



# Can we bring back the third daughter of Ocean God to Jeju Island?: 2012-2017 sea turtle stranding-bycatch and discussion of using the cultural identity of sea turtles for conservation.



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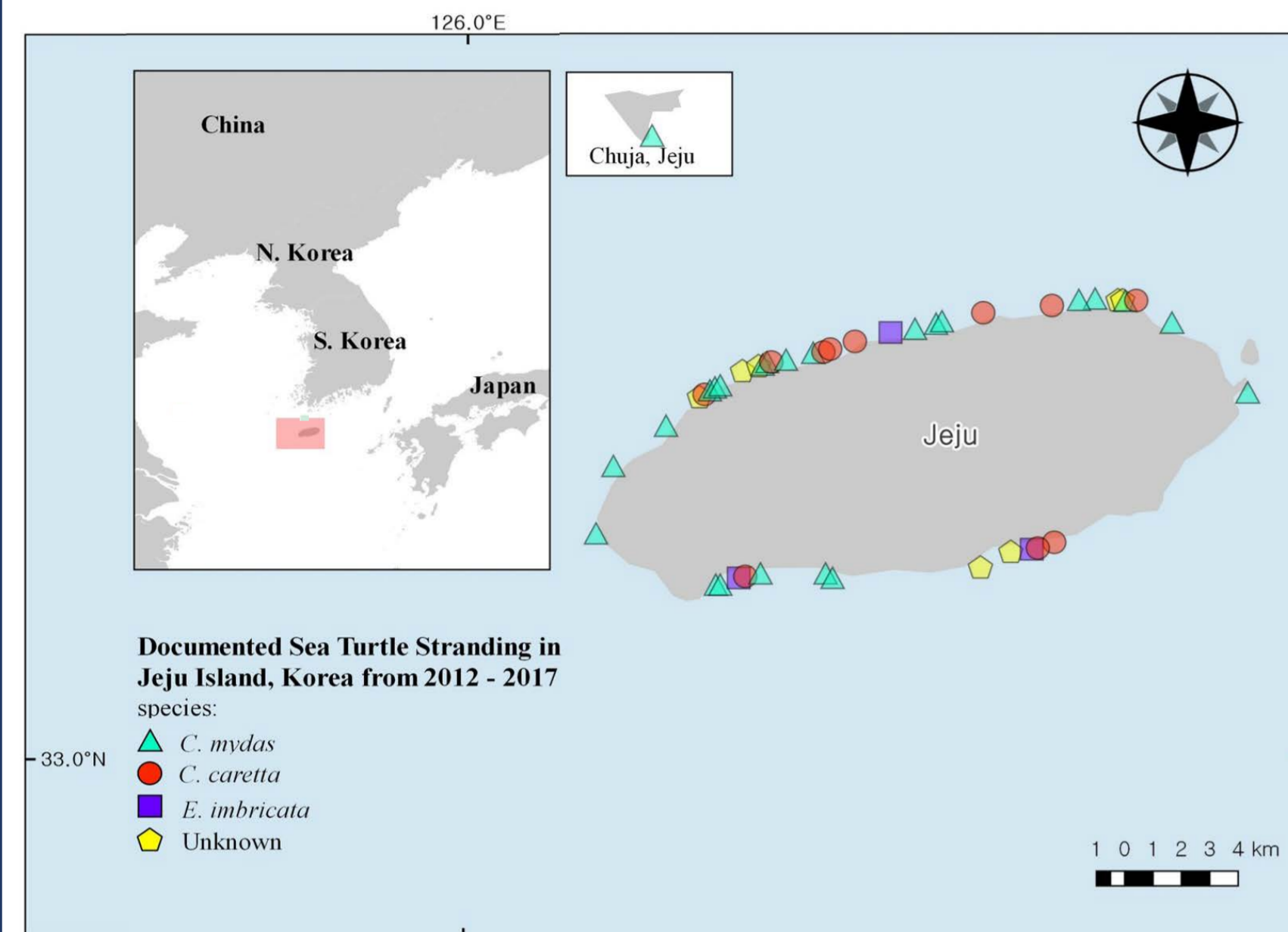
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## Introduction

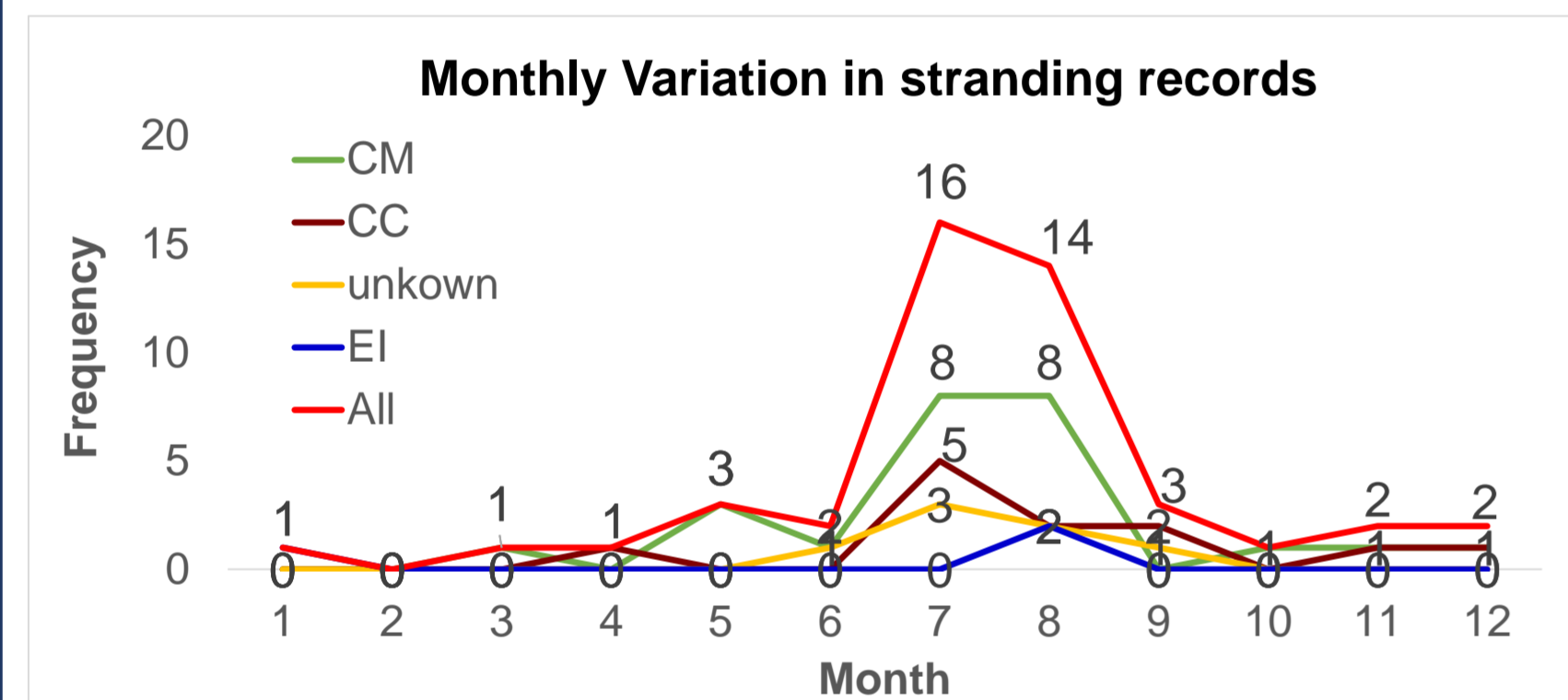
In Jeju Island, three of sea turtle species including Green sea turtle (*Chelonia mydas*), Loggerhead sea turtle (*Carett caretta*), and Hawksbill sea turtle (*Eretmochelys imbricata*) could be observed. However, the population status or ecology of sea turtles around Jeju Island is relatively unknown due to lack of research. Also, all previously known nesting sites with potential breeding colonies were destroyed by anthropogenic activities with the last sighting about 10 years ago. It is crucial to understand the ecology of sea turtle population found in Jeju Island and build a long-term conservation plan to bring the species back to Jeju Island. Recently, there was an effort to collect a continuous data of both stranding and bycatch sea turtles, and the preliminary results are presented here. Also, regarding long-term conservation, the belief of dragon king/queen of the ocean and turtle as the third and youngest daughter of the king/queen by the woman divers in Jeju Island is presented. It is our hope for this to be a start of long-term research and conservation of the sea turtles in Korea.

## Result and Discussion

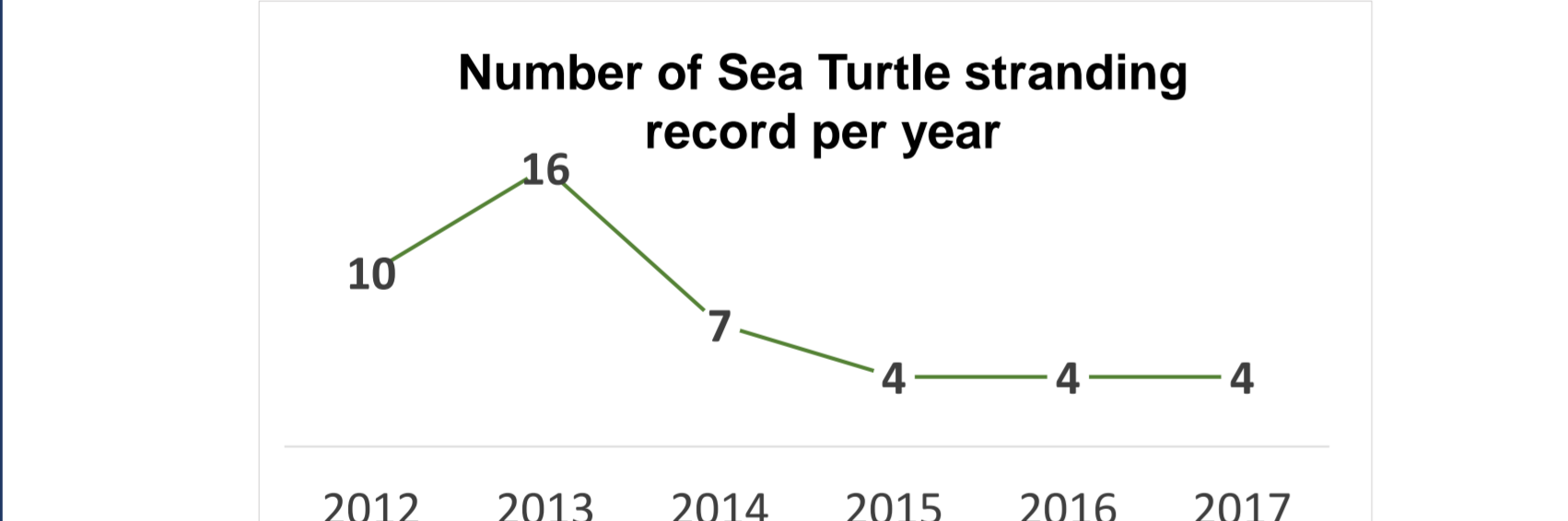
### Stranding



- Sea turtle stranding is often discovered by the visitors who walk along the ocean side road, sea side cleaners and fishermen (Image e).
- Most places which the stranded individual is discovered are close to the walkway or active fishing village.
- North of Jeju has the highest ship, ferry, and fishing boat traffic, which could result in higher death count.



- Majority of stranding may occurs with the peak sea water temperature and air temperature in Jeju Island (Ko et al. 2002). However, this could also be due to the higher number of visitors and ocean side cleaners hired by the government.



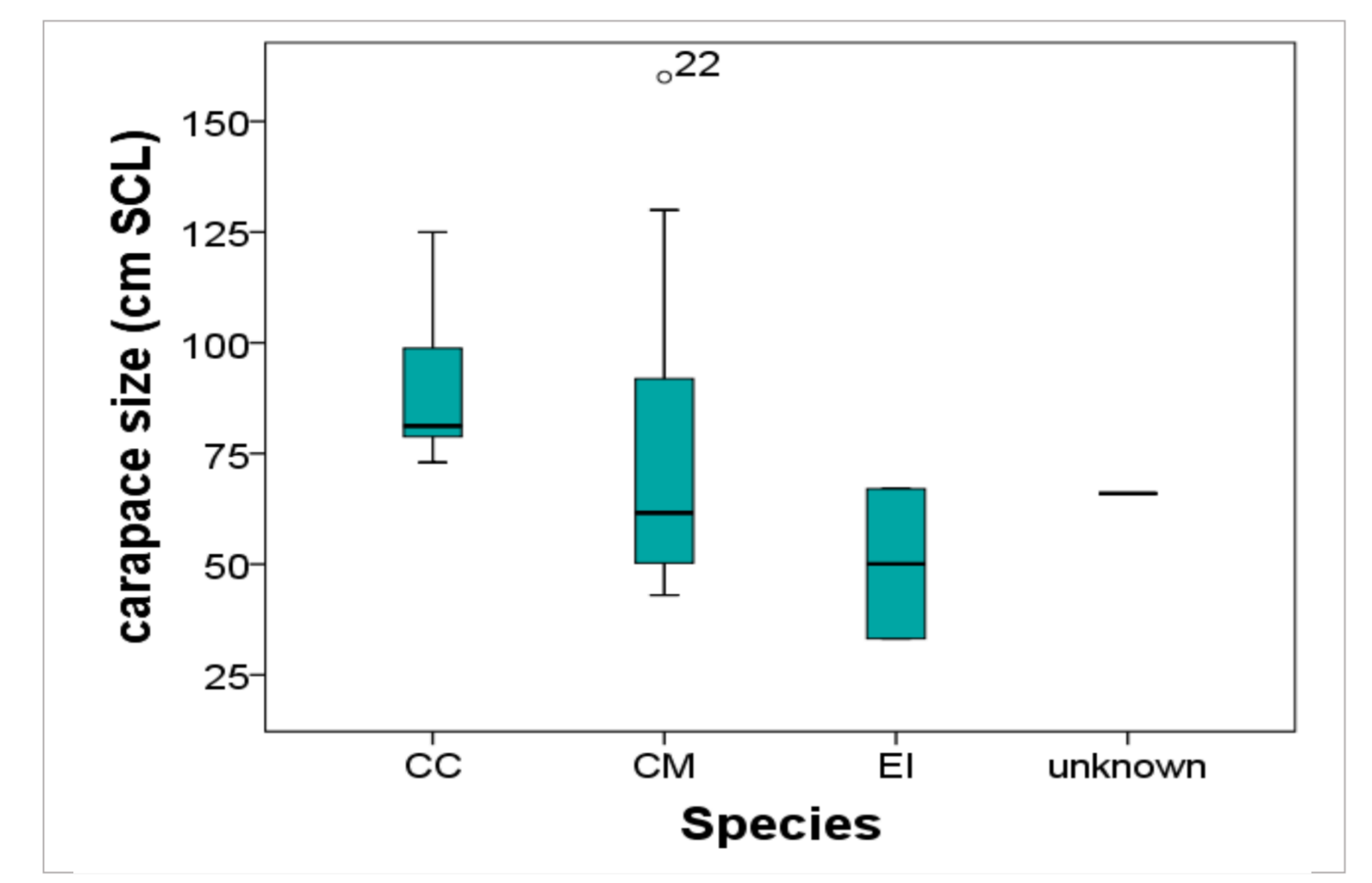
- The cause of drop on stranded individuals is unknown. However, the sea turtle species were assigned as marine protected species in 2012.



e. How sea turtles are usually found in the ocean side

	Total	Dead	Alive
Unidentified	7	7	0
C. mydas	24	Gillnet(1), Unknown(6)	-
		Drift gillnet(3), Heavy impact(3), Fishing gear(1), Unknown(15)	2
C. carata	12	11	1
E. imbricata	3	Heavy impact(2), Unknown(9)	Unknown(1)
		Drift gillnet (2), Unknown (1)	0

- Cause of death for all individual is unclear, however, depending on the condition of the carapace or physical evidence of injury could lead to educated speculation on the cause of death (Image a, b, and d).



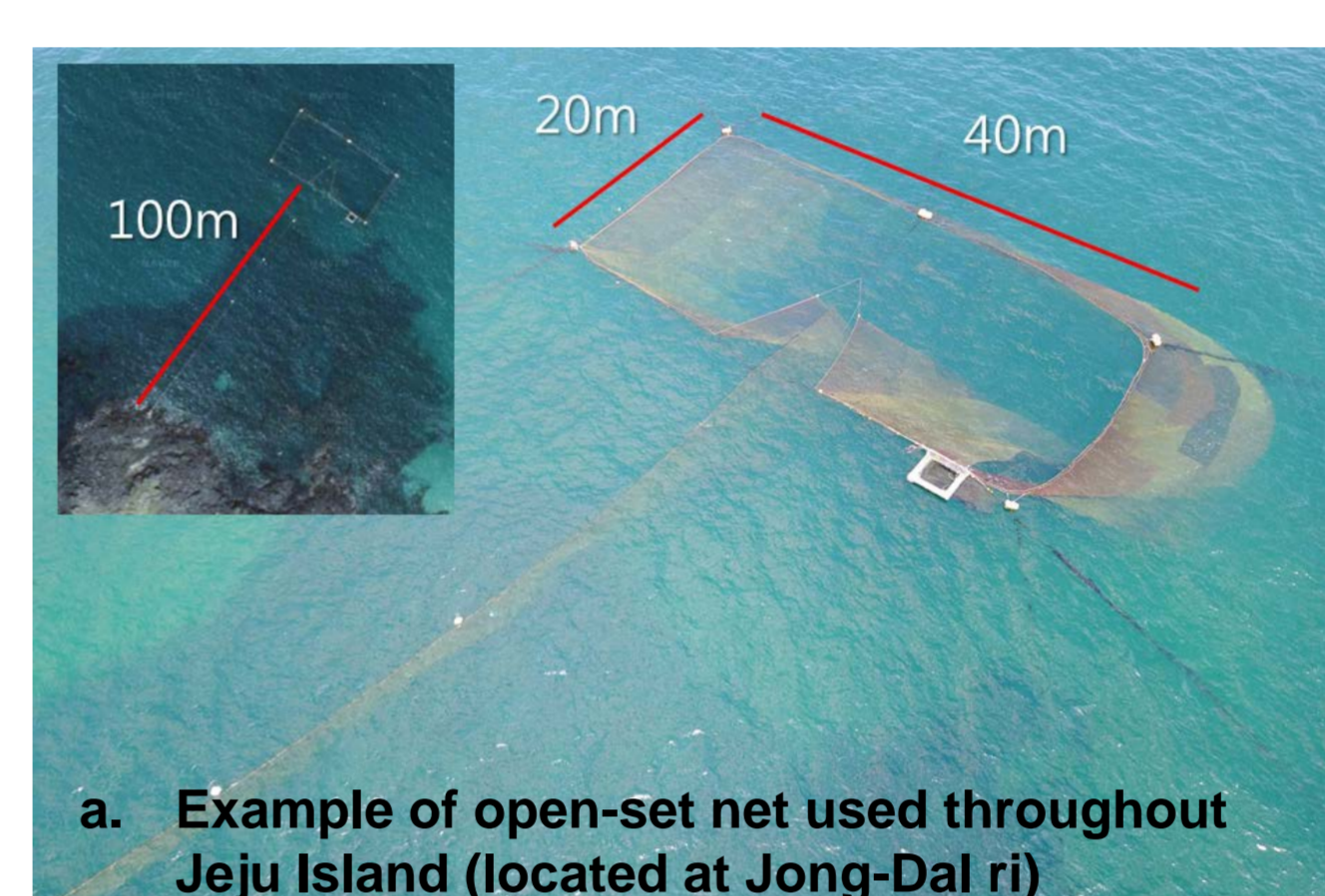
- 60.9% of stranded individual's carapace size (cm SCL) was measured.
- Not all measures are trustworthy as many are made by marine police or the fishermen who have never received any training for data recording.
- Depending on the local marine police department the data collection or measurement varies.

- The quality of data collection **needs** to be improved through providing data recording training for those who are responsible to respond to the stranded marine animals: marine police.
- The stranding report system should be synchronized in detail and data should be collected and organized by a single department.
- There should be a law placed to protect the marine protected species when they are encountered in the ocean by fishing boats or other large ships that pass by.

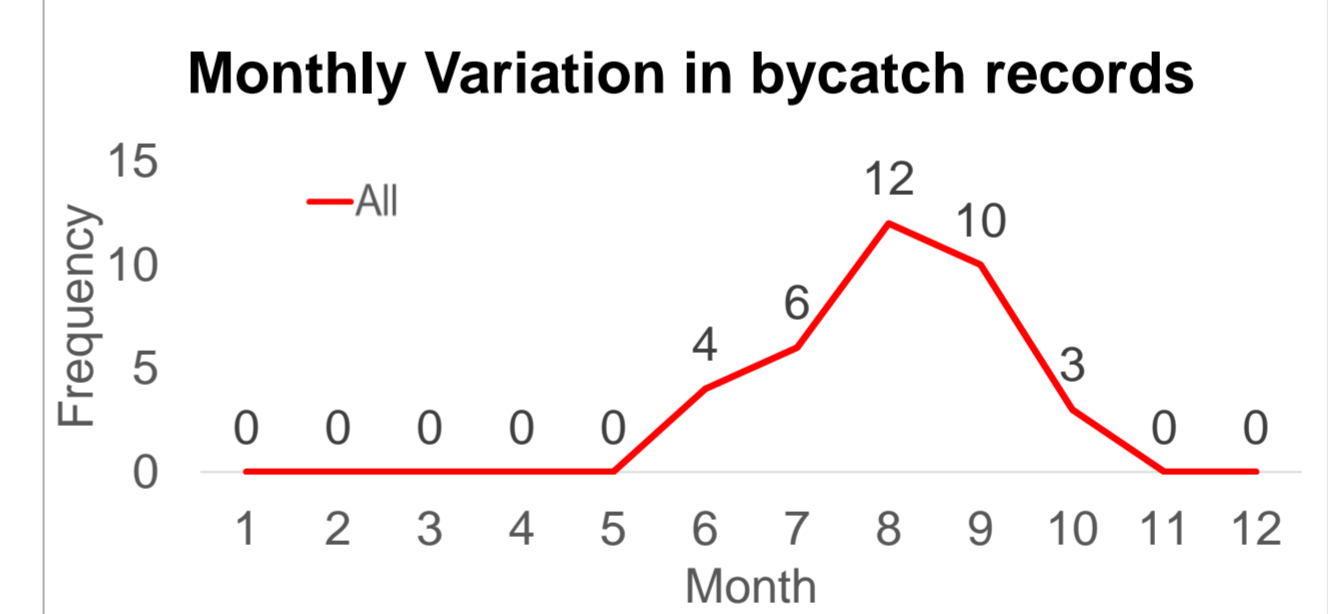
### Bycatch

	Total	Dead	Alive
Unidentified	6	0	6
C. mydas	31	0	31
C. carata	1	1	0

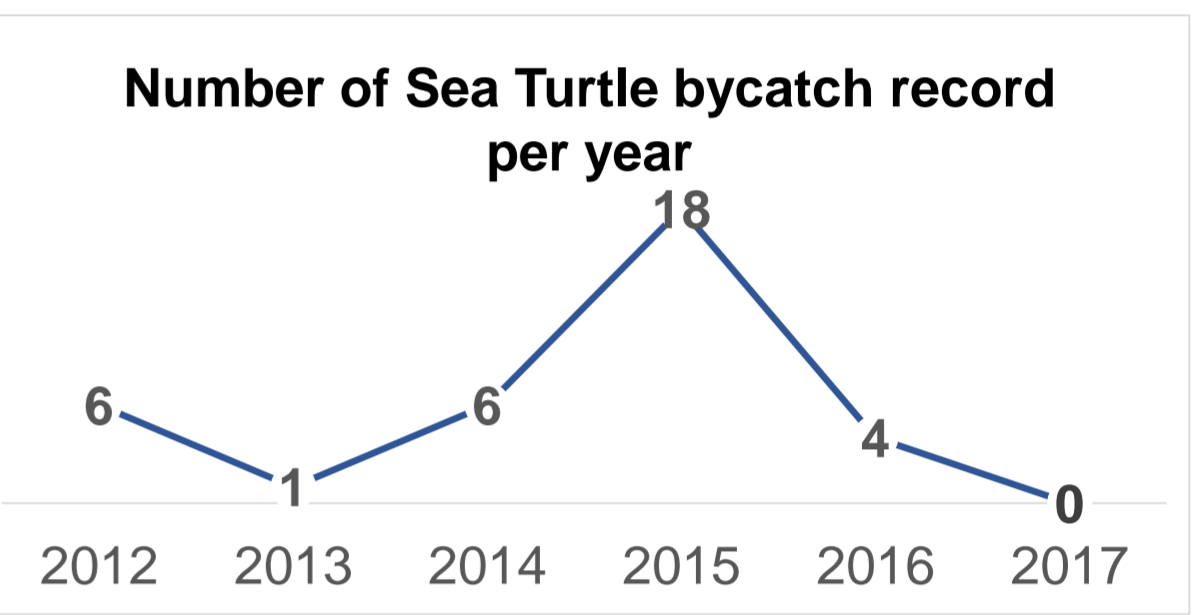
- All except one cases of bycatch were reported from the open-set net and all individuals found in open-set net were found alive and sent back to the wild (96.9%).



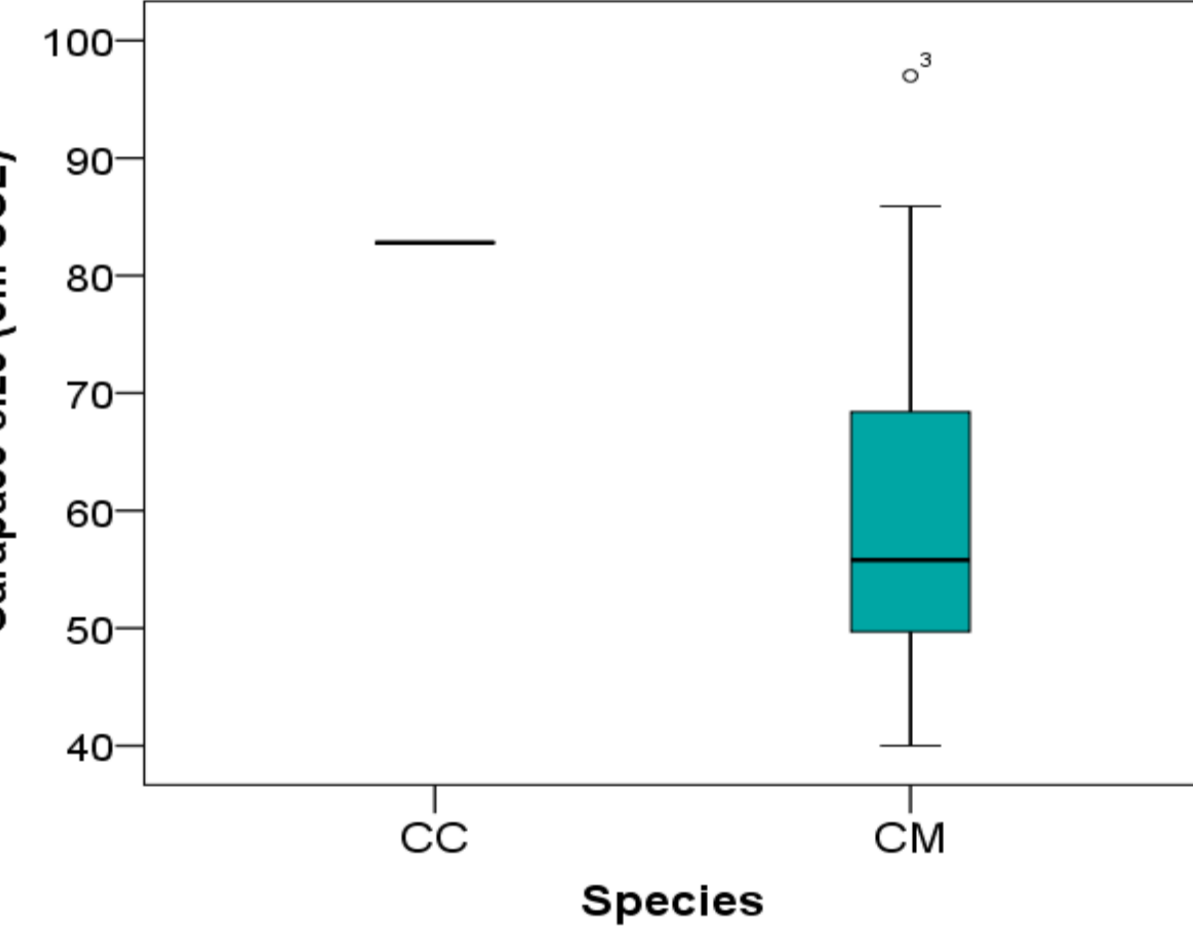
- There are about 60 open-set nets around the Jeju Island and they are set out between April to November.
- 80.0% of recorded individuals were from two open-set nets (Gwideok-ri, and Shinpung-ri).



- If all or majority of bycatch sea turtles from open-set nets around the island are collected the data could be used to estimate population density, migration pattern, and habitat use. All the baseline data necessary to build and perform long-term conservation plan for sea turtles found in Jeju Island.
- Increasing the number of GPS tagged individuals of all species could lead to further understanding of the population which use Jeju Island as par of their home range.
- Training course and rewards for the fishermen could be useful in collecting uniform and useful data on bycatch sea turtles.



- The report of bycatch when found alive in an open-set net is **NOT** obligatory for the fishermen.
- 62.9% of the bycatch were reported in year 2015 and 2016 when researchers were looking to attach GPS tags.



- The size of the bycatch individuals is limited to the weight of the sea turtle because the fishermen need to lift it into the boat in order for the measurement to be made.

## Cultural Identification Sea Turtles in Jeju Island

The belief of dragon king/queen of the ocean and turtle as the third and youngest daughter of the king/queen by Jeju Islanders who highly depend on the sea for their livelihood is still active and strong. It is especially true for woman shellfish divers in Jeju Island, Haeyeo, who free dives to collect shellfish, octopus, and other marine animals for their livelihood (Image 1).

The folktale states that the sea turtles are sacred and it serves as a messenger between the people and the ocean god. The listed are some of the belief systems related to sea turtles (Min 2011):

1. Sea turtles should NOT be harmed.
2. If a diver witnesses a front face of the sea turtle, the turtle will make your wish come true.
3. When encountered with a sea turtle in the ocean, they should serve conch or other sea shells (Image 2).
4. If a sea turtle is found dead, a traditional ritual should be performed and send it back to the ocean (Image 4).
5. If a gigantic sea turtle is witnessed, you will die.
6. Sea turtles die 9 times and come back to life 12 times.



Image 1. Haeyeo from Jeju Island (UNESCO Culture Intangible Heritage)

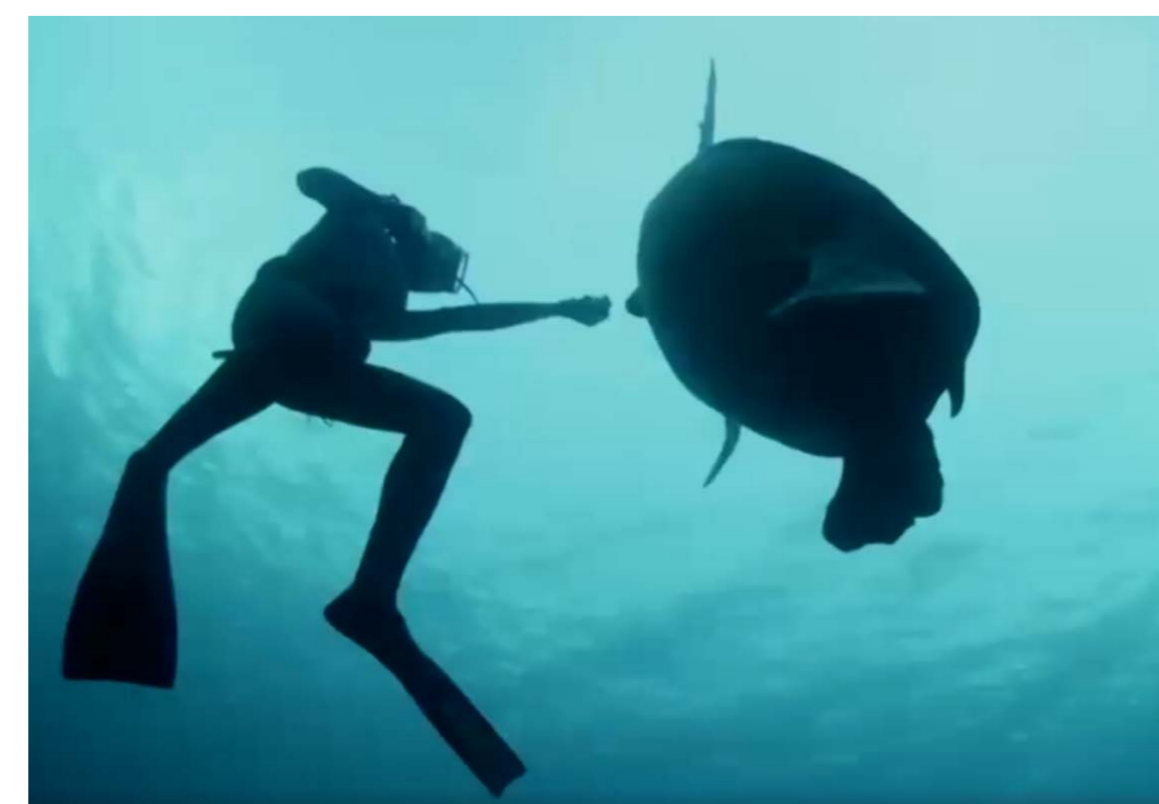


Image 2. Haeyeo feeding sea turtle.



Image 3. Haeyeo and traditional ritual before sending the sea turtle back to the wild. (Left) While sacred cloth and branches represents a "Door of Ocean god". The dead sea turtle is wrapped with the with cloth and sent back to the ocean. (Right) Haeyeo is having their fortune told.



Image 4. A sea turtle was found dead (2013 July 29th), and the neighborhood Haeyeo and fishermen got together and performed a traditional ritual to send the sea turtle back to the wild. (Left) The fishing boat traveled far out to the ocean and released the rope. (Right) The released sea turtle was found to be on the shore of neighboring area in 2013 Aug 6th.

## Acknowledgment

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