

Migratory birds' fuelling station empty

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Millions of Australia's migratory shorebirds are being pushed closer to extinction as the quality of their primary feeding grounds, or 'refuelling areas', in East Asia continue to decline.

New research has declared the main refuelling areas in the Yellow Sea at risk of total collapse as [coastal development](#), widespread pollutants, dead zones, increasing jellyfish and algal blooms continue to affect the Yellow Sea's tidal flat ecosystem.

Apart from losing their main refuelling areas, shorebirds such as the threatened curlew, bar-tailed godwit and the great knot also risk running out of food in the remaining tidal flats, says Dr Richard Fuller of the National Environmental Research Program's Environmental Decisions Hub (NERP's EDH) and the University of Queensland (UQ).

"Each year, millions of shorebirds migrate between Australia and Arctic Russia, where they breed," Dr Fuller says. "They fly through the East Asian-Australasian Flyway, stopping in China, Korea and other East Asian countries to rest and feed.

"Twenty seven sites in the Yellow Sea tidal flats are used by forty per cent of shorebirds that migrate through this route. This is an enormous area that fringes more than 4,000 kilometres of the coastlines of China, North Korea and South Korea – if you stand on the coastline, there are tidal flats as far as the eye can see."

Lead author Dr Nick Murray says two thirds of the tidal flats have

already been destroyed by coastal development, and the study shows that the remaining ecosystem is declining in quality as well as quantity.

"This is caused by rapid growth of urban, agricultural and industrial developments in the coastal zone, heavy modification of large rivers that supply sediments to the flats and the swift emergence of large-scale tide and wind power generation facilities," he says.

"The tidal flat ecosystem is also threatened by weed invasion, extensive pollution in coastal areas, overharvesting of finfish and shellfish populations, sea-level rise, and ongoing erosion and subsidence of its sediments."

Apart from providing a stable coastline, storm protection and food for the coastal population of more than 150 million people, tidal flats also support an abundance of invertebrates such as worms, crustaceans and molluscs, which migratory birds feed on as they stop to refuel.

"If degradation of the tidal flat ecosystem continues, these invertebrates will also be killed," says Dr Fuller. "Pollution, especially, is a major problem – it's mainly caused by toxic chemicals that have leached from the land or were dumped into the waterways.

"So the shorebirds didn't just lose two thirds of their habitats. While we are uncertain how severe the degradation will be, the birds may also have to cope with a loss of food and a heavily polluted environment."

"We have to stop the decline of the Yellow Sea tidal flat ecosystem immediately," Dr Murray says. "We need to better plan how to develop coastlines at regional and national levels, including identifying places where development shouldn't occur.

"We should also expand the coastal protected area network, as well as

better protect existing reserves to prevent illegal land reclamation and coastal exploitation."

Dr Fuller adds that countries along these tidal flats also need strong regulations to stop pollution. "Cleaning up existing pollution, while expensive, is a straightforward process – the key is to prevent it from happening again."

The good news is Australia, China, Korea and Japan have signed agreements to protect the shorebirds, and regularly exchange information on ways to save them, he says.

"We have to be vigilant, or the entire area will disappear due to massive urbanisation," he warns. "This will remove the principal stop-over area for millions of migratory birds, reducing populations and resulting in fewer birds in Australia each year.

"If that happens, it's a devastating loss of one of the most awe-inspiring migrations of the natural world. These birds cover tens of thousands of kilometres each year during their migration across an entire hemisphere."

The researchers will continue their studies as part of the Threatened Species Recovery Hub commencing this year, funded through the Australian Government's National Environmental Science Program.

More information: Murray, N. J., Ma, Z. and Fuller, R. A. (2015), "Tidal flats of the Yellow Sea: A review of ecosystem status and anthropogenic threats." *Austral Ecology*. doi: 10.1111/aec.12211

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