Western and Central Pacific Fisheries Commission

SCIENTIFIC COMMITTEE
TWENTIETH REGULAR SESSION

Manila, Philippines
14 – 21 August 2024

First International Workshop on FAD retrieval, Galápagos 2024

WCPFC-SC20-2024/EB-IP-17

Moreno et al.

First International Workshop on FAD retrieval, Galápagos 2024[1]

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8th Meeting of the Ad-Hoc Working Group on FADs

Resumen

El presente documento tiene como objetivo informar al grupo de plantados de la CIAT sobre el primer taller internacional de recuperación de plantados. Éste tuvo lugar en la Fundación Charles Darwin, en Galápagos del 8 al 10 de mayo de 2024, organizado por la Fundación para la Conservación de Atunes (Tunacons), International Seafood Sustainability Foundation (ISSF) y WWF Ecuador. La pregunta principal que se quería abordar en el taller era: ¿cómo debe ser un programa de recuperación de plantados[2] (FRP) para que sea efectivo? Un total de 63 actores clave, entre ellos pescadores, armadores, asociaciones de pesca, gobiernos, científicos y ONGs de los tres océanos, se reunieron en persona para contribuir a responder esta pregunta desde un punto de vista logístico, técnico, económico y legal. De este modo, se definieron los pasos a seguir tanto antes como durante la implementación de un programa de recuperación de plantados. Este breve documento sintetiza las conclusiones principales; sin embargo, se está elaborando un informe más completo que también se hará llegar al grupo de plantados cuando esté disponible.

Summary

This document aims to inform the IATTC's FAD (Fish Aggregating Device) working group about the first FAD retrieval workshop, which took place in Charles Darwin Foundation from May 8 to 10, 2024, organized by Tuna Conservation Foundation (Tunacons), the International Seafood Sustainability Foundation (ISSF), and WWF Ecuador. The main question addressed in the workshop was: what does an effective FAD retrieval program[3] (FRP) look like? A total of 63 key stakeholders, including fishers, vessel owners, fishing associations, governments, scientists, and NGOs from around the globe, gathered in person to contribute to this question from logistical, technical, economic, and legal perspectives. As a result, the steps to be taken both before and during the implementation of a FAD retrieval program were defined. This brief document summarizes the main conclusions; however, a more comprehensive report is being prepared and will also be shared with the FAD group when ready.

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[1] *Suggested citation*: Moreno, G., Moran, G., Guerrero, P. (2024). First International workshop on the recovery of Fish Aggregating Devices. *Ad-Hoc* permanent working group on FADs. Inter-American tropical tuna commission, La Jolla, CA.
[2] Empleamos el acrónimo FRP, para "Programa de Recuperación de Plantados".
[3] The acronym FRP is used for "FAD Retrieval Program"

Index

1. INTRODUCTION

The use of drifting Fish Aggregating Devices (FADs) involves the remote monitoring of these devices. Fishers deploy FADs in specific areas and leave them to drift, tracked by a geolocating buoy equipped with an echosounder. The fisher monitors its trajectory remotely until the FADs aggregate tuna, and once the buoy with the echosounder indicates the presence of biomass, the fishers visit and catch them (Lopez et al., 2014). Predicting the trajectory of any floating object beyond two weeks is challenging.

There is growing global concern about the impact of lost or abandoned FAD structures on benthic, pelagic, and coastal communities. In the Pacific Ocean specifically, it is estimated that 46,000 to 65,000 FADs are deployed annually (Escalle et al., 2024). Recent data from the WCPFC (Western and Central Pacific Fisheries Commission) show that 11.3% of FADs end up stranded, 6% are recovered, and 82% have an unknown fate (Escalle et al., 2023). For the Inter-American Tropical Tuna Commission (IATTC), there are no precise stranding data, but the following graph shows how FAD deployment has increased over the last two decades while recoveries remain stable and low over time (Figure 1, Lopez et al., 2023).

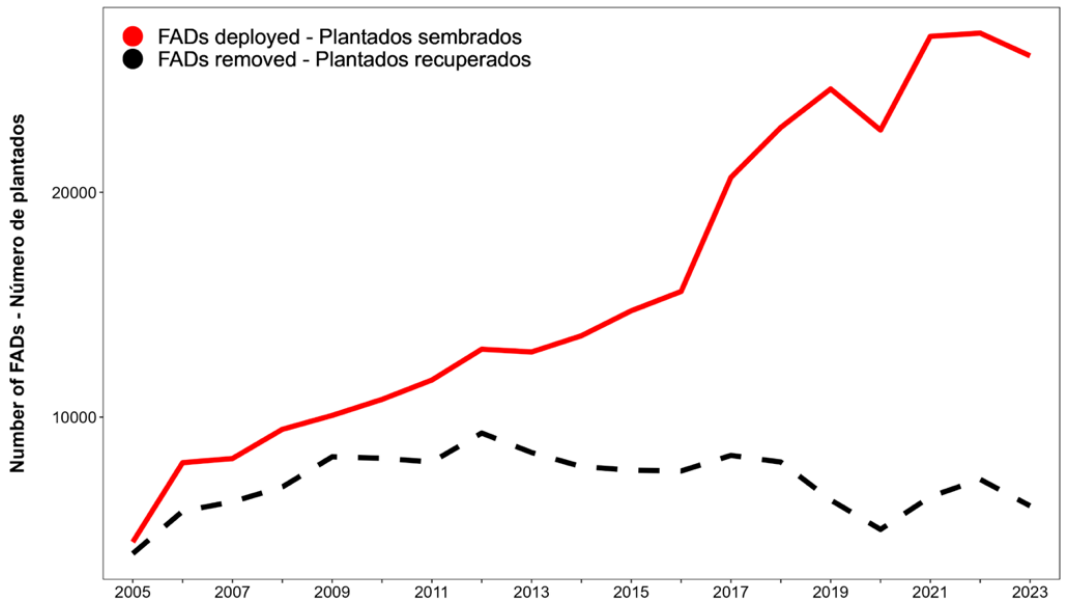

Figura 1. Deployed FADs and retrieved FADs (Lopez et al., 2023)

For the past two decades, fishers, scientists, managers, and NGOs have been working to minimize the impact of FAD structures through various measures, such as modifying

their structure to be non-entangling and made from biodegradable materials (ISSF, 2019; Moreno et al., 2020; Escalle et al., 2022; Roman et al., 2022; Zudaire et al., 2023). The tuna Regional Fisheries Management Organizations (RFMOs) in the Pacific have imposed limits on the number of active FADs in the water (CMM-2023-01 in the WCPFC and C-21-04 in the IATTC), including activation and deactivation criteria (IATTC, C-21-04). They have also implemented measures to modify FAD structures to eliminate their netting starting in 2024 in the WCPFC (CMM-2023-01) and 2025 in the IATTC (C-23-05). Furthermore, the IATTC has regulations for transitioning to biodegradable FADs starting in 2026 (C-23-04), while in the WCPFC, fleets are encouraged but not required to begin this transition.

Given the FAD fishing strategy, in which even with good practices, the loss or abandonment of a percentage of deployed FADs is inevitable, the need to recover these FADs before they impact coastal or benthic ecosystems is crucial (Figure 2). Currently, both in the Eastern and Western Pacific, participation in FAD recovery programs (FRPs) is recommended (CMM-2023-03 and C-23-03, respectively).

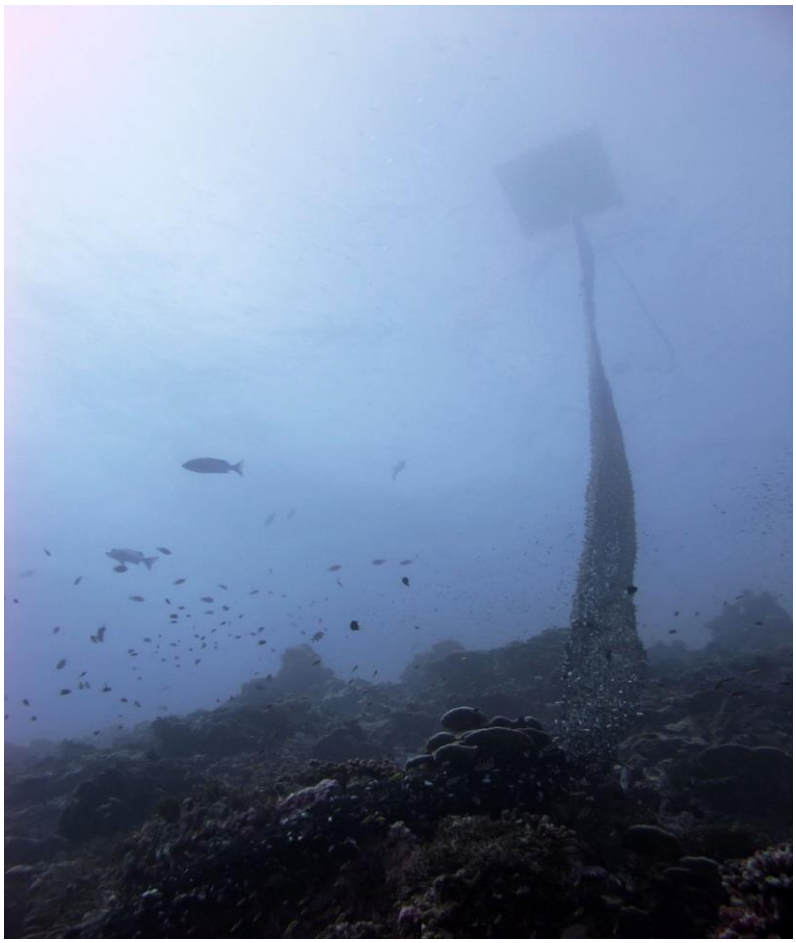

Figura 2. FAD stranding in a reef, Palmyra Island. *Photo: Kydd Pollock*

Three FAD recovery programs currently exist. The oldest is in the Indian Ocean, called *FAD Watch*, and two are in the Pacific Ocean, one on Palmyra Island and the other in the Galapagos, with the latter recently initiated. Given market requirements and RFMO recommendations, it is possible that fleets are now adhering to FRPs; however, the

criteria and minimum standards necessary for an effective FRP are unclear. This first meeting in Galapagos served to delve into this issue.

2. OBJECTIVES

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

To this end, we set two specific objectives:

1. Identify key elements and participants for a successful FRP.
2. Bring together a wide spectrum of stakeholders to foster discussion and collaboration.

3. RESULTS

The workshop considered FAD retrieval at two distinct points in the FAD lifespan, (i) while in the open ocean and (ii) once arriving to coastal areas or on land. FAD recovery needs to be understood to be a long-term initiative, and one that is capable of adapting to different FAD types and deployment strategies over time.

3.1.1 Actions Prior to FRP Implementation

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 a 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.

- *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 working closely with relevant authorities and developing a plan that clearly defines the program's scale, objectives, responsibilities, and a work plan and timeline, including waste management. Identifying program actors, 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 should include strategies for the project's maintenance and persistence over time.

- *Regulation and Legal Compliance*

In order to address regulatory implications and compliance, inclusions of legal experts in the process is critical. The legal analysis identifies existing laws and regulations affecting the program and establishes a solid basis for operating legally and sustainably over time. Proposing and establishing new regulations may be necessary for the program's success. Collaboration with RFMOs to modify or create regulations will be necessary. This joint effort ensures regional regulations effectively support recovery and conservation initiatives.

- *Identified Actors*

  - **Government and Authorities**: Fishery managers, Enforcing agencies, Marine Protected Area (MPA) Authorities, municipalities responsible for waste management, fishing licenses, affected communities, maritime salvage, the Navy.
  - **Industry**: Shipowners, shipowners' associations, fishers using FADs, artisanal fishers, seafood processing industry.
  - **Organizations and Regulators**: RFMOs, NGOs, regional organizations (FFA, PNA), marine debris collection projects.
  - **Tourism-Related Actors**: Tourism agencies, recreational boats, tour boats, diver boats.
  - **Science and Research**: RFMO scientists, NGO scientists, universities.
  - **Technology Providers**: Buoy providers for tuna vessels, tracking technology providers, trajectory visualization map providers, satellite services.

- *Coordination and Collaboration*

Coordination and collaboration among the actors identified are essential for a FRP's success. An initial important step is drafting memorandums of understanding that establish cooperation among involved parties. Defining confidentiality agreements are important. The cooperation and commitment of shipowners and fishing captains are crucial for successfully implementing these measures.

- *Research and Analysis*

A FRP should gather information and conduct research both at the start and throughout its life. 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.
- Continuous monitoring of FADs to know where they go if they do not strand.
- Study the impact of FADs on coastal ecosystems.

- Track the types of recovered FADs (design, materials, etc.).
- Developing key performance indicators (KPIs) is crucial research. These KPIs allow 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 promote transparency and program adaptation to new scenarios, facilitating progress and effectiveness.
- Collect and analyze the current state of existing knowledge gaps. This analysis helps identify areas where additional research is needed, allowing efforts to be effectively focused on continuously improving the program.
- Assess the carbon footprint of the various FAD recovery options.

- *Awareness and Socialization of the Program*

Finally, socializing the FRP is essential for raising awareness and education, fostering participation and collaboration among different involved actors, and ensuring compliance with established commitments. For example, workshops involving different actors, such as fishers, scientists, managers, 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 currently existing 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°, but Palmyra is located at 162°, hindering the monitoring and thus the retrieval of FADs in Palmyra.
  - A discussion on FAD deactivations and ownership (yet to be defined) is needed. Fleets working near the limit of active FADs may exceed this limit if FADs are not deactivated. One potential solution could be transferring ownership to third parties (RFMOs, NGOs, or other institutions). Another solution could be monitoring FADs using an independent beacon, like the NAOS beacon (CLS), which is cost-effective and allows long-term traceability.

- Real-time tracking platform: FRPs should have an operator who can view the real-time trajectory of abandoned FADs (regardless of the beacon brand) to recover them effectively and prevent impact (Figure 3). Technology providers showed during the workshop that this capability exists, similar to VMS for vessel monitoring.

- Reliable internet connection: Ensure a good internet connection for FRP operator on land to continuously obtain FAD positioning data.

- *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.
  - 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, and the navy to assist in the recovery program.

- *Data Management and Knowledge*

  - 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 to advance knowledge and raise awareness.

- *Program Management*

  - Indicators: Develop indicators to monitor program effectiveness.
  - Adaptive management: Continuously evaluate and adapt strategies based on indicators and results.
  - Cost: Calculate and continued to update actual program costs.
  - Waste management: Ensure proper waste management, supporting local communities in this task, 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 Zunibal).

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*.

3.2 FAD Recovery in open ocean

Recovering FADs in open ocean before they impact the coast is as crucial as recovering them from land. Good practices and collaborative actions could significantly reduce FAD loss and abandonment, minimizing not only environmental impact but also the economic costs of FAD retrieval programs on land.

During the workshop, participants organized into seven groups of mixed stakeholders, including fishers, buoy companies, scientists, NGOs, and government representatives, to identify actions facilitating FAD recovery in the open ocean. These actions were classified by actor type: vessel, shipowner, fleet, government, NGOs, and scientists.

Specific actions by actor:

- *Vessel Captains*

  - 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. In other words, follow the FAO guidelines for marking fishing gear. This allows for identifying the origin of a FAD that arrives onshore without a buoy.
  - A more exhaustive monitoring and share of FADs:
    - Share/sell FADs with other vessels before they leave the fishing zone.
    - Share "non-fishing" FAD locations, i.e those FADs that are beyond the fishing ground or out of the range of the fishing company, in a common platform to be used or recovered by other users.
    - 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 other in the FRP to design and improve the program.

- *Shipowners*

  - Form alliances with other companies for FAD recovery.
  - Share or sell FADs instead of deactivating them:
    – Within the region, IATTC or WCPFC, among different shipowner companies.
    – Among shipowner companies operating in different regions, such as those operating in the Eastern Pacific Ocean and selling FADs leaving their fishing zone to companies in the Western and Central Pacific.
  - Participate in a FAD recovery program.
  - Consider use of dedicated FAD recovery vessel owned by the company or shared among several companies.
  - Remotely sink the FAD (in the case of biodegradable FADs).

- *Different Fleets in the region*

  - Cooperation for FAD recovery in open ocean, regionally and pan-Pacific.
  - Share recovery vessels
  - Create a platform for reusing unwanted or abandoned FADs "non-fishing FADs" to be used by other interested parties (oceanographers, other fishers) or to recover them.
  -

- *Government*

  - Incentivize recoveries through conservation measures and legislative changes.
  - Establish a FAD registry.
  - Manage waste disposal once in port.
  - Ensure compliance with requirements.
  - Set up a FAD monitoring center.

- *NGOs*

  - Coordinate efforts among actors.
  - Support with research and funding.
  - Transfer knowledge between fleets.
  - Raise awareness about impacts and push for change.

- *Scientists*

  - Identify high-impact and high-loss deployment areas.
  - Study FAD trajectories to predict their potential stranding in areas of interest.
  - Identify FAD loss hotspots at sea.

4. FUNDING FOR FAD RECOVERY PROGRAMS

During the workshop, the potential funding sources for FRP 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 differing opinions regarding the responsibility for strandings. While some participants saw the extractive sector as solely responsible, others considered that other beneficiaries, such as buoy selling companies, tuna buying and processing industries, and countries selling licenses, should also share responsibility.

One participant highlighted the need to consider Extended Producer Responsibility (EPR) for this case. EPR is an approach that requires manufacturers and beneficiaries of a product to take responsibility for managing the products they market, even after consumer use and when they become waste. This strategy aims to include all estimated environmental costs associated with a product throughout its lifecycle. These social costs are often externalities to market mechanisms.

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. Additionally, adding a surcharge to the current cost of geolocating buoys to fund recovery programs was considered.

The potential use of abandoned FADs or "non-fishing FADs" that have left the fishing zone in other scientific areas, such as ocean current tracers or pelagic ecosystem observers (Moreno et al. 2016, Imzilen et al. 2019), was also proposed. The data collected by the FADs would be of significant value to physical oceanographers 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 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:

- 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.
- Regulate the deactivation or end of monitoring of the FAD in a way that allows and enables for 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 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 charge the science bodies for preparing a FRP work plan.

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:

- The inclusion of as many stakeholders and fleets as possible will result in the most success.
- Create specific work plans, budgets and pilot projects to make progress.
- Present the workshop report to all tuna RFMOs to promote a unified global discussion and ensure synchronized progress.
- 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.

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Appendix: List of participants

Name and surname	**Company or institution it represents**
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/Corpag
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.
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Mariana Vera-Zambrano	Conservación Internacional - Galapagos Nature Positives Economies Model
Mauricio Castrejón	Universidad de las Américas, Ecuador
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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