POLICY BRIEF

Satellite tracking to monitor area-based management tools & identify governance gaps in fisheries beyond national jurisdiction

Caroline Jablonicky, Doug McCauley, David Kroodsma, Kristina Boerder, & Daniel Dunn

A new source of publically accessible data on fishing vessel activity is providing unprecedented insight into the scope of fishing in areas beyond national jurisdiction (ABNJ) and governance gaps therein. This emerging source of ocean 'big data' can help quantify who is fishing where in ABNJ, can enhance cooperation between competent authorities, and can help States and competent organizations implement policies and management measures related to the conservation and sustainable use of biodiversity beyond national jurisdiction. These data can also empower States to make more informed decisions regarding the development of new governance structures for ABNJ by identifying governance gaps that should be addressed in any new international legally binding instrument.

What is AIS?
The data in question from the high seas is derived from the Automatic Identification System (AIS). Use of AIS was originally adopted by the International Maritime Organization (IMO) to prevent vessel collisions at sea and requires certain vessels to carry transponders that constantly transmit information on the vessel's location, speed, course and other identifiers. Increasing coverage of satellites equipped with AIS receivers will soon make it possible to continuously monitor vessels on all parts of the high seas. Researchers have developed behavioral classification models that can help discern fishing effort by gear type in these data and other vessel activities.

How is this data useful to the BBNJ Prep Com process?
There are many applications of AIS that can inform the ongoing negotiations. Here, we present three examples: 1) monitoring large and remote MPAs, 2) identifying gaps in governance of ABNJ and 3) highlighting opportunities for data sharing that require strong coordination among competent authorities in ABNJ.
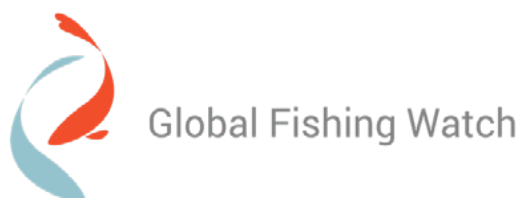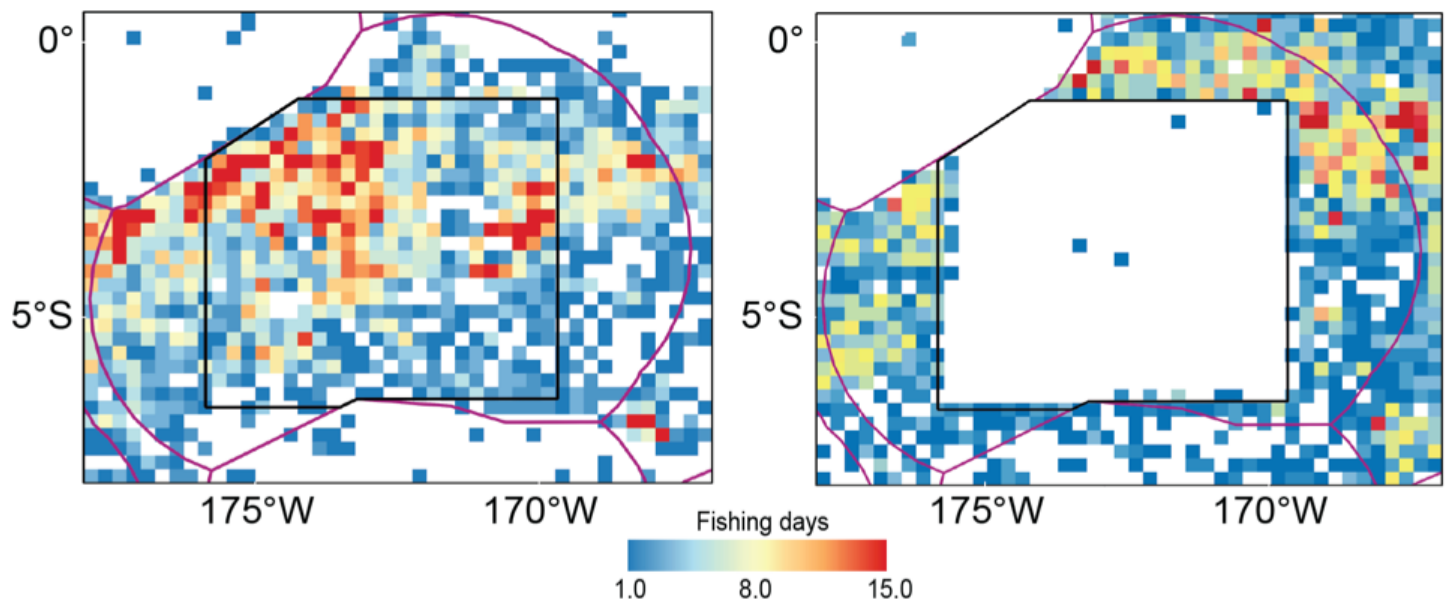
Figure 1.

Monitoring Large Marine Protected Areas

We demonstrated the utility of AIS to monitor large and remote MPAs by tracking fishing activity inside the Phoenix Island Protected Area (PIPA) before and after it was closed by the government of Kiribati to all fishing on 1 January 2015. PIPA is a California-sized MPA that protects approximately 410,000 km2 of ocean. Our data review showed substantial fishing activity before closure, and a sharp drop at closure (Fig. 1). Six months of post-closure monitoring revealed only one case of fishing activity in PIPA, and this vessel was interdicted and fined by the Republic of Kiribati. Some of the vessels fishing in PIPA prior to closure transited to other open areas of the Republic of Kiribati to fish after the closure.

Not only does AIS data allow us to monitor these MPAs but it helps us measure the value of these very large MPAs to ABNJ stakeholders. For example, another study examined fishing effort around the Galapagos Marine Reserve, a large MPA covering 133,000 km2, using AIS data. Over a time span of nearly five years it was possible to document an attraction of fishing effort to the reserve boundaries, indicating potential benefits of the MPA for adjacent fisheries.

Regional & Thematic Gaps in Governance of Fishing on the High Seas

To make informed decisions regarding the form and scope of a new international agreement on the conservation and sustainable use of biodiversity beyond national jurisdiction it is important that Parties have a full understanding of the gaps in current governance of ABNJ. AIS data provides evidence that there is considerable fishing activity that occurs outside of the jurisdictional boundaries of existing regional fisheries management organizations (RFMOs) or on target species that are not managed by any competent organization. For example, we used behavioral analyses of AIS data to identify a deep sea trawler fishing in ABNJ on Argentina's continental shelf claim area in a region that lacks any competent management authority for deep sea fishing (Fig. 2a). Analysis of AIS data also uncovered thematic gaps where fishermen are targeting species that are not managed under the competent authorities in the region. For example, six vessels were identified as fishing for squid just outside of the Argentinian Exclusive Economic Zone in an area that has no management for the species under the existing regional organizations (Fig. 2b). Geographic and thematic gaps in governance of fishing in areas beyond national jurisdic-

Figure 2a and 2b.
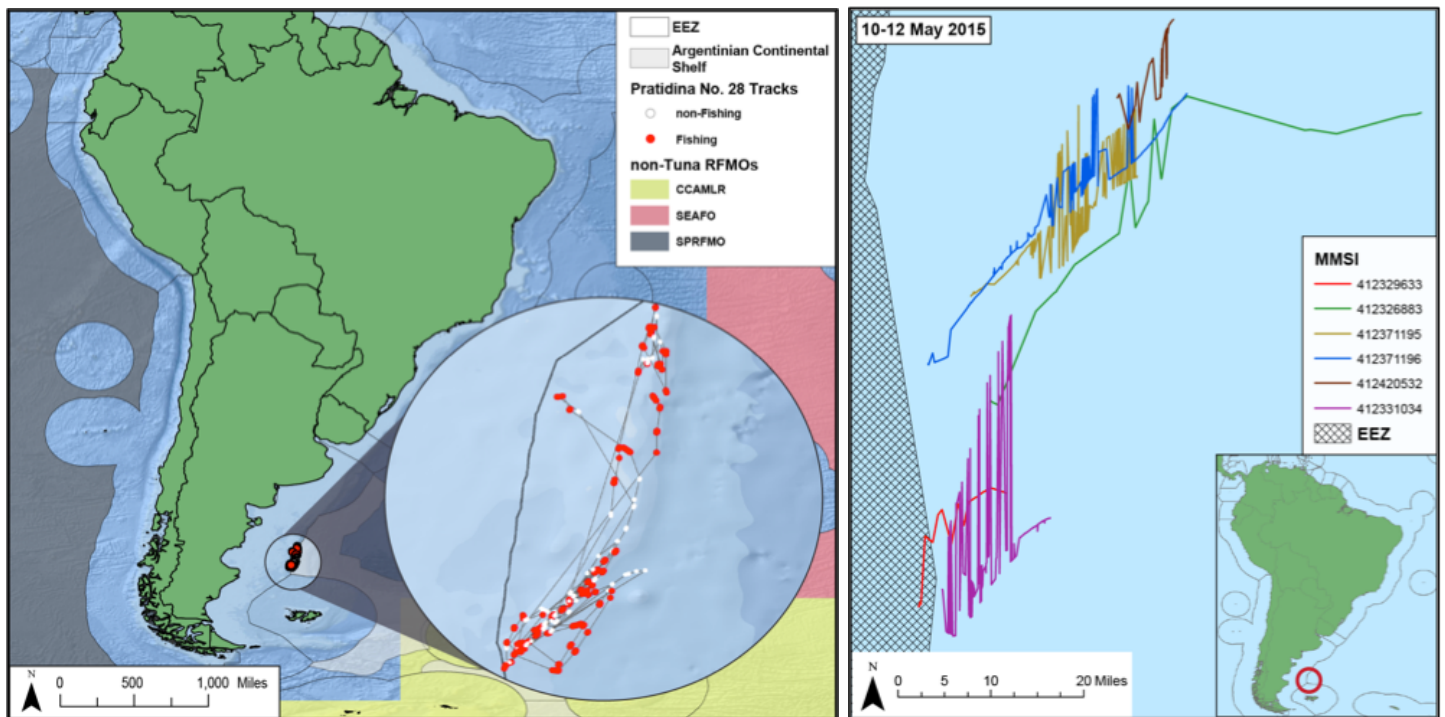
The exclusive economic zone displayed in these maps is from the VLIZ Maritime boundaries geodatabase (World Exclusive Economic Zones Boundaries, version 8, 2014; www.marineregions.org) and the Argentinian Extended Continental Shelf Claim was downloaded from the UN Continental Shelf Programme's Extended continental shelf geodatabase (Argentine Republic submission, 2009; www.continentalshelf.org).

tion, such as the ones identified here through the use of AIS data, present an obstacle to conservation and sustainable use of ABNJ.

Multi-RFMO Interactions
Although regional fisheries bodies have boundaries that divide up ocean basins, the resources and fisheries they govern rarely constrain themselves to those boundaries. The movement of resources and resource users between RFMO boundaries presents a challenge to regional sectoral governance, and limits our ability to develop an integrated global understanding of how fishing effort is impacting biodiversity in ABNJ. The AIS dataset allows us insight into how vessels travel and fish between RFMOs and can identify the ports they visit in between. We illustrate here the activity of a longliner that visited 4 RFMOs and 5 ports from January 2015 - Mar 2016 (Fig. 3). Governance of

this type of cross-RFMO fishing requires very high levels of cooperation between the competent authorities and may necessitate the development of minimum standards across RFMOs. AIS provides a common platform for sharing information between RFMOs that can improve both regional and global goals for the conservation and sustainable use of biodiversity in ABNJ.

Global Fishing Watch & Technology Transfer
Global Fishing Watch (GFW) is a technology partnership between Skytruth, Oceana and Google focused on thoughtfully using AIS data to increase transparency of fishing activity worldwide. GFW has partnered with academic researchers to develop new tools for understanding patterns in AIS data and making them more accessible to decision makers. Core data on global fishing effort

Figure 3.
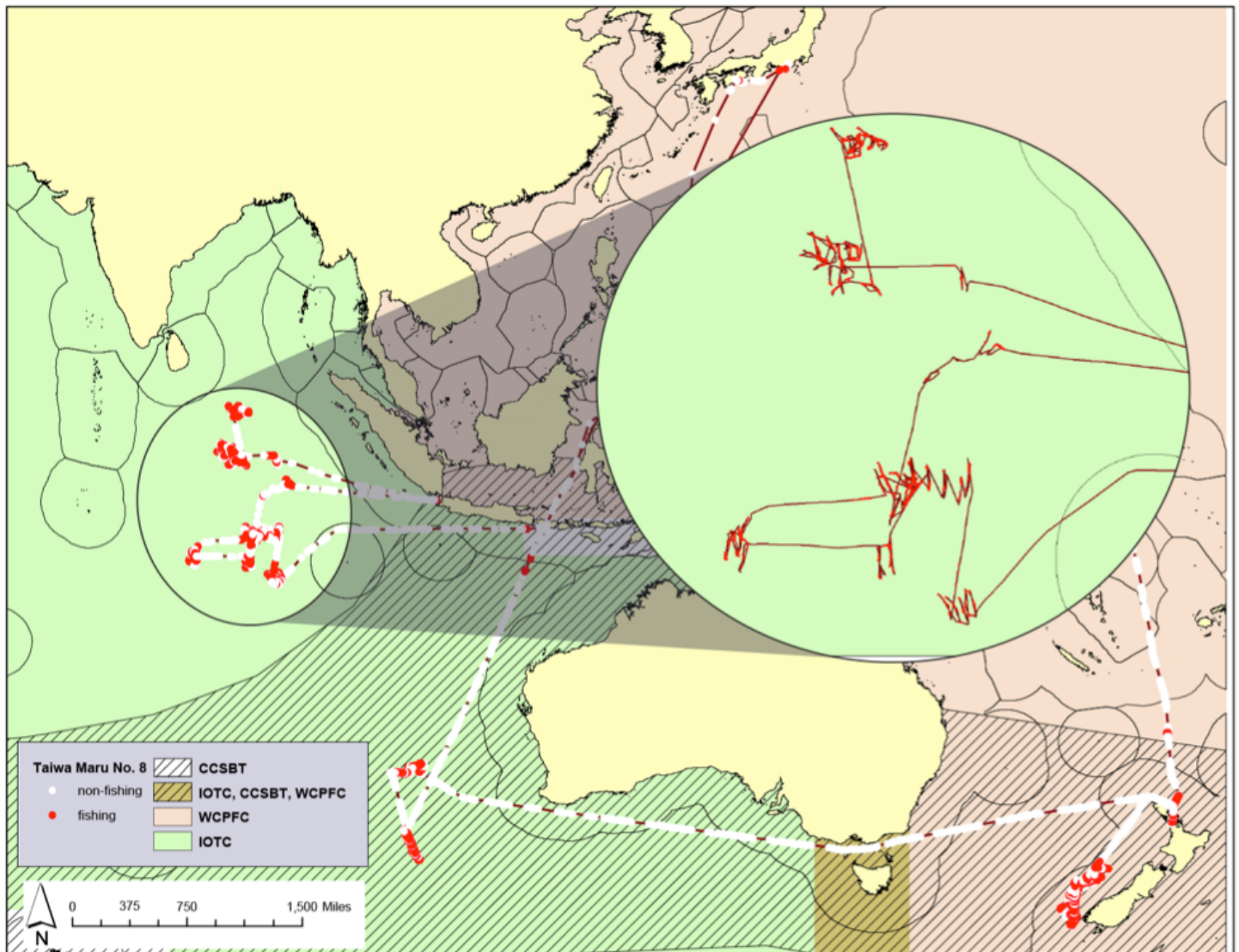
will be made available for the public via an interactive webtool to be released in Sept 2016. This represents a significant form of technology transfer by providing all Parties with direct access to easily interpreted information on the distribution of fishing effort in their (or any) region. The development of this tool illustrates the important role civil society can play in facilitating technology transfer and meeting basic duties that stem back to the Law of the Sea.