# A collaborative approach to collecting species-specific manta and devil ray catch data and assessing handling effects on post release survival

## SC21-EB-WP-09

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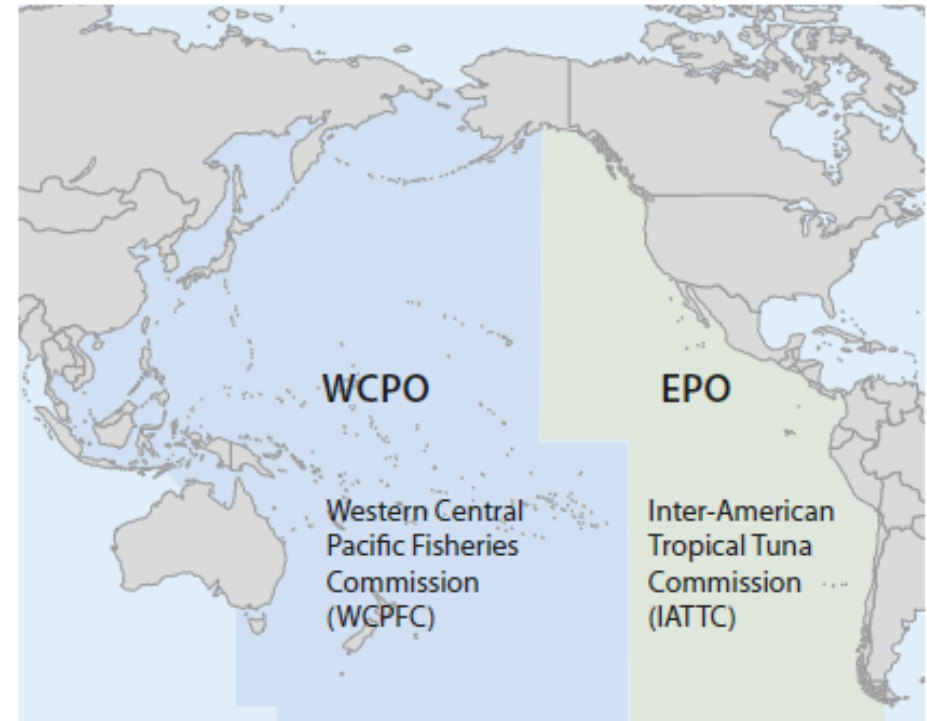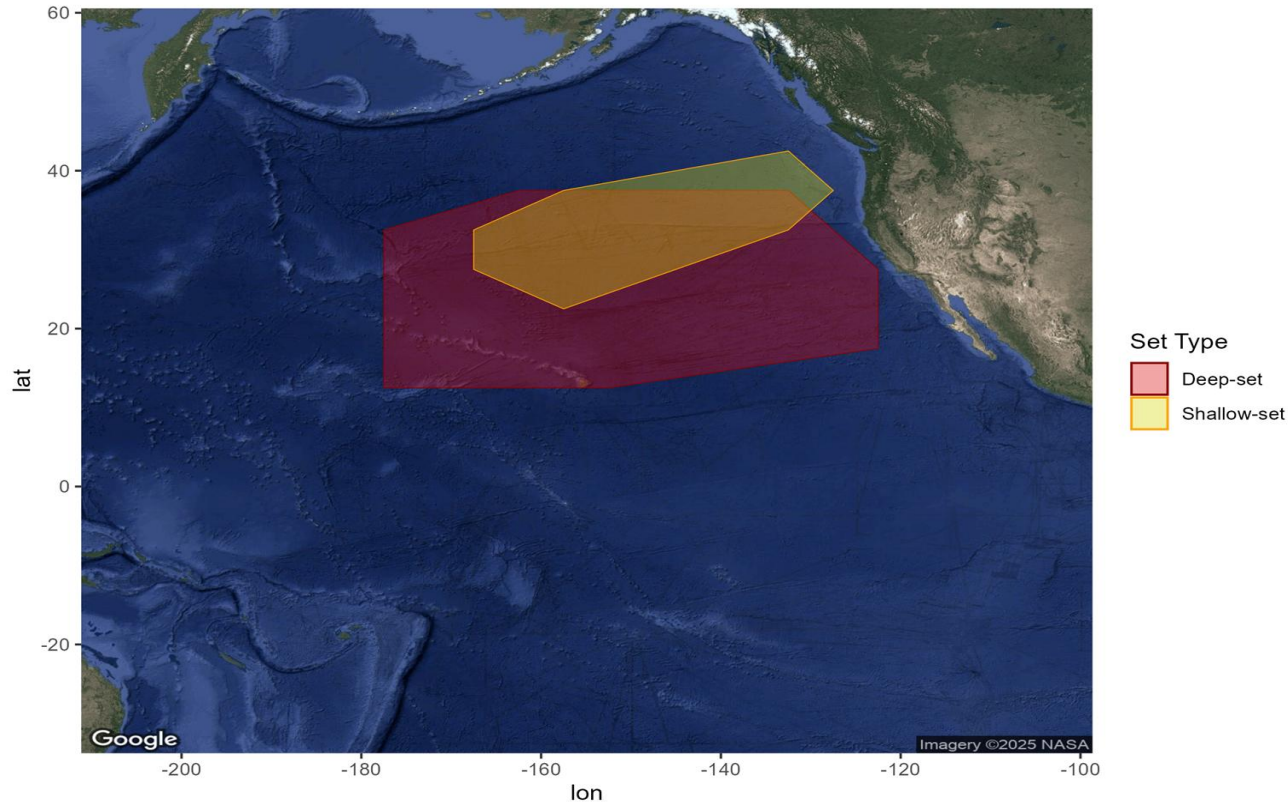
# The problem:

- Giant/oceanic manta ray (*Mobula birostris*) listed as threatened throughout their range under US Endangered Species Act (ESA) in 2018.
- Fishing mortality greatest threat to population recovery
- Major data gaps in US Longline : 1) species-specific catch rates, 2) survival rates post-interaction.

NOAA Fisheries

# Spatial overlap

- 8 species found in PO
- 7 in WCPO, 5 in EPO
- Hawaii based LL fishery overlaps with 5



Hawaii Longline Fishing Footprint

Set Type
Deep-set
Shallow-set



WCPO — Western Central Pacific Fisheries Commission (WCPFC)
EPO — Inter-American Tropical Tuna Commission (IATTC)

**WCPO**
*Mobula birostris*
*Mobula alfredi*
*Mobula tarapacana*
*Mobula mobular*
*Mobula thurstoni*
*Mobula eregoodoo*
*Mobula kuhlii*

**EPO**
*Mobula birostris*
*Mobula tarapacana*
*Mobula mobular*
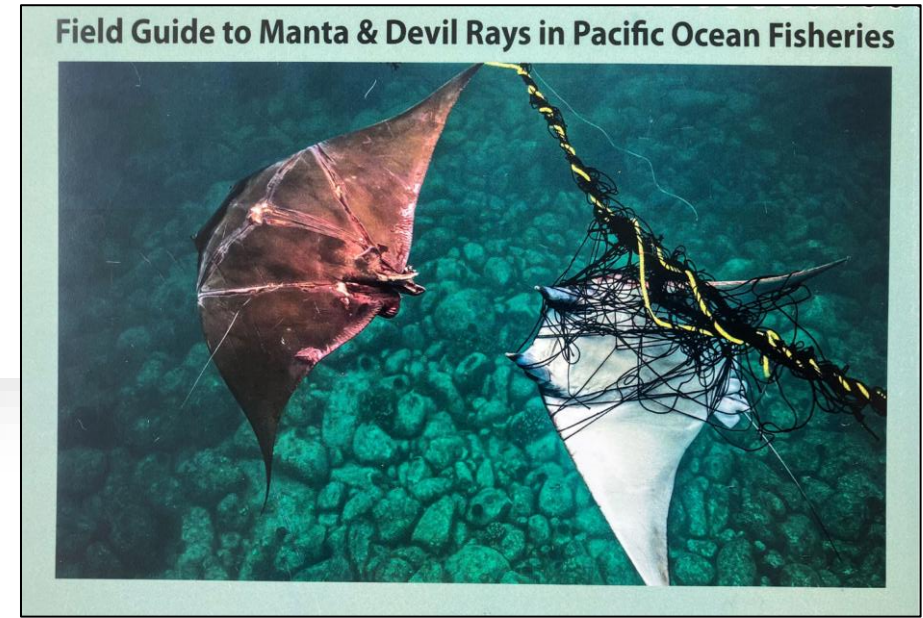*Mobula thurstoni*
*Mobula munkiana*

# Addressing the problem:

- Improving species identification
- Elucidate post release fate & handling impacts
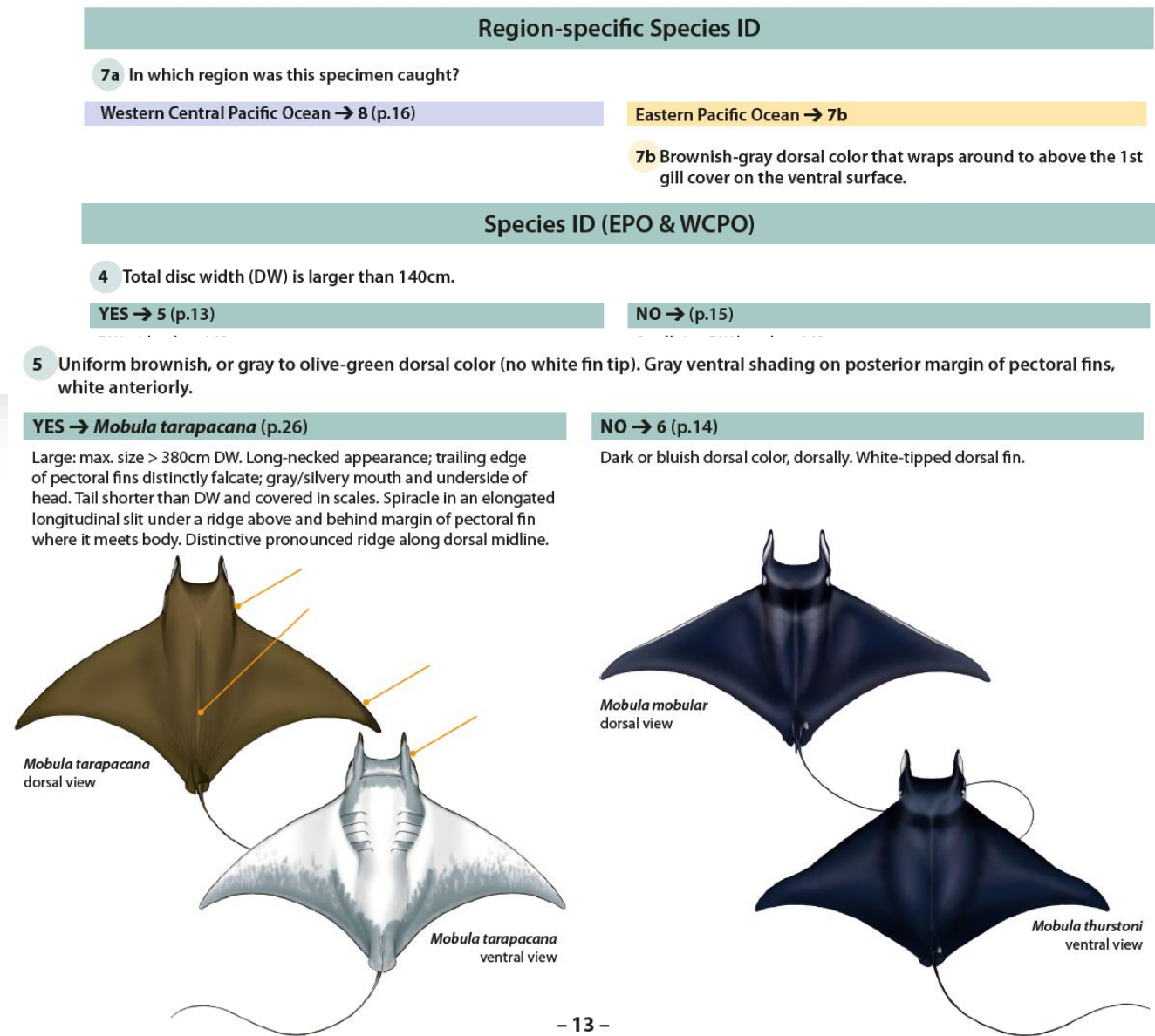
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Field Guide to Manta & Devil Rays in Pacific Ocean Fisheries

- Improving species identification
    - Development of an ID Guide
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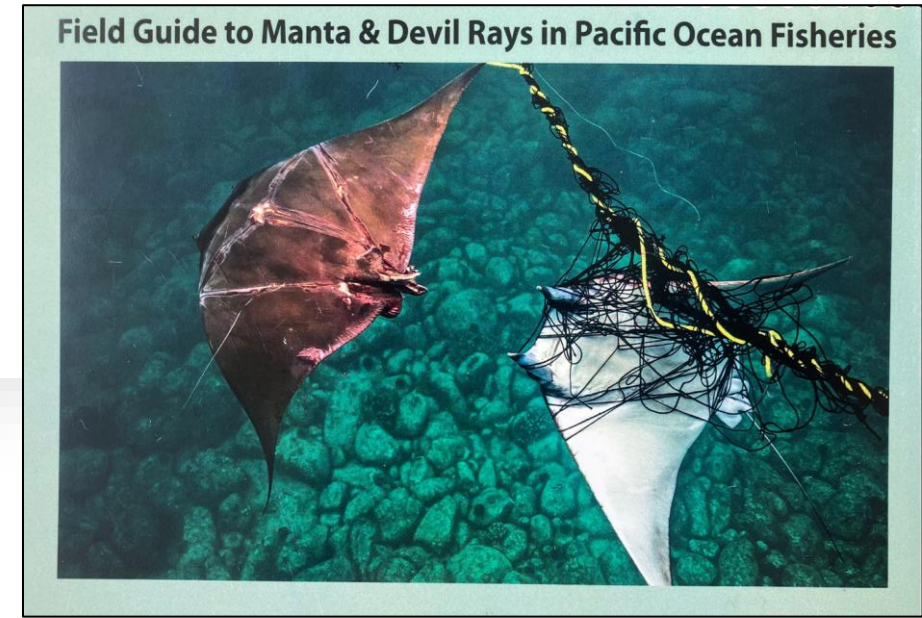
Improving species identification
- Development of an ID Guide
  - a) Region
  - b) Size
  - c) Coloration

# Addressing the problem:



Field Guide to Manta & Devil Rays in Pacific Ocean Fisheries

- Improving species identification
  - Development of an ID Guide
    - Training observers and debriefers
  - **Requesting imagery from fishers, observers and Electronic Monitoring (EM) projects**
- Elucidate post release fate & handling impacts

# Addressing the problem:



- Improving species identification
  - Development of an ID Guide
    - Training observers and debriefers
  - Requesting imagery from fishers, observers and Electronic Monitoring (EM) projects
  - **Genetic sampling (PIROP & NWFSC)**

- Elucidate post release fate & handling impacts

# Data required for each tag deployed

The below data fields are requested for each interaction with a mobulid ray. (See identification instructions next page). Successful tag events with good data and footage will be reimbursed at a rate of $800 USD.

Please take a photo of the data on this sheet and email or text us as soon as you return to port 🙂
Email: pacificsharktagger@gmail.com and/or Text Forest O'Neil: 808.321.9188

Tag serial #: _____, Tag PTT #:_____ Tag location: ☐Left wing, ☐Right wing

MM  DD  YY

Trip No._____, Set No._____, Date____/____/____,

Time_____, Latitude_____ N / S , Longitude_____ W / E

Sex: ☐Claspers present (male), ☐Claspers absent (female), ☐Undetermined

Hook/entanglement location: ☐Mouth, ☐Cephalic fin, ☐Wing, ☐Body,

☐Other_____

Capture condition: ☐Good, ☐Injured, ☐Lethargic, ☐Dead (Please don't tag dead animals)

Release condition: ☐Good, ☐Injured, ☐Lethargic, ☐Dead

Handling/release method: ☐Line cut, ☐Dehooker, ☐Escaped, ☐Other _____

Trailing gear?_____ft, Comments:_____

_____

**Condition Definitions:**
*Good* - Animal active and energetic, no visible signs of trauma or injury, no bleeding from the vent or gills, fights against the gear, swims away well.
*Injured* - Clear evidence of injury to any part of the body; bleeding may be seen from the hook, gills or vent.
*Lethargic* - Animal exhibits signs of life but does not appear very active; still makes efforts to swim.
*Dead* - Animal does not exhibit signs of life, sinks or sinks upside down.
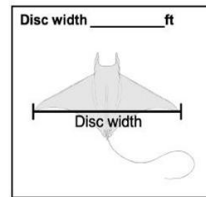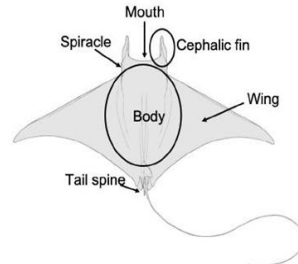
- Mouth
- Spiracle
- Cephalic fin
- Body
- Wing
- Tail spine
- Disc width _____ ft

- ## Elucidate post release fate & handling impacts
  - **Telemetry - trained fishers to tag and record additional data**

# Addressing the problem:



- Improving species identification
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    - Training observers and debriefers
  - Requesting imagery from fishers, observers and EM projects
  - Genetic sampling
- Elucidate post release fate & handling impacts
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  - **PIROP Observers collected additional interaction data**

# PIROP Data Collections

**Elasmobranch form**

- ***Disposition*** - Record condition of animal at release.
- ***Hook/entanglement locations***
- ***Handling*** - Record how mobula is removed from gear
- ***Gear remaining*** (trailing gear)

**Catch form**

- ***Species code*** - Add comment for scientific name.
- ***Length*** - Wingspan (disc width)
- ***Sex***

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**Data codes for species ID:**

- Other Ray
- Manta/Mobula Ray
- Mobula (Devil Ray)
- Giant Manta Ray

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- Elucidate post release fate & handling impacts
  - Telemetry - trained fishers to tag and record additional data
  - PIROP Observers collected additional interaction data
  - **EM program review of mobula interactions**

# Mobula Genetic Results

**N = 42 Samples, N = 36 Positive ID, N = 1 Could not be resolved, N = 5 Awaiting processing**

| Genetic Sampling IDs | | | |
|---|---|---|---|
| Manta spp. | *Mobula alfredi/ Mobula birostris\** | 1 | 3% |
| Spinetail devil ray | *Mobula mobular* | 7 | 19% |
| Sicklefin devil ray | *Mobula tarapacana* | 7 | 19% |
| Bentfin devil ray | *Mobula thurstoni* | 21 | 58% |

# Tag Results

**N = 15 tags: 1 mortality, 1 survivors, 1 non-reporter, 1 lost, 1 bad deploy**
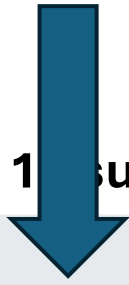


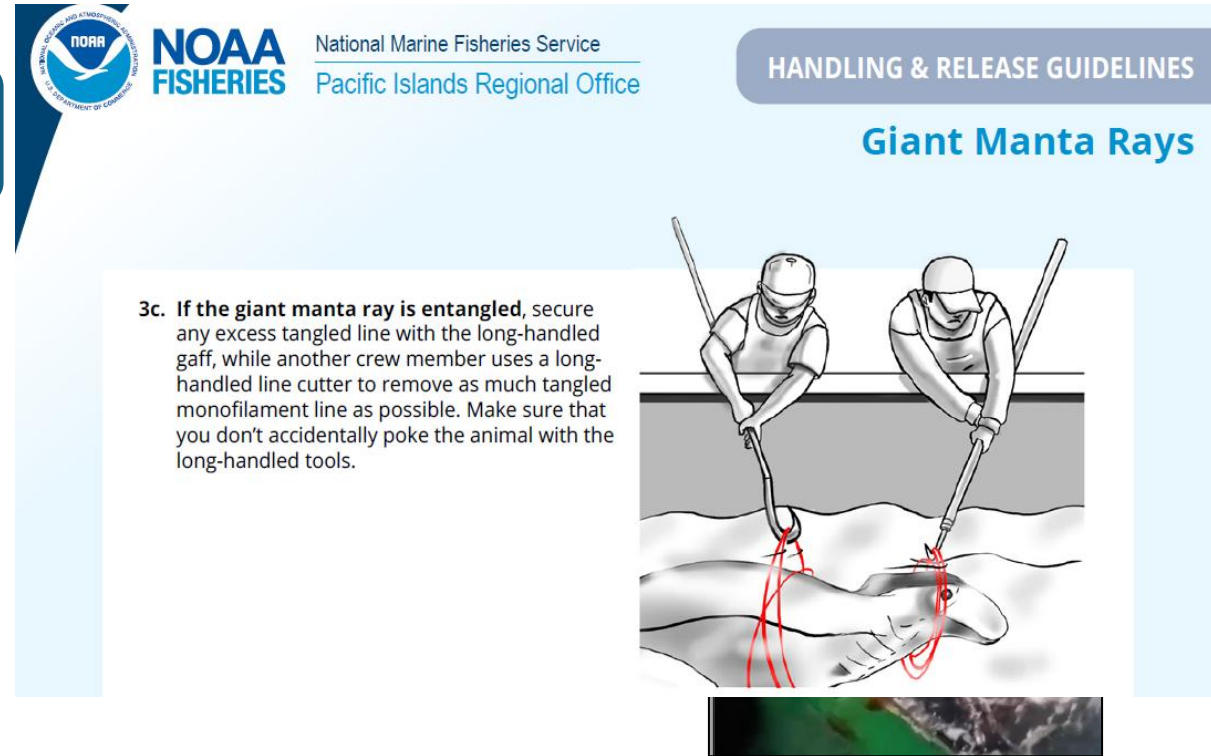| Species | No. Tags | Hook / entanglement locations | Release condition | Trailing gear | Post-release fate | Deploy period (days) |
|---|---|---|---|---|---|---|
| *M. birostris* | 2 | N=2 Entangled | N=1 Good<br>N=1 **Injured** | 0, NR | N =1 survivor<br>N =1 bad deploy | 60 |
| *M. tarapacana* | 2 | N=2 Foul hooked | N=1 Good<br>N=1 **Injured** | 0.9 -1.2 m | N=2 survivor | 58-60 |
| *M. mobular* | 4 | N=1 Entangled<br>N=3 Foul hooked | N=1 Good<br>N=2 **Injured***<br>N=1 Lethargic | 0- 0.6 m | N = 2 survivor<br>**N=1 mortality***<br>N=1 non reporter | 10*-60 |
| *M. thurstoni* | 6 | N=4 Foul hooked<br>N=2 Mouth hooked | N=4 Good<br>N = 1 Alive<br>N=1 **Injured** | 0.2 – 1.2 m | N = 6 survivor | 60 |

# Electronic Monitoring (EM) Data Collection

*What mobulid interaction details can EM systems reliably collect?*

N = 24 interactions were flagged for review
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## Data collectable with EM:

- Species ID 79% of the time
- Disc Width ("wingspan") possible with additional validation
- Hook/entanglement location
- Condition
- Handling/release methods
- Trailing gear

# Next steps: Review PIROP data

**Elasmobranch form**

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- *Hook/entanglement locations*
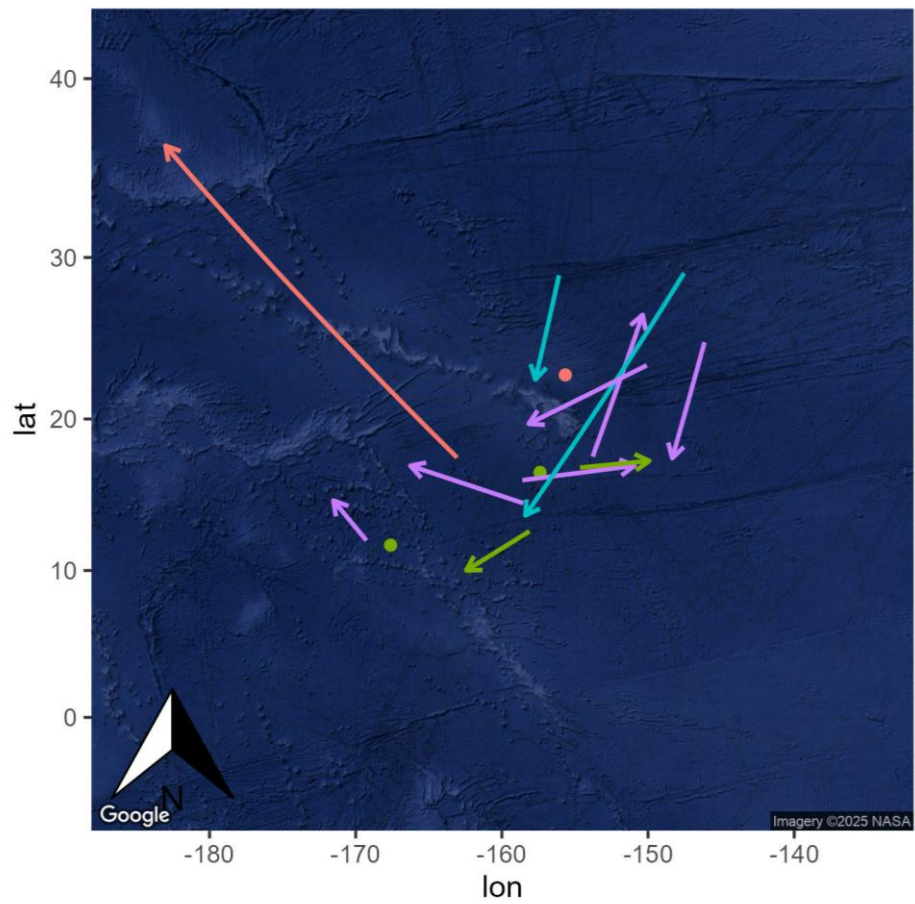- *Handling* - Record how mobula is removed from gear
- *Gear remaining*

**Catch form**

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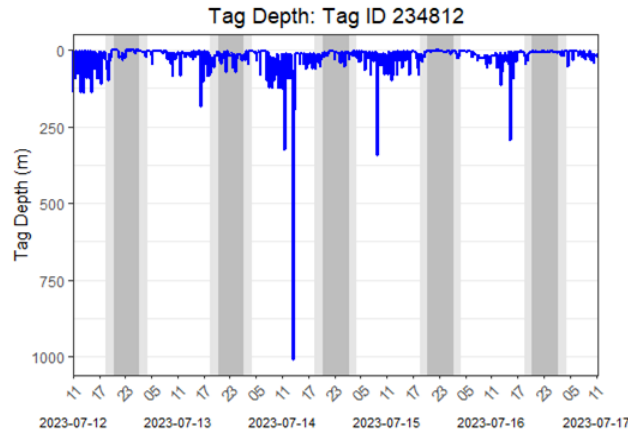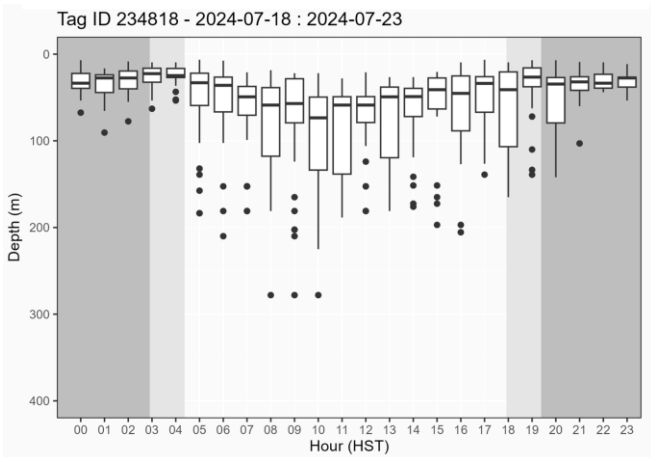- *Length* - Wingspan (disc width)
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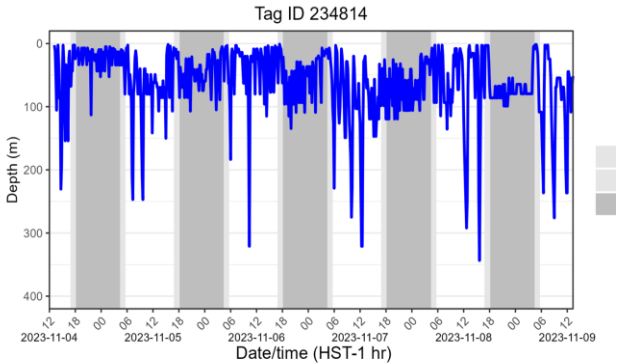- Manta/Mobula Ray
- Mobula (Devil Ray)
- Giant Manta Ray

# Next steps – Habitat use

# Conclusions & Recommendations

- US Hawaii-based LL fisheries interacts with at least 4 spp. (*M. birostris, M. tarapacana, M. mobular, M. thurstoni*)

- Good tools available for high confidence species level interaction data (ID Guides, EM programs, genetics)

- Post release survival may be relatively high for mobulids released using BHRP, but additional tagging is required for PRS rates and to identify good predictors

- Electronic Monitoring technologies can capture important interaction data

- Fishers are excellent partners for telemetry programs
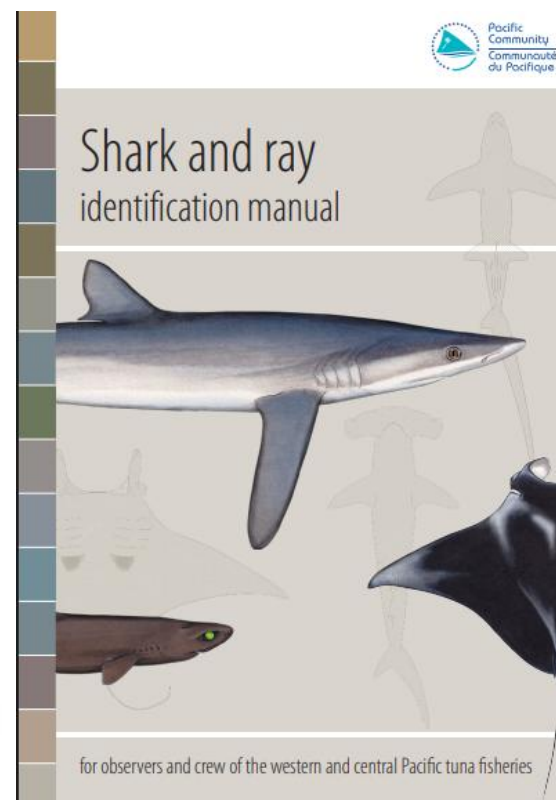
# Acknowledgements

- Funding from the NOAA Office of Protected Species

- Hawaii longline fishers!!!
- Genetics project: Jamie Marchetti (NOAA PIRO).


Photo credit: Corey Nevels

https://www.sharktagger.org/mobulid-id-guide