Preliminary assessment of the behaviour of drifting FADs during stranding events and costs of a recovery vessel at sea

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Current scenario to prevent impacts of FAD structures on sensitive ecosystems

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1) Limit the number of FADs per vessel

2) Transition towards biodegradable FADs

3) Promote the retrieval of FADs by dedicated recovery programs.

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FAD STRANDING TRIALS

- 3 TYPES OF FADS IN EXPERIMENTS
- MADE WITH BIODEGRADABLE MATERIALS
- STRANDED IN “CORAL REEF-LIKE” SEABED

CAGE-TYPE FAD (IO)

RAFT-TYPE FAD (IO)

SAIL-TYPE FAD (AO, EPO, WCPO)

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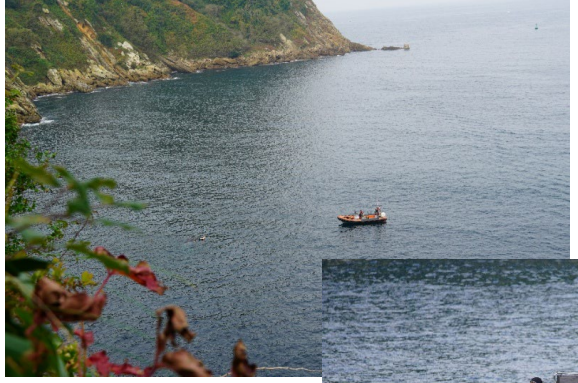
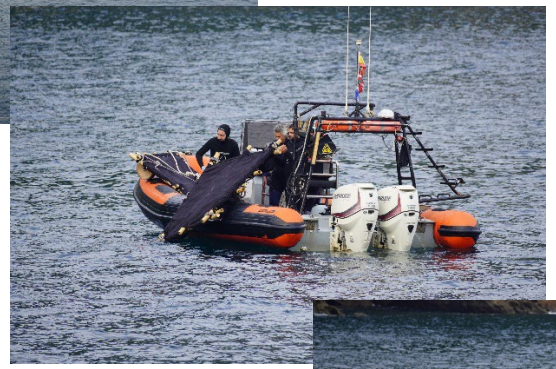
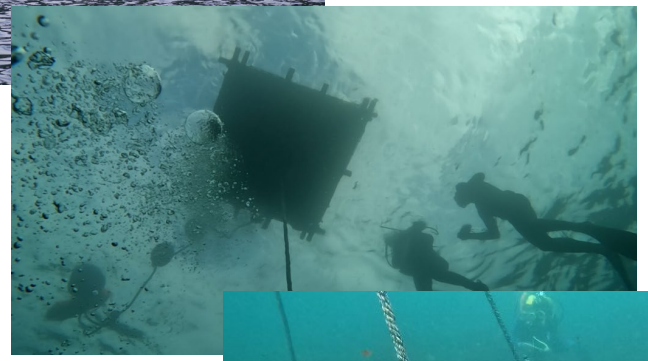
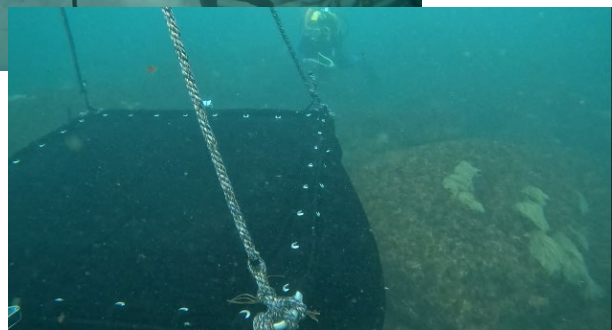
DATA COLLECTION







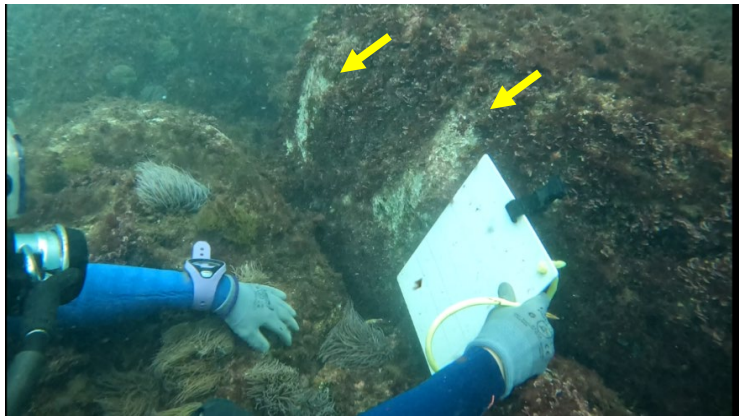


- STANDING OBSERVATIONS WITH DIFFERENT TREATMENTS (NATURAL DRIFT, BALLAST SNAGGED, FORCE DRIFT, FORCED DRIFT UPSLOPE).

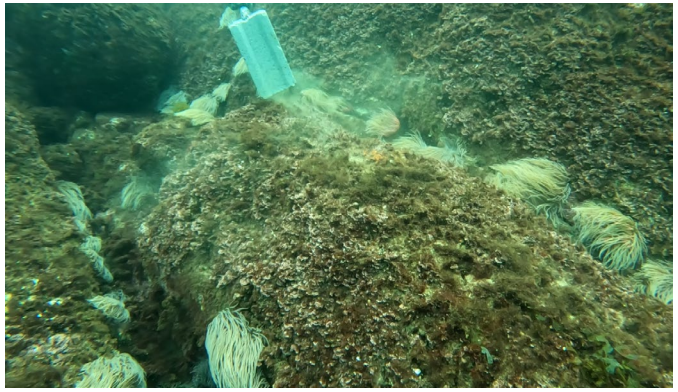
- NUMBER OF CONTACTS PER MINUTE AND TYPE (ABRASSION, COLLISION, SNAGGING) AND PART CONTACTING (RAFT, ROPE, BALLAST) WERE RECORDED.

RESULTS

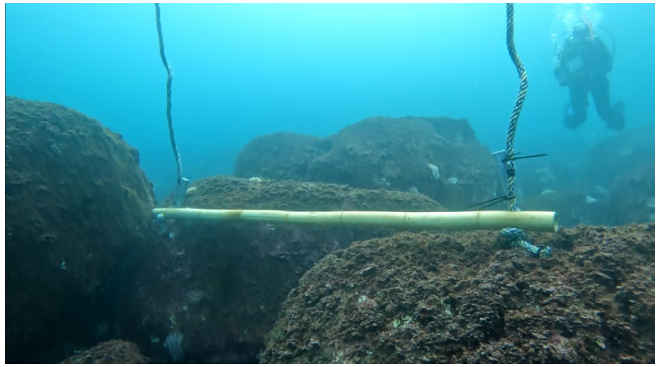
- HARD-PARTS OF THE BOTTOM BALLAST OF THE FADS CAUSED THE MOST DAMAGE TO THE SEA BED.
- SOME BALLASTS WERE PRONE TO SNAGGING AND EXERTING PULLING PRESSURE ON THE SEABED.
- OTHER PARTS OF THE FADS LIKE THE SUBMERGED ROPES AND SAILS ALSO INTERACTED WITH THE SEA BOTTOM.
- RESTRANDING EVENTS WERE OBSERVED IN SEVERAL OCCASIONS.



Abbrasion by bottom metalic frame of Cage_type FAD



Abbrasion trail by ballast brick of Raft_type FAD



Collision by bamboo with gravel ballast of Sail_type FAD

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RETRIEVAL OF FADS FROM SMALL VESSELS FROM RECOVERY PROGRAMS

Phase	Assessed element	Cage	Raft	Sails
Transport	Difficulty transporting from shore to vessel	Low	Low	High
	Space required (bulkiness)	Low	Low	High
	Robustness	High	Medium	Medium
Deployment	Difficulty manoeuvring during deployment	Low	Low	High
Retrieval	Difficulty manoeuvring during retrieval	Low	Low	High

Retrieving a Sail_type FAD from small vessel

AT SEA RECOVERY VESSEL COSTS

Total revenue	MIN (USD)	MAX (USD)	UNITS
	1.535.796	**1.677.219**	USD/year
Revenue per satellite buoy	292	409	USD/satellite buoy
Number of satellite buoys recovered	5.245	4.092	Number
Operating costs			
Operating days	200	250	Days
Fuel costs	2.693	2.693	USD/day
Vessel maintenance	234.240	234.240	USD/year
Permits and fees	70.272	70.272	USD/year
Land rent (warehouse)	1.756	1.756	USD/month
Number of people	8	8	Crew
Wage costs	417.649	417.649	USD/ year
Insurance costs	167.059	167.059	USD/ year
Total operating costs	**1.406.892**	**1.541.580**	USD/ year
Other costs (5%)	70.344	77.079	USD/ year
Annual depreciation	58.560	58.560	USD/ year
Total annual costs	**1.535.796**	**1.677.219**	**USD/** year

Typical supply vessel in IO/AO

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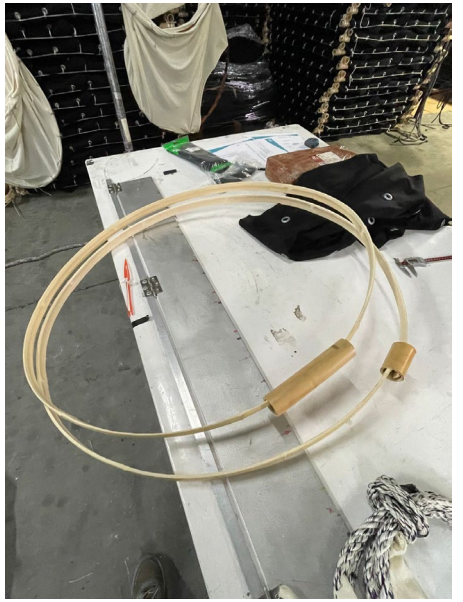
RECOMMENDATIONS

- CONTINUE TO IMPLEMENT BIODEGRADABLE FAD USE BUT WITH LIGHTER AND SHALLOWER DESIGNS THAT REDUCE IMPACTS OF THEIR STRUCTURES ON SENSITIVE COASTAL ECOSYSTEMS, PARTICULARLY BALLAST ELEMENTS (E.G., SAND BAGS OR ROPES WITH BREAKAGE POINTS).

- MORE RESEARCH OF REAL-TIME STRANDING EVENTS OF FAD TYPES IS RECOMMENDED TO INCREASE EXPERIMENTAL SAMPLE SIZE AND THE EFFECTS OF THE RAFT INTERACTION WITH THE SEABED REQUIRES MORE TESTING TO DEVELOP CORRECTIVE DESIGNS.

- TRIALS WITH AT SEA RETRIEVAL VESSELS IN FAD LOSS HOTSPOTS COULD SHOULD BE EXPLORED TO COMPLEMENT ON LAND RETRIEVAL PROGRAMS, WHERE THE COSTS COULD BE PARTIALLY OFFSET BY THE RESALE OF ECHO-SOUNDER BUOYS.



Circular JellyFAD (ISSF©)

THANK YOU!

Acknowledgements

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