



**TAHI OPU**



**MARINE MONITORING, ENFORCEMENT &  
DETERRENCE PROGRAMME**

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**TAHI OPU FUNDATION 2026**

# Executive Summary

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**Tahi Opu uses a suite of monitoring techniques to help stop illegal fishing, increase ocean protection, regulate marine tourism and log marine debris.**

## **Why Timor-Leste?**

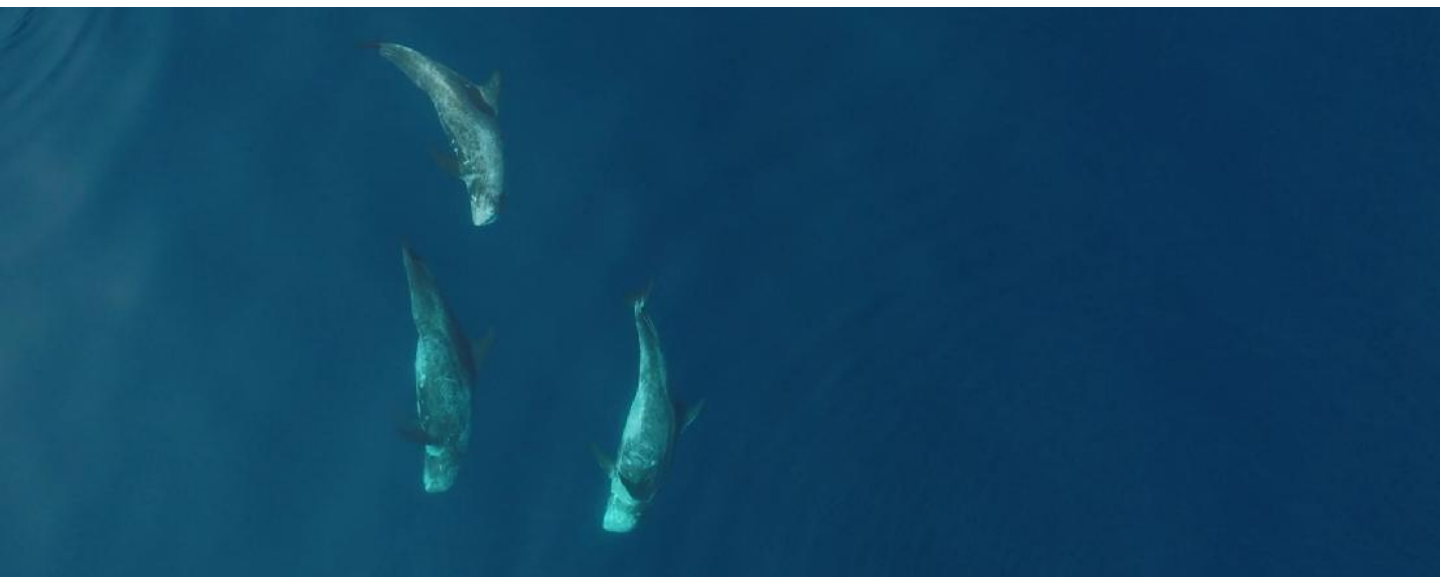
Timor-Leste sits at the heart of the Coral Triangle, the world's centre of marine biodiversity, with waters home to over 1,000 species of reef fish, 400 species of coral, blue whales, whale sharks, manta rays, and critically endangered hammerhead sharks. Yet this extraordinary natural wealth is being systematically stripped by illegal, unreported and unregulated (IUU) fishing, costing the nation an estimated USD 40 million per year.

## **The Problem**

Despite possessing some of the world's strongest fisheries legislation, including penalties of up to 18 years imprisonment and USD 1.2 million in fines, Timor-Leste has never brought a single prosecution. The laws exist. The enforcement capacity does not.

## **Our Solution**

Tahi Opu, meaning 'Custodians of the Sea', is a Timorese-led foundation established to change that. Our National Marine Monitoring Programme is designed to support the fantastic work that the Timorese government is already doing to protect its oceans, and with helping the Fisheries Inspectors and Maritime Police to do their job better.



## How the programme works

We are deploying a national drone and satellite surveillance network across Timor-Leste's 75,000 km<sup>2</sup> EEZ, embedding trained drone operators directly within the Fisheries Inspectorate and Maritime Police - the people with the legal authority to board, arrest, and prosecute. Evidence gathered feeds directly into prosecution-ready case files. Every element of the programme is designed to produce not just detection, but consequences.

## Why it works

Funding is deliberately blended across philanthropy, institutional grants, government contribution, and scientific partnerships, so that no single funder can end the programme. The capability is trained into permanent Timorese staff, so it endures beyond any external support.

Our programme is built on deterrence, instead of 24/7 monitoring, and is therefore cost effective. As Timor-Leste has no foreign commercial fishing licenses and no internal fishing fleet, deterring IUU fishing from the EEZ will be protecting 75,000 km<sup>2</sup> of ocean.

The long-term goal is for our services and our capacity to be integrated into the existing structures. We assist with capacity building, training, and physical assets, in order to deter illegal fishing before it happens, protecting the nation's food security, its biodiversity, and its ocean economy for generations to come.

## Project Objectives

### 1. Combatting Illegal Fishing:

- 1.1) Deploy an integrated drone and satellite surveillance system
- 1.2) Commission Kapuru A'i as a dedicated enforcement and patrol vessel
- 1.3) Establish a mooring infrastructure network to enable patrols

### 2. Capacity Building:

- 2.1) Deliver practical, field-based training to Fisheries Inspectors and Maritime Police
- 2.2) Use Kapuru A'i as a floating platform for education and community outreach

### 3. Protecting Biodiversity:

- 3.1) Enforce marine tourism laws and protect whale populations
- 3.2) Document and remove marine debris during patrol operations
- 3.3) Protect reef ecosystems through reef-safe mooring infrastructure





## The IUU fishing crisis

Marine protection in Timor-Leste and other areas of the world face two structural failures:

### ***Governance and Compliance***

The Tahi Opu Foundation's Marine Monitoring, Enforcement and Deterrence Programme is designed from the ground up to solve both failures simultaneously.



Annual losses caused by IUU fishing rose from USD 20 million in 2003, to USD 40 million in 2013.

Timor-Leste possesses some of the strongest anti-IUU fishing legislation in the world. Law No. 12/2004 provides for imprisonment of up to eighteen years and fines of up to USD 1.2 million for serious fisheries offences whilst UNCLOS grants coastal states the authority to board, inspect, arrest, and prosecute vessels in their EEZ.

**These powers currently exist on paper only. No prosecution under these statutes has ever been brought.**

Most IUU fishing is conducted by foreign vessels, and is concentrated in its southern waters where maritime presence and enforcement is weak.

Fleets target not only large, economically viable species, but they also illegally and deliberately catch species which are supposed to be protected by international law, e.g. scalloped hammerhead sharks.



## Unique transnational protection opportunity in the Sahul Banks

The Sahul Banks are a series of remote reefs and pinnacles on the Australian continental shelf, 200km from Timor-Leste and 400km from the Australian coastline. The reefs contain some of the oldest, largest and most diverse corals on Earth, and past surveys recorded extensive megafauna populations including eleven shark species.

However, these waters have been subjected to illegal fishing at an enormous scale. No sharks were seen in our recent survey, showing a collapse of the higher trophic levels. We must act now, working alongside Indonesia and Australia, to protect the Sahul Banks, deter illegal fishers, and ensure food security for the people of Timor-Leste.



## The world's richest biodiversity

The Sahul Banks is part of the richest biodiversity in the world. The waters of Timor-Leste within the surrounding Indo-Malay Pacific region are recognised as the global epicentre of tropical marine diversity.

Timor-Leste's Exclusive Economic Zone covers over 75,000 km<sup>2</sup>, encompassing the main island of Timor (including the Nino Konis Santana National Park), the Special Administrative Region of Oecusse-Ambeno (RAEOA), and the two islands of Atauro and Jaco. Our programme will protect all of these areas which are under threat from illegal fishing.

**This territory contains some of the most biologically significant marine environments on earth.**

Atauro Island recorded as hosting the highest fish biodiversity of any site measured globally:

An average of 253 species of reef fish were recorded at each survey site.

Ancient migratory corridors bring blue whales and more than 20 cetacean species, some in huge superpods, while the south coast functions as a nursery for snapper, critically endangered scalloped hammerhead sharks, and sits adjacent to the southern bluefin tuna breeding grounds.



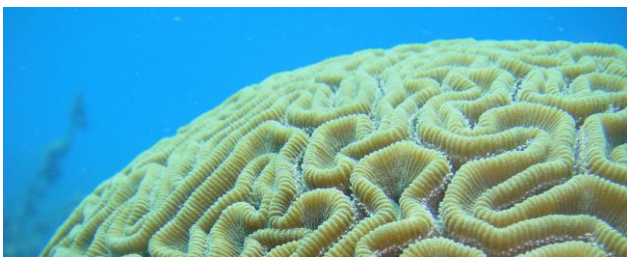


## The Opportunity

There is an opportunity to establish a drone surveillance and monitoring teams in Timor-Leste, integrating marine rangers, the Maritime Police, Fisheries Inspectorate (AGAPA), Navy, Ministry of Agriculture and Fisheries and the Blue Economy Team, to effectively manage the MPA network and EEZ.

Timor-Leste's coral reefs, particularly around Atauro Island, are considered global refuges from climate change due to cooler, nutrient-rich water brought by the Indonesian Throughflow and upwelling.

These currents mitigate warming and help prevent mass coral bleaching, resulting in exceptionally high biodiversity and healthy reef ecosystems.



Several factors make 2026 – 2029 an important window:

- The Government's Blue Economy Plan (2025-2035) is being operationalised.
- The Prime Minister and Blue Economy team have expressed their preference for Timorese-led, results-focussed initiatives.
- Tahi Opu can establish marine monitoring at a time when the Navy has not yet regained offshore patrol capacity.
- Marine Tourism (particularly whale-watching) is growing rapidly along the north coast. Unregulated growth risks driving away resident whale populations.
- International frameworks, e.g. 30x30 and the BBJN Treaty, create a diplomatic environment for ambitious marine protection.



# Programme Components

The programme is designed to deliver what is needed and what works best in-country, and is tailored to the specific needs of the Timor-Leste.

## 1. Fisheries Inspectors & Maritime Police training programme:

The programme works directly alongside the Fisheries Inspectors and Maritime Police in the day-to-day execution of their duties. Training is practical and delivered in the field — covering drone operation, use of binoculars, satellite phones and motorbikes; evidence handling and chain-of-custody procedures; safety at sea and vessel operations; practical application of Timorese fisheries law and UNCLOS; species identification and biodiversity monitoring; and community engagement protocols.

## 2. Satellite & Drone Surveillance Architecture:

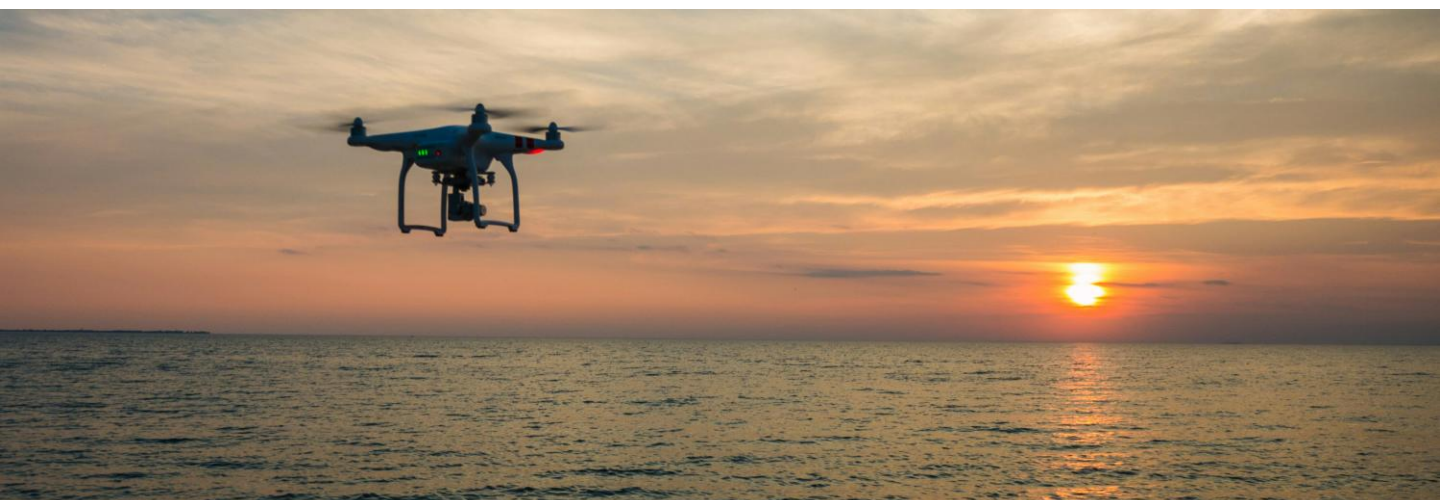
The drone programme, integrating 4 classes of drone – coordinated with satellite platforms Earth PBC and Skylight – forms the operational backbone of the monitoring system.

## 3. The National Marine Protection Platform — *Kapuru A'i*:

A 20m sailing vessel equipped with a drone helipad, hybrid drive system, fast RIB and VIP accommodation. Kapuru A'i focusses on monitoring, enforcement support and education.

## 4. Mooring Infrastructure Network:

A significant operation constraint on Timorese marine enforcement is the lack of safe vessel mooring locations. Tahi Opu will install 4 heavy-duty eco-moorings at patrol hubs, providing a reef-safe anchoring system in biodiversity hotspots.



# Programme Objectives

## 1. Combatting Illegal Fishing:

*Detect, deter, and prosecute illegal fishing activity across Timorese waters through surveillance, enforcement, and legal procedure.*

### 1.1) Deploy an integrated drone and satellite surveillance system

- Operationalise local and long-range drones, coordinated across patrol zones
- Integrate drone feeds with Earth PBC and Skylight satellite platforms
- Generate continuous, evidence-quality monitoring coverage of the EEZ

### 1.2) Commission Kapuru A'i as a dedicated enforcement and patrol vessel

- Deploy a drone-capable, hybrid-drive 20m vessel for sustained patrol operations
- Support rapid enforcement response via onboard fast RIB
- Provide a mobile command platform

### 1.3) Establish a mooring infrastructure network to enable patrols

- Install four heavy-duty eco-moorings at key patrol hubs
- Enable reliable vessel staging for extended enforcement coverage across patrol zones

## 2. Capacity Building

*Develop the skills, knowledge, and institutional capacity of Timorese enforcement personnel to operate independently and sustainably*

### 2.1) Deliver practical, field-based training to Fisheries Inspectors and Maritime Police

- Train in drone operations, evidence handling, chain-of-custody procedures, and safety at sea
- Build proficiency in Timorese fisheries laws, marine tourism regulations, and UNCLOS
- Develop skills in species identification, biodiversity monitoring, and debris documentation
- Establish community engagement protocols for enforcement personnel

### 2.2) Use Kapuru A'i as a floating platform for education and community outreach

- Host marine education programmes for communities, students and stakeholders
- Support VIP and government engagement to build institutional backing for enforcement
- Serve as a visible symbol of Timor-Leste's national marine protection commitment





## Programme Objectives

### 3. Protecting Biodiversity

*Actively safeguard Timor-Leste's marine ecosystems, including whale populations, reef systems, and key species, through monitoring, enforcement, and direct intervention.*

#### 3.1) Enforce marine tourism laws and protect whale populations

- Enforce vessel exclusion zones and marine tourism regulations during whale seasons
- Monitor whale and key species populations through drone surveillance and field observation
- Intercede with non-compliant operators using Kapuru A'i and fast RIB

#### 3.2) Document and remove marine debris during patrol operations

- Record plastic and debris accumulation zones across patrol areas
- Conduct active debris removal during boat patrols, prioritising reef systems and biodiversity hotspots
- Contribute debris distribution data to national and international conservation bodies

#### 3.3) Protect reef ecosystems through reef-safe mooring infrastructure

- Eliminate anchor damage in biodiversity hotspots through eco-mooring installation
- Site moorings at ecologically sensitive patrol hubs to minimise operational impact



# Programme Activities

## YEAR 1 – Foundation and Trials

- Sign MOU with Fisheries and Maritime Police
- Begin training Fisheries Inspectors in drone operations and evidence handling
- Assemble drone fleet and do flight trials from land, incorporating the use of binoculars and motorbikes
- Do first systematic drone surveys of the south coast, Atauro corridor and Sahul Banks
- If possible, acquire *Kapuru A'i* vessel in Australia and get it fitted and ready
- Appoint core team of 3 per rotation (captain, engineer, ranger/observer)
- Establish operational data-sharing and evidence-management protocols

## YEAR 2-3 – Consolidation and Scale

- Fisheries Inspectors continue effective surveillance and chain-of-custody procedures
- Advance with Sahul Banks Trilateral Transboundary protection negotiations (with Australia and Indonesia)
- Operate *Kapuru A'i* on fully capacity with monitoring rotation

## YEAR 4-5+ – Transfer and Regional Expansion

- Gather species monitoring data from researchers and fishers to document recovery
- Begin to replicate the model for use in other SIDS
- Sign protection of the Sahul Banks into law.





# We are different

## Why Marine Drone Monitoring Programmes Fail — and What Tahi Opu Does Differently

Drone-based marine monitoring has been trialled across four continents over the past decade. The results are instructive: the technology consistently works. The programmes consistently don't. The failure is almost never technical. It is structural, financial, or political.



**A 2022 meta-analysis found that the programmes which actually achieved a reduction in IUU fishing shared three traits:**

1. Institutional integration with enforcement agencies
2. Diversified funding, and
3. A deterrence-first rather than coverage-first approach

The Tahi Opu programme shares all these benefits and is designed to address each of these problems directly.



**Drone programmes fails when:**

- There is no enforcement mandate attached to the monitoring output, rangers could observe illegal activity have limited power to act on it.
- Programmes operate on project-cycle funding, there will be no budget to sustain operations once the grant period ends.

Rather than maximising flight hours, it optimises for deterrence — since visible, unpredictable patrols combined with even one credible prosecution can sustain a deterrent effect well beyond the flights that created it. Drone operation is also trained into the permanent staff, so the capability outlasts any external support.





# Proposed Budget (USD)

The programme is funded from a variety of sources: foundations, high-net-worth individuals, the world bank, the Global Environment Facility (GEF), government funded contracts, and international development funds.

## Capital Costs (Year 1):

| Item                                                                        | Cost    |
|-----------------------------------------------------------------------------|---------|
| Kapuru A'i vessel purchase and refit (hybrid, VIP, drone platform)          | 200,000 |
| Fast RIB (7 m) purchase and rigging                                         | 25,000  |
| Four heavy-duty eco-moorings                                                | 120,000 |
| Drone fleet: 4 VTOL, 6 multi-rotor, ground control stations, satellite link | 120,000 |
| Total Capital Investment                                                    | 465,000 |

## Annual Operating Costs (Full Programme):

| Item                                          | Annual Cost |
|-----------------------------------------------|-------------|
| Boat Crew                                     | 50,000      |
| Technical Support Staff (Timorese Team)       | 150,000     |
| Expenses                                      | 15,000      |
| Vessel and drone maintenance                  | 20,000      |
| Overheads (office, insurance, communications) | 50,000      |
| Total Annual Operating Cost                   | 285,000     |

Cost for 3 years: 855,000 + 465,000 = **1,320,000**





| Risk                                                                                                                                                                              | Mitigation                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Government relationship deterioration, either if the programme loses alignment with the Blue Economy team or a change in government to one less receptive to implementing policy. | Tahi Opu is structured as a Timorese-led Foundation — not a foreign NGO. Its governance and personnel are Timorese. A change of government changes partners, not the programme's fundamental legitimacy. |
| Indonesia relations weaken due to enforced action against Indonesia fishing vessels.                                                                                              | This strategy requires bilateral understanding with Indonesia before prosecution. The programme is explicitly framed as collaborative rather than confrontational.                                       |
| Operator burnout and funding gaps as small programmes in difficult operating environments are vulnerable to key-person loss and funding interruptions.                            | The two-crew rotation model builds redundancy. The blended finance model ensures no single source is critical.                                                                                           |
| Unfavourable maritime conditions (monsoon south coast)                                                                                                                            | South coast patrols concentrated in dry season; drone operations from shore cover the monsoon period                                                                                                     |
| Drone technology dependency                                                                                                                                                       | Year 1 trials identify optimal platforms before long-term procurement; EASA-equivalent compliance maintained                                                                                             |
| IUU prosecution failure                                                                                                                                                           | Evidence systems designed to prosecution standard from day one; legal counsel engaged before first boarding operation                                                                                    |
| Marine tourism reputational risk                                                                                                                                                  | Strict no-swim designation in Whale Heritage Park; ranger-led compliance monitoring on all tourism operations                                                                                            |
| 30x30 political resistance                                                                                                                                                        | Programme avoids top-down 30x30 advocacy framing; positioned as supporting artisanal fisheries recovery, not restricting fishing access                                                                  |
| Artisanal community resistance                                                                                                                                                    | Community rangers drawn from fishing communities; artisanal fishers excluded from enforcement targeting                                                                                                  |



## Kapuru A'i - vessel

Timor-Leste's turbulent history means they do not have a vessel that can travel across the whole EEZ. Kapuru A'i means 'whale' in a Bikelo village dialect, and is a floating symbol of Timor-Leste's marine identity and sovereignty. The vessel works in conjunction with our Marine Monitoring Programme to combat illegal fishing, acting as a mobile command and response platform. A fast RIB stored onboard enables rapid deployment for interception and escort duties, while enforcement authority remains at all times with the onboard Fisheries Inspectorate and Maritime Police.



### A platform for education

Whilst Kapuru A'i is primarily a surveillance vessel, it also serves as an educational platform. Inviting children from schools all around Timor-Leste, we provide a unique at-sea experience where students participate in sustainable marine tourism activities while learning about the species found in their unique and biodiverse waters.

### Join us on board

The Kapuru A'i is also a platform for funders and supporters to come and see our work amongst the extraordinary marine biodiversity of Timorese waters, including pygmy blue whales and 24 other cetacean species. This opportunity provides funders with a vivid and personal connection to the mission they are supporting.

The Kapuru A'i is more than a patrol vessel — it is a statement of national intent, demonstrating that Timor-Leste is committed to protecting its oceans with presence, capability, and pride.







**Thank you**

Thank you for considering this proposal to protect one of the most biodiverse and biologically significant marine regions in the world. We would be delighted to answer any questions you may have.