DOCUMENT FAD-10-04

OPTIONS FOR FAD MARKING IN THE IATTC

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This document was produced by the IATTC staff in response to a FADWG-9 recommendation, endorsed by the SAC-16 that, "*The pros and cons of the implementation of different methods for marking FADs be explored.*"

CONTENTS

SUMMARY

Fish aggregating devices (FADs) are man-made floating objects deployed to attract and aggregate tropical tunas. Their use has expanded substantially in the purse-seine fishery since early 2000s, prompting the IATTC to adopt various management measures, including the requirement that all FADs be identified at deployment via the satellite buoy ID under Resolution C-19-01.

At its 9th meeting (La Jolla, May 2025), the FAD Working Group concluded that a dedicated IATTC FAD register was not currently required, given that the existing observer and buoy-based system acts as a *de facto* FAD register and already addresses most key scientific and management needs (see FAD-09-03). The Working Group, however, recommended that *"the pros and cons of the implementation of different methods for marking FADs be explored"*. This document is presented in response to that recommendation.

Seven broad categories of FAD marking approaches are reviewed: (i) physical ID tags, (ii) electronic and RFID tagging, (iii) remote electronic identification using long-range radio (e.g. LoRaWAN), (iv) QR codes and barcodes, (v) the existing satellite buoy-based identification system, (vi) visual color coding, and (vii) hybrid systems combining two or more of the above. For each approach, advantages, disadvantages and IATTC-specific implementation considerations are described. A brief overview of FAD marking practices across other tuna RFMOs is also provided, complemented by a short review of fishing gear marking approaches developed by FAO and ICES.

No single marking method is without limitations. Physical and electronic marking can provide permanent unique identifiers for the FAD structure, but may require new regulatory obligations, hardware, observer protocols and resources. The current buoy-based system is robust and operationally well-established but does not assign a permanent identity to the physical FAD structure. Visual color coding alone is insufficient for individual FAD identification but can complement other approaches. Hybrid systems offer redundancy at the cost of greater complexity.

The IATTC staff does not recommend a specific marking method at this stage, beyond the current buoy-based identification/marking system. The most appropriate approach will depend on the objectives the Commission wishes to achieve through FAD marking and the level of change and resources that CPCs and the Secretariat are prepared to commit and invest in. Should the Commission wish to move forward, the staff suggests that the specific objectives of FAD marking be clarified prior to selection of a technical approach. This document is presented as a foundation for discussion within the FAD Working Group and the Commission, as appropriate.

1. INTRODUCTION

Monitoring of FADs at sea has become an increasingly important component of FAD management across tuna RFMOs. At the IATTC, Resolution C-19-01 requires that all FADs be identified at deployment using either the satellite buoy ID or a unique alphanumeric code provided by the Secretariat. This system, supported by 100% mandatory observer coverage on Class 6 purse-seine vessels and approximately 40-55% voluntary coverage on Class 1-5 vessels, has allowed the IATTC staff to track approximately 150,000 unique FAD lifespans since 2019 (see FAD-09-02). From those, only 4–7% of the observer-reported FAD records were flagged as having discrepancies that prevented reliable tracking (i.e., ~93–96% of records were usable for tracking; FAD-09-02). Note that only 0.09% of all FADs deployed in the EPO since 2019 had no buoy attached to it observed (required by Resolution C-19-01). During visits, only ~1.5% of FAD visited FADs were lacking a buoy; buoy ID was available to the observer 99.52% of the times when the buoy was present.

As described in FAD-09-03, the main limitation of the current marking system is its inability to assign a permanent identifier to the physical structure of the FAD itself. If a satellite buoy is replaced without observer presence, the physical identity of that unit is effectively lost. A permanent physical or electronic marking system could partially address this gap, enabling tracking across multiple deployments, "ownership" and associated potential accountability discussions, and improved monitoring of the total number of unique physical FADs in operation — provided that the marked component remains attached to a cohesive FAD structure. Where a FAD breaks apart at sea, any marker affixed to one component (physical tag, RFID chip, or buoy) can no longer identify the unit as a whole, so no marking system can fully resolve identity loss arising from structural disintegration.

At its 9th meeting (May 2025), both the staff and the FAD Working Group/Scientific Advisory Committee (SAC) concluded that the existing IATTC system covers most key scientific and management needs without requiring a formal FAD register. At the same meeting, the FAD Working Group, endorsed also by the SAC, recommended that *“the pros and cons of the implementation of different methods for marking FADs be explored”*. This document responds to that mandate.

2. FAD MARKING IN OTHER TUNA RFMOs

To date, no tuna RFMO requires the physical marking of FAD structures with permanent unique identifiers. FAD identification across RFMOs is achieved primarily through the satellite buoy ID, with varying degrees of observer verification and reporting requirements. Table 1 summarizes the current state of FAD marking and identification practices across the four main tuna RFMOs.

TABLE 1. Comparison of FAD marking/identification practices across tuna RFMOs.

RFMO	Marking method	Mandatory?	Status	Notes
IOTC	Satellite buoy ID; no physical FAD marking required under Res. 24/02	Yes (buoy ID only)	Implemented	No requirement for permanent physical marking of the FAD structure; physical marking under active discussion. A buoy-level FAD register is in pilot phase (2025), with full implementation expected January 2026.
ICCAT	Satellite buoy ID; no standardized physical marking required	Partial (logbook reporting)	Implemented	Buoy ID reporting in logbooks required; physical FAD marking not mandated. Some CPCs apply national markings voluntarily.
WCPFC	Satellite buoy ID; some CMMs reference vessel-specific markings	Partial	Implemented	CMM 2022-01 requires FAD identification via buoy ID. No standardized physical marking. PNA operates a buoy registration scheme requiring buoy owners to register and report to national authorities.
IATTC	Satellite buoy ID per Resolution C-19-01; no physical marking currently used, a unique code could be requested to the Secretariat	Yes (buoy ID per C-19-01 or unique code provided by the Secretariat)	Implemented	Current system (Buoy ID-based) has tracked ~150,000 FAD lifespans since 2019 using buoy IDs (see FAD-09-02)(~95% of successful tracking; only 0.09% of FAD deployments without buoys attached observed since 2019; buoy ID available 99.52% of times; FAD without buoy only ~1.5% of visits). Physical marking of FAD structures not currently required; a unique code could be requested to the Secretariat.

The lack of physical marking requirements across all RFMOs reflects both the practical challenges of marking objects deployed at sea and the historical reliance on electronic, buoy-based identification. Interest in more robust physical marking systems is, however, growing, particularly in the context of increasing FAD numbers, the transition to fully biodegradable FADs, stranding concerns, and ongoing discussions on ownership and accountability.

3. FISHING GEAR MARKING IN OTHER RELEVANT ORGANIZATIONS

While no tuna RFMO currently requires permanent physical marking of FAD structures, broader fishing gear marking has been addressed by other international bodies, most notably the Food and Agriculture Organization of the United Nations (FAO) and the International Council for the Exploration of the Sea

(ICES). Their work focuses primarily on passive and static gears (gillnets, traps, longlines) rather than on FADs, but the underlying principles and technical options are relevant to the present discussion.

The FAO Voluntary Guidelines on the Marking of Fishing Gear, endorsed by the Committee on Fisheries in 2018, provide a non-binding framework for States and RMFOs to implement gear marking with the dual objectives of identifying gear ownership and reducing abandoned, lost or otherwise discarded fishing gear (ALDFG). The Guidelines envisage a flexible toolbox combining physical identifiers (engraved tags, embedded codes), electronic systems (RFID, satellite-linked transponders) and standardized visual elements, applied proportionally to risk and fishery context.

ICES, through its Working Group on Marine Litter (WGML) and its Working Group on Fishing Technology and Fish Behavior (WGFTFB, formerly FAST), together with related expert groups, has reviewed gear-marking technologies and ALDFG mitigation approaches in North Atlantic fisheries, with practical lessons on tag durability, reader interoperability and data management that are transferable to FAD contexts.

These frameworks are not directly prescriptive for tropical tuna fisheries but are useful as a complement to RFMO-specific approaches, particularly on standardization, durability requirements and ALDFG considerations.

4. OPTIONS FOR FAD MARKING

The following section describes seven broad categories of FAD marking approaches. These categories are not mutually exclusive, and combinations could in fact be used to address different operational objectives simultaneously. In most of the cases, a robust attachment method, capable of withstanding the dynamic forces and degradation processes experienced by FADs at sea, would also need to be developed. A summary comparison, including advantages, disadvantages and IATTC-specific implementation considerations, is provided in Table 2.

4.1. Physical marking / Unique ID tags

Physical marking involves affixing a durable tag or plate bearing a unique alphanumeric code to the FAD structure at the time of construction or prior to deployment. Materials must be resistant to UV radiation, saltwater immersion, biofouling, and mechanical wear. Stainless steel engraved plates, hard-anodized aluminum tags, and high-durability UV-resistant polymer labels have been used in other marine contexts (e.g. vessel hull markings, gear identification in some lobster and crab fisheries) (FAO, 2019). Resolution C-19-01 already provides for this approach as an alternative to the satellite-linked buoy ID: vessels may request a unique alphanumeric code from the IATTC Secretariat and are required to apply it to the FAD using letters of at least 5 cm in height, painted with epoxy or equivalent durable material. In practice, however, this provision has not been used by any operator, and all FADs deployed in the EPO continue to be identified via the satellite buoy ID. The existence of the unused C-19-01 alternative therefore indicates that the regulatory pathway for physical marking is already in place, but that uptake has been negligible in operational conditions.

4.2. Electronic / RFID tagging

Radio-frequency identification (RFID) chips can be embedded within FAD structures during or after construction, providing a tamper-resistant and electronically readable unique identifier. RFID is widely used in supply-chain management and is increasingly being explored for marine gear tracking. Near-field communication (NFC) tags offer similar functionality and are readable by standard smartphones. Both technologies require close proximity for reading and are therefore not suitable for remote identification.

4.3. Remote electronic identification (long-range radio)

Longer-range radio technologies can transmit a buoy or FAD identifier from the floating unit to an approaching vessel without requiring observers to physically scan a tag. The IATTC staff, with Satlink and Digital Observer Service, trialed this approach using LoRaWAN at the Achotines laboratory (Panama), achieving >75% detection probabilities at 500–750 m for status signals and 100–500 m for location data (see FAD-08-03). Ranges were deliberately constrained so that identification occurs only at vessel-approach distances and the technology cannot be used for active remote FAD searching. Potential advantages include integration with EM systems, multi-year battery life and tamper-resistance; limitations include sea-state sensitivity, performance variability and current dependence on internet connectivity. The staff has recommended LoRaWAN for automatic remote FAD-buoy identification at ≤500 m. Unless the technology is used outside of the buoy, identification remains tied to the satellite buoy rather than the physical FAD structure.

4.4. QR codes / Barcodes

Waterproof QR codes or barcodes printed on marine-grade substrates can encode multiple data fields (e.g., FAD ID, vessel, date of manufacture) in a compact, scannable format. Their main advantages are very low cost and compatibility with smartphone-based scanning, requiring no specialized equipment. Their main limitation is durability at sea; protective lamination or housing is needed to extend longevity, extensive logistical needs, and replacement protocols would need to be established.

4.5. Satellite buoy-based identification

The existing buoy-based system already tracks FADs at near-complete coverage (~96% of observer-recorded interactions retain a usable buoy-ID linkage; FAD-09-02), and represents the IATTC's established and de facto FAD marking mechanism under Resolution C-19-01. Note that only 0.09% of all FADs deployed in the EPO had no buoy attached to it observed (required by Resolution C-19-01). During visits, only ~1.5% of FAD visited FADs were lacking a buoy; buoy ID was available to the observer 99.52% of the times when the buoy was present. Targeted, incremental refinements—such as minor adjustments to observer protocols for recording buoy replacements and closer linkage of observer-reported buoy IDs with the raw satellite buoy data submitted under Resolutions C-21-04 and C-24-01 (now C-25-01) could further consolidate this performance at minimal cost. These refinements would not resolve the lack of a permanent identifier tied to the physical FAD structure, but, given current tracking levels and management framework, the case for substantial enhancement of the buoy-based identification system is limited.

4.6. Color coding / Visual marking

Standardized color schemes or visual patterns applied to FAD components (e.g., floating structure) can facilitate at-sea attribution to a vessel, flag, company or FAD category (e.g. biodegradable status) without the need for scanning equipment. This approach can be particularly relevant, for example, for aerial monitoring and stranding event attribution. It cannot, however, provide unique individual identification and is therefore insufficient as a standalone marking system.

4.7. Hybrid marking systems

A hybrid approach combining two or more of the above methods could provide redundancy and address different operational needs simultaneously. For example, a permanent physical tag providing a unique ID could be combined with a color-coded visual indicator for fleet attribution and a QR code to facilitate rapid scanning during observer interactions. If desired, a phased implementation, starting with low-cost elements and progressively adding electronic components, could reduce the initial resource burden.

5. COMPARATIVE ASSESSMENT OF FAD MARKING OPTIONS

Table 2 provides a comparative summary of the seven marking approaches described above. For each option, the table includes a brief description, main advantages, main disadvantages and specific considerations relevant to IATTC implementation, including economic, logistical, regulatory and operational dimensions.

TABLE 2. Summary of FAD marking options: description, advantages, disadvantages and IATTC implementation considerations.

Marking option	Description	Advantages	Disadvantages	IATTC implementation considerations
Physical marking / Unique ID tags	Durable tags, plates or painting (e.g. engraved metal, UV-resistant polymer, epoxy paint) bearing a unique alphanumeric code, affixed to the FAD structure at construction or prior to deployment. Resolution C-19-01 already includes this approach partially (Secretariat-issued unique code, ≥5 cm letters in epoxy paint or equivalent), but no operator has used it in practice; all FADs are marked via the satellite buoy ID.	• Direct link between the physical FAD structure and a permanent identity • Low per-unit cost if standardized • Compatible with existing observer data collection • Applicable to all FAD types • A version of this already in C-19-01	• Tags can be lost, damaged, or become illegible (UV, biofouling, mechanical wear) • Requires observers/skippers to physically locate and record the ID • Does not enable remote tracking • Limited verification in absence of observer coverage	• Regulatory pathway already exists under Resolution C-19-01 (Secretariat unique code; ≥5 cm letters; epoxy paint or equivalent), but uptake to date has been negligible • Standardized tag format and placement could be reaffirmed or refined in a future Resolution • Significant coordination with CPCs and industry for implementation • Observer training to systematically locate and record physical IDs • Linkage to existing buoy-ID data in IATTC data systems would need to be addressed • Cost mechanisms may be needed

Electronic / RFID tagging	Radio-frequency identification (RFID) chips or near-field communication (NFC) tags embedded in FAD structures. Readers (handheld or fixed) scan tags at close range during interactions.	• Unique, tamper-resistant identification • Faster and more reliable than manual ID reading • Reader devices increasingly inexpensive • Can be integrated into observer workflows • Resistant to biofouling if properly embedded	• Higher per-unit cost than physical labels • Requires reader hardware on vessels and/or for observers • Short read range (cm to m); not suitable for remote identification • Saltwater and pressure can degrade performance over time • Standardization of chip type and reader compatibility needed across fleets	• Procurement and distribution of readers to observers and/or vessels • Reader maintenance and replacement protocol needed • Resolution would need to specify chip standards (frequency, format, data fields) • Pilot testing in EPO conditions (saltwater immersion, depth, temperature) recommended before fleet-wide deployment • Data transfer protocol from readers to IATTC database to be defined
Remote electronic identification (long-range radio)	Low-power radio sensor (e.g. LoRaWAN) mounted on the satellite buoy or the FAD transmits the buoy/FAD ID and ancillary data to a gateway/receiver installed on a vessel approaching the FAD. Read range deliberately limited to vessel-approach distances (~100–500 m) to avoid enabling active remote searching. Pilot-tested by IATTC at the Achotines laboratory with Satlink and Digital Observer Service (FAD-08-03).	• Automated, observer-independent capture of buoy ID at vessel-approach distances • High detection probability (>75%) at 500–750 m for status data and 100–500 m for location data • Long sensor battery life (up to 10 years) • Tamper-resistant; compatible with mass production • Could be Integrated with electronic monitoring (EM) workflows • Addresses a long-standing data quality issue (remote automatic buoy-ID capture) • Same reader infrastructure could support other onboard data collection (e.g. electronic scales)	• Sensor and gateway specifications (frequency band, protocol, data fields, max range) would need to be standardized • Coordination with buoy/FAD manufacturers needed to embed sensors at production • Integration with the existing buoy-ID data flow (Resolutions C-21-04, C-24-01, now C-25-01) to be defined	• Sensor and gateway specifications (frequency band, protocol, data fields, max range) would need to be standardized in a future Resolution • Protocols needed for placement in FAD structures • Pilot extension from Achotines to operational EPO conditions recommended before fleet-wide deployment • Procurement and installation of reader hardware (gateway/hub) on vessels, with maintenance and replacement protocol • Integration with the existing buoy-ID data flow to be defined • Could be deployed as a low-burden upgrade path complementing the existing buoy-based identification system
QR codes / Barcodes	Waterproof QR codes or barcodes printed on durable substrates (e.g. marine-grade label, engraved plate) affixed	• Very low per-unit cost • Scannable with standard smartphone	• Vulnerable to biofouling, UV degradation and mechanical damage	• Substrate and protective laminate specifications must be standardized for marine durability

	to FADs and scanned with a smartphone or dedicated reader.	cameras (no specialized hardware) • Can encode multiple data fields (FAD ID, vessel, manufacturing/deploying date) • Familiar technology; minimal training required • Compatible with app-based observer data collection (non-existent at the moment)	• Requires close physical access; does not resolve remote-monitoring limitations • Inconsistent scan reliability under field conditions (wet, moving platforms) • If not properly protected, longevity at sea is limited	• If IATTC moves toward electronic observer data collection, QR scanning could be integrated • Replacement protocol for damaged codes would need to be defined • Observer or skipper application development or adaptation needed • Low cost makes this option suitable for pilot testing at minimal expense
Satellite buoy-based identification	The existing IATTC system, in which the satellite-linked buoy ID functions as the *de facto* FAD marker/identifier under Resolution C-19-01. Targeted, incremental refinements (improved data collection; closer and automatic linkage with raw satellite buoy data) could further consolidate performance that already allows tracking of ~96% or more of FADs deployed since 2019. Only 0.09% of FAD deployed without a buoy observed since 2019. Buoy ID available 99.52% when buoy present; only ~1.5% of visits buoy not present.	• Already in operation under Resolution C-19-01; no new regulatory framework required • ~96% of observer-recorded FAD interactions retain a usable buoy-ID linkage (FAD-09-02). Tracked ~150,000 FAD lifespans since 2019. Only 0.09% of FADs deployed without a buoy observed since 2019. Buoy ID recorded 99.52% when buoy present; only ~1.5% of visits buoy not present. • Builds on existing IATTC infrastructure and data flows • No new hardware required for vessels or observers • Enables desk-based tracking of FAD trajectories and lifespans	• Does not assign a permanent ID to the physical FAD structure • Identity lost if buoy is replaced without observer present • Dependent on buoy availability and observer reporting • Does not resolve "ownership" of the physical unit across multiple deployments	• System already operational; case for substantial enhancement is limited given current ~96% tracking coverage • Minor refinements to observer protocols for recording buoy data achievable within the current Resolution framework • Closer linkage of observer-reported buoy IDs with raw satellite buoy data could consolidate performance • Staff data systems already support this approach (FAD-09-02) • Does not resolve the lack of a permanent identifier tied to the physical FAD structure and associated questions
Color coding / Visual marking	Standardized color schemes or visual patterns applied to FAD components (floating structure) to indicate, for example, vessel, flag, company or FAD category (e.g. biodegradable status). Typically used as a complement to unique ID systems.	• Immediately visible without scanning equipment • Low cost and simple to implement • Useful for at-sea or land-based identification and monitoring • Complements other marking methods • Could support identification of	• Cannot provide unique individual identification; only broad category-level attribution (e.g., fleet, FAD category) • Colors fade over time due to UV exposure and biofouling • Limited information content	• Could be implemented alongside a unique ID system as an additional layer • Color standards would need to be defined per broad category (e.g., flag, company or FAD type) in a Resolution • Could help for FAD stranding tracking (see FAD-09 INF-A) by facilitating origin

		abandoned FADs and stranding events	• Not suitable as a standalone identification system • Standardization across multiple fleets/companies requires coordination	identification of stranded FADs • Minimal cost burden; could be phased in as FADs are constructed or maintained
Hybrid marking system	Combination of two or more of the above approaches (e.g. physical unique ID tag + QR code + color coding), providing redundancy and covering different use cases (e.g. remote vs in-situ identification, unique vs fleet-level attribution).	• Redundancy reduces risk of total identity loss if one element fails • Addresses different operational needs simultaneously (e.g. observer, stranding attribution) • Flexible; components can be phased in incrementally • Aligns with emerging best practices in other fisheries (FAO, 2019; EU Mediterranean longline and trap fisheries EU Reg. 404/2011; US/Canada lobster and crab pot fisheries)	• Increases implementation cost and complexity • Multiple systems require coordination and standardization • Risk of inconsistency across elements if not tightly specified • Greater training and observer workload • Regulatory framework would need to cover multiple marking elements	• A phased approach could start with low-cost elements (color coding, physical ID) before adding electronic components • IATTC could draw from FAO, EU, US/Canada experiences • The Commission would need to define a minimum viable hybrid system and assess cost-benefit before adoption • Pilot program recommended prior to fleet-wide implementation • Would benefit from a formal cost-benefit analysis and stakeholder consultation

6. DISCUSSION

The choice of a FAD marking system for the IATTC cannot be made in isolation from a clear definition of the objectives the Commission wishes to achieve through FAD marking. As noted in FAD-09-03, different management objectives may call for different marking and identification approaches. A system designed primarily to assign attribution for stranded FADs may prioritize visual color coding and simple physical tags, while a system aimed at tracking individual FAD units across multiple deployments would require access to buoy IDs and permanent unique physical identifiers linked to a database.

Across the options reviewed, no single approach is without limitations. Physical and electronic marking systems can provide robust unique identities for FAD structures, but require new regulatory frameworks, procurement of materials and hardware, and adjustments to observer protocols and data systems. The existing buoy-based system remains the most practical near-term option for improving FAD tracking at sea, but its fundamental limitation—the inability to follow the physical FAD structure across buoy replacements or shore periods without the presence of an observer—maybe hardly resolved without some form of physical or electronic permanent marking.

The IATTC is in a strong position relative to other tuna RFMOs, given its permanent scientific staff, its high observer coverage on the purse-seine fleet, the existing data infrastructure and requirements, and the existence of methods to collect significant volume of FAD lifespan and tracking data (see FAD-09-02). Any new marking system should be designed to complement and integrate with these existing assets rather than duplicate them.

Cost and logistical burden vary considerably across options. Physical ID tags and QR codes represent the lowest per-unit cost and could be piloted without major regulatory changes, while RFID systems require greater upfront investment in hardware and standardization. A hybrid system offers the most functional redundancy but at greater complexity. Any option requiring vessel or CPC action would benefit from a structured pilot program involving willing participants before fleet-wide implementation is considered.

The results of the long-range radio LoRaWAN trials reported in FAD-08-03 are particularly relevant in this context. They demonstrate that a long-range radio approach can reliably transmit a buoy identifier at the vessel-approach distances at which observer or EM identification of the FAD typically occurs (commonly <500 m), while explicitly avoiding the active remote searching of FADs the vessel is not already monitoring. Such an approach could substantially improve the reliability and automatic detection of buoy-ID capture by observers and EM systems, addressing a data quality issue, and could be integrated with the satellite buoy-based identification approach described above. Its main current caveats are that, unless used directly on the FAD structure, it identifies the buoy and the performance under unfavorable sea states has not yet been characterized, and that fleet-wide deployment would depend on coordination with buoy manufacturers and on standardization of sensor and reader specifications. These considerations suggest that long-range remote identification is best positioned as complement to, rather than a substitute for, physical marking of the FAD structure where permanent FAD identity is the management objective.

Coordination with other tuna RFMOs and with FAD/buoy manufacturers and the fishing industry will be important to ensure that any marking system adopted by the IATTC is compatible with emerging international standards and does not create unnecessary additional burdens on a fleet that can operate across multiple ocean basins.

In weighing these options, the experience of other tuna RFMOs could be prioritized for IATTC, given the strong operational and ecological similarities of FAD-based fisheries across oceans and the comparability of fleets, observer programs and data systems. The broader frameworks developed by FAO (notably the 2018 Voluntary Guidelines on the Marking of Fishing Gear) and the technical work of ICES on gear marking and ALDFG are nonetheless useful as complementary inputs, particularly with respect to standardization principles, durability specifications and the integration of marking with abandoned-gear mitigation. Aligning IATTC choices first with the practices and trajectory of other tuna RFMOs—while drawing selectively on FAO and ICES guidance where it adds value—would help ensure consistency for fleets operating across Convention Areas, as appropriate.

7. CONCLUSION

This document responds to the recommendation of the FAD Working Group at its 9th meeting (May 2025) that the pros and cons of the implementation of different methods for marking FADs be explored. Seven broad approaches are described and compared: physical ID tags, electronic / RFID tags, remote electronic identification using long-range radio (e.g. LoRaWAN), QR codes and barcodes, buoy-based identification, visual color coding, and hybrid systems. Each approach involves trade-offs between cost, durability, information content, and implementation complexity.

The IATTC staff does not recommend a specific marking method at this stage, beyond the current buoy-based identification/marking system. The most appropriate approach will depend on the objectives the Commission wishes to achieve through FAD marking, the level of resources that CPCs and the Secretariat are prepared to commit, and the degree of coordination achievable with the fishing industry and relevant manufacturers. Should the Commission wish to move forward, the staff suggests that the specific objectives of FAD marking be clarified prior to selection of a technical approach.

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