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Rescue Inventory and Turtle Rehabilitation at the Turtle Education and Conservation Center Denpasar-Bali

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A B S T R A C T

Turtles are ancient animal species that have survived millions of years ago until today. The turtle population in Indonesia is currently facing various threats to its sustainability. This study aims to determine the number of stranded turtles and the results of confiscation in the 2018-2023 period and to determine the condition of the turtles after being rescued by TCEC. This research was conducted on January 9 - February 11 at the Turtle Conservation and Education Center. Samples were all types of turtles that were rescued from early 2018-2023 by the TCEC and were rehabilitated in the ponds that had been provided. The results of this study indicate that in 2020 there was an increase in rescue cases carried out by the TCEC. The factor for the surge in rescues in 2020 was due to bad weather which stranded turtles, apart from that there were strong winds, heavy ocean currents, and fishing activities from the community that at that time were affected by Covid-19, all people switched professions to become fishermen which caused a surge in rescue cases with the statement bycatch in 2020.

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INTRODUCTION

Turtles are ancient animal species that have survived millions of years ago until today. Turtles are often referred to as iconic animals that live in waters, especially the sea. Turtles often migrate thousands of kilometers between their foraging and egg-laying sites. The mother turtle's egg-laying cycle is every two to four years where the mother turtle will come to the beach four to seven times to lay or lay her eggs in the sand that has been dug before. Experts say that only approximately 1-2% of the success rate of turtle survival to maturity is the number of eggs produced (Profauna, 2022). Turtles use sandy beach areas as a stopover and carry out biological activities such as nesting and laying eggs (Janawi, 2009).

The high utilization of turtles by humans causes the turtle population to decrease. The use of turtles by humans as pets, even used as food and used as illegal trade. Besides human influence, natural factors also threaten the existence of sea turtles such as predators, disease, and climate change (Basuni et al., 2014). Based on CITES provisions, all types of sea turtles have been included in Appendix I, which means that international trade in turtles for commercial purposes is also prohibited. The IUCN World Conservation Agency includes the hawksbill turtle on the list of critically endangered species. However, the green, olive ridley, and hawksbill turtles are classified as endangered. The threat to sea turtles is trade in the form of meat, eggs, or body parts. The turtle that is often traded for its meat is the green turtle. The turtle meat trade still occurs on the island of Bali. The hawksbill turtle is the type of turtle that is often taken for its scaly carapace to make souvenirs. Actions aimed at curbing the threat of extinction include urgent and coordinated multinational interventions in protecting all nesting beaches and the establishment of marine protected areas, reducing fisheries bycatch by marine and coastal fisheries through the implementation of turtle exclusion tools, addressing Pan-Pacific policy actions; and support the sustainability of traditional turtle use (Casale et al., 2018; Mazaris et al., 2017; Stanford et al., 2020).

An important conservation measure for endangered species is rescue and rehabilitation, which contributes to maintaining wild populations by releasing rehabilitated turtles back into the wild. Rescue and rehabilitation centers also promote conservation through community education and research. Rehabilitation requires the application of environmental enrichment techniques to promote behavioral traits and improve the innate skills needed by turtles to return to normal populations. This review aims to demonstrate the environmental enrichment effects of rehabilitation welfare and the survival efficacy of turtles released into the natural environment (Abalo-Morla et al., 2022; Robinson et al., 2021; Yu et al., 2023).

The purpose of this research is to find out the number of stranded turtles and the results of confiscation in the 2018-2022 period and to find out the condition of the turtles after being rescued by TCEC, so that after taking this research it can support turtle conservation programs in Bali. Thus the authors chose the title of this study, namely Rehabilitation Inventory from Threats and Rescue Results at the Turtle Conservation and Education Center Denpasar-Bali**.**

THEORETICAL REVIEW

This research is inventory research carried out by searching for data and observing turtle rescue until post-rehabilitation after turtle rescue at TCEC.

H1: Stranded turtles and confiscated turtles were found in 2018-2023.

METHODOLOGY

Time and Place of Research

This research was conducted on January 9 – February 11 2023 at the Turtle Conservation and Education Center, Denpasar – Bali.

Experimental Design

Sampling was done by census technique. A census is a way of collecting data when all elements of the population are filled in one by one. The data obtained is the result of census processing referred to as the actual data (true value), or often also called parameters. The samples used in this study were all types of turtles rescued by TCEC.

Materials and Research Tools

The collection of research data used the observation method including data carried out by several activities including checking the health of turtles that were being rehabilitated at TCEC, The interview method was carried out by asking questions directly to the head of TCEC regarding history, organizational structure, vision and mission and matters related to the research theme In this case, the literature study method is a data and information collection technique that discusses previous research as a reference by understanding the content of information sourced from journals, books, scientific papers, and other sources, documentation, namely collecting documents and data needed in later research problems. studied in depth so that it can support and add to the trust and evidence of an incident.

The tools used in this study were stretchers, books and stationery, tape measure, wet towels, car tires, hand gloves, and masks. This research will process and present data by looking at a situation objectively and displaying the results in the form of tables and diagrams. The purpose of this descriptive research with a qualitative approach is to explain a situation that is to be examined with the support of literature studies on efforts to save and rehabilitate turtles after being threatened, to further strengthen the researcher's analysis in concluding.

RESULTS

The results of this study are that there are three species of turtles in Bali waters that have experienced threats such as the olive ridley, hawksbill, and green turtles, and are being treated and rehabilitated at the Turtle Conservation and Education Center. TCEC has a role to save the turtle population so that it remains sustainable for the balance of the marine ecosystem. Globally turtle populations are declining in a fast period. The threat of death to newly hatched turtles usually occurs because of predators such as birds, monitor lizards, and

crabs. In addition, the greatest threat faced by sea turtles is humans. Catching turtles is done by humans because almost the entire body of a turtle can be consumed and can even be used for profit. However, the turtle rescue program carried out by TCEC is trying to save the turtles that have encountered several threats in the sea area of Bali. However, turtles that have faced threats have been rescued, starting from police confiscation of turtles due to illegal trade deposited at TCEC, stranded turtles characterized by weak conditions, turtles hit by ships with broken carapace and broken flipper parts, and turtles with parasites on their skin and Other diseases can be seen in (Table 1).

Table 1. TCEC Rescue Data from 2018-2023

Year	Mount	Type	Amount (tail)	Information
2018	March	Green Sea Turtle	1	Found stranded with a wound exposed to the net
	December	Green Sea Turtle	3	BALAWISTA officers found Kuta Beach in stranded condition
	December	Olive Ridley Sea Turtle	2	Netted
		TOTAL	**6**	

Year	Mount	Type	Amount (tail)	Information
2019	January	Olive Ridley Sea Turtle	1	BALAWISTA officers found Kuta Beach in stranded condition
	April	Hawksbill Sea Turtle	1	Found floating and many tritips on carapace
	April	Hawksbill Sea Turtle	1	Netted
		TOTAL	**3**	

Year	Mount	Type	Amount (tail)	Information
2020	March	Hawksbill Sea Turtle	2	BALAWISTA officers found Kuta Beach in stranded condition
	May	Hawksbill	1	Found by POKMASWAS

		Sea Turtle		Mina Werdi Batu Lumbung in stranded condition
	May	Olive Ridley Sea Turtle	1	Found floating with broken carapace
	June	Hawksbill Sea Turtle	3	Found in stranded condition
	Juli	Hawksbill Sea Turtle	2	Found floating
		TOTAL	**9**	

Year	**Mount**	**Type**	**Amount (tail)**	**Information**
2021	January	Hawksbill Sea Turtle	1	Found by fishermen with floating conditions
	May	Hawksbill Sea Turtle	1	Found by a coral reef employee in a floating condition
	December	Olive Ridley Sea Turtle	1	Found in stranded condition
	December	Hawksbill Sea Turtle	2	Found in stranded condition
	December	Olive Ridley Sea Turtle	1	Found in stranded condition
		TOTAL	**6**	

Year	**Mount**	**Type**	**Amount (tail)**	**Information**
2022	March	Hawksbill Sea Turtle	1	BALAWISTA officers found Kuta Beach in stranded condition
	March	Hawksbill Sea Turtle	1	Found by fishermen in floating conditions and entangled in nets
	April	Olive Ridley Sea Turtle	1	Found in stranded condition
	November	Hawksbill Sea Turtle	1	Found in stranded condition
	December	Hawksbill Sea Turtle	1	Found in stranded condition

		TOTAL	**5**	

Year	**Mount**	**Type**	**Amount (tail)**	**Information**
2023	January	Olive Ridley Sea Turtle	1	Found in stranded condition
	January	Olive Ridley Sea Turtle	1	Found in stranded condition
	February	Green Sea Turtle	1	Found stranded and limp
	February	Hawksbill Sea Turtle	1	Found in stranded condition
	February	Olive Ridley Sea Turtle	1	Found in stranded condition
		TOTAL	**5**	

In Table 1, there are rescue cases from early 2018-2023 with various threats, and rescue comparisons can be made where significant differences in threat cases are always handled by TCEC (Figure 1).

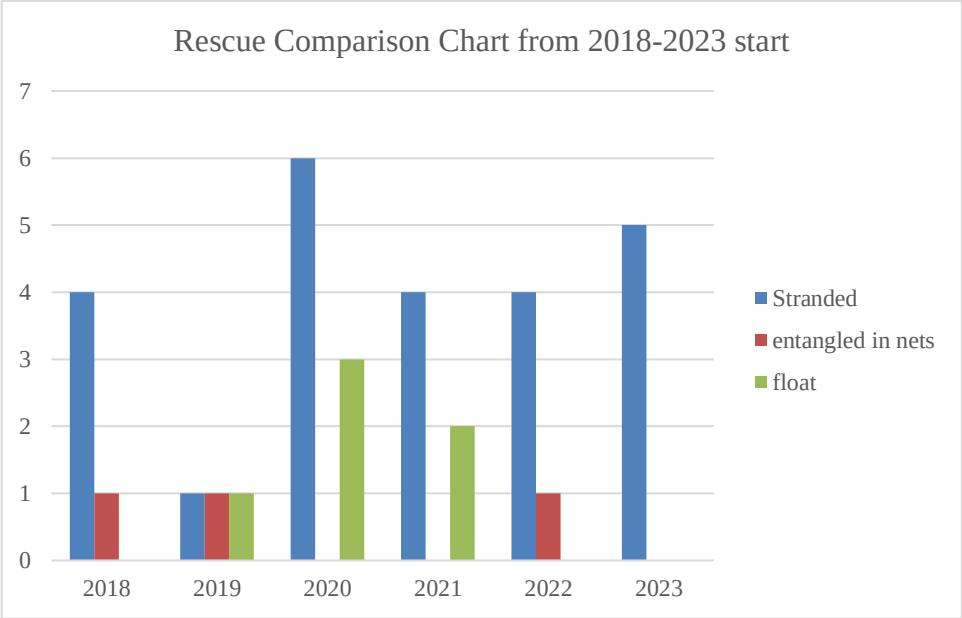

Figure 1. Rescue Comparison Chart from 2018-2023 start

So after making a comparison with the diagram, in 2020 there was a surge in rescue cases because it was caused by illegal trade and bad weather which stranded turtles starting from strong winds and strong ocean currents. According to the BMKG, in 2020 it shows that almost all parts of Indonesia are entering the dry season, related to the transition from westerly winds to

easterly winds. On the other hand, many people have switched professions to become fishermen because the impact of the COVID-19 pandemic has caused a surge in rescue cases with bycatch statements in 2020.

a) Rescue Process in the Field

The rescue process was carried out in several stages carried out by TCEC, along with the rescue process carried out by TCEC volunteers, namely:

1. TCEC volunteers head to the stranded turtle position after receiving information from the community. Then TCEC volunteers traced the position where the turtle was last seen.
2. Check the condition of the turtle at the time of rescue, if the turtle is seriously injured, it can be referred to the Kedonganan Veterinary.
3. Take action by placing a wet towel on the turtle's shell so that the turtle does not become dehydrated.
4. Put the turtle on a stretcher and then lift it and bring it to the rescue car.
5. The turtle is placed on the car tires that have been provided so that the turtle's position is comfortable when traveling to TCEC and Kedonganan Veterinary.

b) Process of Medical Actions After Turtles are Saved

In the process of medical action carried out by the Turtle Conservation and Education Center (TCEC) after rescuing turtles, TCEC collaborated with the Kedonganan Veterinary Flying Vet. In live turtle stranding cases, turtles usually experience trauma or injury to the outside of the turtle's body such as injuries from fishing activities, injuries from predators, or other natural causes. The incidence of stranded turtles usually increases during the west wind season or seasons with bad weather, around November to February around Bali waters. The most appropriate medical team effort is given to the turtle first, the veterinarians carry out the examination procedure by veterinary rules. During the rehabilitation phase at the Turtle Conservation and Education Center pool, turtles with new cases of stranded and weak conditions are examined every 2 weeks by a veterinarian and accompanied by a Turtle Guard at Udayana University. This examination is usually only for giving antibiotics and vitamins to turtles. Even though they are at the rehabilitation stage, rescued turtles are still susceptible to disease. Sea turtles are usually susceptible to fungi that cause disease and the turtle will be disturbed. For turtles that die while stranded or after being rescued, the medical team usually performs surgery (necropsy). Perform necropsy on dead turtles, namely to find the cause of death in turtles. In the necropsy procedure, all organs are taken to be used as laboratory samples to obtain information on the causes of death in turtles. Checking the organ samples on turtles for testing such as microbiology, parasitology, toxicology, and DNA. And if the turtle dies for a long time, then a necropsy will be difficult to do and can only test it macroscopically.

c) Releasing Turtles After Post-Rescue Rehabilitation

Before releasing turtles, TCEC coordinated with various stakeholders such as the Bali Province Natural Resources Conservation Agency (BKSDA), Denpasar Coastal and Marine Resources Management Agency (BPSPL), Turtle Guard (Udayana University), and other relevant agencies. The care provided

during the rehabilitation stage includes treating injuries if the turtle is injured and recovering from the stress of a long journey, until finally the medical team declares that it is suitable for release. Before being released, the turtles had been tagged in the form of attaching anti-rust metal tags attached to one of the front flipper parts. Marking is done if the turtle is stranded or found by the community. These findings must be reported to the Bali BKSDA and other NGOs. In 2018, 10 turtles were released, while in the following year, 37 turtles were released in 2019, in 2020 58 turtles were released, in 2021 were 24 turtles released, and in 2022 there were 62 turtles were released and in early 2023, there was 1 hawksbill turtle released on Melasti beach. This release turtle consists of rescue and smuggling cases from early 2018-2023.

DISCUSSION

This part allows you to elaborate on your results and findings academically. You must not put numbers related to your statistical tests here; instead, you have to explain those numbers here. You have to compile your discussion with academic support to your study and a good explanation according to the specific area you are investigating.

CONCLUSIONS AND RECOMMENDATIONS

Most of the turtles rescued by TCEC are stranded and threatened by illegal trade. Turtles rescued with a history of 50:50 were in a weak condition and died, while turtles rescued by the Police and Polairud from illegal trade were 50% injured and dehydrated. After healing, the turtles undergo rehabilitation at TCEC to restore their condition so they can be released back into nature. Turtle rescue from early 2018-2023, namely in 2020 when covid-19 there was an increase in rescues caused by bad weather factors that stranded turtles, such as strong winds, swift ocean currents, and fishing activities from the community who were at that time affected by the covid-19 19 all people switch professions to become fishermen. Turtle care at TCEC is usually done by treating it in a pond first. During the treatment process, the turtles are fed regularly. Mandatory matters in turtle care at TCEC are health checks within a time limit of once a week by Turtle guards (Udayana University) and veterinarians from Kedonganan Veterinary. During their rehabilitation, many turtles were attacked by barnacles on the carapace and skin, fungi, and tumors on the neck and eye parts of the turtles

FURTHER STUDY

Every research is subject to limitations; thus, you can explain them here and briefly provide suggestions for further investigations.

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REFERENCES

Abalo-Morla, S., Belda, E. J., March, D., Revuelta, O., Cardona, L., Giralt, S., Crespo-Picazo, J. L., Hochscheid, S., Marco, A., & Merchán, M. (2022). Assessing the use of marine protected areas by loggerhead sea turtles (Caretta caretta) tracked from the western Mediterranean. *Global Ecology and Conservation*, *38*, e02196.

Basuni, S., Masy'ud, B., & Yulianda, F. (2014). Peran para pihak dalam pengelolaan kawasan konservasi penyu pangumbahan. *Jurnal Analisis Kebijakan Kehutanan*, 29276.

Casale, P., Broderick, A. C., Camiñas, J. A., Cardona, L., Carreras, C., Demetropoulos, A., Fuller, W. J., Godley, B. J., Hochscheid, S., & Kaska, Y. (2018). Mediterranean sea turtles: current knowledge and priorities for conservation and research. *Endangered Species Research*, *36*, 229–267.

Janawi. (2009). *Perkembangan Suhu Sarang Penetasan Buatan pada Penetasan Telur Penyu hijau (Chelonia mydas L.) di Pantai Pangumbahan Kabupatan Sukabumi* [Skripsi]. Universitas Suryakencana.

Mazaris, A. D., Schofield, G., Gkazinou, C., Almpanidou, V., & Hays, G. C. (2017). Global sea turtle conservation successes. *Science Advances*, *3*(9), e1600730.

Profauna. (2022, February 7). *Tentang Penyu Indonesia*. https://www.profauna.net/id/ kampanye-penyu/tentang-penyu-indonesia/YgC3VgRXIU

Robinson, D. P., Hyland, K., Beukes, G., Vettan, A., Mabadikate, A., Jabado, R. W., Rohner, C. A., Pierce, S. J., & Baverstock, W. (2021). Satellite tracking of rehabilitated sea turtles suggests a high rate of short-term survival following release. *Plos One*, *16*(2), e0246241.

Stanford, C. B., Iverson, J. B., Rhodin, A. G. J., van Dijk, P. P., Mittermeier, R. A., Kuchling, G., Berry, K. H., Bertolero, A., Bjorndal, K. A., & Blanck, T. E. G. (2020). Turtles and tortoises are in trouble. *Current Biology*, *30*(12), R721–R735.

Yu, D., Xia, Z., Yang, X., Ng, C. K. Y., Yang, K., Wu, Z., Liu, X., & Hu, H. (2023). Migratory movements and foraging grounds of endangered green sea turtles in South China Sea based on satellite telemetry during fishing moratorium. *Frontiers in Marine Science*, *10*, 1105264.