FADs retrieval from the tuna purse seine fishery in the Galapagos Islands (2022 – May 2025)

Authors: Guillermo Moran Velásquez, Jazmín Bastidas Medina and Grace Unda

Foundation for Tunas Conservation (TUNACONS)

Abstract

This study describes the development, implementation and results of the technical-operational model for the recovery of FADs in the Galapagos Islands, Ecuador, during the period 2022 to May 2025 only with the TUNACONS member fleet. The objectives, technical rationale, actors involved, efficiency indicators and comparisons with similar projects in other oceans are analyzed. The results highlight a good recovery rate, community integration and contribution to marine sustainability, although challenges are identified to improve efficiency in the long term.

Keywords: Plantados, sustainability, artisanal fisheries, Galapagos, marine conservation, recovery of FADs.

Introduction

The use of drifting Fish Aggregator Devices (FADs) is a common practice in industrial tuna purse seine fishing worldwide. While these devices are effective in attracting large concentrations of pelagic fish, they can also be a significant threat to marine ecosystems when they move uncontrollably into marine protected areas or tourist island areas. This problem is not unique to the Galapagos Islands, but is also seen in other oceans, including sensitive areas such as the Fernando de Noronha Archipelago National Park in the South Atlantic, the Maldives Islands in the Indian Ocean, and parts of the Great Barrier Reef in the Central and Western Pacific. In these regions, the FAD can run aground on coral reefs, tourist beaches or areas of high biodiversity, generating negative impacts such as the physical destruction of habitats, plastic pollution and alterations in local ecological dynamics (The Nature Conservancy, 2022; IOTC, 2023; WCPFC, 2024).

In response to this problem, the *Caring for Galapagos Initiative* was launched as a recommendation of the Third Galapagos National Fisheries Summit in January 2021. This initiative was promoted with the support of key actors in the fishing sector, including the National Chamber of Fisheries (CNP), The National Federation of Artisanal Fishing Associations of Ecuador (FENACOPEC), Association of Tuna Shipowners of Ecuador (ATUNEC), Foundation for Tunas Conservation (TUNACONS), World Wildlife Fund (WWF-Ecuador) and The Corporation of Galapagos Artisanal Fishing Organizations (CORPAG), with the aim of reducing the negative impacts of FADs in the coastal marine areas of the Galapagos Islands. As an essential component of this initiative, the

implementation of a FADs Retrieval Program was defined, designed to minimize the risks of contamination and grounding, and to strengthen the capacities of local fishing cooperatives in the sustainable management of their fisheries within the Galapagos Marine Reserve.

In addition, the TUNACONS Foundation assumed the leadership in the technical implementation and the search for funding with initial support from the CNP and WWF Ecuador to make this initiative possible, developing the operational model for the recovery of FADs and promoting strategic alliances to ensure its long-term sustainability. This comprehensive approach has made it possible to integrate local fishing communities, strengthen their technical capacities and promote a circular economy based on marine sustainability.

Methodology

The technical-operational model for the recovery of FADs was designed by TUNACONS under technical advice, with the active participation of the artisanal fishing organizations of Galapagos, to structure a comprehensive management approach that assigns specific functions to the actors involved. The objective is to manage in an orderly manner the fish aggregator devices (FAD) that are reported to be adrift or at risk of stranding in sensitive areas of the Galapagos Islands (see figure 1).

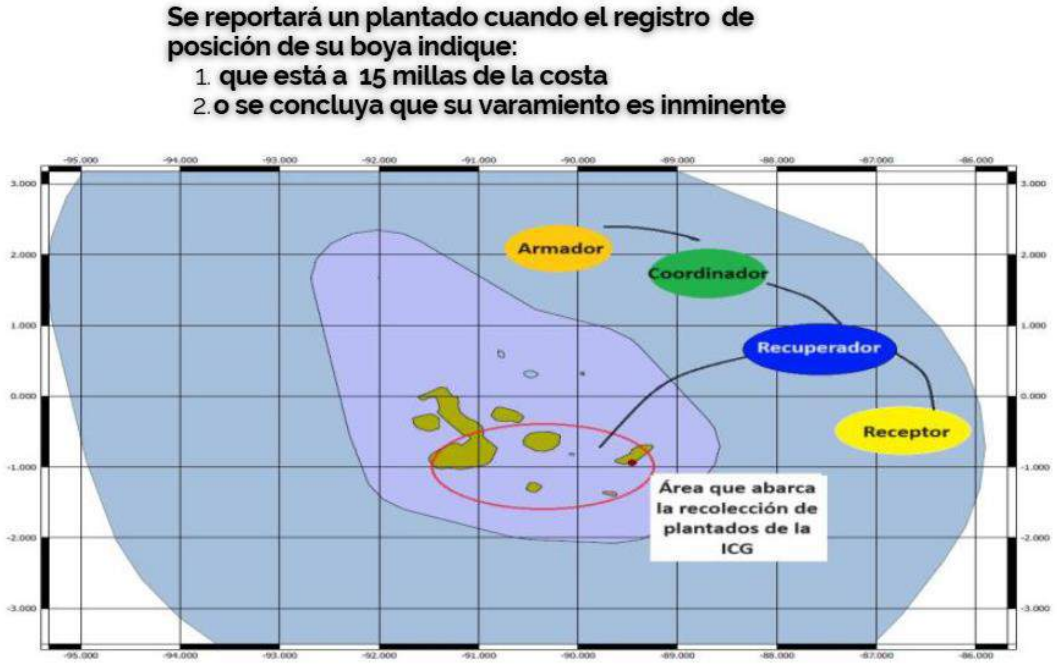

Figure 1 *Operational zoning and assigned roles by area in the recovery of FADs*

The operational protocol for the recovery of FADs defines a series of clear steps from the initial report to the final disposal of the recovered material, ensuring traceability and technical control in each phase (see fig. 2 and 3). Steps include:

1. FADs Detection: Identification and initial reporting.

2. Coordinate Communication: Transmission of precise location.
3. Recovery Team Activation: Deployment of the nearest team.
4. Physical Recovery: Rescue of the FAD at sea.
5. Dock Delivery: Transfer of recovered materials.
6. Classification and Final Disposal: Proper handling according to type of material.

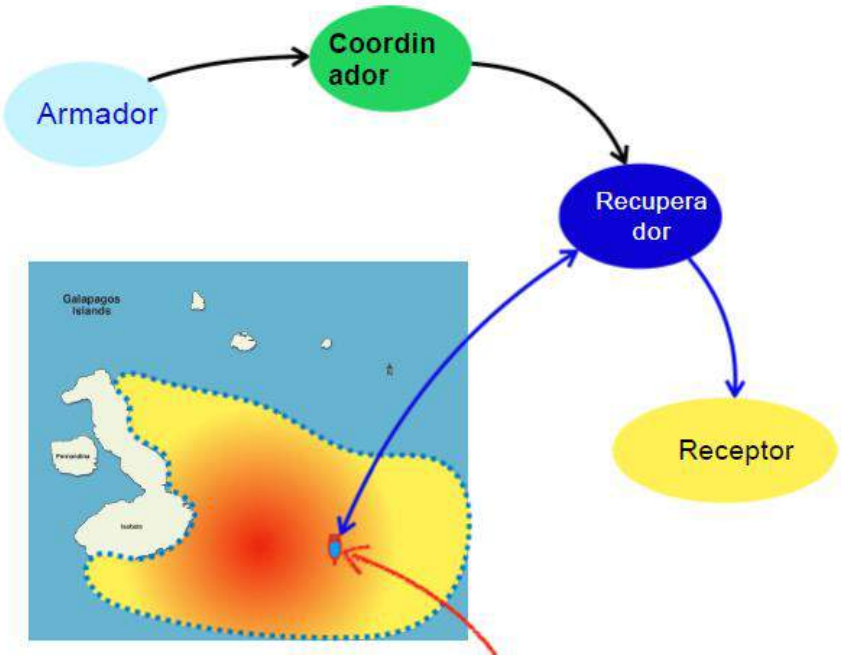

Figure 2: *Communication flow between key actors in the recovery model*

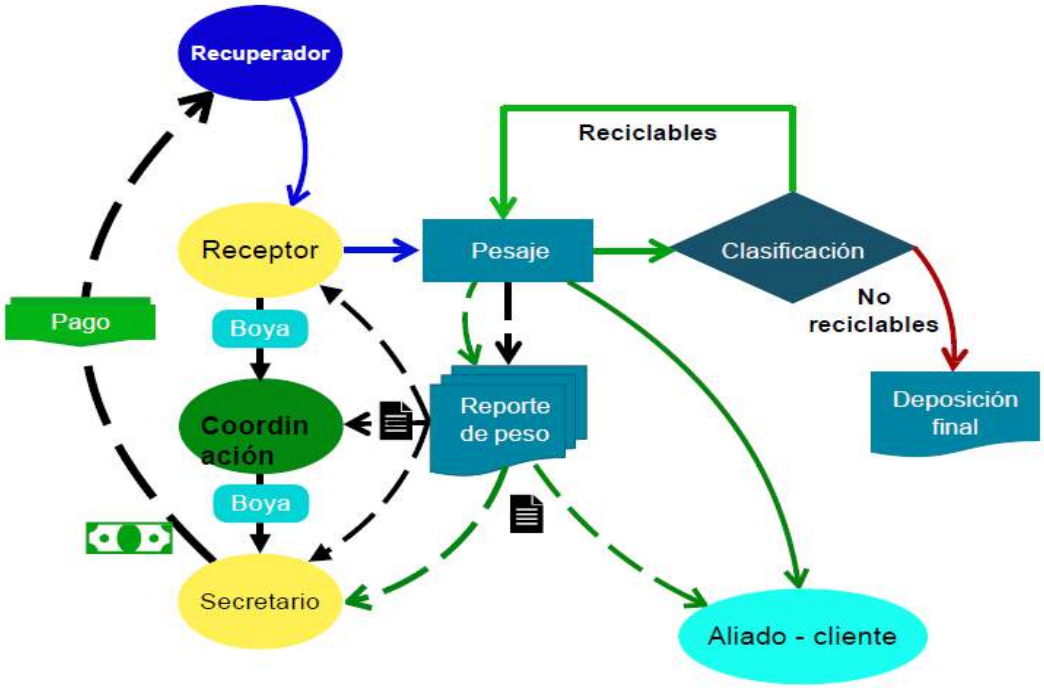

Figure 3 *Flow diagram of the technical process of recovery, weighing and classification of FADs*

Operation Scenarios by Location and Complexity

Based on the operational experience documented between 2022 and May 2025, three scenarios were established that allow the logistics and payments to the reclaimer for expenses and service by the shipowner to be adjusted, according to the location and complexity of each site:

Scenario	Description	Payment for Recovered Planting
Scenario A	FADs reported within a 15-mile radius of shorelines or at risk of stranding.	**MX $454**
Scenario B	FADs recovered during regular fishing activities.	**$300**
Scenario C	FADs in remote areas or outside the usual fishing areas.	**Up to $600**, depending on the complexity of the recovery.

These scenarios were designed to optimize the use of resources and minimize response times, considering factors such as distance to the recovery point, sea conditions, and equipment availability.

Results

To present in a more structured way the achievements and learnings of the FAD recovery project in the Galapagos Islands, the results have been divided into five sections:

1. General Recovery Indicators

During the implementation period (2022 to May 2025) with the TUNACONS member fleet, a total of 49 FADs were recovered, preventing the dispersal of approximately 4,985.17 kg of materials into the ocean. This represents an 89.1% efficiency in the recovery of reported FADs. However, this number of recovered FADs represents only 0.08% of the total FADs deployed by the TUNACONS member fleet in the Tropical Eastern Pacific, highlighting the importance of continuing to strengthen retrieval efforts to minimize environmental impacts.

2. Community Participation and Local Strengthening

Galapagos fishing cooperatives, such as CORPAG, have played a critical role in the implementation of the model, contributing local knowledge and operational logistics to improve recovery rates. This participation has made it possible not only to increase recovery rates, but also to strengthen the technical and organizational capacities of local communities, promoting greater awareness of marine sustainability and creating new economic opportunities. Approximately 85 artisanal fishermen have participated on board 20 different boats, acting as reclaimers of FADs.

3. Environmental Impact and Waste Reduction

The project has succeeded in preventing the dispersion of nearly 5 metric tons of marine debris in the waters of the Galapagos Islands, significantly reducing the risk of plastic pollution and damage to sensitive marine habitats. This directly contributes to the conservation goals of the Galapagos Marine Reserve and reinforces the fishing fleets' commitment to sustainable practices.

4. Economic Efficiency and Operating Costs

The project has proven to be economically efficient, with operating costs controlled thanks to the integration of local resources and the use of appropriate technologies for monitoring and recovery. Accrued costs include payments to reclaimers, equipment acquisition, and logistical expenses, which have been optimized through the use of community networks and collaboration schemes with other actors in the fisheries sector.

5. Annual Recovery Detail

Below is an annual summary of the alerts received, FADs recovered, weight collected, and payments made to reclaimers between 2022 and May 2025:

Year	No. of Alerts	Recovered FADs	Lost FADs	Weight Collected (kg)	Amount Paid to Recuperators
2022	**13**	**12**	**1**	**1.407,01**	**$5.734,00**
2023	**15**	**11**	**4**	**1.027,55**	**$4.016,00**
2024	**20**	**19**	**1**	**1.952,61**	**$8.432,00**
2025	**7**	**7**	**0**	**598,00**	**$2.468,00**
Total	**55**	**49**	**6**	**4.985,17**	**$20.650,00**

In addition, Figure 4 is included below, which presents a visual comparison of the weight collected and the payments made to the reclaimers during the same period.

Figura 4 *Comparativo de peso recolectado y pagos realizados por recuperación de plantados (2022 – mayo 2025)*

Figure 4: Comparison of weight collected, and payments made for the recovery of FADs (2022 – May 2025)

Discussion

The results of the project highlight the importance of combining advanced technology with local knowledge to improve efficiency in the recovery of FADs. Although the results are encouraging, the relatively low percentage of FADs recovered compared to those deployed reflects a significant challenge for conservation efforts. In addition, opportunities were identified to improve traceability and accuracy in monitoring, as well as to strengthen collaboration networks with other ocean regions facing similar problems.

Compared to models implemented in other oceans, such as FAD recovery projects in the Indian Ocean, Atlantic, Western and Central Pacific, there are important differences in the approaches adopted. For example, the Indian Ocean Tuna Commission (IOTC) has prioritized the use of advanced satellite monitoring and traceability technologies, achieving high levels of accuracy in the location of FADs, although with challenges in terms of high operating costs and dependence on imported technologies (IOTC, 2023). On the other hand, the International Commission for the Conservation of Atlantic Tunas (ICCAT) has focused its efforts on collaboration with local fishing communities, promoting economic incentive schemes to encourage the recovery of FADs, which has improved community participation and the integration of traditional knowledge in recovery processes (ICCAT, 2023).

In the case of the Western and Central Pacific, the Western and Central Pacific Fisheries Commission (WCPFC) has implemented innovative programs that include the use of drones and electronic tracking systems to monitor the movements of FADs, combining advanced technology with community-based approaches to improve recovery rates (WCPFC, 2024). However, these efforts also face significant challenges, such as international coordination between multiple member states and the high costs associated with implementing advanced technologies in remote areas.

In addition, *The Nature Conservancy* has developed the FAD Watch program in the Palmyra Atoll, located in the Central Pacific. This program focuses on the recovery of fish aggregator devices (FADs) to protect sensitive marine ecosystems. Through a collaboration between the fishing industry and conservation organizations, FADs are tracked in real time to intercept them before they damage coral reefs. This approach has proven effective in reducing marine pollution and protecting marine protected areas.

The Galapagos model, in contrast, has struck a balance between technology and community participation, leveraging local knowledge to improve operational efficiency without relying exclusively on advanced technologies. This has made it possible to maintain lower costs and greater adaptation to local conditions, although with challenges in terms of coverage and accuracy of satellite monitoring. This experience suggests that hybrid approaches, which combine technology and community engagement, can deliver more sustainable results in the long term.

Key findings

1. Efficiency of the Recovery Model

The Galapagos Islands Plant Recovery Model has proven to be effective in mitigating marine pollution in coastal marine areas, achieving a recovery efficiency of 89.1% during the period analyzed (2022 - May 2025). This positions the project as a benchmark in the management of FADs in marine protected areas, highlighting its ability to reduce marine debris and minimize environmental impact.

2. Community Participation and Local Strengthening

The project has been successful in integrating local fishing communities, such as Galapagos cooperatives, into recovery processes. This participation has strengthened the technical capacities of fishermen, improved their knowledge of marine sustainability and creating new economic opportunities. The focus on the participation of local institutions such as municipalities has been a key factor for the success of the model.

3. Technological Innovation and Traceability

Despite technological limitations, the model has managed to develop effective monitoring and recovery systems, including the use of satellite technologies for the identification and location of FADs. However, opportunities are identified to improve long-term accuracy and traceability through the integration of more advanced technologies and georeferenced data.

4. Challenges and Opportunities for Continuous Improvement

Analysis of the model's performance reveals several challenges, including high operating costs, difficulties in remote monitoring, and the need to strengthen collaborative networks with other ocean regions. These challenges offer opportunities to innovate in logistics processes, optimize recovery routes, and explore new technologies to improve operational efficiency.

5. Recommendations for Future Implementations

- Expand regional collaboration to include other fishing fleets operating in the waters around the Galapagos area.
- Strengthen the development of similar programs in other areas of the Galapagos Marine Reserve to scale the positive impact.
- Continue to strengthen the technical capacities of the waste pickers through training in new technologies.
- Improve traceability through more accurate technologies for satellite monitoring and georeferenced data management.
- To foster local and international collaboration networks to share experiences and best practices in the management of FADs.

References

1. Indian Ocean Tuna Commission (IOTC). (2023). *Guidelines for FAD Management and Recovery in the Indian Ocean*. Disponible en: https://www.iotc.org/documents/fad-management-guidelines
2. International Seafood Sustainability Foundation (ISSF). (2024). *Best Practices for FAD Recovery and Sustainable Tuna Fisheries*. Disponible en: https://www.iss-foundation.org/resources
3. International Commission for the Conservation of Atlantic Tunas (ICCAT). (2023). *Management and Recovery of FADs in the Atlantic Ocean*. Available in: https://www.iccat.int/en/docs/fad_management.html
4. Western and Central Pacific Fisheries Commission (WCPFC). (2024). *FAD Management Guidelines and Electronic Monitoring Systems for the Western and Central Pacific*. Disponible en: https://www.wcpfc.int/fad-management
5. TUNACONS. (2025). *Technical-Operational Model for the Recovery of FADs in the Galapagos Islands*. TUNACONS Foundation, Guayaquil, Ecuador.
6. WWF Ecuador. (2024). *Assessment of the Impact of FADs in Galapagos Protected Areas*. WWF Ecuador Foundation, Quito, Ecuador.
7. The Nature Conservancy. (2022). *Passing FAD: Partnership Protects the Reef at Palmyra Atoll*. Disponible en: https://blog.nature.org/2022/03/28/passing-fad-partnership-protects-the-reef-at-palmyra-atoll/
8. The Nature Conservancy. (2023). *The Nature Conservancy Announces Expansion of First dFAD Partnership*. Disponible en: https://blog.nature.org/2023/06/18/the-nature-conservancy-announces-expansion-of-first-dfad-partnership/
9. The Nature Conservancy. (2024). *How to Catch a Wild dFAD*. Available in: https://blog.nature.org/2024/10/21/how-to-catch-a-wild-dfad/
10. The Nature Conservancy. (2024). *Enhancing the Effectiveness of Blue Water Marine Protected Areas*. Disponible en: https://blog.nature.org/science-brief/enhance-the-effectiveness-of-blue-water-marine-protected-areas/