ALDABRA EXPEDITION REPORT - OCTOBER 2025

I. Information about Plastic Odyssey

Plastic Odyssey is a non-profit organization founded in 2017 with the mission to fight against plastic pollution.

For three years, the Plastic Odyssey ship sailed around the world, making 40 stopovers to document, test, and share practical solutions for recycling plastic waste and promoting sustainable alternatives.

In 2024, a new chapter began. Following the Henderson Island cleanup, Plastic Odyssey and UNESCO officially partnered to strengthen their collaboration in protecting marine environments and combating plastic pollution.

The aim of this partnership is to lead expeditions to World Heritage marine sites affected by ocean waste in order to:

- **Conduct scientific research** to better understand the impact of marine pollution,
- **Protect fragile ecosystems** through large-scale cleanup operations,
- **Raise awareness** among children and high-level decision-makers about the urgency of preserving our oceans.

Plastic Odyssey vessel off Aldabra Atoll

II. Purpose of the mission

This recognition mission (October 11 to 19, 2025) set out to:

- **Map and quantify** marine plastic debris distribution via drone and ground surveys;
- **Evaluate and test** equipment and methods, including prototype tools;
- **Assess logistics feasibility** (energy, water, food supply, medical support, and camp ops);
- **Collect plastic samples for recycling** feasibility across the Indian Ocean network;
- **Produce media content** to support awareness and prepare the major cleanup expedition.

Plastic Odyssey vessel preparing for the first waste extraction

Context:

Aldabra Atoll is a UNESCO World Heritage Site and one of the most ecologically valuable regions in the Indian Ocean. Despite long-term protection, Aldabra faces severe marine plastic pollution, documented by research led by the Seychelles Islands Foundation (SIF) in collaboration with the University of Oxford.

Given the scale of pollution and its impact on biodiversity, Aldabra is a priority site for large-scale cleanup. Research led by SIF has quantified the accumulated waste and identified its principal sources. This mission will build on SIF's previous cleanups and enable Plastic Odyssey and SIF to design a scientifically robust, logistically feasible, and environmentally responsible intervention for a future major cleanup.

Turtle hatchlings navigating plastic debris on DDM Beach

Sea turtle making its way through plastic debris after nesting

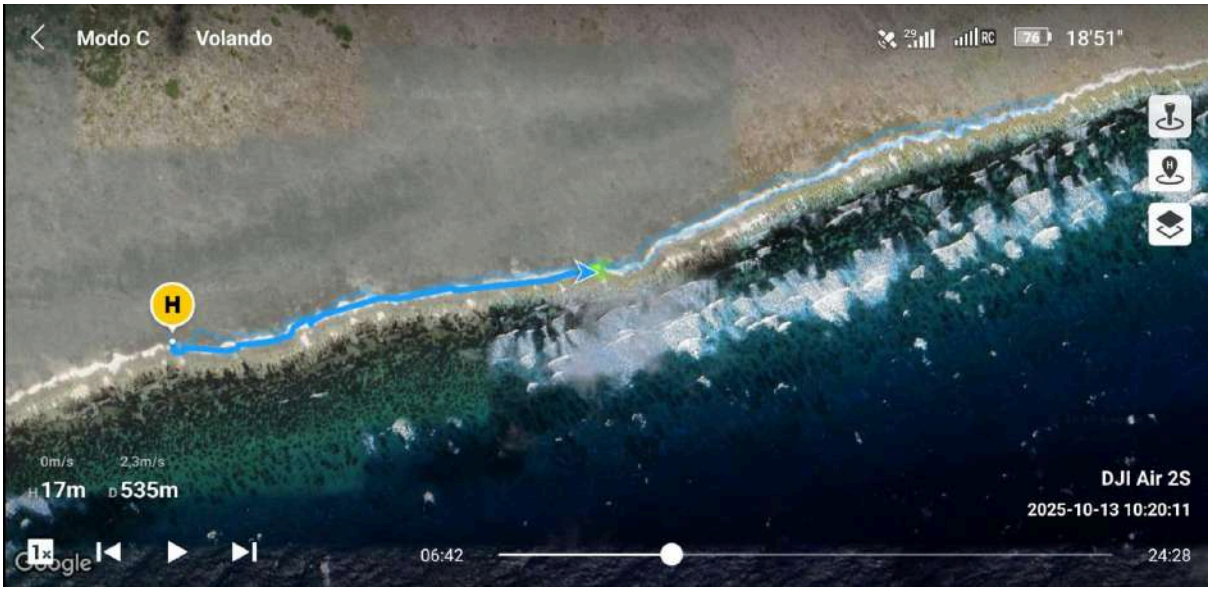
A giant tortoise among plastic waste

III. Results of the Plastic Odyssey recognition mission

1. Drone mapping & waste counting

Platform:	*DJI Mavic Air 2S*
Coverage:	*~120 km of flight spanning 40 km of coastline (≈ 100 m swath)*
Ground truthing:	*~75 km walked to fully cover the same segment (Pointe Hodoul — NE — to Anse aux Vacoas — SW)*
Power:	*40 batteries, ≈ 20 min endurance each*

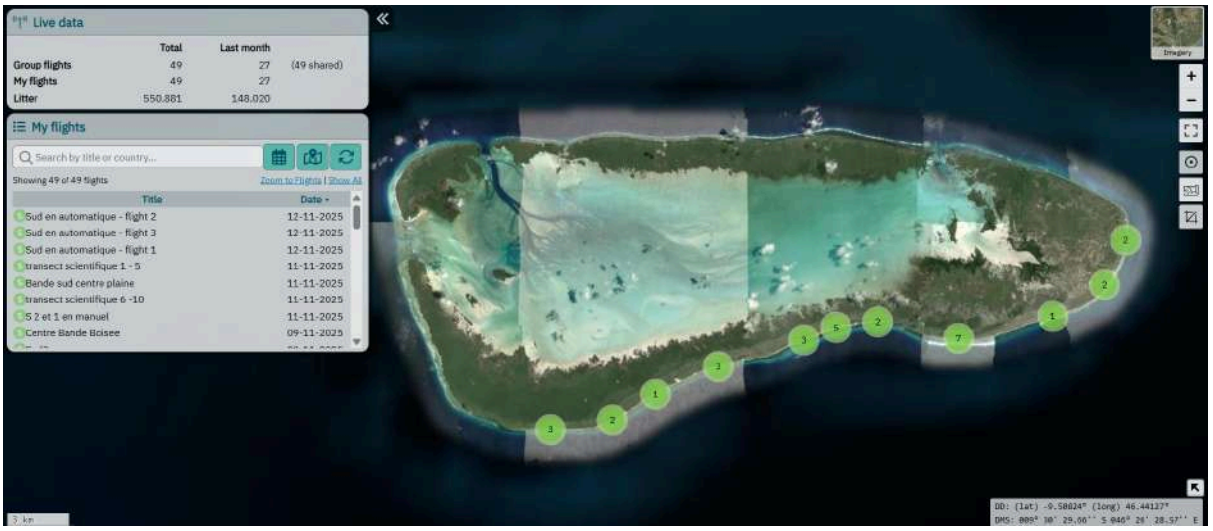
GPS track of the expedition



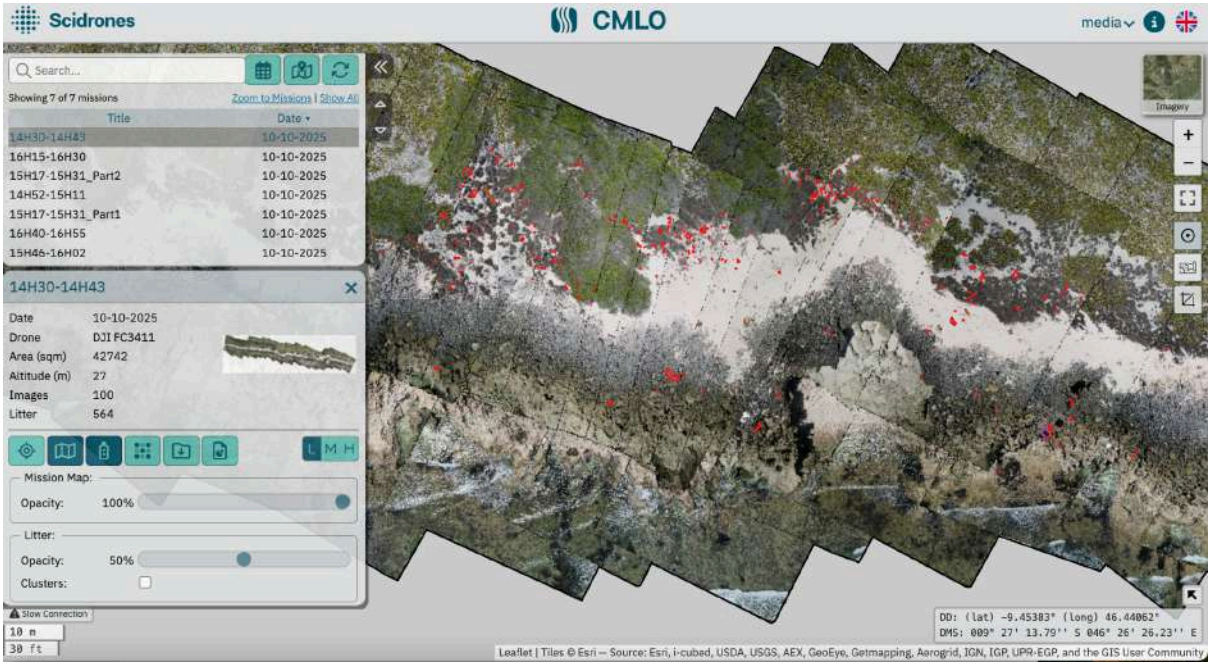
View of the drone survey

Using drone imagery, identification work has begun to count visible shoreline wastes on Grande Terre in collaboration with Scidrone.

Next step: estimate volume and weight per category and location using conversion factors



Drone photogrammetry: first trial of the SciDrone tool



Plastic items identified (red dots) from drone imagery

2. Waste measurement & identification

We have measured and weighed 385+ items across 7 categories: buoys, ropes, jerrycans, HDPE bottles, PET bottles, flip-flops, bottle caps. We will use these data to build conversion factors that translate a photo-based item count into estimated volume and mass for planning extraction and transport.

Waste measurement and identification near DJL camp

385+ waste items weighted and measured to strengthen the drone identification model:

<u>Average weight</u>

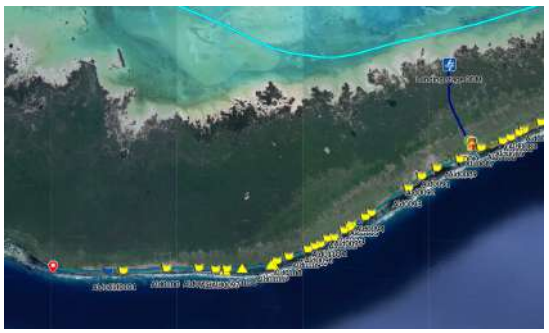
- **Flip flop**: 83 gr *(30 items)*
- **Bottle cap**: 3.75 gr *(200 items)*
- **Buoy**: 1.5 kg *(62 items)*
- **Rope**: 375 kg/m^3 (3 items)
- **PET Bottle**: 30 gr *(32 items)*
- **Jerrycan**: 1.4 kg *(34 items)*
- **HDPE bottle**: 44 gr *(24 items)*

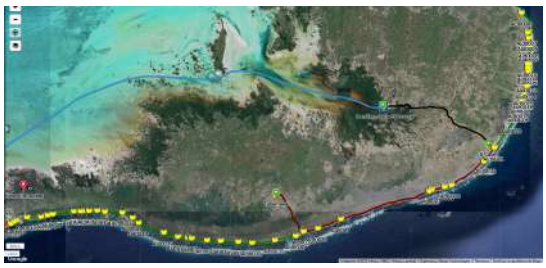
3. Field assessment

115 GPS points of interest have been recorded along the coast from Pointe Hodoul (NE) to Anse aux Vacoas (SW). Each point is linked to a short video describing the site (terrain/ground conditions, extraction point, etc.).

Expedition team assessing terrain

View of the GPS points





4. Tools testing

- “Kirikou” oversoles

To improve walking on limestone without damaging footwear, we tested a slip-on oversole made from recycled tires (tested by Francis). Feedback was positive. Improvements needed: replace the elastic strap with more robust webbing/straps (the elastic broke when walking in mud), and consider additional heel retention.

Test of Kirikou oversole by Francis (Island Manager)

- Portable watermaker

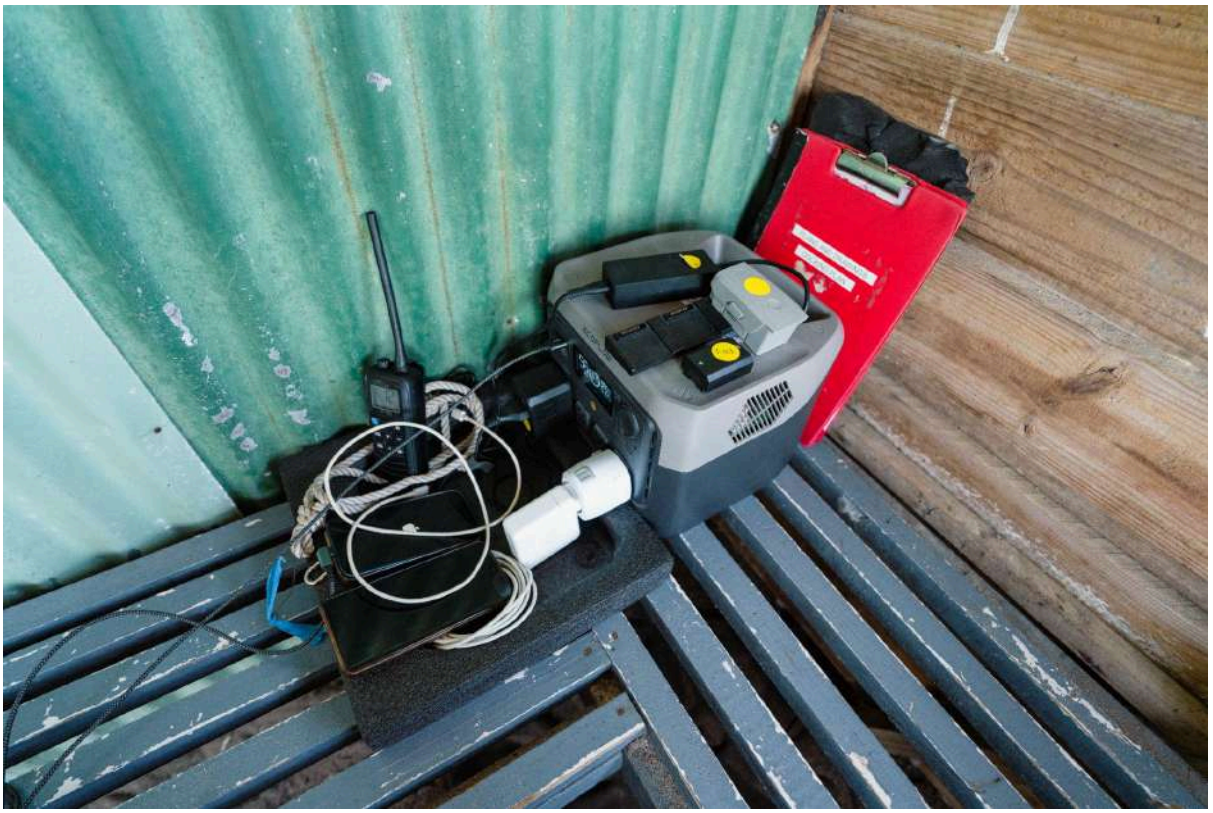
A portable, solar-powered watermaker was used at DJL, producing ~5 L/h of fresh water from ~50 L/h of seawater.
Improvements: a protective casing for the generator; an integrated seawater pump to avoid the tiring manual hauling of seawater; and cable modifications to run the watermaker from the EcoFlow battery instead of carrying an additional battery.

Solar-powered watermaker producing freshwater at DJL camp

- Portable batteries and solar panels (EcoFlow)

Two EcoFlow batteries fitted with solar panels were used to recharge drone batteries. One unit was carried on a carrying frame during coastal walks to ensure sufficient power availability for drone mapping.

EcoFlow solar panels charging the drone batteries at DDM



Ecoflow battery at DJL

- Water filtration system

We tested filtration systems to safely drink stored rainwater at the camps. A LifeStraw Gravity system worked properly; we could filter batches of ~3 L in under 2 min. The main issue was clogging after 1–2 days of use, requiring a backwash time-consuming and not very practical.

Rainwater filtration using a LifeStraw Gravity system

Other technologies can be found with a bigger capacity (ex: Lifesaver Jerrycan, MSR Guardian Purifier)

5. Waste removal trials

Two waste extractions systems have been tested :

- Floating platform

Loading of the platform at DJL beach

We repurposed a floating pontoon as a low-draft loading platform to shuttle bagged waste from beaches. This system proved efficient on our previous expedition. The 2 × 3 m platform can transport up to ~1 t of waste per trip.

With a draft of <10 cm, it is best used at low tide when there are no shore-break waves.

Method	1. *Establish the offshore connection: using a drone with a remote-release, drop a light heaving line to the RIB holding ~300 m offshore at safe depth.* 2. *The RIB crew attaches the heaving line to the towing line connected to the platform.* 3. *The shore team hauls the heaving line back, bringing the towing line ashore.* 4. *With a portable winch/capstan, pull the platform to the beach, keeping the offshore end secured to the RIB.* 5. *Once the platform is loaded, the RIB tows it back out to the ship.*

Platform towed off Aldabra's coast

Installation of the forestry winch to tow the platform ashore

Improvements for Aldabra:	• *A strong heaving line.* • *A heavy-lift, waterproof drone capable of carrying and dropping a heaving line over long distances (up to ~500 m).*

Example of heavy-lift drone: Swellpro fisherman (2,000$)

- The slide

Along much of the coast, reaching the sea requires crossing limestone karst belts 5–30 m wide. To avoid long carries to the few accessible beaches, we built a proof-of-concept slide from floating bamboo found on site and installed it over the karst. Waste, especially garlands of buoys, slid across the karst easily. This technique shows strong potential for future cleanups.

First test of a bamboo slide to extract garlands of buoys

As an alternative to bamboo, a lightweight, modular slide can be built from HDPE pipe sections and a lightweight frame with adjustable legs that stands on the karst and keeps the slide level. The modules can be dismantled into transportable sections for easy deployment and recovery.

AI generated illustration of a slide concept

- Garland method

Most items can be secured to a long rope using clove hitches (cabestan knots) to create a towable garland behind a RIB, making extraction easier.

- **Buoys**: attached by their rings (very few rings are broken)
- **Jerrycans**: attached by the handle (if watertight)
- **Flip-flops**: attached through the holes in the soles.
- **Rigid plastics:** loaded into a large cylindrical container lashed into the garland.
- **Ropes/nets**: cut into shorter lengths and towed directly

AI generated illustration of a garland of wastes

Note: small garlands can be towed easily on sand

The “bridal train”: the garland is attached to a carrying frame

6. Waste recycling trial

Approximately 300 kg of waste (rigid plastics, ropes, and flip-flops) was extracted for recycling-process prototyping:

- **Furniture prototypes**: one bench and two chairs made from rigid plastics.

Bench and chair, 100% made from Aldabra waste, built aboard Plastic Odyssey

- **Small items (Aldabra souvenir shop):** 15 soap holders and 40 keyrings were prototyped using Aldabra waste and offered to the Aldabra souvenir shop to gauge tourist interest.

Soap holders 100% made from Aldabra waste

- **The remaining shredded rigid plastics** were delivered to Brikole (Kyle) for prototyping on their machines.

Brikole exposing their first products made out of recycled plastic in Mahé

- **Flip-flops upcycling (Ocean Sole):** A sample of 400 flip flops will be sent to Ocean Sole for transformation into art pieces.

400+ flipflops were collected on Aldabra to be transformed by Ocean Sole

- **Ropes:** A 20 kg rope sample was collected to test hot-pressing it into sheets using the onboard sheet press

Plastic sheets production aboard Plastic Odyssey

Recommendations for a large scale ACUP mission

1. Logistic and rundown of a major cleanup of Grande terre

To account for the two distinct seasons in Aldabra, particularly on Grande Terre, and to ensure the availability of the SIF team, the mission could be organized in two phases (as already proposed in the Cleanup Scalability report):

Phase 1 – Collection and Storage (August to October)
During this cooler and drier period, weather conditions are favorable for collection operations. Waste could be gathered and stored near the designated extraction points. However, the South Coast is exposed to strong winds and high waves, making it more difficult for extraction activities at this time.

Phase 2 – Extraction and Transformation (January to February)
Weather conditions during this period are generally more suitable for transferring collected waste from shore to ship. This phase would also allow for the use of tools and methods tested during the October 2025 reconnaissance mission.

In November, December the SIF Aldabra Team is usually busy with cruise ships visiting the atoll.

2. Camp infrastructure optimization

Health and Safety
Manual operations on Aldabra present several critical health and safety challenges, including

- Injuries (cuts, ankle sprains).
- Dehydration and heat stroke due to high temperatures and prolonged exposure.
- Limited shaded areas for rest and recovery.
- Restricted water storage capacity and potential water-quality concerns.

Mitigation Measures

- From the pool of selected volunteers, designate one qualified emergency doctor or nurse to provide on-site medical coverage and administer first aid in the event of an incident.
- Equip each camp with a rolling stretcher with low-pressure sand wheels to enable safe and efficient evacuation if required.

Shade
Wind-powered shade canopies (“shade socks”) could be a good option to provide shade during the windy season.

AI illustration of Shade socks nearby a daily collection site

Water

Portable watermakers could be installed at each base camp (Cinq Case, DJL, DDM). The unit we tested produces ~5 L/h of freshwater. We recommend a larger model (e.g. 30 L/h Schenker watermaker, at least for DJL camp.

Note: A more resilient setup should integrate a solar-powered transfer pump to draw seawater directly into a 200 L buffer tank.

Rainwater option: when enough rainwater is stored, use a filtration/purification system (e.g. Lifesaver Jerrycan, MSR Guardian Purifier)

Toilets

The installation of one or two portable toilet cabins, to be moved regularly (every 1–2 weeks) is recommended in order to manage sanitation effectively and maintain hygiene standards around the base camp.

Latrine cabins to prevent open-air defecation areas (Glenans Archipelago, France)

Dormitory
Installation of 2 military tents (as illustrated below) for 8 persons, to keep the Hutts dedicated to food preparation and staff

Military tent to increase accommodation capacity (Glenans Archipelago, France)

Food
We plan to partner with freeze-dried food manufacturers to source bulk dehydrated proteins, condiments, and other value-added components. Combined with standard staples (rice, pasta, couscous, etc.), this approach provides balanced meals while minimizing the weight we must move from the landing site to the camp.

Forward Collection Camps (Waste Logistics)
To streamline the collection and transport of waste to extraction points, we will establish temporary forward collection camps roughly 5 km from the base camps (DJL, DDM, or Cinq Case). Each camp would operate for 2–4 days with a team of eight, fully self-sufficient in food and water. The precise locations will be chosen to match known marine-litter accumulation zones.

Communication
A Starlink Mini terminal, with low power consumption (<40 W), could facilitate communications between camps and improve logistics planning and emergency response.

3. Team of volunteers

Volunteers should be carefully selected to ensure they can operate for several weeks under challenging field conditions. An open call for volunteers could be launched, as previously done by SIF, followed by a structured selection and onboarding process. This process could include a 2–3-day “go/no-go” field assessment: a short expedition (camping and cleanup activities) in accessible locations such as La Curieuse or other areas/ islands to be cleaned nearby Mahé.

Each volunteer should be contracted for a minimum of 2–3 weeks to minimize logistics.

The team composition should include specific skill sets, with at least one medical professional (doctor) and cooks to support field operations.

4. Waste collection

To optimize the collection and movement of waste to extraction points, establish a temporary collection camp approximately 5 km from the DJL, DDM, or Cinq Case base camps. This forward camp could be deployed for 2–4 days with a team of 8 people, self-sufficient in food and water. The exact location of each intermediary camp should be chosen to align with known marine-litter accumulation zones.

Maintaining Volunteer Motivation
To sustain motivation throughout the mission, we suggest:

- Rotating collectors between different camps;
- Using varied collection methods (e.g., zone-completion sprints to 100% clean, by waste type, etc.);
- Introducing friendly challenges and light gamification.

Collecting on the limestone karst

Kirikou oversoles can be used to traverse karst terrain during small cleanup operations. For larger tasks, such as removing heavy, entangled ropes, a modular protective walkway made from recycled tire discs or flip-flop soles collected from Aldabra could be deployed.

AI illustration of a temporary walkway on the karst made out of tires (left) or discarded flip flops (right)

Ropes & nets
A cordless hot knife can be used to cut ropes into smaller, manageable sections.
Because the rope floats, the cut sections can be towed directly by the RIB and extracted using the slide.

Gathering Waste at Collection Points

To move waste to designated collection points, several techniques can be used depending on the terrain. Where feasible, a low-pressure-tire trolley can transport the bags; otherwise, a carrying frame can be used for loads up to 30 kg.

AI generated illustration of a low pressure tire trolley

A team member carrying a 50 kg bag of waste

Storage of wastes

Regarding concerns about storage bags being damaged by prolonged sun exposure: the first waste streams to be collected will primarily be larger items such as buoys and jerrycans. Buoys can be stored outdoors without major issues, as they are highly weather-resistant. Other large items can be stored in the common “net bags” typically used in Tanzania (see photos below).

Net bag to transport plastic waste in Tanzania

AI illustration of storage bags: Off-the-shelf bags for wood-log storage (left) and purpose-built bags made from fishing nets (right).

For smaller waste fractions, the use of big bags will still be necessary. However, a simple shelter that both collects rainwater and provides protection for the waste during the cleanup phase can be built in preparation of the cleanup.

AI illustration of a storage shelter

Waste Extraction

The platform system could be used at beach locations; at other collection points, the slide system would be required. A rescue jet boat could be a suitable option to tow the platform or waste garlands.

AI illustration of a Rescue Runner towing a platform

Bags Storage and transfer to Mahé

Onboard Shredding

Waste should be shredded after extraction to reduce volume by up to 10×. Current shredding/processing capacity on the Plastic Odyssey vessel is ~1 t/day, with an upgrade planned to ~5 t/day in the coming months.

Rope Pre-processing

Ropes can be pre-processed onboard by cutting them into smaller sections, which are easier to store and transport. A stationary rope-cutting system, such as a chopper designed for mooring lines and heavy-duty ropes, could be installed in the Plastic Odyssey workshop.

Stationary rope-cutting system to process big ropes and mooring lines

Staging & Backhaul Logistics

Once shredded and bagged, the waste can be loaded onto an inflatable storage barge secured alongside the vessel, then towed to a protected area near ilôt Picard to await transfer. A barge or the station's supply ship can offload the storage barge and backhaul large quantities of shredded waste. As in the 2023 cleanup, using the same resupply vessel, ~80 t per voyage, returning empty, would significantly reduce costs. Likewise, the barge used for resort construction on Assumption Island (capacity >80 t), which also returns empty, could be leveraged. Because transport is a major cost driver in the extraction phase, it will be essential to secure agreements to use these existing logistics assets.

NOFI inflatable storage barge

AI-generated illustration: transferring bags from Plastic Odyssey to a storage barge

5. Waste valorisation

Rigid plastic and buoys
Brikole, a local company based in Victoria can transform rigid plastic waste into furniture (as piloted during the Aldabra trial). Partnering with local designers could create a high-value furniture line made from Aldabra plastic waste. Potential clients include hotels, restaurants, and local councils, among others. www.brikole.net

Example of furnitures made out of recycled plastic

Ropes
BRIKOLE: Brikole's core activity began with the collection and export of end-of-life fishing nets, which are recycled into pellets, a high-quality raw material used by impact-driven companies such as Patagonia. The ropes are then transformed into premium, story-rich materials that can be repurposed for various partner projects including eyewear, watch straps, cosmetic packaging, furniture, or even phone components with future applications still to be defined. www.brikole.net


Fishing nets from Brikole transformed into textile

Flip flops

Flip flops collected from Aldabra can be recycled into high value artwork. A sample of 400 flip flops has been collected to make a first test. A range of products “Made from Aldabra”.
www.oceansole.com


Products made out of flip flops by Ocean Sole

PET Bottles

Harini & Co. Pty Ltd collects and grinds PET bottles in the Seychelles for export; it would be worth assessing integration into the national EPR buyback scheme.
At Plastic Odyssey Factories, the Easy Wool machine converts PET bottles into high-quality fibers for cushions/mattresses, insulation, and textiles.

Erik Frank pilots local recycling solutions like PET fiber


EasyWool bottle to fiber machine

Installation of the bench and chair on Picard

Last sunset on Aldabra for the Plastic Odyssey Team (by Alexis Rosenfeld)

https://aldabra.plasticodyssey.org/logbook/

For more info, see the [Expedition Logbook] by Pierre Lepidi

APPENDIX - LIST OF PLASTIC ODYSSEY EXPEDITION MEMBERS

#	Name	Role	Position	Nationality
1	Simon Bernard	Plastic Odyssey Founder & Expedition leader	onboard & ashore	French
2	Yoann Long	Captain of M/V Plastic Odyssey	onboard	French
3	Pierre-Louis Gachet	Chief Mate	onboard	French
4	Léna Cherbonnel	First Mate	onboard	French
5	Simon Gouret	Chief Engineer	onboard	French
6	Jonathan Gala bi	Second Engineer	onboard	Ivorian
7	Patrick Awate	Bosun	onboard	Togolese
8	Desiré Youan Maya	Seaman	onboard	Ivorian
9	Megan McKain	Seaman	onboard	British
10	Aodren Bronsard	First Cook	onboard	French
11	Morgane Kerdoncuff	Stopover coordinator	onboard & ashore	French
12	Germain Giraud	Recycling Engineer	onboard	French
13	Thibault Roudier	Recycling Engineer	onboard & ashore	French
14	Mélodie Martin	Recycling technician	onboard	French
15	Marine Reveilhac	Mediaman	onboard & ashore	French
16	Alexis Rosenfeld	Photographer & UNESCO Representative	onboard & ashore	French
17	Pierre Lepidi	Reporter	onboard & ashore	French
18	Maluha Rosenfeld	UNESCO representative	onboard & ashore	French
19	François Ray	Mediaman	onboard & ashore	French