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Electronic Tracking of Fish Aggregating Devices

Monitoring a frequently-used tuna fishing gear

The problem

Today's purse seine fisheries for tropical tuna rely heavily on fish aggregating devices (FADs) to support record-high catch levels. An estimated 100,000 of these drifting, floating objects are deployed annually in the oceans. Tuna and other species gather beneath the FADs, which are generally built out of rafts, synthetic ropes, and plastic webbing that descends as far as 100 meters below the water's surface.[1]

Purse seine fishing vessels catch tuna by encircling them in large nets and hauling them on board. The FADs help fishermen attract and locate tuna schools, but they also ensnare other species, such as vulnerable sharks, juvenile tunas, and sea turtles, that gather around the floating devices. The high numbers of these drifting rafts in use have been shown to affect migration patterns of tuna.[2] The proliferation of these artificial objects has added to the growth in marine litter in our oceans and has contributed significantly to the dramatic decline of Pacific bigeye tuna populations. Still, despite the ecological consequences of unmanaged FAD use, no management or monitoring systems effectively regulate this gear that is used to catch almost half of the world's tuna.

The solution

There is growing consensus among scientists, fishery managers, fishermen, and conservationists that FAD fisheries must be better managed. At an international symposium in 2011, scientists and managers endorsed a number of improvements.[3] They called on:

- Fishing vessels to share basic technical data on the number of drifting FADs deployed and actively monitored by vessels and companies, and the movement and range of the devices throughout an ocean area.
- Fishery managers to develop management plans to record the number and status (i.e., lost, stolen, or retrieved) of deployed FADs and to outline identification procedures to clarify ownership of and responsibility for lost or abandoned gear.

One way to accurately and efficiently collect the information needed to develop a successful management plan is to use existing satellite technology. Fishing vessels deploy FADs equipped with satellite buoys that allow captains to locate these objects at any given moment. Fishery managers can tap into that network instead of creating a costly new tracking program.

The benefits

An electronic tracking system offers significant benefits to fishery managers. They include:

- **Daily location data.** Electronic reporting can provide near-real-time data on the location of FADs so that states can develop limits on deployment of the devices and suspend fishing without delay once fishermen reach a set threshold.
- **Improved quantity of scientific data.** Oceanographic data collected and transmitted electronically from the FAD buoys such as water temperature, current, and the number of fish swimming below the floats—even their species and sizes—would provide valuable information to evaluate the potential impact of the devices on tuna species and the broader ecosystem.
- **Reliability and security of data.** By relaying the data without human intervention, the electronic system provides greater assurances of data reliability and security than a relatively inefficient paper-based system.
- **Reduced marine litter.** Fishery managers can identify the owners of FADs that are abandoned on the high seas or in nations' exclusive economic zones. If such devices wash up on reefs or other coastal habitats, managers are able to determine ownership to aid in recovery and assigning cleanup costs. That capacity would create a strong incentive for fishermen to retrieve all FADs.

The project

The Pew Charitable Trusts is working closely with eight Pacific island countries, collectively called the Parties to the Nauru Agreement (PNA), to develop a system that tracks FADs, with the goal of fostering better management throughout the region. About 50 percent of the global skipjack tuna catch comes from the waters of the PNA countries in the western central Pacific Ocean. For the PNA to effectively manage, monitor, and verify fishing activities, managers need to know how many FADs are in their waters, where they are, and who owns them.

Phase 1

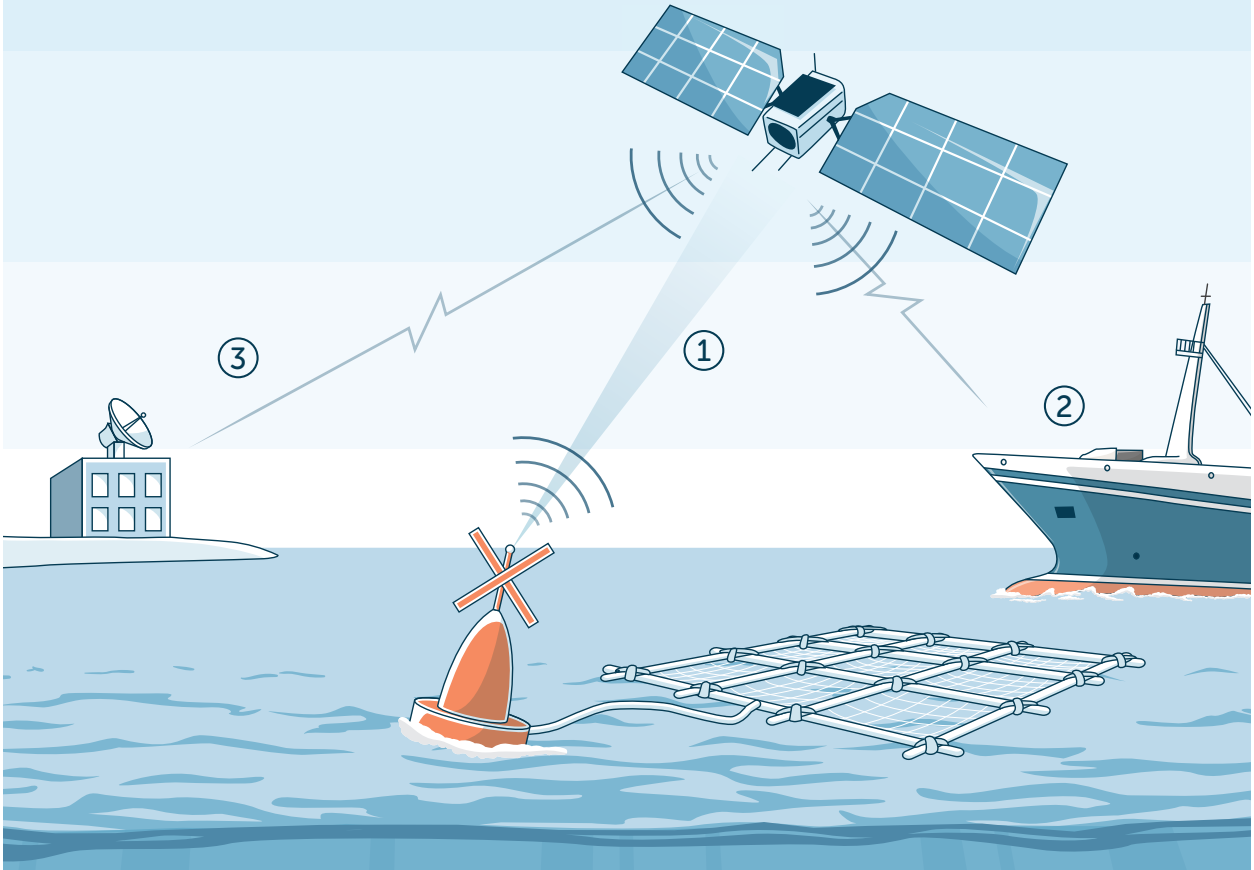
In 2012, Pew and the PNA Office launched a trial that successfully tracked FADs in PNA waters using technology already employed by fishing vessels. All major brands of satellite buoys attached to FADs can be tracked at no additional cost to fishermen by simply requiring owners (vessels or companies) to authorize dual reporting.

The project also developed the Fisheries Management Information System adopted by the PNA so FADs could be tracked as an integrated component of the system currently used to manage the fishery.

Phase 2

In early 2014, Pew and the Gordon and Betty Moore Foundation funded efforts to scale up the FAD tracking system so it could track the tens of thousands of objects drifting throughout the PNA's waters and monitor each time a fishing vessel sets its net on one. This system will allow fisheries managers and scientists to monitor FAD use in near real time. It will also expand management options and provide an incentive for fishing vessels to collect FADs in order to avoid paying clean-up costs. Once the system is fully operational, the PNA will oversee the first tuna fishery in the world to record data on all of the FADs in its waters. That undertaking will create opportunities for scientists; improve monitoring, control, and surveillance; and increase accountability.

How Fish Aggregating Device Tracking Works



1. FAD buoys transmit messages to a satellite.
2. The satellite signals the FAD's owner so it knows where to send fishing boats.
3. Simultaneously, the satellite can signal the Parties to the Nauru Agreement's database and be shared with scientists to improve understanding and management of the fishery.

The future

Electronic tracking is the future of managing fish aggregating devices. Ultimately this project will improve oversight of the world's most widely used gear for tuna fishing in regions beyond the western and central Pacific. As the market continues to demand responsible fishing practices, electronic tracking has the ability to add another level of transparency to the tuna supply chain.

Endnotes

1 European Parliament Committee on Fisheries, "The Use of FADs in Tuna Fisheries" (2014), http://www.europarl.europa.eu/RegData/etudes/note/join/2014/514002/IPOL-PECH_NT(2014)514002_EN.pdf and The Pew Charitable Trusts, "Estimating the Use of Drifting Fish Aggregating Devices (FADs) Around the Globe" (2012), http://www.pewtrusts.org/en/research-and-analysis/reports/2012/11/30/estimating-the-use-of-drifting-fish-aggregating-devices-fads-around-the-globe.

2 X. Wang et al., "The Large-scale Deployment of Fish Aggregation Devices Alters Environmentally-based Migratory Behavior of Skipjack Tuna in the Western Pacific Ocean," PLOS ONE 9, no. 5 (2014): e98226, doi:10.1371/journal.pone.0098226.

3 Secretariat of the Pacific Community "Artisanal and Industrial FADs: A Question of Scale—Tahiti Conference Reviews Current FAD Use and Technology," *SPC Fisheries Newsletter* 136 (September/December 2011), http://fads2011.sciencesconf.org/conference/fads2011/pages/SPC_Fish_Newsletter_2012.pdf.

For further information, please visit:

pewtrusts.org/en/projects/global-tuna-conservation

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