

SUMMARY OF THE FIRST INTERNATIONAL WORKSHOP ON FAD RETRIEVAL: May 8–10, 2024, Galápagos, Ecuador



© ISSF (2024)

Photo: Gala Moreno

Gala Moreno, Guillermo Morán, Pablo Guerrero & Lauriane Escalle /
August 2025

Suggested citation:

G. Moreno, G. Morán, P. Guerrero, and L. Escalle. 2025. Summary of the First International Workshop on FAD Retrieval: May 8–10, 2024, Galápagos, Ecuador. ISSF Technical Report 2025-10. International Seafood Sustainability Foundation, Pittsburgh, PA, USA

Topic Categories: FADs, FAD retrieval, FAD recovery programs, Marine ecosystem health, RFMOs

Abstract

The First International Workshop on the Recovery of Fish Aggregating Devices (FADs, known locally in the eastern Pacific Ocean as “plantados”) was held May 8–10, 2024, at the Charles Darwin Foundation facilities in Puerto Ayora, Galápagos, Ecuador. The workshop was organized by the Tuna Conservation Group (TUNACONS), the International Seafood Sustainability Foundation (ISSF), and WWF Ecuador. The objective of the workshop was to address the following question: **How should a FAD Recovery Program (FRP) be designed to ensure its efficiency?**

A total of 63 key stakeholders participated in the workshop, including fishers, vessel owners, manufacturers and satellite buoy service providers, fishing associations, governments, scientists, and non-governmental organizations (NGOs) from the Indian, Atlantic, and Pacific Oceans. Participants shared their knowledge and experience working with FADs as well as insights into the design of FRPs. The workshop addressed the logistical, technical, and economic aspects necessary to ensure the efficiency of such programs. Finally, participants identified the steps required to design and implement a FAD recovery program, both within the Galápagos Marine Reserve and in other parts of the world.

Author Information

G. Moreno | **International Seafood Sustainability Foundation** |
Pittsburgh, PA, EE. UU.

G. Morán | **Fundación para la Conservación de Atunes (Tunacons)** |
Guayaquil, Ecuador

P. Guerrero | **WWF-Fondo Mundial para la Naturaleza** |
Quito, Ecuador

L. Escalle | **Oceanic Fisheries Programme, The Pacific Community (SPC)** |
New Caledonia

August 2025

The research reported in the present Technical Report was funded by the International Seafood Sustainability Foundation (ISSF) and conducted independently by the author(s). The report and its results, professional opinions, and conclusions are solely the work of the author(s). There are no contractual obligations between ISSF and the author(s) that might be used to influence the report’s results, professional opinions, and conclusions.

The International Seafood Sustainability Foundation (ISSF) — a global coalition of seafood companies, fisheries experts, scientific and environmental organizations, and the vessel community — promotes science-based initiatives for long-term tuna conservation, FAD management, bycatch mitigation, marine ecosystem health, capacity management, and illegal fishing prevention. Helping global tuna fisheries meet and maintain sustainability criteria to achieve the Marine Stewardship Council certification standard is ISSF’s ultimate objective. To learn more, visit issf-foundation.org, and follow ISSF on [Facebook](#), [X](#), [Instagram](#), [YouTube](#), and [LinkedIn](#).

Learn more at issf-foundation.org.

Table of Contents

Executive Summary	4
1. INTRODUCTION	6
1.1 FAD Recovery Programs	8
1.1.1 Western Indian Ocean.....	8
1.1.2 Pacific Ocean.....	9
2. OBJECTIVES.....	14
3. RESULTS.....	15
3.1 FAD Recovery from Land	15
3.1.1 Preliminary actions prior to the implementation of a dFAD recovery program	15
3.1.2 Key Elements of a Land-Based FRP	18
3.2 FAD Recovery in Open Ocean.....	21
4. FUNDING FOR FAD RECOVERY PROGRAMS	25
5. RECOMMENDATIONS FOR TUNA RFMOS	26
6. CONCLUSION AND NEXT STEPS	27
Acknowledgments.....	27
REFERENCES	28
Appendix I: List of Workshop Participants	29
Appendix II: Visual Documentation of Workshop.....	31

Executive Summary

The First International Workshop on Fish Aggregating Device (FAD) Recovery was held May 8–10, 2024, in the Galápagos Islands, Ecuador. The event was organized by ISSF, Tunacons, and WWF Ecuador and brought together 63 participants from fishing fleets, NGOs, government representatives, buoy manufacturers, technology providers, scientists, and representatives of tuna RFMOs from the Indian, Pacific, and Atlantic Oceans.

The primary objective was to advance the design of effective FAD Recovery Programs (FRPs), both from land and at sea, considering technical, logistical, economic, regulatory, and stakeholder collaboration aspects.

Coastal FAD Recovery

Key elements highlighted included:

- The need for financial planning, inter-institutional coordination, and legal regulation. It may be necessary to collaborate with RFMOs to modify or establish regulations that enable the implementation of FRP objectives. Such joint efforts help ensure that regional frameworks effectively support recovery initiatives.
- The importance of developing operational protocols to ensure consistency and efficiency in recovery operations.
- The use of technology for real-time FAD tracking as well as tools for trajectory prediction.
- The need for research to identify critical stranding areas and to trace the origin of recovered FADs.
- The importance of developing performance indicators to evaluate FRP effectiveness alongside regular monitoring to adapt the program to evolving scenarios.
- The relevance of collaboration with other maritime stakeholders — such as maritime rescue services, recreational vessels, artisanal fishers, tourism boats, NGOs, and the navy — to support coastal recovery efforts.

During the workshop, the potential to fund pilot projects (lasting 6–12 months) was explored. These would be aimed at planning and designing new FRPs while addressing the necessary economic, logistical, and financial components.

Offshore FAD Recovery

Recovering FADs offshore, before they strand along coastlines, is equally important. The workshop addressed potential strategies for offshore recovery or, in other words, preventing FAD loss and abandonment through good practices and collaborative actions.

Several good practices were proposed to avoid loss and abandonment, including forming alliances with other vessels or fishing companies to facilitate FAD sharing. These partnerships are critical to enabling FAD transfers and recovery and to reducing abandonment rates.

Discussions also covered ways to enhance FAD traceability, which could be achieved through creating a FAD registry, maintaining active monitoring buoys without deactivation, or deploying independent tracking technology separate from the fleet's primary buoys.

Finally, the need to establish a clear definition of FAD ownership was identified.

Financing Mechanisms

Potential financing options identified included:

- Implementing the principle of extended producer responsibility (EPR), whereby manufacturers and users of a product assume responsibility for its post-consumer phase, including its management as waste
- Establishing levies for each deployed FAD to fund FRPs
- Reusing recovered FADs for alternative purposes, such as scientific research or continued fishing use

Recommendations to Tuna RFMOs

Workshop outcomes underscored the need to revise or develop new conservation measures within tuna RFMOs. Key considerations include:

- Defining FAD ownership, specifying the owner of both the structure and the buoy
- Establishing rules or procedures for ownership transfer
- Regulating deactivation or cessation of FAD monitoring to enable FAD recovery beyond the primary fishing area
- Exempting FADs that have left the fishing grounds from active FAD limits, recognizing that they may be active but non-operational
- Designing a FAD registry to effectively account for deployed, lost/abandoned, and recovered FADs
- Developing marking criteria not only for tracking buoys but also for the FAD structures themselves
- Exploring potential funding sources to support FRPs

1. INTRODUCTION

Drifting Fish Aggregating Devices (dFADs) used in tropical tuna fisheries represent a widely adopted fishing strategy across the three tropical oceans. These devices, designed to aggregate tuna, consist of floating structures primarily made from materials such as ropes, cloth, and bamboo (Escalle et al., 2023; Itano, 2007). FADs include a submerged component that, on average, can extend to depths of 50 meters (Figure 1).

Purse seine vessels deploy (or "seed") FADs in strategic areas, allowing them to drift through productive waters and aggregate tuna. Each FAD is equipped with a satellite linked buoy that includes an echosounder to remotely monitor tuna aggregations beneath the device (Lopez et al., 2014). This data is transmitted via satellite to fishers, who use it to assess the optimal time to visit the FAD and conduct a fishing operation.

The time a FAD drifts unattended, between its deployment and the vessel's visit, can range from weeks to months, depending on oceanographic conditions, fishing strategy, and the behavior and presence of target species.



Figure 1. FAD stranded in Palmyra atoll. Photo: Kydd Pollock

Globally, it is estimated that approximately 100,000 drifting Fish Aggregating Devices (FADs) are deployed annually in tropical oceans (Gershman, 2015). This widespread use presents major challenges in terms of management and monitoring, and has raised concerns about potential negative impacts on target species, non-target species, and marine ecosystems (Pons et al., 2023).

Although fishers deploy FADs in specific zones intending for them to drift through productive waters and aggregate tuna, their trajectories are difficult to predict, resulting in many devices being lost or abandoned. This may occur when FADs drift outside the fishing range of the vessel, sink, or are appropriated by other vessels before recovery. There is growing global concern about the environmental impact of lost or abandoned FADs on benthic, pelagic, and coastal ecosystems.

Recent data from the Western and Central Pacific Fisheries Commission (WCPFC) indicate that 11.3% of deployed FADs eventually become stranded, 6% are recovered, and the fate of the remaining 82% is unknown (Escalle et al., 2023). This high level of uncertainty is largely due to the deactivation of the geolocating buoy once a FAD drifts beyond the fishing range or outside the vessel's operational area, resulting in the loss of all communication with the device.

The Inter-American Tropical Tuna Commission (IATTC) does not currently provide precise estimates on FAD strandings. However, Figure 2 illustrates a marked increase in FAD deployments over the past two decades, while recovery rates have remained consistently low over time (López et al., 2025).

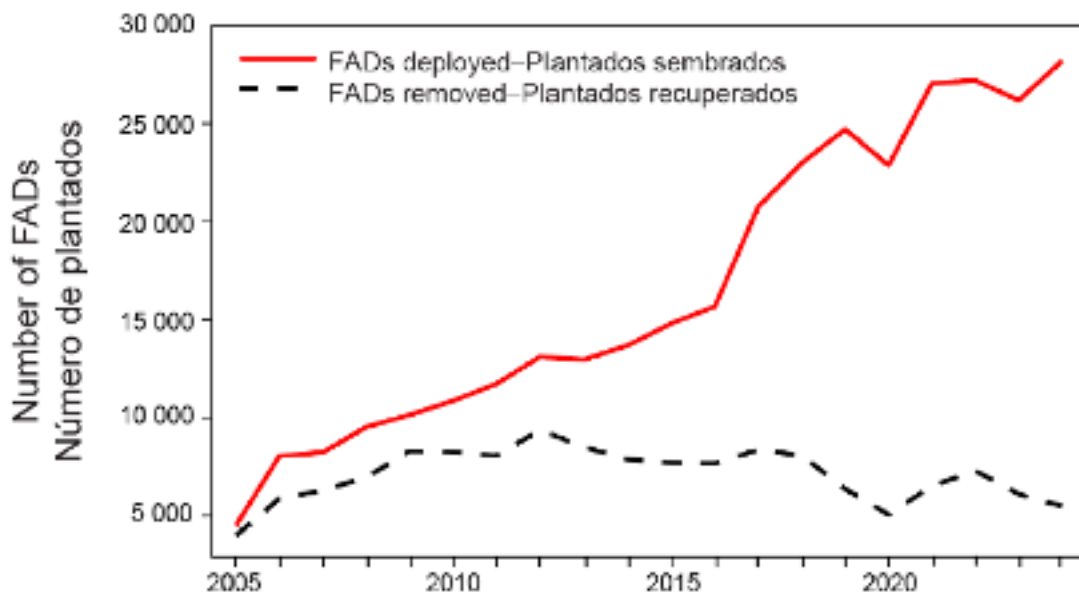


Figure 2. Deployed FADs and retrieved FADs in the EPO (Lopez et al., 2025)

Over the past two decades, fishers, scientists, managers, and NGOs have implemented — or are in the process of implementing — various initiatives to minimize the impact of FADs (Table 1). Tuna Regional Fisheries Management Organizations (RFMOs) have established limits on the number of active FADs at sea, including — in the case of the tuna RFMOs in the Pacific — criteria for buoy activation and deactivation (Table 1).

To mitigate entanglement of marine fauna in FAD structures, non-entangling FADs have been developed without netting (ISSF, 2019). In the past decade, research and trials have focused on the

use of biodegradable materials for FAD construction (ISSF, 2019; Moreno et al., 2020; Escalle et al., 2022; Roman et al., 2022; Zudaire et al., 2023). Currently, the Indian Ocean Tuna Commission (IOTC), the International Commission for the Conservation of Atlantic Tunas (ICCAT), and the IATTC have adopted conservation measures establishing a gradual transition towards the use of biodegradable FADs (Table 1). In the WCPFC, fleets are encouraged to adopt biodegradable FADs, although such a transition is not mandatory.

Despite fleets' implementation of best practices to prevent FAD loss and abandonment, and RFMOs' adoption of conservation measures, the loss or abandonment of a proportion of deployed FADs remains inevitable. Therefore, it is essential to implement management actions that promote FAD retrieval.

These actions should prioritize mitigating impacts before FADs reach coastal and benthic ecosystems or fragment into marine debris that could affect both marine life and human activities. Currently, all RFMOs recommend that the tuna sector participates in FAD retrieval programs (FRPs), but the characteristics and minimum standards required for such programs to be efficient have not yet been defined (Table 1). At present, five FRPs exist globally, each with distinct characteristics, which are described in the following section.

1.1 FAD Recovery Programs

1.1.1 WESTERN INDIAN OCEAN

- **FAD Watch:** The first dFAD recovery program, known as *FAD Watch*, was established through a collaborative effort among OPAGAC-AGAC, the NGO Island Conservation Society (ICS), Islands Development Company (IDC), and the Seychelles Fishing Authority (SFA). Implemented in 2016 and continued in 2017, the program recovered 25 and 84 dFADs, respectively, from both the OPAGAC-AGAC fleet and other fleets operating in the region.

The strategy consisted of a two-stage geofencing alert system: The fleet notified ICS when a dFAD entered an initial geofence of 5 nautical miles, followed by a second alert when the dFAD reached 3 nautical miles from any of the islands included in the recovery program (Alphonse, Farquhar, Desroches, Poivre, Aride, and Silhouette). Recovery operations were carried out by ICS using 18-foot fiberglass boats and were funded by the OPAGAC-AGAC fleet.

The program was later expanded to include purse seine fleets participating in the Sustainable Indian Ocean Tuna Initiative (SIOTI FIP), covering a total of 27 purse seiners from France, Italy, Mauritius, Seychelles, and Spain. However, updated results from this expanded phase are currently unavailable.

- **Seychelles Government dFAD Recovery Operations:** The Spanish purse seine company INPESCA provided one of its support vessels to the Government of Seychelles to assist in dFAD recovery and other marine operations. The vessel, now named *Saya de Malha*, has been integrated into the Seychelles Coast Guard. To date, it has conducted three dFAD recovery campaigns.

The first campaign, conducted in Aldabra in March 2023, recovered 75 dFADs. The second campaign, in November 2023, focused on other islands and recovered between 10 and 20 dFADs. These initial efforts were opportunistic, with the vessel patrolling the vicinity of various islands to locate stranded dFADs and other marine debris.

However, the strategy shifted in late 2024 to include the at-sea recovery of dFADs, not only stranded ones. To support this, a real-time dFAD tracking system was installed onboard the *Saya de Malha*, and the team began identifying key dFAD transit areas to maximize recovery efficiency.

The most recent campaign recovered 108 dFADs and was funded by SIOTI through a Memorandum of Understanding (MoU), which allocates up to €100,000 per campaign. The estimated cost of each campaign is approximately €74,000 (equivalent to about 1 million Seychellois Rupees, SCR), covering personnel, fuel, and coordination expenditures.

- **Oceanika program:** The Oceanika Program, led by the NGO Oceanika (dedicated to dFAD recovery), began operations in early 2023. By 2024, Oceanika had completed nine missions, totaling 102 days at sea and covering 3,145 nautical miles.

Each mission involved 6 to 8 specialists, including 4 crew members and 2 to 4 professional divers. A total of 96 dives were conducted, resulting in the successful recovery of 137 dFADs in Seychelles waters. No fishing companies or vessels were involved in these operations; Oceanika conducted all activities independently, with funding from private donors.

In 2024, Oceanika signed an agreement with OPAGAC-AGAC, under which both parties will collaborate on dFAD recovery in the Indian Ocean, following the FAD Watch recovery strategy and the geofencing alert system.

1.1.2 PACIFIC OCEAN

- **Palmyra Atoll Program (U.S.):** The dFAD recovery program at Palmyra Atoll began in May 2021 in collaboration with the U.S. Tuna Group, followed by the participation of Cape Fisheries in June 2021 and OPAGAC-AGAC in February 2023.

The program currently involves 22 companies and 35 purse seine vessels. The purse seine industry funds satellite buoy communication services, while The Nature Conservancy (TNC) covers the costs of buoy software subscriptions, data downloads, staff recovery time, vessel maintenance, marine debris disposal, and the reuse and shipment of satellite buoys for use in anchored FADs deployed by artisanal fishers in the Solomon Islands. The TNC team managing the project includes a program manager and 4 to 6 staff members for each dFAD recovery operation. To date, 40 dFADs have been intercepted, corresponding to approximately 5,000 feet (about 1,500 meters) of ropes, nets, canvas, shade cloth, floats, bamboo, and PVC pipes. All debris is incinerated, except for the GPS buoys, which are reused for anchored FADs in the Solomon Islands.

The recovery cost per dFAD, including coordinator and recovery staff time, fuel, vessel maintenance, and waste management, is approximately \$800. In 2024, a total of 28 dFADs were recovered at a total cost of \$22,000.

- **Galápagos Islands Program (Ecuador):** In the Galápagos Marine Reserve, a dFAD recovery program was launched as part of the Cuidando Galápagos initiative. This effort is led by TUNACONS, with support from the National Chamber of Fisheries (CNP) and CORPAG, the artisanal fishing organization of the Galápagos Islands. The program aims to protect the archipelago's fragile marine-coastal ecosystems from the threat posed by drifting FADs.

To mitigate this impact, a 15-nautical-mile geofence system was implemented in 2022 around six main islands: Isabela, Pinzón, Santa Cruz, San Cristóbal, Santa Fe, and Floreana. The presence of dFADs within these zones is monitored by industrial tuna fleet managers. When a dFAD crosses the virtual boundary, fleet managers notify a local coordinator in the Galápagos, who then alerts resident artisanal fishers. These fishers deploy to retrieve the device. The results to date are as follows:

- 2022: 13 alerts, 12 dFADs recovered, totaling 1,407 kg of material
- 2023: 15 alerts, 9 dFADs recovered, totaling 1,027 kg
- 2024: 18 alerts, 17 dFADs recovered, totaling 1,233 kg

A key aspect of the program is the active involvement of artisanal fishing communities. Four cooperatives and over 41 fishers with 15 fiberglass boats have contributed to recovery operations. This approach not only helps to protect the marine environment but also compensates fishers with USD \$300–600 per recovered dFAD, depending on the distance traveled to reach the device. The program operates on an annual budget of approximately USD \$25,000, distributed as follows:

- USD \$15,000 for administrative and coordination costs
- USD \$5,000–6,000 for recovery payments to fishers
- USD \$4,000 for meetings and logistics

The recovered dFAD components are delivered to local municipalities for proper disposal. When possible, components such as buoys and nets are reused or recycled, minimizing environmental impact. As the program progresses, it aims to enhance monitoring techniques, increase community engagement, and strengthen recycling capacity, further supporting conservation efforts in the Galápagos.

Table 1. FAD-related conservation measures in tuna RFMOs

IOTC: Indian Ocean Tuna Commission
 IATTC: Inter-American Tropical Tuna Commission
 ICCAT: International Commission for the Conservation of Atlantic Tuna
 WCPFC: Western and Central Pacific Fisheries Commission
 PNA: Parties of Nauru Agreement

Conservation Measures	IATTC	WCPFC	IOTC	ICCAT
Limit on active FADs	<ul style="list-style-type: none"> • Now: 50-340/ depending on vessel category C-21-04	<ul style="list-style-type: none"> • Now: 350/vessel CMM 2023-01	<ul style="list-style-type: none"> • Now: 300/vessel • 2026 on: 250-280/vessel • 2028 on: 225-255/vessel Res 24-02	<ul style="list-style-type: none"> • In 2025: 300 FADs/vessels • 2026 and 2027: 288 FAD per vessel Rec 24-01
Limit of geolocating buoy purchase	–	–	<ul style="list-style-type: none"> • Now: 500/vessel • 2026 on: 440-480/vessel • 2028 on: 420-460/vessel Res 24-02	–
FAD registry	In 2024, the Commission tasked the SAC, with support from IATTC staff and the <i>Ad Hoc</i> FADs Working Group, to advise on the potential benefits and implementation of a FAD register, aligned with other RFMOs	Since 2024: PNA 4 th Implementing Arrangement	To be established in 2026 Res 24-02	–
FAD’s buoy data reporting	Position and biomass (compliance and science) C-21-04	Only position PNA 4 th Implementing Arrangement 2016	Only position (compliance) Res 24-02	Only position (compliance) Rec 22-01
FADs with no netting	Netting prohibited from 2025 on C-23-04	Netting prohibited from 2025 on CMM 2023-01	Netting prohibited	Netting prohibited starting 1 Jan 2025 Rec 24-01

Conservation Measures	IATTC	WCPFC	IOTC	ICCAT
Biodegradable FADs	Stepwise transition from 2026 on C-23-04	Encouraged CMM 2023-01	Stepwise transition from 2026 on Res 24-02	Stepwise transition from 2025 on Rec 24-01
FAD retrieval	Encouraged C-23-03	Encouraged CMM 2023-01	Encouraged Res 24-02	–
FAD activation / deactivation criteria	<ul style="list-style-type: none"> Deactivations allowed if: loss of signal, beaching, temporarily during closure period or being outside fishing ground Reactivations allowed after the closure C-21-04	Not allowed between 20°S and 20°N, only allowed if signal loss, stranded (after 1 month) PNA 4 th IA 2024	–	–
FAD marking	Geolocating buoy's ID C-15-03	<ul style="list-style-type: none"> No specific guidelines on FAD marking Geolocating buoy is used 	<ul style="list-style-type: none"> Now: Geolocating buoy's ID 2026 on: Buoy's ID + FAD structure with IOTC's unique identifier 	<ul style="list-style-type: none"> No specific guidelines on FAD marking Geolocating buoy is used
FAD ownership rules	–	–	–	–

Table 2. Summary of the characteristics of current dFAD recovery programs

Program	Start year	Coord.	Participating fleets	Estimated annual cost	dFAD recovered	Recovery vessels
FAD Watch (Seychelles)	2016	OPAGAC-AGAC, ICS, IDC, SFA,	SIOTI FIP fleets	Not available	2016: 25; 2017: 84	Fiberglass boats (~18 feet)
Government Seychelles	2023	SFA, Government of Seychelles	FIP SIOTI	€74,000 per campaign (~1 million SCR)	March 2023: 75; Nov. 2023: 10–20; Dec. 2024: 108	Auxiliary vessel Saya Malha (Seychelles Coast Guard)
Oceanika (Seychelles)	2023	Oceanika (ONG)	OPAGAC-AGAC	Funded by the NGOs donors, cost not available	137 (2023–2024)	Not specified; includes 2–4 divers & 4 crew members
Palmyra atoll (U.S.)	2021	TNC	U.S. Tuna Group, Cape Fisheries, OPAGAC-AGAC.	\$800 per FAD; Total en 2024: \$22,000	2024: 28; Total estimated: 40	Fiberglass vessels with, 4–6 personnel
Galápagos Islands (Ecuador)	2022	TUNACONS, CNP, CORPAG,	Tunacons & ATUNEC fleets.	\$25,000	2022: 12; 2023: 9; 2024: 17 (up to November)	15 fiberglass boats operated by artisanal fishers

As described above, various dFAD recovery initiatives have been implemented in the Pacific and Indian Oceans, each applying different strategies. These range from collaboration with artisanal fleets, as seen in the Galápagos program, to partnerships with non-governmental organizations, as in the case of Palmyra with TNC in the Pacific, and Oceanika and ICS in the Indian Ocean. In other cases, such as that of the Government of Seychelles, the authorities use a vessel donated by a tuna company to carry out dFAD recovery operations. Both the Galápagos and Palmyra programs employ a geofence-based alert system, which notifies recovery teams when a dFAD is detected within a specified distance of designated recovery zones. The types of vessels used in these efforts vary widely, from small fiberglass boats operated by NGOs or artisanal fishers to larger auxiliary fishing vessels.

In light of growing market demands to minimize the ecological impact of dFADs, and recommendations from tuna RFMOs urging fleets to participate in dFAD Recovery Programs, it is likely that more fleets will begin to establish or join such initiatives, either existing programs or new ones under development. Since most of these FRPs are still in early stages, minimum criteria and standards, including cost elements, to ensure their effectiveness have not yet been clearly defined, including long-term cost considerations.

The first international workshop on FAD retrieval was organized to analyze and discuss these critical issues.

2. OBJECTIVES

The main objective of the first international FAD retrieval workshop was to advance the definition and future implementation of FRPs both from land and in the open ocean.

To this end, we set the following specific objectives:

- Provide an overview of the current status of FAD deployments, tracking, and recovery in the global tuna fisheries
- Identify key elements and participants for a successful FRP both from land and in the open ocean
- Bring together a wide spectrum of stakeholders to foster discussion and collaboration
- Explore fundraising strategies and financing opportunities for FAD retrieval programs

3. RESULTS

The workshop considered FAD retrieval at two distinct stages in the FAD lifespan: (i) while in the open ocean and (ii) once when stranding in coastal areas or on land. FAD recovery programs, whether at sea or on land, should be designed with a long-term perspective and incorporate adaptive management to accommodate changing circumstances, such as increases or decreases in dFAD loss and abandonment, reduced dFAD usage by fleets, or the adoption of 100% biodegradable dFADs.

3.1 FAD Recovery from Land

During the workshop, the possibility of funding pilot projects of a determined duration (6-12 months) was explored as an initial step to address necessary aspects (economic, logistical, financial, etc.) of an FRP.

However, it was also highlighted that a program can begin even if not all the aspects described below have been addressed, and improvements can be implemented as the program progresses. In other words, it is essential to avoid over-analysis and prioritize action.

3.1.1 PRELIMINARY ACTIONS PRIOR TO THE IMPLEMENTATION OF A DFAD RECOVERY PROGRAM

Design and Planning of the FAD Recovery Program

The first essential step before implementing a FRP is the detailed design and planning of the program. This involves relevant stakeholders, such as authorities, decision makers, industry, fishers, NGOs, working closely to develop a plan that clearly defines the program's scale, objectives, responsibilities, along with a work plan and timeline — including waste management and the funding and institutional infrastructure needed for it to be viable and sustainable. Identifying interested actors and champions, forming work teams, and assigning specific responsibilities is crucial for execution. Financial planning is also fundamental to ensuring the program's long-term sustainability. This includes diagnosing costs and determining funding sources. Economic planning and financial viability should include strategies for the project's maintenance and persistence over time.

Regulation and Legal Compliance

To effectively address regulatory implications and ensure compliance, the involvement of legal experts, policymakers, decision-makers, and relevant authorities is essential throughout the process. A legal analysis is needed to identify existing laws and regulations that may affect the program and to establish a solid foundation for its long-term legal and sustainable operation. In some cases, proposing and adopting new regulations may be necessary to ensure the program's success. Collaboration with RFMOs will be required to amend or develop regulatory frameworks. This joint effort will help ensure that regional regulations effectively support recovery and conservation initiatives and enable full compliance with management measures.

Coordination and Collaboration among Stakeholders

Coordination and collaboration among stakeholders are essential for the success of a dFAD Recovery Program (FRP). A critical first step is the development of Memoranda of Understanding (MoUs) that establish the foundations for cooperation among the parties involved. Building alliances among fleets, buoy providers, and other key actors as well as defining confidentiality agreements is necessary. Likewise, the cooperation and commitment of vessel owners and fishing captains are crucial to successfully implementing these measures.

The following potential stakeholders were identified in FRPs:

- **Government-based bodies and authorities:** Fisheries governing bodies, fishery managers, enforcing agencies, Marine Protected Area (MPA) authorities, municipalities responsible for waste management, maritime salvage, the Coast Guard and Navy
- **Fishing industry:** Shipowners, shipowners' associations, fishers using FADs, artisanal fishers, other industrial fishing gears
- **Seafood sector:** Seafood processing industry, retailers
- **Management organizations and regulators:** RFMOs, NGOs, regional bodies (e.g., FFA, PNA), marine debris collection projects
- **Technology providers:** Buoy providers for tuna vessels, tracking technology providers, FAD trajectory visualization map providers, satellite tracking service providers
- **Science and research:** RFMO scientists, Research and fisheries organization scientists, NGO scientists, universities
- **Conservation community:** Stakeholders focused on protecting marine ecosystems and reducing environmental impacts
- **Tourism-related stakeholders:** Tourism agencies, recreational boats, tour boats, diver boats
- **Coastal human communities:** Coastal settlements affected by FAD arrival, storage and inefficient waste management
- **Maritime transportation business:** Cargo shipping companies

Research and Analysis

An FRP should gather information and conduct research at both the start and throughout the life cycle of FADs. During the workshop, the following research was identified:

- Study critical stranding areas of FADs. This knowledge is fundamental for developing specific and efficient recovery strategies.

- Study the origin of stranded FADs to identify sources and deployment patterns of these devices and their impact.
- Continuously monitor FADs to know where they go if they do not strand.
- Create a database to track the types of dFADs being recovered (design, dimensions, materials, etc.).
- Develop key performance indicators (KPIs), which allow for evaluating the FRP's success by tracking specific metrics, e.g., the number of recovered FADs versus deployed ones. Regularly monitoring these indicators and publishing the results promotes transparency and program adaptation to new scenarios, facilitating progress and effectiveness.

Other studies that, while not essential, could add value to the program or could be carried out in collaboration with external researchers include:

- Assessing the impact of dFADs on coastal, benthic, and pelagic ecosystems
- Evaluating the carbon footprint associated with each recovery option
- Studying the biodegradable materials used in dFAD construction (e.g., sustainably sourced, non-toxic in the marine environment)
- Analyzing the design and length of the submerged appendage in relation to its likelihood of loss and associated impact
- Reviewing current knowledge gaps. This analysis will help identify areas where further research is needed, allowing efforts to be targeted more effectively to continuously improve the program.

Awareness and Socialization of the Program

Finally, establishing effective communication protocols to socialize the FRP and highlight the benefits of engagement is essential for raising awareness and education, fostering participation and collaboration among different actors involved, and ensuring compliance with established commitments.

For example, workshops involving different actors — such as fishers, scientists, managers, NGOs, and local communities and other interested or affected parties — promote a greater understanding and support for the program.

3.1.2 KEY ELEMENTS OF A LAND-BASED FRP

Thanks to the participation of the coordinators of the three FRP programs globally — Palmyra (U.S.), Seychelles FAD watch, and Galapagos (Ecuador) — and the involvement of the stakeholders in the workshop, we were able to identify key points for developing effective FAD recovery programs.

Monitoring Lost or Abandoned FADs

- Ensure fleets share FAD positions: It's crucial that participating fleets share the positions of all abandoned FADs with the FRP. Currently, fishers often deactivate the geo-locator beacon once the FAD leaves the fishing zone, making it impossible to track and recover these FADs. For instance, many FADs in the EPO drifting westwards towards Palmyra Island are deactivated at 150°W, but Palmyra is located at 162°W, hindering the monitoring and thus the retrieval of FADs in Palmyra.
- A more thorough discussion and agreement on definitions regarding FAD deactivation and ownership is necessary, as this remains an unresolved issue. Fleets currently operating near the limit of active FADs could exceed this limit if they do not deactivate buoys that drift outside their fishing grounds. Potential solutions could include:
 - FADs drifting outside the fishing area would not be deactivated but would no longer count as active FADs, and therefore would not be included in the limit of active FADs.
 - Transfer ownership of FADs outside the fishing area to third parties such as RFMOs, NGOs, or other institutions capable of managing these data - similar to how Vessel Monitoring Systems (VMS) operate. In this way, once the buoy crosses the boundary of the fishing area, the fishers would no longer be monitoring those FADs, and the FADs would therefore be excluded from the active FAD limit.
 - An alternative could be the use of an independent, non-fishing beacon to monitor FADs, such as the NAOS buoy (CLS), which provides only positional data without biomass estimates, and has significantly lower transmission costs than the buoys used by fishers. This beacon could be monitored by RFMOs, NGOs, or an independent institution, similar to the management of VMS data. When a fisher needs to deactivate a fishing buoy in order to activate a new one in a more productive area while remaining within the established FAD limit, the independent buoy would continue transmitting its position, allowing it to be retrieved through an FRP.
- FRPs should have a platform capable of displaying, in real time, the trajectories of lost or abandoned FADs, regardless of the buoy brand used by the associated fleet. This would facilitate efficient recovery by enabling better route planning and retrieval of FADs before they can cause environmental impacts (Figure 3). Technology providers demonstrated that

this is already feasible, similar to vessel tracking via VMS. In addition to real-time tracking, a drift prediction tool would be desirable to prioritize the recovery of certain FADs over others. In particular, Zunibal and CLS demonstrated the use of such tools employing artificial intelligence and current data.

- For the FAD monitoring platform to function effectively for recovery purposes, it is essential to ensure a stable internet connection so that program operators can continuously access the positional data of the devices.

FAD Recovery Protocols

- *Standard Operating Procedures (SOPs)*: Draft and edit SOPs to ensure consistency and efficiency in recovery operations.
- *Training*: Train personnel for both sea and land recovery operations, focusing on protocols and safety.
- *Complete recovery*: Recover the entire FAD structure, not just the beacon.
- *Suitable vessels*: Ensure the vessels used can safely recover and store FADs and have the mechanical advantage necessary to do so in a timely and efficient manner.
- *Trajectory prediction tools/maps*: Use tools or maps to predict FAD trajectories when they enter established geofences for efficient pre-impact recovery.
- *Collaboration*: Coordinate with other maritime users like maritime rescue, recreational boats, tourism boats, NGOs, the Coast Guard and the Navy to assist in the recovery program.

Data Management and Knowledge

Proper management of the data generated by the program is essential to evaluate its effectiveness, advance knowledge on FADs, and contribute to scientific and educational outreach.

- *Data management*: Collect and analyze data gathered during the FRP for research on impacts, program effectiveness, and FAD trajectories and origins.
- *Publication and dissemination*: Publish and share studies with the RFMOs and other relevant stakeholders to advance knowledge and raise awareness.

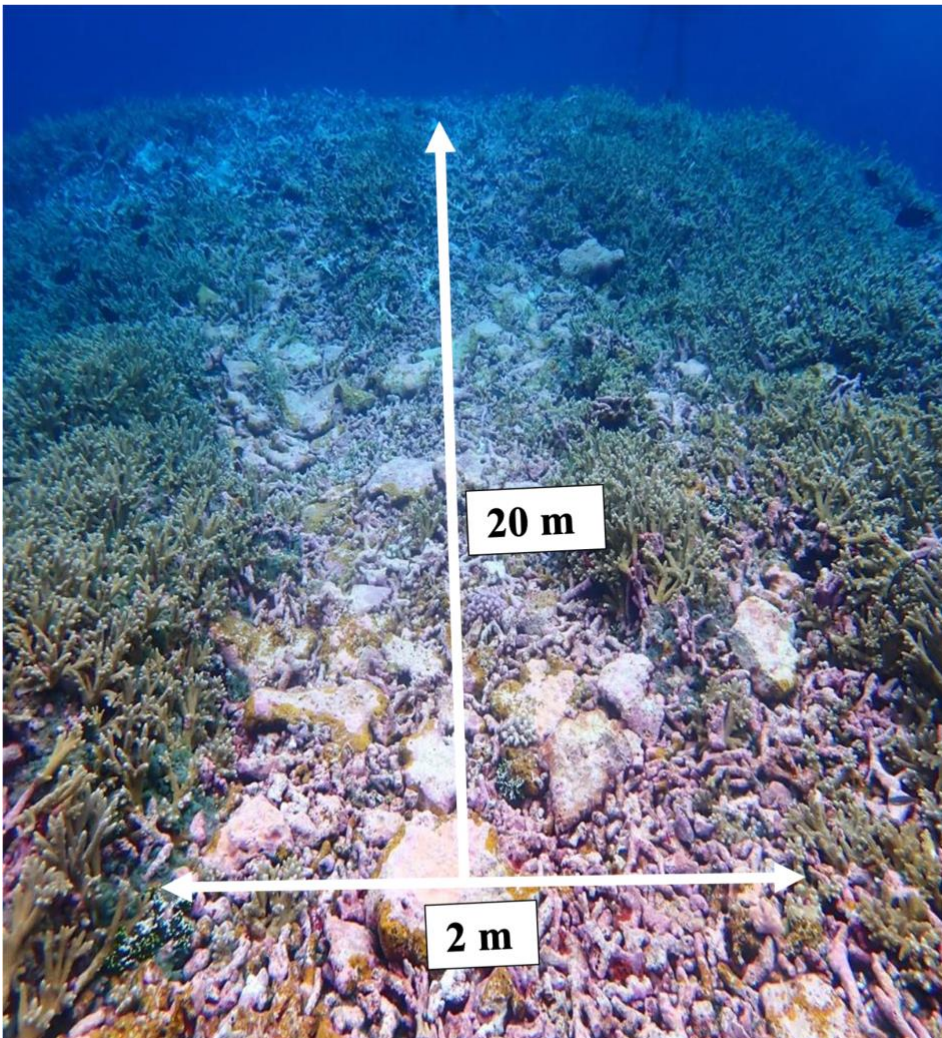


Figure 3. Impact caused by a raft of a FAD on the reef in Palmyra, creating a hole 20 meters long and 2 meters wide. Photo: Daniel Clifford.

Program Management

Effective program management requires tools for monitoring, evaluation, and continuous improvement, as well as realistic financial planning and a responsible approach to waste management, particularly in island contexts with logistical constraints. The following needs were proposed:

- *Indicators:* Develop indicators to monitor program efficiency.
- *Adaptive management:* Continuously evaluate and adapt strategies based on indicators and results.
- *Cost:* Calculate and continuously update actual program costs.

- *Waste management*: Ensure proper waste management, supporting local communities in this task, which is crucial on islands with limited space and infrastructure. Consider recycling strategies, such as programs already reusing beacons (Recon by Satlink, Blue Recovery by Marine Instruments, and Searcle by Zunibal).
- *Normative framework*: It should establish the legal, operational, and institutional foundations necessary for the program's implementation. This includes setting clear objectives, defining the geographic and jurisdictional scope, outlining procedural norms, and specifying the roles and responsibilities of all stakeholders involved.

3.2 FAD Recovery in Open Ocean

Recovering dFADs in the high seas, before they reach coastal areas, is just as important as retrieving them from shore. For this reason, the workshop also addressed how dFADs could be recovered at sea — in other words, how to prevent their loss and abandonment through good practices and collaborative actions.

If these actions are implemented, the number of dFADs that become marine debris — impacting ecosystems and coastal infrastructure — will likely be reduced. This will decrease not only the environmental cost of dFADs but also the economic cost of dFAD Retrieval Programs (FRPs).

During the workshop, seven working groups were created, composed of various stakeholders including fishers, buoy companies, scientists, NGOs, and government representatives. The objective was to identify the different actions that could facilitate dFAD recovery at sea. These actions were categorized by stakeholder type — that is, at the level of individual vessels, fishing companies, buoy providers, fleets, governments, NGOs, and scientists.

Below are the specific actions identified for each stakeholder group, aimed at promoting dFAD recovery at sea and reducing their loss and abandonment:

Fishers: On-board Best Practices

- When visiting FADs close to the limit of the fishing zone, recover them instead of leaving them at sea. This involves recovering both the structure of the FAD and the tracking buoy.
- Mark the different parts of the FAD structure, including the tail and the raft, using, for instance, the FAO gear marking guidelines as a reference. This allows for identifying the origin of a FAD that arrives onshore without a buoy.
- More intensive monitoring and sharing FADs with other fishers:
 - Share/sell FADs with other vessels before they leave the fishing area.
 - Share the position of geolocating buoys that are outside the fishing zone, or beyond the vessel's operational range, on a common platform managed by a third party, so they can be recovered or used by other interested stakeholders.

- Do not deactivate FADs to allow recovery, or use of a geolocation beacon, independent from the fishers' echosounder buoys to track the FADs out of the fishing ground.
- Change deployment strategies to avoid high-loss or high-impact areas.
- Share knowledge with others in the FRP to design and improve the program.
- If the technology is available, consider sinking the FAD remotely, but only in the case of biodegradable FADs.

Shipowners

- Participate in a FAD recovery program.
- Form alliances with other companies for FAD recovery.
- Share or sell FADs instead of deactivating them:
 - Within the region, among different vessel companies
 - Among vessel companies operating in different regions, such as those operating in the EPO and selling FADs that are leaving their fishing area to companies in the WCPO
- Consider the use of dedicated FAD recovery vessels, owned by the company or shared among several companies.

Associations of Vessel Owners and Fleets from Different Countries

The actions identified for this stakeholder group mirror those of individual shipowners but involve broader collaboration frameworks that span multiple countries and regional fleets.

- Promote cooperation and the establishment of alliances between companies at both regional and pan-Pacific levels, in order to share resources, experiences, and strategies for dFAD recovery.
- Use recovery vessels jointly across different fleets, optimizing operational costs and increasing the efficiency of large-scale dFAD retrieval.
- Develop a shared platform for the reuse of unwanted or abandoned dFADs, facilitating their redistribution among interested stakeholders and preventing them from becoming marine debris.

Geolocating Buoy Providers

- Explore and implement technological solutions that enhance the exchange of information and the traceability of dFADs between vessels and with dFAD Retrieval Programs (FRPs).
- Actively collaborate with FRPs by providing both technical and financial support for their implementation and improvement.
- Improve buoy identification systems through simpler and more accessible coding methods that enable rapid association between buoys and their operators.
- Support the responsible management of recovered buoys, promoting their recycling or reuse.

Government Authorities

- Promote dFAD recovery through conservation measures and regulatory frameworks, such as setting deployment limits linked to recovery rates or controlling deactivations.
- Establish a national dFAD registry to improve the tracking and management of FADs.
- Create a dFAD monitoring center, which could operate as a new entity responsible for tracking transferred dFADs and monitoring signals from inactive or deactivated units.
- Develop and implement systems for the proper management and disposal of dFAD waste in port.
- Define clear timelines for the adoption of new measures or regulatory transitions.
- Ensure effective enforcement of legal and technical requirements related to dFADs.

Non-Governmental Organizations

- Coordinate efforts among the various stakeholders involved, facilitating cross-sector collaboration.
- Support the development or promotion of scientific and technical research.
- Contribute to the financing of initiatives related to dFAD recovery.
- Facilitate the transfer of knowledge and best practices among fleets from different regions.
- Coordinate dFAD recovery programs.
- Promote awareness and increase public understanding of the environmental impact of lost or abandoned dFADs.
- Promote the adoption of changes in policies, operational practices, and governance mechanisms.

Scientists

- Identify deployment areas associated with high dFAD density, loss rates, and environmental impact.
- Analyze dFAD trajectories to predict potential stranding zones and areas of ecological concern.
- Map dFAD loss hotspots in the open ocean to support targeted recoveries and mitigation efforts.
- Support the research from data recovered by FRPs.

4. FUNDING FOR FAD RECOVERY PROGRAMS

During the workshop, the potential funding sources for FRPs were discussed in a plenary session. Despite the presence of various stakeholders, including the fishing industry, buoy representatives, governments, and NGOs, no concrete model emerged from the discussions. As this was the first meeting focused on the recovery of FADs, this point requires further dialogue among the different stakeholders. There were divided opinions regarding the responsibility for strandings. While some participants saw the extractive sector as solely responsible, others considered that other beneficiaries — such as geolocating buoy-selling companies, tuna buying and processing industries, and countries selling licenses — should also share responsibility.

One of the participants highlighted the importance of considering, in the context at hand, the principle of Extended Producer Responsibility (EPR). This approach proposes that manufacturers and beneficiaries of a product assume responsibility for its management even after its use, once the product becomes waste. The aim is to incorporate all environmental costs associated with the product's life cycle, from production to final disposal. In general, these environmental costs tend to appear as externalities that are not internalized by market prices, meaning that the negative impacts generated are not borne by those who cause them but by society. However, there are mechanisms to internalize these costs. For example, the recycling fee applied to canned beverages, which is included in the product price, seeks to ensure that waste management costs are covered by those who consume the product.

In this regard, the possibility of introducing a surcharge to the current cost of geolocating buoys was discussed as a potential funding mechanism for FAD recovery programs. This approach would follow the principles of Extended Producer Responsibility, by requiring buoy owners or users, those who benefit from the deployment of dFADs, to contribute directly to the financial sustainability of recovery initiatives. By internalizing part of the environmental cost associated with lost or abandoned FADs, such a mechanism could help ensure the long-term viability and effectiveness of FAD retrieval efforts.

Various approaches to financing were discussed, such as creating a project portfolio with estimated costs to explore diverse potential sources. Establishing strategic partnerships to facilitate funding was also suggested.

Another proposal involved repurposing lost and abandoned FADs, or “non-fishing FADs” once they exit fishing grounds, for scientific applications. These devices could be used as ocean current tracers or pelagic ecosystem observers (Moreno et al. 2016, Imzilen et al. 2019). The data collected by such FADs would be of significant value to physical oceanographers, biologists, ecologists, geographers, and economists, especially in the context of climate change.

In summary, to ensure long-term funding for an FRP, it is essential to explore a variety of potential sources, establish strategic partnerships, and adopt innovative approaches to generate additional revenue. Clearly, this workshop provided an initial approach to the scale of the FADs issue, globally and possible funding sources. But this issue requires further development and dialogue regarding the responsibility of different stakeholders in financing.

5. RECOMMENDATIONS FOR TUNA RFMOS

The workshop highlighted the need to adopt new or modify existing conservation measures within tuna RFMOs. Some of these considerations are summarized as follows:

- FAD removal should be explicitly defined as an activity not considered "fishing" under RFMOs definitions, to facilitate at-sea recovery operations. This clarification would allow vessels to remove FADs while transiting during fishing closure periods, thereby supporting the implementation of FAD retrieval programs without conflicting with existing regulatory frameworks.
- Define the ownership of the FAD, specifying who owns the structure and the buoy in the water.
- Establish rules for the possibility of transferring ownership and monitoring systems.
- Regulate the deactivation or end of monitoring of the FAD in a way that enables its recovery outside the fishing area.
- Exclude FADs that have left the fishing ground from active FAD limits.
- Design a registry of FADs to effectively account for the number of FADs deployed, lost, abandoned, and recovered.
- Define the permitted tasks of a FAD recovery vessel.
- Develop marking criteria for the FAD structure, not just the tracking buoy.
- Explore potential funding sources for the FRPs.
- RFMOs should task the science bodies with exploring the feasibility of various FRP options and allocate specific funding for this task.

6. CONCLUSION AND NEXT STEPS

This first workshop allowed the diverse stakeholders to start taking steps and identifying key actions for an effective FRP. It was also a unique opportunity to engage in discussions among various stakeholders about how to advance and collaborate, forming new alliances. To continue the progress from this workshop, several important steps were identified, as detailed below:

- **Inclusive participation:** The inclusion of as many stakeholders and fleets as possible will result in the most success.
- **Operational planning:** Create specific work plans, budgets and pilot projects to make progress.
- **Dissemination at regional and global scale:** Present the workshop report to all tuna RFMOs to promote a unified global discussion and ensure synchronized progress.
- **Intersectoral technical group:** Establish a technical group composed of representatives from various stakeholders to review progress in different FRPs and share these advancements across different regions. This group could meet annually to update strategies and evaluate progress.

Acknowledgments

Special thanks to the Charles Darwin Foundation for providing an inspiring environment, Bumble Bee Seafood for financial support, and all participants who made this workshop a milestone for advancing FAD recovery.

REFERENCES

- Anonymous. 2023. ISSF Workshop on Different Approaches to Limit the Number of FADs in the Oceans. ISSF Technical Report 2023-03. International Seafood Sustainability Foundation, Pittsburgh, PA, USA <https://www.issf-foundation.org/about-issf/what-we-publish/issf-documents/issf-2023-03-issf-workshop-on-different-approaches-to-limit-the-number-of-fads-in-the-oceans-san-diego-ca-usa-march-1-3-2023/>
- Escalle, L., Hamer, P., & The PNA Office. (2023). Spatial and temporal description of drifting FAD use in the WCPO derived from analyses of the FAD tracking programmes and observer data (SC19-2023/EB-WP-05). WCPFC Scientific Committee.
- Escalle, L., Scutt Phillips, J., Lopez, J., Lynch, J. M., Murua, H., Royer, S. J., Swimmer, Y., Murua, J., Sen Gupta, A., Restrepo, V., & Moreno, G. (2024). Simulating drifting fish aggregating device trajectories to identify potential interactions with endangered sea turtles. *Conservation Biology*, e14295. <https://doi.org/10.1111/cobi.14295>
- Imzilen, T., Chassot, E., Barde, J., Demarcq, H., Maufroy A., Roa-Pascuali L., Ternon, JF, Lett, C. (2019). Fish aggregating devices drift like oceanographic drifters in the near-surface currents of the Atlantic and Indian Oceans. *Progress In Oceanography*. 171. 108127. <https://doi.org/10.1016/j.pocean.2018.11.007>, <https://archimer.ifremer.fr/doc/00482/59376/>
- ISSF. (2019). Guide to non-entangling FADs. International Seafood Sustainability Foundation, Washington, D.C., USA. <https://www.issf-foundation.org/about-issf/what-we-publish/issf-documents/non-entangling-and-biodegradable-fads-guide-english/>
- Lopez, J., Moreno, G., Sancristobal, I., & Murua, J. (2014). Evolution and current state of the technology of echo-sounder buoys used by Spanish tropical tuna purse seiners in the Atlantic, Indian and Pacific Oceans. *Fisheries Research*, 155, 127–137.
- Lopez, J., Román, M., Lennert-Cody, C. E., Maunder, M. N., Vogel, N. Fuller, L.M. (2023). Floating-object fishery indicators: A 2023 report. (FAD-08-01). IATTC.
- Moreno, G., Dagorn, L., Capello, M., Lopez, J., Filmlalter, J., Forget, F., Sancristobal, I., and Holland, K. (2016). "Fish aggregating devices (FADs) as scientific platforms." *Fisheries Research* 178: 122- 129.
- Moreno, G., Murua, J., Jauharee, A.R., Zudaire, I., Murua, H. and Restrepo, V. (2020). Compendium of ISSF research activities to reduce FAD structure impacts on the ecosystem. ISSF Technical Report 2020-13. International Seafood Sustainability Foundation, Washington, D.C., USA <https://www.issf-foundation.org/about-issf/what-we-publish/issf-documents/issf-2020-13-compendium-of-issf-research-activities-to-reduce-fad-structure-impacts-on-the-ecosystem/>
- Moreno G., Crochet, T., Murua, H., Restrepo, V (2023) A novel FAD tracking device tested in the Pacific Ocean. 7th meeting of the ad hoc working group on FADs, 2023. https://www.iattc.org/GetAttachment/22abf1a3-fb89-4a15-a107-7c9a5d9820cb/FAD-07-MISC_Moreno-et-al--FAD-marking-system.pdf
- Roman, M., Lopez, J., Hall, M., Robayo, F., Vogel, N., García, J.L., Herrera, M., Aires-da-silva, A. (2022). Prueba de prototipos y materiales biodegradables para la pesquería sobre plantados de atunes tropicales: informe de avances y recomendaciones del personal. 6th meeting of the ad hoc working group on FADs, 2022. https://www.iattc.org/GetAttachment/64b617f6-aeff-442e-bfb7-269e9ade7464/FAD-06-02_Plantados-biodegradables-informe-final-del-proyecto-y-recomendaciones-del-personal.pdf
- Zudaire I., Moreno, G. et al. 2023. Biodegradable drifting fish aggregating devices: Current status and future prospects. *Marine Policy* 153 (2023) 105659

Appendix I: List of Workshop Participants

Name and surname	Company or institution represented
Aitor Aizpurua	Zunibal
Alexi Moncayo	COPAHISA
Allain Valerie	Pacific Community
Amanda Ramos	Consejo de gobierno del régimen especial de galápagos
Andrés Arens Hidalgo	Presidente CIAT
Arturo Izurieta	Parque Nacional Galápagos
Craig Heberer	The Nature Conservancy
Dana Zambrano	Subsecretaria de Recursos Pesqueros
Danny Rueda	Parque Nacional Galápagos
David Itano	The Nature Conservancy
Emily Durham	Fundación Charles Darwin
Gala Moreno	ISSF (Organizadora y facilitadora del taller)
Grace Unda	Iniciativa Cuidando Galapagos/Corpog
Greg Hammann	Marine Instruments
Guillermo Morán	Tunacons (Organizador del taller)
Ibone Rodriguez	Zunibal
Idoia González	Tunasat
Igor Sancristobal	Collecte Localisation Satellites (CLS)
Jazmin Bastidas	Tunacons
Jefferson Murua	AZTI
Jenifer Suarez	Dirección Parque Nacional Galápagos
Jerson Moreno Mendoza	Conservación Internacional
Jon Lopez	Inter-American Tropical Tuna Commission
Jorge Ramírez	Fundación Charles Darwin
José L. García	Tunacons
Josu Santiago	AZTI
Juan Carlos Torres	Presidente de COPES PROMAR y de CORPAG
Kathryn Gavira	Satlink
Kydd Pollock	The Nature Conservancy-Palmyra Atoll
Lauriane Escalle	The Pacific Community
Lucia Norris	Galapagos Conservation Trust
Luigi Benincasa	ATUNEC
Luis Neira	RUXTEL S.A.
Marcelo Hidalgo	Fishing Industry Association of Papua New Guinea
María José Barragán	Fundación Charles Darwin
Mariana Vera-Zambrano	Conservación Internacional - Galapagos Nature Positives Economies Model
Marlon Román	IATTC
Mauricio Castrejón	Universidad de las Américas, Ecuador
Mauro Alban	COPROPAG

Mayi Zambrano	TUNACONS
Mikel Monasterio	NIRSA
Nicolas Moity	Fundación Charles Darwin
Pablo Guerrero	WWF Ecuador (Organizador del Taller)
Pablo Caparros Alvarez	Nautical del Ecuador S.A.
Paola Sangolqui	Fundación de Conservación Jocotoco
Rakan Zahawi	Fundación Charles Darwin
Ricardo Visaira Coronel	Parque Nacional de Galápagos
Ricardo Zambrano	Conservación Internacional
Sara Pfeifer	Global Ghost Gear Initiative (GGGI)/ Ocean Conservancy
Sarah Hutchison	Galapagos Conservation Trust
Sarah Morau	Fundación Charles Darwin
Solange Andrade Vera	Fundación Charles Darwin
Stalyn Llerena	COPESAN
Thibaut THELLIER	French Polynesia Marine Resources Department
Wilfrido Lucero	Tri Marine
William Gibbons-Fly	American Tunaboat Association
Paula Carrillo	WWF

Appendix II: Visual Documentation of Workshop







iss-foundation.org

3706 Butler Street, Suite 307
Pittsburgh, PA 15201
United States

Phone: + 1 703 226 8101
E-mail: info@iss-foundation.org