

# Post-release survival of mobulid rays in purse seine fisheries

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Marine Mammal  
Institute



Oceanic manta ray  
*M. birostris* <EN>



Bentfin devil ray  
*M. thurstoni* <EN>



Sicklefin devil ray  
*M. tarapacana* <EN>



Spinetail devil ray  
*M. mobular* <EN>

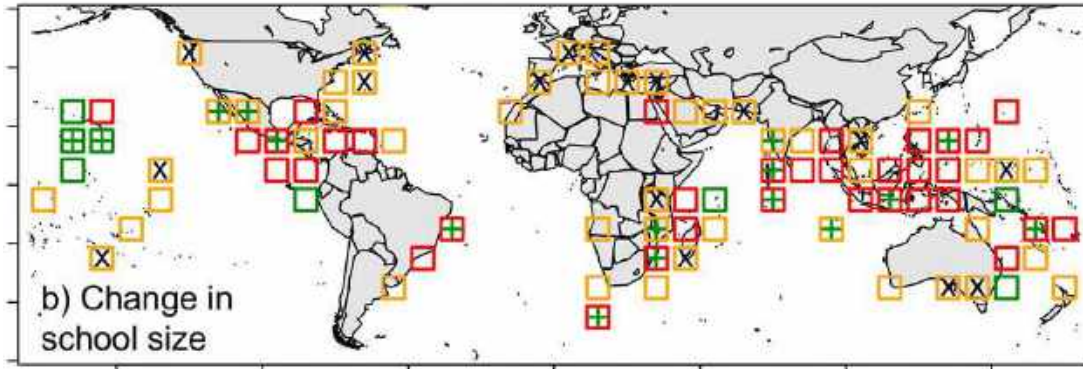
- Large bodied
  - + Long lived
  - + Low reproductive rate
  - + Small population sizes
- 

= Highly susceptible to population declines

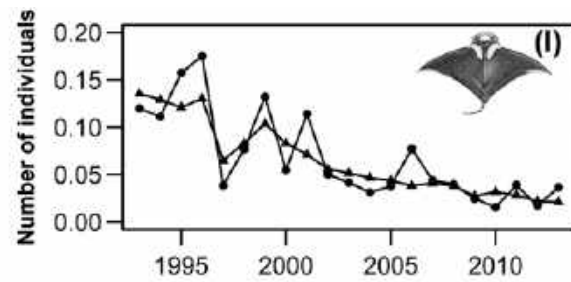
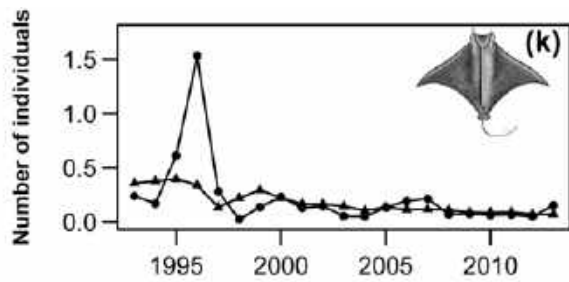


# Population trends

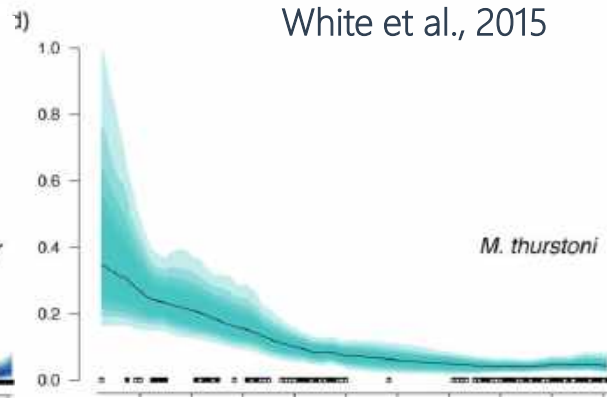
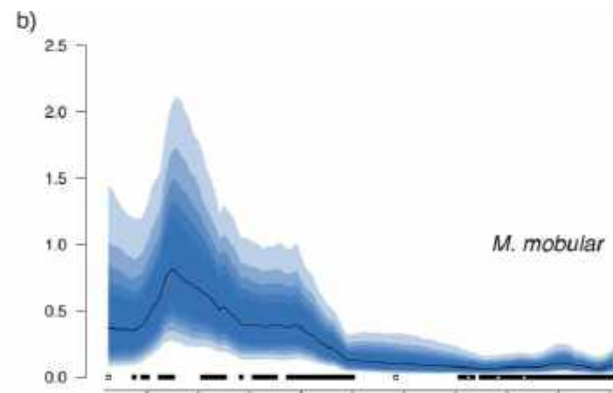
Global decline in school size and sighting frequency



Ward-Paige et al., 2013



White et al., 2015



Fernando & Stewart, 2021

Declines in sighting frequency (Eastern Pacific, Indian Ocean)

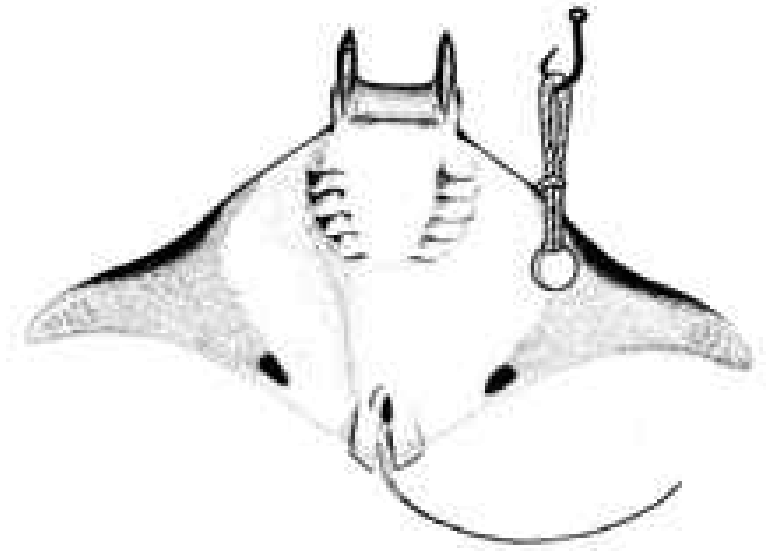
Declines in catch rates (Indian Ocean)



## **Purse Seines:**

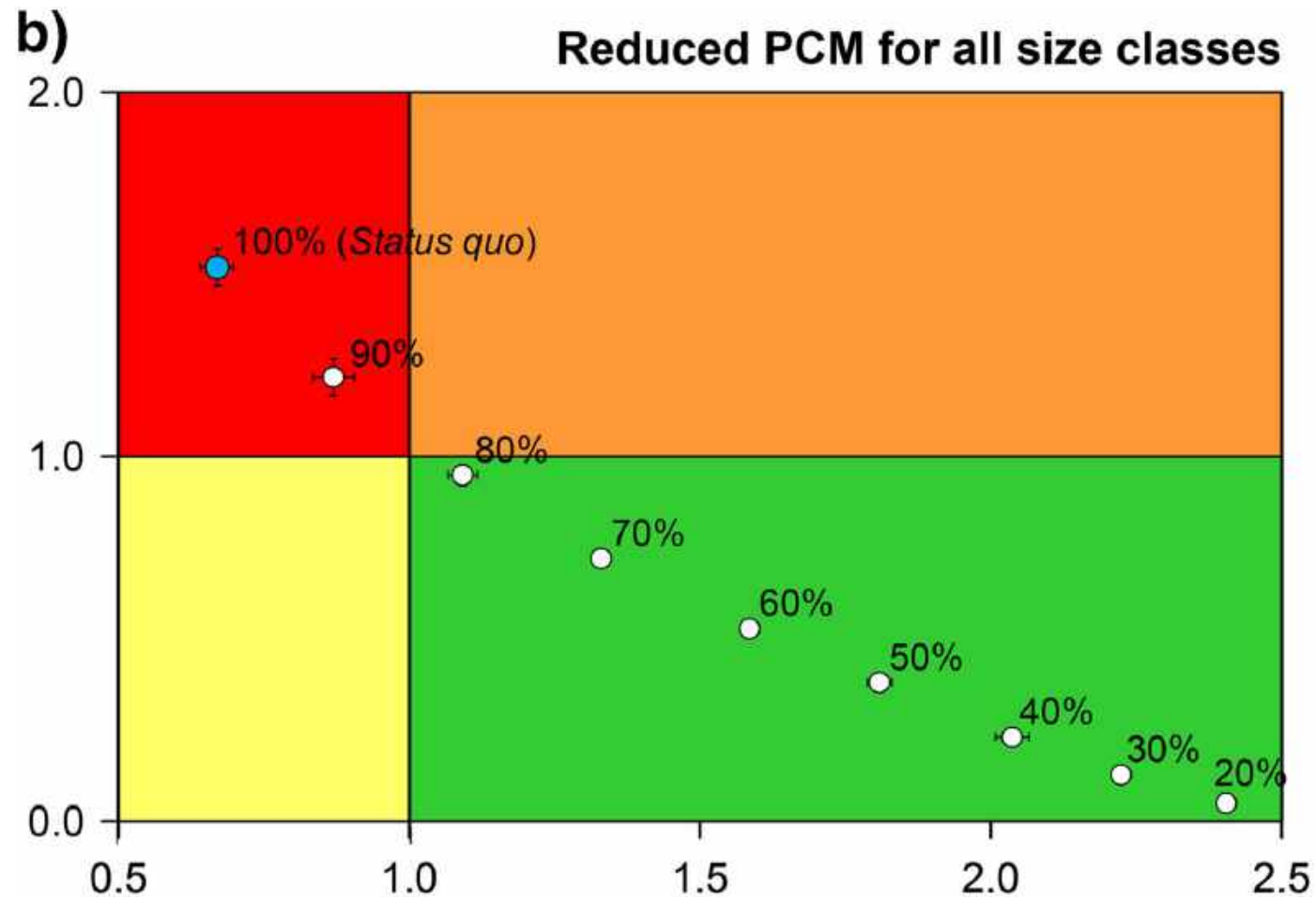
> 13,000 captured / year (mean)

# Former Handling & Release Methods



Assumed post-release mortality: 100%

# Reducing PRM is likely most beneficial



(For *M. mobular*)



# Improved Handling & Release Methods





# Improved Handling & Release Methods



Image courtesy of TUNACONS

# Improved Handling & Release Methods



# Observer Training



# Observer Training



# Tag Deployments

- 53 deployments in ETP 2017-2024
- 16 in NZ (Jones & Francis, NIWA)
- 20 in Atlantic (Hutchinson, ISSF; Murua & Grande, AZTI)

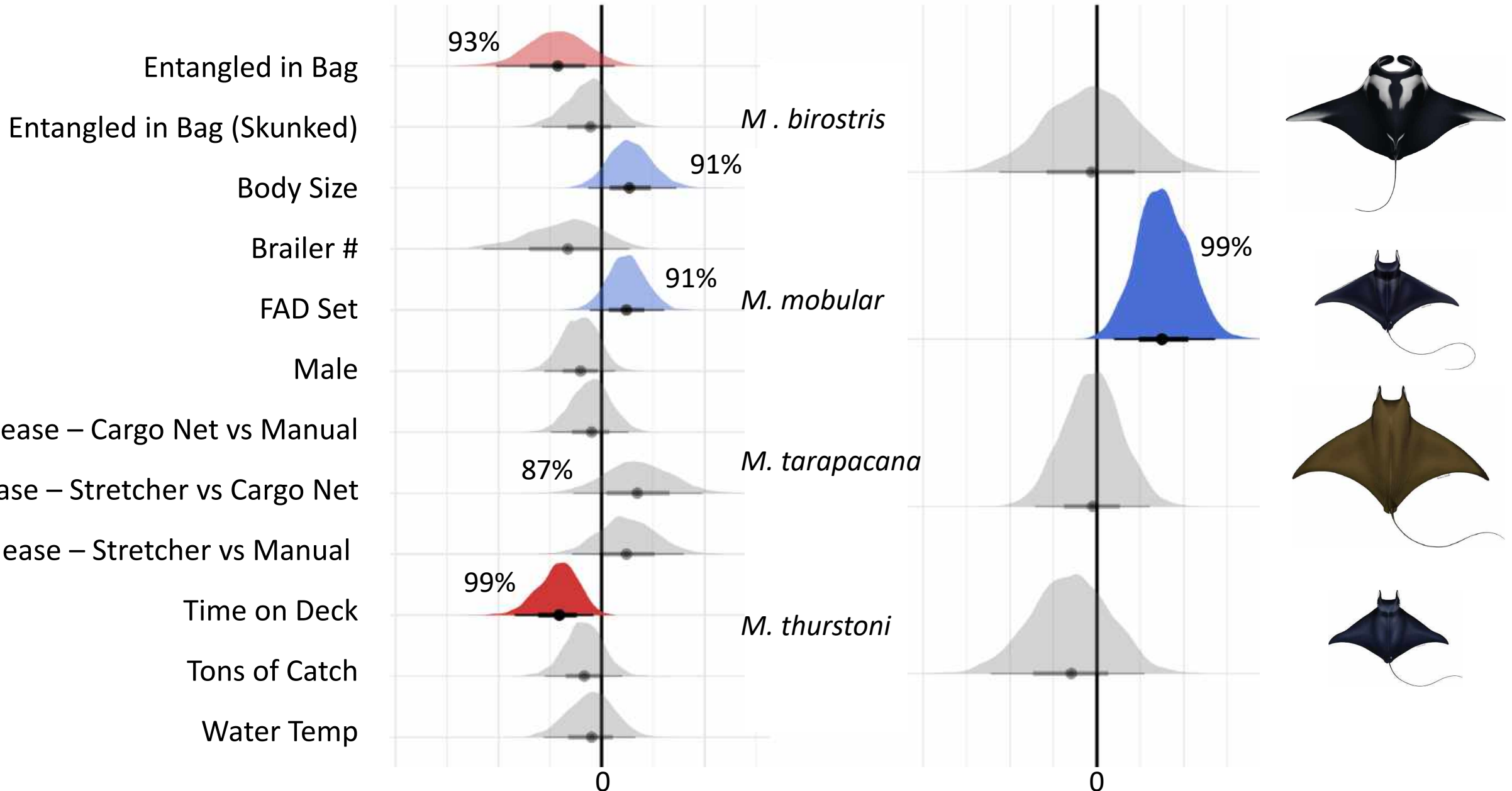
- 41 (32 rpt.) *M. mobular* (74%)
- 32 (19 rpt.) *M. tarapacana* (33%)
- 12 (5 rpt.) *M. thurstoni* (20%)
- 4 (2 rpt.) *M. birostris* (50%)

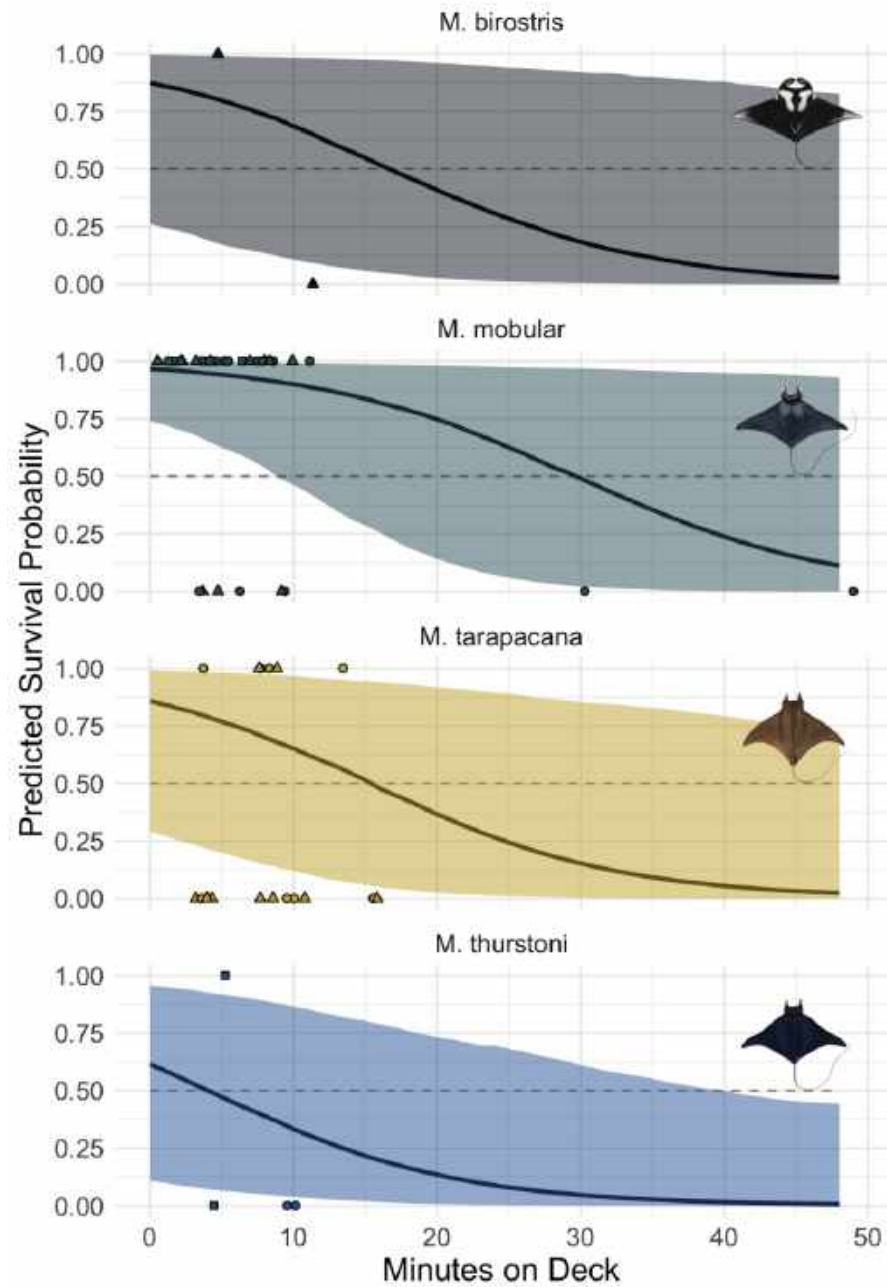


58\* total reporting tags out of 89 deployments

\*2 tags with ambiguous fates excluded

# Covariate Effects



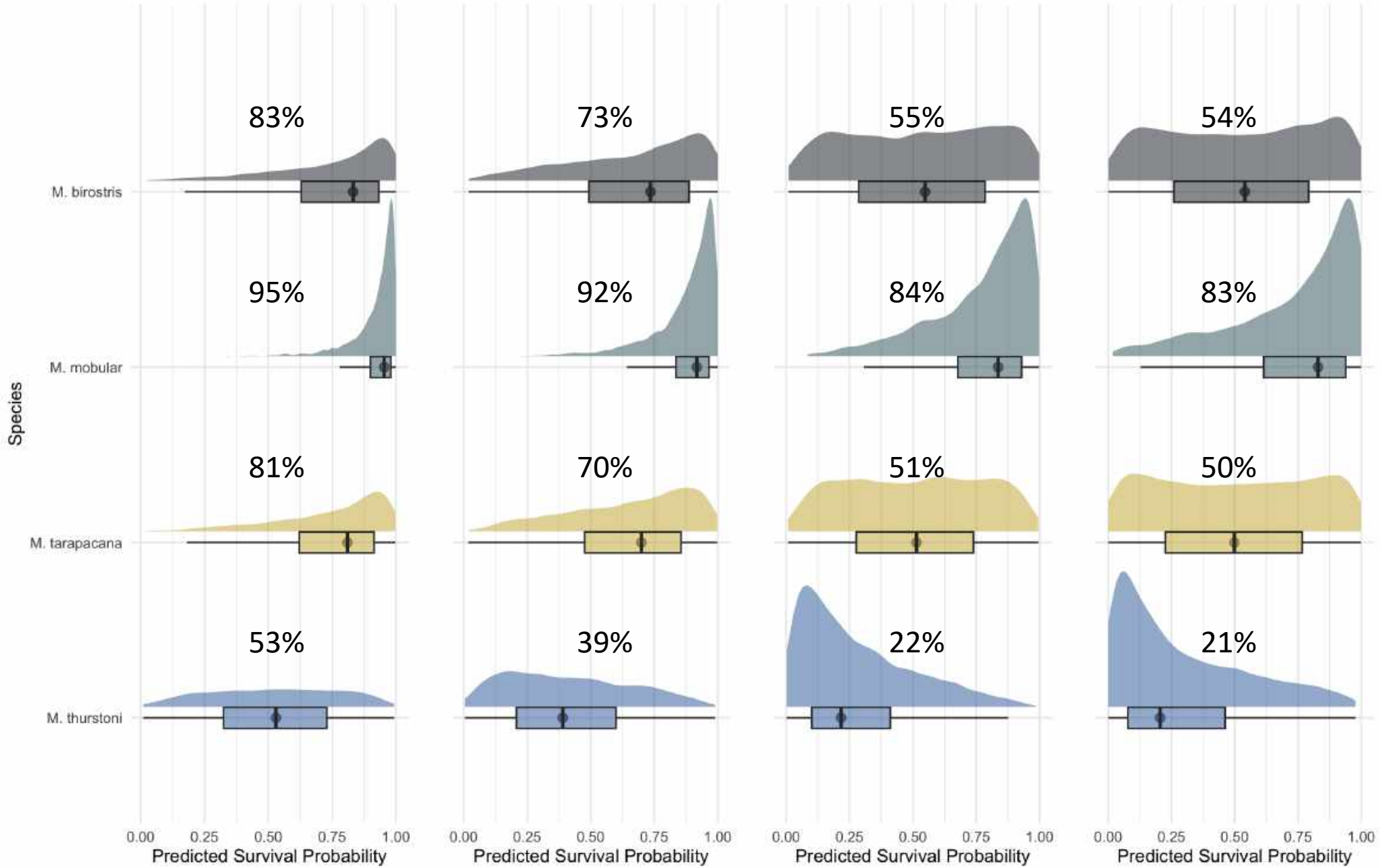


A) 3-minute Handling Time

B) 8-minute Handling Time

C) 15-minute Handling Time

D) 3-minute Handling Time  
Left in Sack





# Takeaways

- New handling methods likely a huge improvement
  - Specific method (by hand, stretcher, net) less important\*
- Mobulid post-release survivorship **can be** moderate to high
  - Highly dependent on:
    - **Species**
    - Time on deck
    - Entanglement in bag

# Recommendations

- Release mobulids in <5 min, flexibility on method
  - Would lean towards stretchers
- Don't let them sit in the sack until brailing is complete
- Explore & evaluate options to release directly from net
  - Even under optimal handling, *M. thurstoni* has low survivorship
  - Spotter pilots may be able to notify crew of mobulids in net

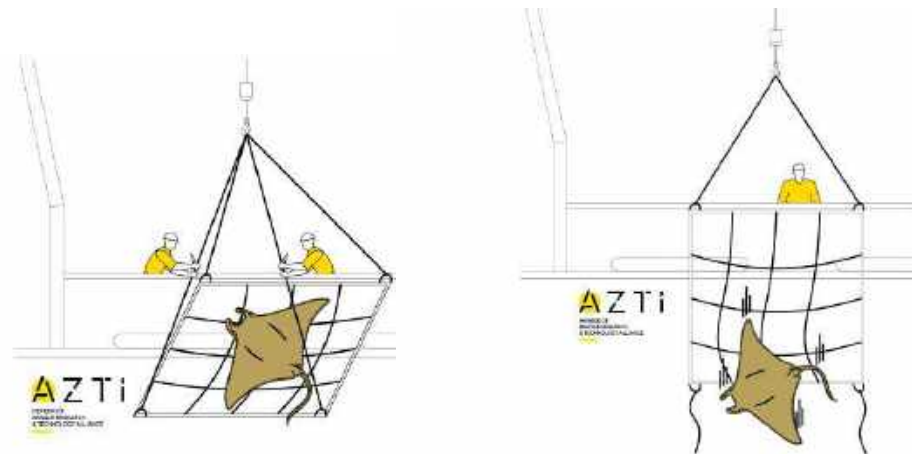
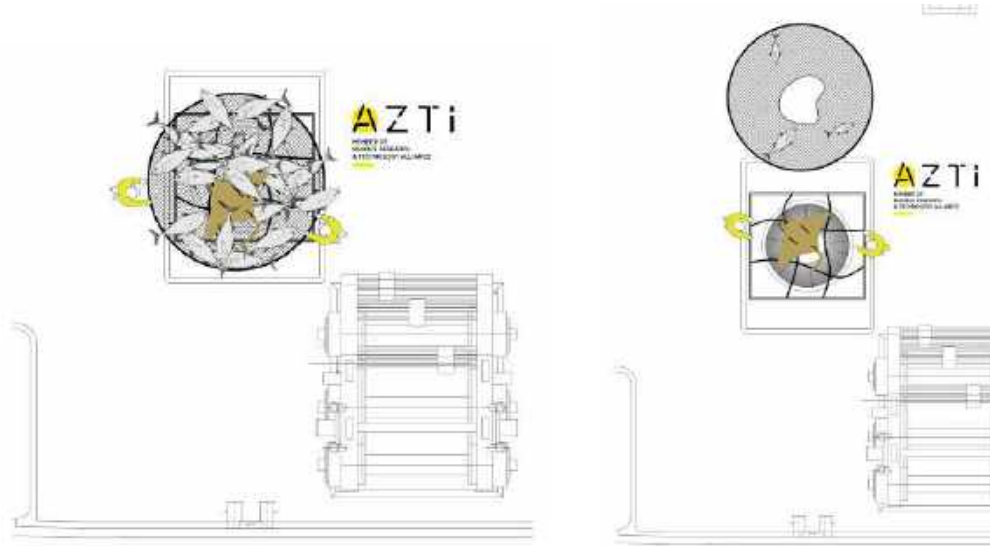
# Recommendations

- Observers should record release conditions so we can estimate fleet-wide survival probability
  - These estimates aren't the \*realized\* mortality rates
  - Actual survival rates are likely much lower

- *M. mobular* 74%
- *M. tarapacana* 33%
- *M. thurstoni* 20%
- *M. birostris* 50%



# Sorting Grids



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