

Aquaculture blessing in disguise for migratory waders fueling up in China

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Hebo Peng is observing the birds. Credits: Hanming Tu. Credit: Hanming Tu

On the mudflats along the Chinese coasts where benign forms of aquaculture are practiced, shorebirds like knots and bar-tailed godwits are doing relatively well. That is shown in the dissertation that NIOZ Ph.D. candidate and biologist He-Bo Peng will defend at the University of Groningen on January 15.

"The culturing of shellfish is by no means a way of nature conservation,

but at least it keeps the mudflats in China and the bird food in a better condition than without this aquaculture," Peng says.

Long-term monitoring

Peng was the first to design a systematic survey of large parts of the intertidal mudflats along the 18.000 km of the Chinese coast. Between 2015 and 2023, he and his colleagues sampled 2,000 points in 40 different locations yearly, analyzing soil properties and living organisms found in the mud. The sampling was designed after the SIBES program, which has been running since 2008 on a grid with 5,000 locations in the Dutch Wadden Sea.

"The work of Peng was one of the first that 'exported' our SIBES-design to [international waters](#)," the scientific coordinator of this monitoring program, NIOZ biologist Allert Bijleveld says. "We are thrilled to see this long-term program copied to other important nature areas worldwide."

"My main finding was that the majority of the 'bird food' that we found in the mud was linked to the culturing of shellfish," Peng says.

"Overall, the number of waders like the great and the red knot is in decline along the Chinese coast, but at least on the locations where shellfish like *Potamocorbula laevis* were cultured in an extensive way, red knots, as well as curlew sandpipers, were doing relatively well. You can, therefore, say this aquaculture is a blessing in disguise for the [migratory birds](#) that depend on these ecosystems."

Reclaiming land

The coast of the Yellow Sea has a long history of land reclamation for

housing and industry. This reclaiming of land has stopped in most locations, and there is even a modest increase in the surface of mud flats in some parts.

Peng says, "On the locations where aquaculture has also stopped, we see an almost unlimited exploitation of the mud flats by the [local community](#). Therefore, the controlled management in aquaculture is a relatively good way to preserve at least some of the natural qualities of the intertidal flats."

In his dissertation, Peng advises to "listen to the mud."

"This work is just a modest start of our understanding of these very important staging areas for birds on migration between eastern Siberia and Oceania. Through the continuation of the long-term monitoring of the mud flats, as well as through tracking of birds with high tech transmitters, we can learn so much more in our quest for understanding of these ecosystems," Peng says.

Professor in global flyway ecology Theunis Piersma stresses the importance of the work of his Ph. D. candidate. "Peng has shown that along the entire 18,000 km of the coastline, from the [temperate climate](#) in the north to the tropical parts in the south, biodiversity has homogenized under the influence of [aquaculture](#). Given the intense use by local communities, returning these mudflats to true natural ecosystems will be a daunting task."

"But the incredible amount of work that Peng has done—and hopefully will continue to do—to monitor these ecosystems will at least help us guide that process, should China choose to protect both the international traveling birds as well as the benthic biodiversity."

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