



Technology & Science

Albatrosses used as flying spies to detect illegal fishing boats



Comparing birds' detections with boat signals, researchers can infer illegal fishing

Emily Chung - CBC News - Posted: Jan 28, 2020 3:36 PM ET | Last Updated: 4 hours ago



A tag with a GPS and radar detector is attached to an adult wandering albatross. Data from the albatrosses showed that about 30 per cent of ships in international waters had no AIS signal, which most registered ships broadcast. (Image courtesy of Julien Collet)

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Sea birds with radar detectors attached to their backs can detect illegal fishing boats in real time, potentially allowing such boats to be caught by authorities, a new study shows.

Over six months last winter (summer in the southern hemisphere), 170 albatrosses monitored more than 47 million square kilometres of the southern Indian Ocean. That allowed research to estimate for this first time the proportion of unreported fishing boats in that region — about one third, says the report [published this week in Proceedings of the Royal Academy of Sciences](#).

Illegal, unreported and unregulated fishing makes it challenging to estimate how much fish is actually being caught around the world and to manage fish stocks sustainably.

That kind of fishing also poses a threat to "bycatch" — other animals unintentionally killed in the process — such as albatrosses, whose populations are declining and some of which are endangered.

"The main reason is long-line fishing," said Henri Weimerskirch, a conservation biologist at the Centre d'Etudes Biologiques de Chizé, Centre national de la recherche scientifique in France, who led the study.



A wandering albatross equipped flies off the coast of the Kerguelen Islands in the Southern Indian Ocean. Adult albatrosses are attracted to fishing boats, and the logger detects the radar used by ships to avoid obstacles. (C. Matheron/TAAF)

The birds, which are known to be attracted to fishing boats, prey on small fish and squid that are used as bait on hundreds or thousands of hooks dragged behind the boats in lines that are up to 100 kilometres long. When the birds take the bait from a hook, they often swallow the hook, get pulled under the water and drown.

Weimerskirch says regulated fisheries are required to take measures to prevent that from happening, such as:

- Setting lines at night.
- Weighting them to keep them below the surface.
- Using devices to scare off the birds.

"But of course this is not used at all by illegal fishing boats," he added, noting that the measures are complex and costly.

Might also save albatrosses

Weimerskirsch had been studying how to better conserve albatrosses, and was particularly interested in figuring out why young albatrosses in particular have such a high mortality rate. He wondered if fishing boats played a major role.

He and his team developed tiny loggers, each device a little heavier than a golf ball, with a GPS to measure the bird's location and a radar detector that can detect a ship's radar at a distance of up to five kilometres.



This tagged juvenile wandering albatross is ready to fledge. The study found that juvenile birds were less attracted to ships, and therefore their high mortality was likely due to not finding enough food. (Adrien Pajot)

The loggers were attached to the backs of two species of albatross captured at breeding colonies in the Crozet, Kerguelen, and Amsterdam islands in the Southern Indian Ocean:

- Wandering albatrosses, which are listed as vulnerable on the IUCN red list.
- Amsterdam albatrosses, which are listed as endangered.

Between November 2018 and May 2019, the birds logged more than 600,000 GPS locations and made more than 5,000 radar detections from 353 different boats.

The data showed that in fact, juvenile albatrosses tend to avoid boats, and only become attracted to them as they mature. Weimerskirch and his colleagues concluded that their high mortality rate was probably caused by not finding enough food.

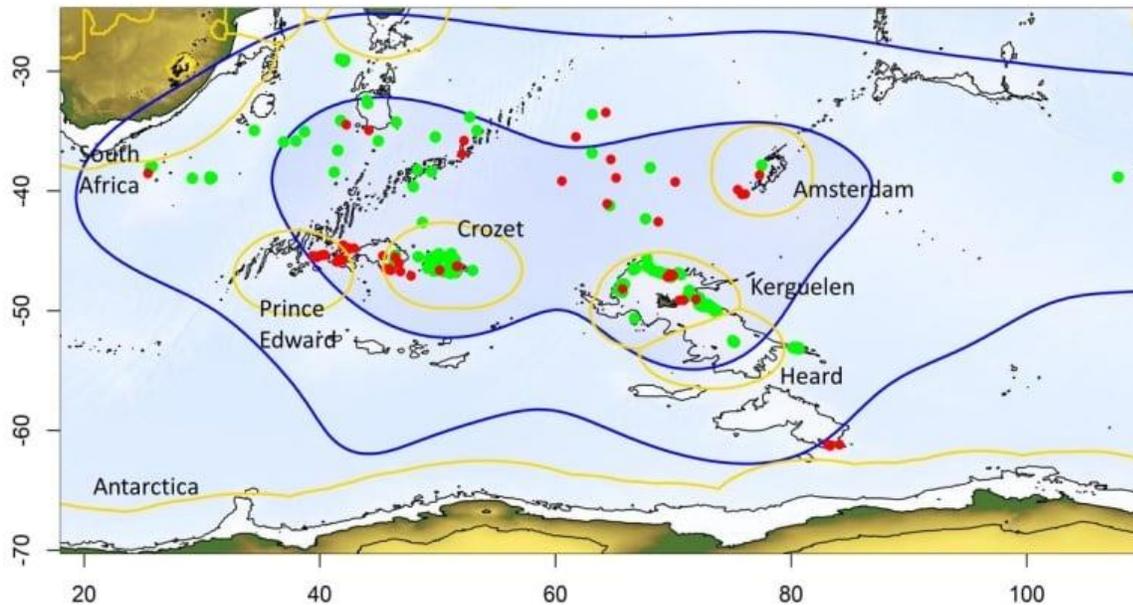
But the data also showed something interesting that raised new research questions.

Detect illegal fishing?

Registered fishing boats broadcast their location and can be tracked via satellite using [Vessel Monitoring Systems](#) or via radio signals using [Automatic Identification Systems](#), which can also be detected from space. The latter is required on all boats above a certain tonnage, but can be switched off.

By comparing the birds' radar signal detections with AIS signals, the researchers noticed that some boats had no AIS signal — suggesting that they might be fishing illegally.

That gave the researchers a new idea. Could this technique be used to get information about illegal or unreported fishing?



This map shows the foraging zone of Ocean sentinel albatrosses (blue line). The green dots mark the location of declared vessels, while the red dots represent unregistered vessels (red dots). The yellow lines mark the boundaries of national Exclusive Economic Zones managed by individual countries. Outside the yellow lines, ships are in international waters. (Weimerskirch et al./PNAS)

The team, which also includes researchers from New Zealand and the UK, managed to get funding through the European Research Council to test the technique through a program called Ocean Sentinel.

What they found was that more than one third of boats in international waters had no AIS signal.

The proportion of boats without an AIS signal was lower in national Exclusive Economic Zones, where fishing regulations are enforced by a particular country.

In such areas, all boats should have their AIS on, Weimerskirch said, and detecting the location of boats without such signals can be used by countries to locate illegal boats.

That could help crack down on illegal fishing and reduce albatross mortality near their nesting grounds, which are on land.

- [World's oldest known wild bird has a new baby at 68](#)
- [DFO will soon use satellites to fight illegal fishing worldwide](#)

In international waters farther from, it's not yet compulsory to turn on the AIS system, Weimerskirch said, but efforts are underway to make that a requirement. In such areas, the data may be useful for giving authorities a better estimate of unreported fishing vessels and their location, he added, but enforcement of regulations is up to the Regional Fisheries Management Organizations, and is complicated.

What if birds get shot at?

Daniel Pauly is a biologist at the University of British Columbia who has [estimated the impact of unreported fishing around the world](#) and studied [decline of seabirds since the 1950s](#), but was not involved in the new study.

He called the research and its findings "neat."

"Technically, I think it's beautiful," he said. "This is a very good thing and it's an additional tool for the detection of illegal fishing."

But he was concerned that once illegal fishing operations hear about the study, they might start to target the birds.

"Pirates do horrible things," he said, noting that illegal fishing operations have been known for engaging in slavery and other human rights violations. "Killing birds would be easy for them."



More albatrosses have now been tagged in New Zealand and the South Georgia islands. (Julien Collet)

Weimerskirsch acknowledged the possibility in areas where the sea is relatively calm and where birds might approach close enough for the logger to be seen.

"Indeed, people if they want to use this kind of system, they should be careful," he said.

- **[Ships are illegally dumping plastic trash at sea, study suggests](#)**
- **[Ocean fish catches 50% higher than reported, study suggests](#)**

He thinks there is little risk to the birds in the Southern Ocean, where the sea is very rough, where there are thousands of birds circling around boats, and where most albatrosses do not come closer to ships than about half a kilometre.

The researchers also tried to paint the loggers the same colour as the birds' feathers.

Weimerskirsch said radar loggers are now being tested in New Zealand and in the British South Georgia Islands in the South Atlantic to see how big a role fishing plays in the decline of other albatross populations.

Link: <https://www.cbc.ca/news/technology/albatrosses-illegal-fishing-1.5443154>