry.

“It really demonstrates that scientists, conservation groups and fishermen can put differences aside and try and solve a problem together,” said Shester. “We can have healthy whale populations and a healthy fishing industry.”

“We can do both,” he said. “It doesn’t have to be one or the other.”