

Global Fishing Watch

Transparency & technology to support sustainable fisheries management

Leah Buckley
Fisheries Management Innovation Group
5 October 2023



Who are we?

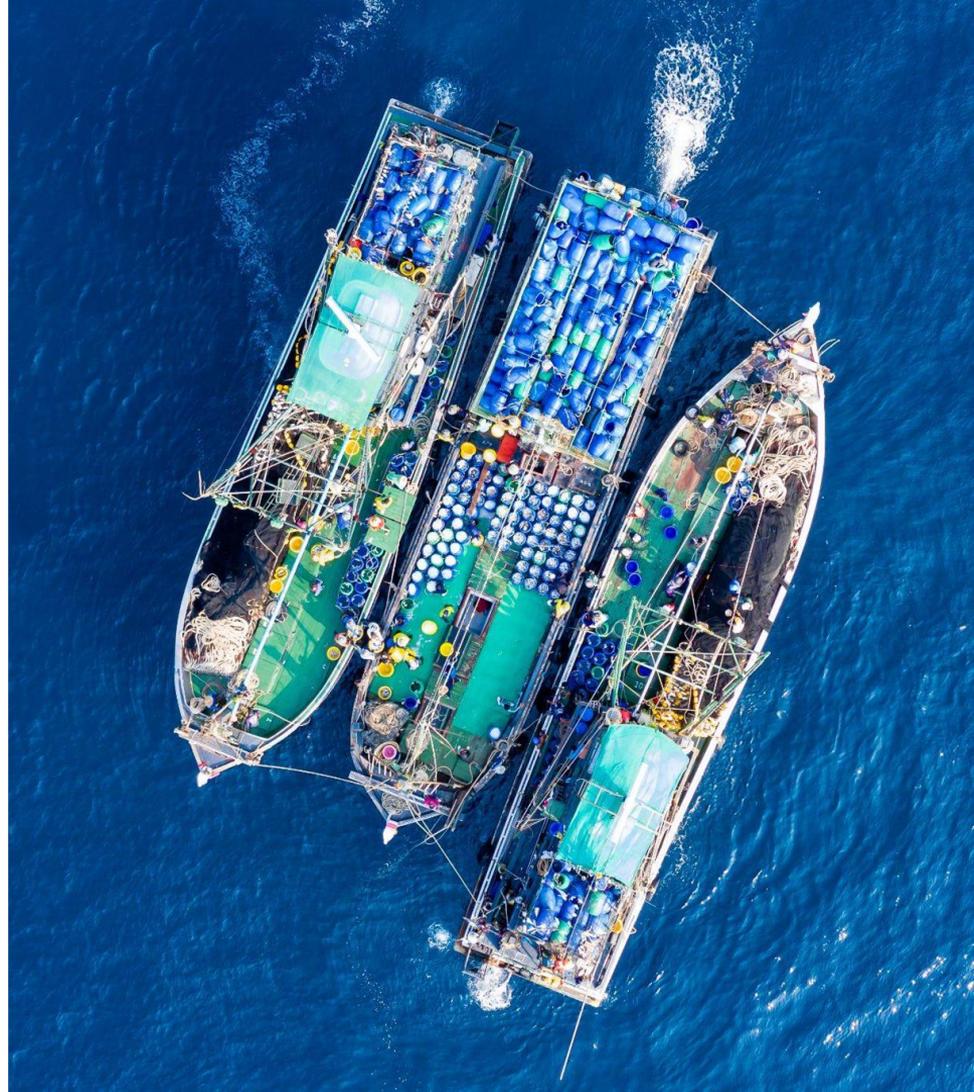
Global Fishing Watch

An international NGO using satellite technology, machine learning and data visualization to build an accurate picture of human activity at sea through free and open data and tools.

Our work supports greater transparency, novel scientific research, sustainable use of our ocean, and reduction of Illegal, Unregulated and Unreported (IUU) fishing.

75+ GFW Staff in 20+ Countries

88K Users in 200+ Countries



Our data



Vessel activity

Fishing effort, ports and voyages and transshipment identified from AIS/VMS data by GFW algorithms



Vessel identity

Comprehensive vessel information (MMSI, flag, gear type, length, authorizations, etc.) for all vessels listed on public vessel registries



Vessel insights

Potential risks such as IUU blacklisting, forced labour, incursions into MPAs, potentially unauthorized events.



Vessel detection

AKA dark targets. Detection of vessels not broadcasting AIS or VMS through use of satellite imagery

Transparency

ACTIVITY **FISHING** PRESENCE +

● Apparent fishing effort

Apparent fishing effort ▾ i 🗕

SOURCE

AIS

hours / 32,000 km²



VESSELS 🔍

Search for vessels or add them from the map.

EVENTS

● Encounter Events for Carriers-Fi...

ENVIRONMENT +

● Sea surface temperature

● Salinity

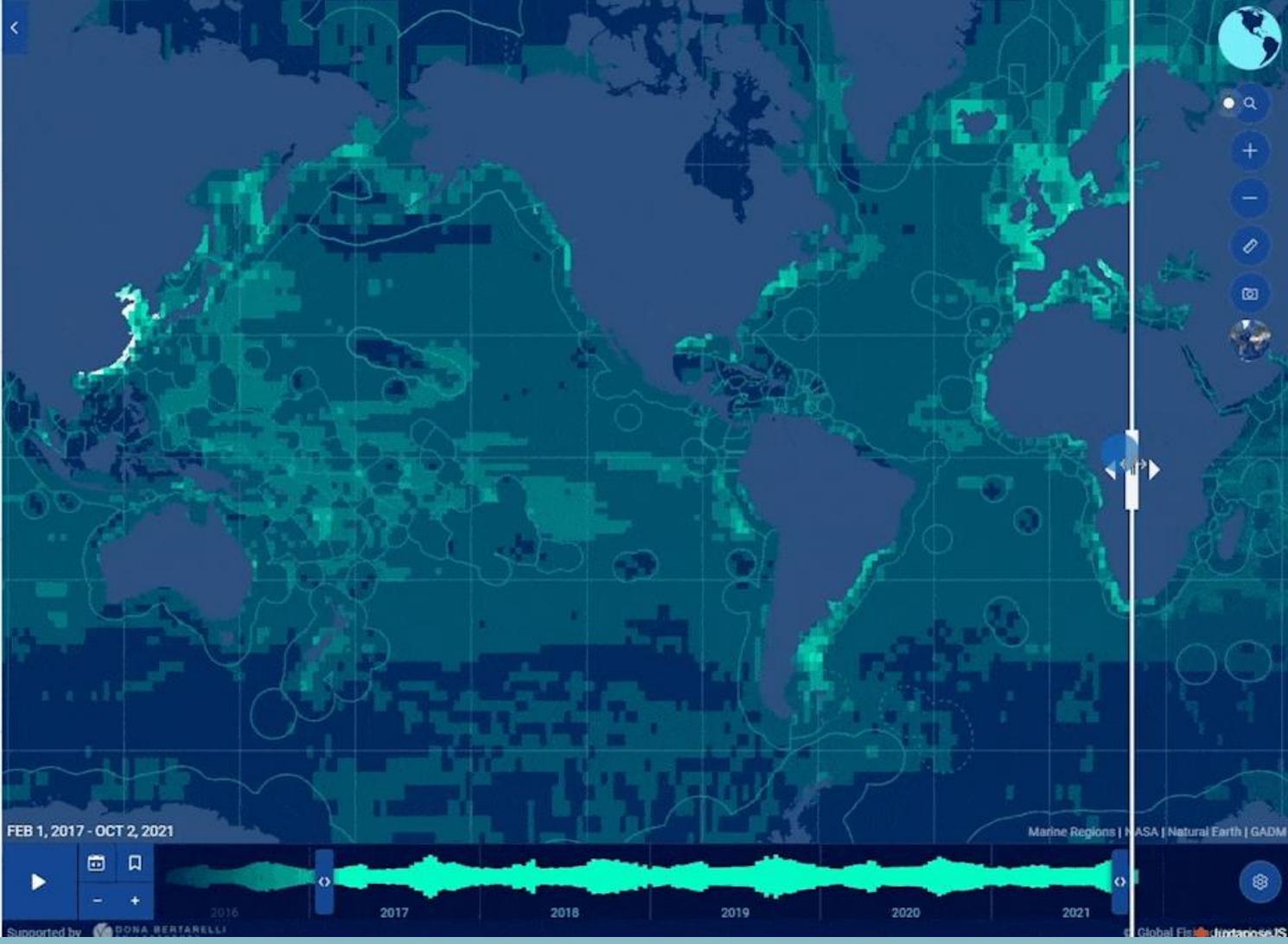
● Chlorophyll-a concentration

REFERENCE LAYERS 🗕 +

EEZs (Source: Marine Regio... i 🗕

● MPAs (Source: WDPA)

● RFMOs



Marine Manager



Human Activity Data

AIS Fishing, VMS Fishing, Fishing vessel night lights (VIIRS), Shipping, Dark vessels, Seismic Resource Testing, Underwater Noise, Mining...



Oceanographic Data

Sea Surface Temperature, Salinity, Bathymetry, Currents...



Biological Data

Net Primary Productivity (Chlorophyll a), Migratory Patterns, Habitat Suitability, Animal Telemetry (upload capability)...

Vessel Viewer

- *Who they are*
- *Where they've been*
- *What they're doing*

Complemented with

- Known authorizations
- Insights
- Fleet analysis

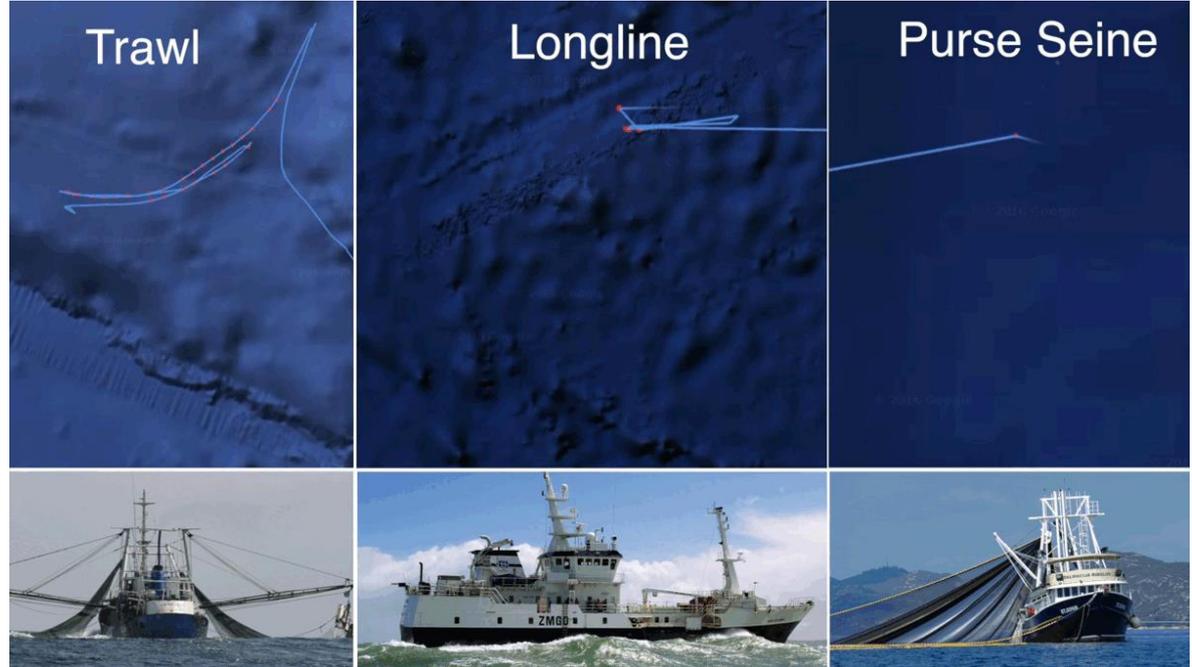


Detecting fishing effort

GFW identifies *apparent* fishing activity in the AIS data based on vessel movement by combining two convolutional neural network models.

Models:

- Vessel classification
- Fishing detection



Detecting vessel presence

All vessels present
on AIS



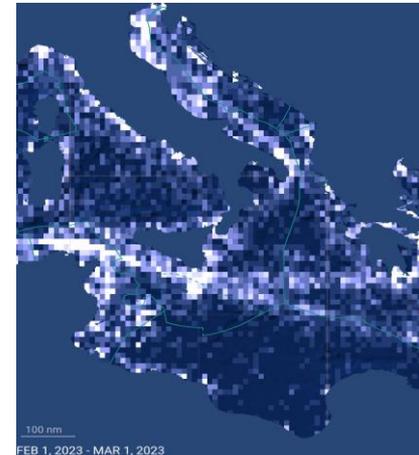
AIS / VMS based
fishing effort



VIIRS boat
detections

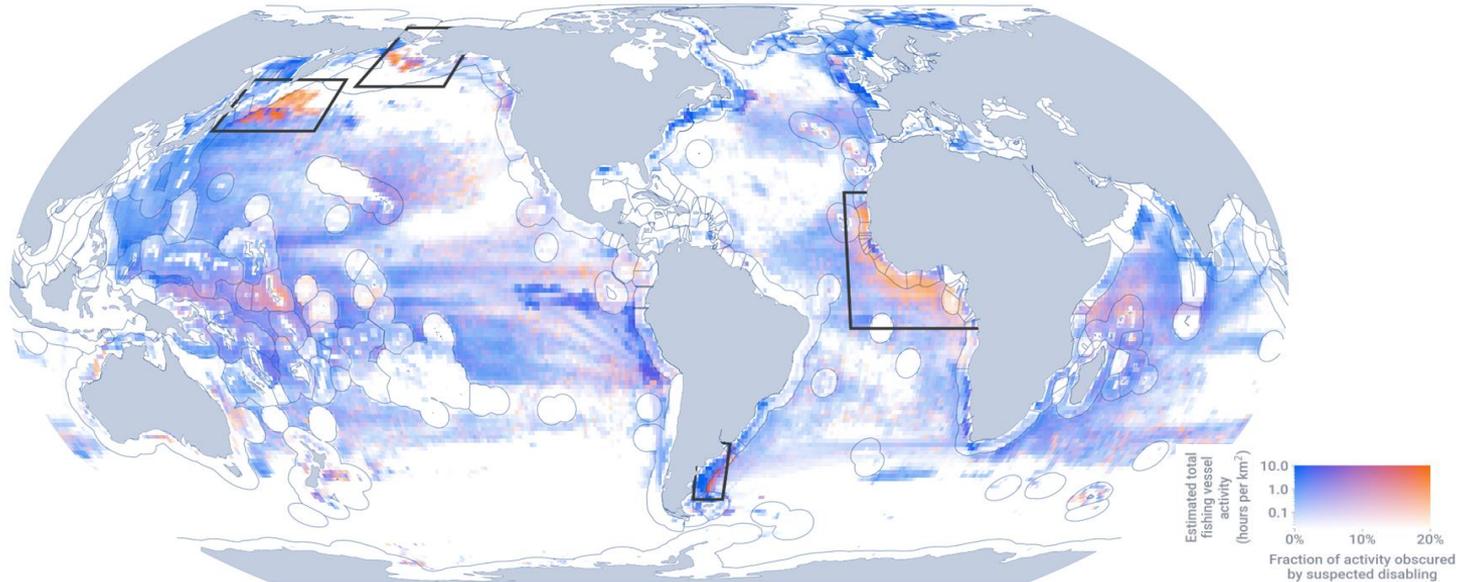


Synthetic Aperture
Radar (SAR)



Hotspots of unseen fishing vessels

Heather Welch, Tyler Clavelle, Timothy D. White, Megan A. Cimino, Jennifer Van Osdel, Timothy Hochberg, David Kroodsma, Elliott L. Hazen. *Science Advances* 8.44 (2022): eabq2109.



Case study: Tristan da Cunha

British overseas territory // Population >200 //
World's most remote inhabited island // 90% of
EEZ protected

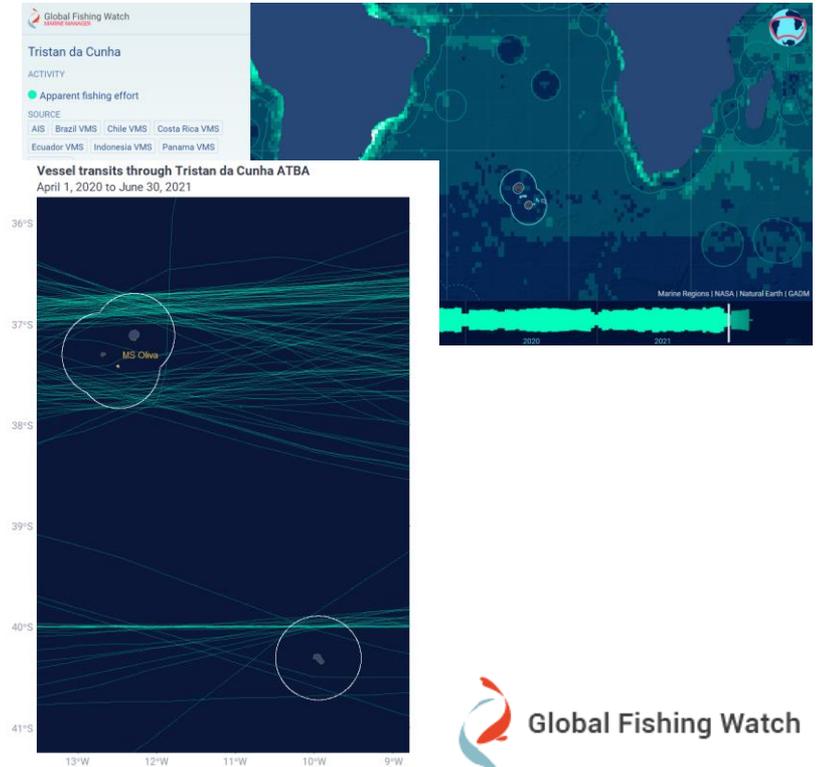
Identified cargo vessels not complying with Areas to be Avoided close to the islands

Provided information to UK Marine Management Organisation in support of Blue Belt

Characterised high-seas longline activity with a high risk of bycatch for Tristan albatross

Estimated long-term trends of longline activity and sea surface temperature

Monitored potential IUU activity



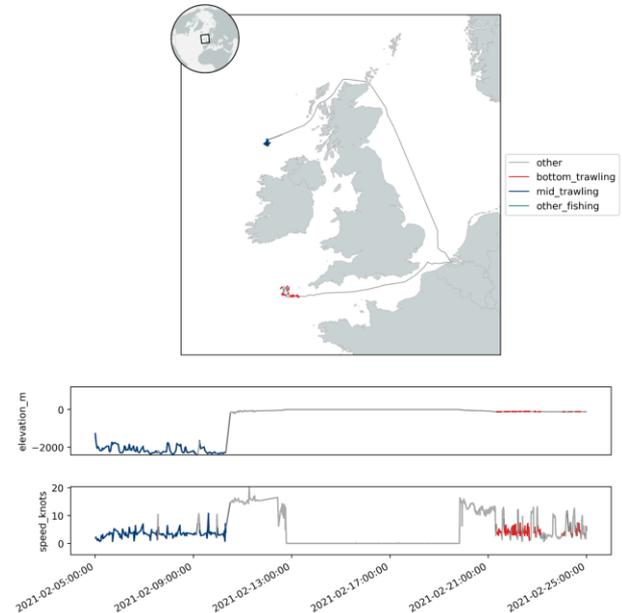
Emerging research: Estimating the footprint of bottom trawling globally

Collaboration between GFW and Woods Hole Oceanographic institution (WHOI)

Aim: Better estimate trawling activities

Developing a *trawler-specific* fishing model to differentiate bottom and midwater fishing.

Training data composed of logbook data from Norway, and the Adriatic and supplemented with data from other regions labeled by WHOI and GFW.



Thank you

For more information contact:

Leah Buckley

leah.buckley@globalfishingwatch.org

Global Fishing Watch is an international nonprofit organization dedicated to advancing ocean governance through increased transparency of human activity at sea. By creating and publicly sharing map visualizations, data and analysis tools, we aim to enable scientific research and transform the way our ocean is managed. We believe human activity at sea should be public knowledge in order to safeguard the global ocean for the common good of all.

Discover more at globalfishingwatch.org

