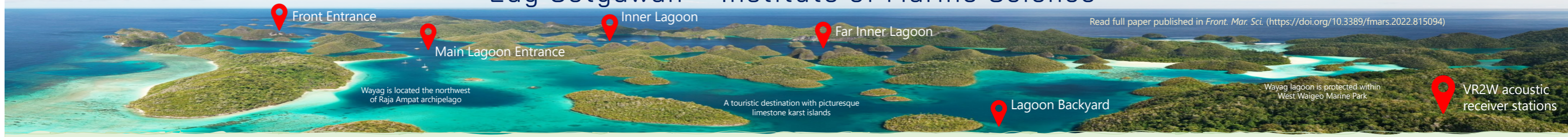


INVESTIGATING REEF MANTA RAY NURSERY IN WAYAG LAGOON, RAJA AMPAT

Edy Setyawan – Institute of Marine Science

Read full paper published in *Front. Mar. Sci.* (<https://doi.org/10.3389/fmars.2022.815094>)



Benefits of living in a nursery

- Sufficient food source
- Shelter from predators
- Social interaction & learning opportunity
- Cleaning stations like 'spa'
- A nursery is a good and safe environment contributing to higher chances of newborn survival!

Most species of sharks and rays use shallow sheltered habitats like lagoons as nurseries for their newborns

Manta nurseries are RARE! It requires massive & long-term effort to identify a nursery area



How to define a nursery for manta rays? See **Criteria!**

We conducted 8 years (2013–2021) of monitoring to provide the most comprehensive description to date of a reef manta ray (*Mobula alfredi*) nursery

The ecology of newborn and juvenile manta rays is understudied



Global population decline due to fishing pressure

Identifying critical habitats (i.e., nurseries) is urgently required to support conservation effort

QUICK FACTS!

- Manta ray pups live independently without parental care immediately after birth
- Largest brain-to-body ratio of all fishes
- Give birth to only 1 pup every 2–6 years
- Live at least 50 years
- Cannot swim backwards
- Males are smaller than females
- Feed on zooplankton
- Have NO sting!
- Size at birth: 1.5–1.9 m from wingtip to wingtip

Criteria of an elasmobranch* nursery

As applied on manta rays, pups and juveniles:

- are more commonly encountered in this area than in other areas
- tend to remain and/or return to this area repeatedly for extended period**
- inhabit the area across years

** best to be assessed using satellite and/or passive acoustic telemetry

MAIN FINDINGS



Photo IDs a juvenile resighted in Wayag lagoon

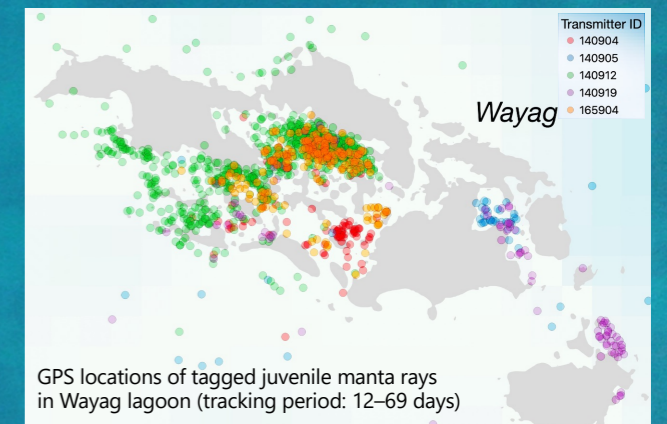
Manta sightings

Newborn and juveniles reef manta rays in Wayag lagoon in 2013–2021

34 unique IDs **21** longest sighting span
47 encounters **27** resighting rate (%)

The estimated body size (disc width) of juveniles ranged from 150 to 240 cm (n = 34). Two juveniles sized 218 and 219 cm were measured using drone.

Satellite telemetry



GPS locations of tagged juvenile manta rays in Wayag lagoon (tracking period: 12–69 days)

- Restricted movements within Wayag lagoon
- Narrow core activity space within and around Wayag lagoon
- Occasional brief excursions to areas outside of the lagoon up to ~45 km

Passive acoustic telemetry

Long-term and high residency of juvenile manta rays within Wayag lagoon!

14.5 months of near-continuous detections **0** detection by receivers outside of Wayag in broader Raja Ampat region
119 days of consecutive detections **24** h detections (daytime and nighttime)***

*** the majority of detections at aggregation sites used by large adult individuals were recorded during the day

- Our findings fulfilled the three criteria of defining a manta ray nursery
- We conclusively confirm that the Wayag lagoon in Raja Ampat serves as a nursery for newborn and juvenile reef manta rays
- Our study presents the most robust assessment and comprehensive description to date of a manta nursery

CONCLUSIONS

TRACKING MANTA RAYS

- Application of drone to locate & measure manta rays, and collect their photo IDs
- Aerial survey (including drone photogrammetry)
- Home range and spatial movement pattern in and around the Wayag lagoon
- Satellite transmitters equipped with GPS (n = 5)
- Boat surveys
- Underwater surveys
- Application of photo ID to identify juvenile manta rays
- Acoustic transmitters (n = 9)
- Residency and continuous occupancy of juveniles in the Wayag lagoon
- VR2W acoustic receiver stations (n = 5)

Supported by:



Key references:

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Contact:

Edy Setyawan
 edy.setyawan@auckland.ac.nz

