

KNOWLEDGE AND AWARENESS OF A LOCAL COMMUNITY ON RIVER TERRAPINS IN SUNGAI PERAK, MALAYSIA

MUHAMMAD FARHAN ABDUL RAHMAN*, LATIFAH ABD MANAF AND MARIANI HO
NYUK ONN @ ARIFFIN

Faculty of Environmental Studies, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia.

*Corresponding author: latifahmanaf@upm.edu.my

Abstract: Malaysia is the largest and final bastion of wild river terrapins (*Bataguraffinis*), especially in Sungai Perak in the state of Perak. However, the lack of knowledge among the local communities about the reptiles may accelerate the decline of its population. To overcome the problem, community-based conservation is a valuable tool to educate and carry out sustainable conservation programs. In this study, the knowledge and awareness of a local community in Mukim Bota, Perak, were accessed using a questionnaire. This study found that members of the local community in Mukim Bota were well aware of the existence of river terrapins in their county, with 56% of 397 respondents replying in the affirmative. A total of 62% of respondents knew that sandbanks were the nesting habitats for river terrapins and 70% noticed that the landings and population were decreasing every year. This study strengthened the theory that a knowledgeable and participative community could produce better outcomes in sustaining a terrapin conservation programme.

Keywords: *Bataguraffinis*, conservation, knowledge, river terrapin, sandbanks, Mukim Bota Perak.

Introduction

Freshwater turtles and tortoises are the most threatened vertebrate species, and their status is worse than birds, bony fish, mammals and other vertebrates (Hoffmann *et al.*, 2010). They are sought after as exotic food, with high demand from China. This has fuelled the illegal trade of the reptiles in Southeast Asia (van Djik *et al.*, 2000). These species are also traded as exotic pets, thus endangering their existence in the wild (Gong *et al.*, 2009). River terrapins (*Batagur affinis*), or locally known as tuntung sungai, are listed as critically-endangered in the International Union for Conservation of Nature (IUCN) red list and its trade has been banned under the Convention on International Trade in Endangered Species (CITES) (IUCN, 2000). They are also among the top 25 most critically-endangered freshwater turtles (Anderson *et al.*, 2011).

Malaysia is known as the only country where a large number of river terrapins may be found in the wild, mostly in rivers of the peninsula in

the states of Perak, Kedah and Terengganu (Moll *et al.*, 2015). However, the population has declined drastically (Moll *et al.*, 2015, Chen, 2017) and the Wildlife and National Parks Department has initiated conservation efforts with the establishment of its first terrapin Wildlife Conservation Centre (WCC) at Bota Kanan, Perak, in 1968 (DWNP, 2010). This was followed by two more centres for river terrapins in Kuala Berang, Terengganu (1976), and Bukit Pinang, Kedah (1982). The centre in Bota Kanan is currently home to 395 river terrapins and 16 painted terrapins (*Batagur borneensis*). At the Bukit Pinang WCC, there are 221 river terrapins and 80 painted terrapins while Kuala Berang WCC has 823 river terrapins (DWNP, 2010). These conservation centres play a vital role in providing protection to the turtle's eggs until they hatch, giving the hatchlings a headstart in life by nursing them and reintroducing them back into the wild. In 2010, this species was gazetted under the Second Schedule (Totally Protected Wildlife) of Malaysia's Wildlife

Conservation Act 2010, which bans the trade and consumption of terrapin products (meat, eggs and pets).

In 2016, a research team from Universiti Putra Malaysia had reported that only two adult female terrapins had landed at the Sungai Perak nesting site near the Bota Kanan WCC during the egg-laying season between January and March (Utusan Malaysia, 2017). The researchers believed the incident implied that the sandbanks of Sungai Perak in Mukim Bota (Bota county), where the WCC and main town of Bota Kanan are located, could have become a less preferred nesting site.

Pollution due to household waste had disrupted the river's pristine environment, which might have discouraged the terrapins from landing. Run-off from poultry and livestock farms, as well as those from rubber estates along Sungai Perak have also fouled the river. The mass discharge contains chemicals, biohazards and bacteria that are capable of altering the river ecosystem (Sinar Harian, 2017). The dangerous chemicals used in agricultural activities along the banks of Sungai Perak are known to progressively threaten the terrapins' survival (Star, 2016). Thus, humans appear to be the main culprits in threatening the survival of river terrapins.

The involvement of local communities in wildlife conservation is an ongoing approach promoted by the government. The move is initiated upon realising that community knowledge may be crucial in building up new approaches and methods, which will uphold the sustainability of a conservation program. Community-based conservation is a valuable tool to educate local folk on their obligations to the environment, in which the knowledge will bring positive impact on their attitude towards conservation behaviour (Abd Mutalib *et al.*, 2013). Therefore, this study aims to assess how knowledgeable and aware a local community is towards the conservation of river terrapins.

Material and Methods

Study Area

Sungai Perak spanned 400km and is the second longest river in Peninsular Malaysia. It is located in Perak, the fourth largest state in the country. It starts from Hulu Perak and flows into the estuary in Bagan Datuk, the southwestern most district in Perak, before emptying into the Straits of Malacca. This study was conducted among members of the community in Mukim Bota within Bagan Datuk, as it is the traditional nesting site for river terrapins when the sandy riverbanks of Sungai Perak are exposed during the dry season.

Population and Sample Size

The population of Mukim Bota was 52,600 people and the main town is called Bota Kanan (Perak Basic Data, 2016). Considering the population size, the required sample size for this study was 397 respondents with 95% confidence level. The size of the sample was determined using a simplified formula by Yamane, (1967) as stated in Equation 1.

$$\text{Sample (n)} = \frac{N}{1+N(e)^2} \quad (\text{Eq 1})$$

where n is the sample size, N is the population and e is the level of precision (0.05).

Data Collection

Data for this study was collected via questionnaires distributed in the community between February to July 2016. It comprised two sections — section (A) revolving around demographic details such as age, level of education and length of residency, as well as their monthly income, while section (B) focused on the respondents' knowledge and awareness on river terrapins. It contained 10 statements in which respondents had to select "yes", "no" or "not sure" as the answer.

The statements were about the nesting season and conservation status of the terrapins. As an alternative to a verbal scale, a visual analogue scale was simply a way of asking

respondents to indicate their choice visually or spatially (Mathers *et al.*, 2009). The construction of section B was based on a survey by Vincenot *et al.*, (2015) and modified to suit the study on river terrapins. The 10 statements are stated in Table 1.

The questionnaires underwent a pilot test in a group of 32 individuals to assess any possible comprehension deficiency by respondents and also to identify language syntax mistakes before being distributed to the targeted respondents. Several modifications were done to the original questionnaire, and they included changing a few statements using the simplest and easily understood form of Bahasa Malaysia. The respondents were observed to have difficulties in understanding certain terms like “population”. Hence, statements like “River terrapin population is decreasing in Sungai Perak” had been changed to “The number of river terrapins in Sungai Perak is decreasing” (K8). The word “population” had to be substituted with “number” as some members of the local community did not understand the word. Moreover, the statement “River terrapin is protected under Act 716 (Wildlife Protection Act 2010)” had been

changed to “River terrapins are protected under the law” (K10). The term “Act 716” had caused confusion among the respondents as they were not familiar with legal terms.

A reliability test was conducted on section B to identify the consistency in answering it. Cronbach’s alpha was used to estimate the reliability of the psychometric test. For this study, the Cronbach’s alpha was 0.830, suggesting that the items had relatively high internal consistency, in which current practice would characterize a reliability value of 0.65 as “unacceptable” and a reliability value of 0.85 as “excellent” (Bonett & Wright, 2015).

The questionnaire was distributed according to a random technique among the community members in Mukim Bota. In order to gather enough respondents, the research survey had focused on collecting data in restaurants and food stalls, morning markets, playgrounds as well as house visits.

Data Analysis

Collected survey responses were analysed using IBM SPSS Version XX (IBM Corporation,

Table 1: Questionnaire design

No.	Level of knowledge	Answers		
K1	River terrapins are commonly found in Sungai Perak.	Yes	No	Not Sure
K2	River terrapins can be found at Terengganu and Kedah.	Yes	No	Not Sure
K3	Presence of river terrapins can affect fishing and agricultural activities.	Yes	No	Not Sure
K4	The nesting activity can be seen along Sungai Perak.	Yes	No	Not Sure
K5	River terrapin eggs can be eaten.	Yes	No	Not Sure
K6	River terrapin nesting season is between January to March.	Yes	No	Not Sure
K7	Riverbanks are places where river terrapins lay their eggs.	Yes	No	Not Sure
K8	The number of river terrapins in Sungai Perak is decreasing.	Yes	No	Not Sure
K9	Baby river terrapins have been sold as exotic pets.	Yes	No	Not Sure
K10	River terrapins are protected under the law.	Yes	No	Not Sure

Table 2: Cronbach’s alpha for section B questions

Reliability statistics		
Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of Items
0.830	0.831	10

Table 3: Percentage score for Section B questions

No.	Level of knowledge	Percentage		
		Yes	No	Not Sure
K1	River terrapins are commonly found in Sungai Perak.	56%	13%	31%
K2	River terrapins can be found at Terengganu and Kedah.	29%	19%	52%
K3	Presence of river terrapins can affect fishing and agricultural activities.	11%	58%	31%
K4	The nesting activity can be seen along Sungai Perak.	43%	23%	34%
K5	River terrapin eggs can be eaten.	62%	7%	31%
K6	River terrapin nesting season is between January to March.	18%	8%	74%
K7	Riverbanks are places where river terrapins lay their eggs.	62%	5%	34%
K8	The number of river terrapins in Sungai Perak is decreasing.	70%	5%	25%
K9	Baby river terrapins have been sold as exotic pets.	16%	53%	32%
K10	River terrapins are protected under the law.	67%	6%	28%

Armonk, New York, USA). Data screening and cleaning were performed to ensure an error-free data set. This study using the “Yes”, “No” and “Not sure” response in section B was the best way to make respondents consider whether the statements applied or did not apply to them, which might possibly reduce satisficing strategies (Callegaro *et al.*, 2015). Data is presented using simple descriptive statistics, including frequency and correlation.

Results

Demographic

In this study, majority of the respondents (47%) were between 15 to 24 years old, and the

highest education level attained was primary school, followed by diploma, matriculation and skills certificates. Most were students (42 %), followed by civil servants (34%), self-employed (10%) and private sector workers (8%). The household income of the respondents’ family ranged from RM1501 to RM2500 per month (27%) and majority had lived in the town of Bota Kanan for more than 11 years (46%).

Knowledge and Awareness Towards River Terrapins

Table 3 shows the percentage score for section B. From the breakdown, the highest number of respondents (around two-thirds) in Mukim Bota

had a hunch that the population of river terrapins were in decline in their area, and a good number understood that the reptiles were protected under the law. But when it came to the species' details, such as which other states it could be found or even in Sungai Perak for that matter, a fair percentage (around half) were found to be ignorant. And many did not know when the nesting season was and that terrapins had been traded as exotic pets.

Discussion

This study examined the local community's knowledge and awareness on the endangered river terrapin in Mukim Bota, Perak, as a basic data to run a conservation program. The results of this study revealed that most respondents knew about the existence of river terrapins in Sungai Perak although majority of the respondents (47%) were between 15 to 24 years old. This was probably due to the establishment and function of the oldest and well-known Wildlife Conservation Centre for river terrapins in Malaysia, which was managed by DWNP since 1968. The conservation efforts included egg collection, hatching, nursing and releasing back to the river to conserve the species. It was a good sign to begin the conservation program as the younger generation was aware of the species' plight.

Since river terrapins did not affect fishing and farming activities, the problem of human-wildlife conflict was not an issue, and the local community could feel at ease when participating in a conservation program. An example of a successful conservation programme involved the local community in Sungai Kemaman, Terengganu, where residents were roped into a team called the "Terrapin Guardians", which was involving in hatching, nursing and releasing river terrapins back into the wild (Chen, 2017).

The banks of Sungai Perak near Bota Kanan were traditionally a nesting place for river terrapins, but only 43% of respondents were aware that river terrapin nesting activities could be spotted along the river. This was due to the

declining number of the terrapin population and it was a rare sight for the younger generation of residents to see terrapins lay eggs. Before 2016, when only two landings were reported, there were 25 terrapin landings reported near Bota Kanan in February 2005 (Star, 2005).

There were weaknesses in keeping data at the Bota Kanan WCC due to the lack of dedicated workers. There were no records of how many river terrapins that had been released back into Sungai Perak. If the local community was deployed to assist in the conservation effort, there would probably be enough manpower to collect data and assess the effectiveness of the WCC's conservation efforts.

Conclusion

The local community at Bota Kanan did have knowledge and awareness about river terrapins in their area, and the reptiles did not cause any human-wildlife conflict. Better community knowledge and awareness was vital in protecting the species from extinction, especially for the younger generation, who rarely get to see and appreciate the terrapins. The local community should be involved in terrapin conservation efforts in Mukim Bota and the facilities of the Bota Kanan WCC should be improved, maintained and opened to the local community to maintain the sustainability of the river terrapin conservation program.

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References

Abd Mutalib, A. H., Fadzly, N., & Foo, R. (2013). Striking a balance between tradition and conservation: General perceptions and awareness level of local citizens regarding turtle conservation efforts based on age

- factors and gender. *Ocean and Coastal Management*, 78, 56–63. <http://doi.org/10.1016/j.ocecoaman.2013.03.015>
- Anderson, E. T., Minter, L. J., Clarke, E. O., Mroch, R. M., Beasley, J. F., & Harms, C. A. (2011). The effects of feeding on hematological and plasma biochemical profiles in green (*Chelonia mydas*) and Kemp's ridley (*Lepidochelys kempii*) sea turtles. *Veterinary Medicine International*, ID 890829. <https://doi.org/10.4061/2011/890829>.
- Bonett, G. D., & Wright, T. A., (2015). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning. *Journal of Organizational Behavior*, 36(1),3-15, DOI: 10.1002/job.1960.
- Callegaro, M., Murakami, M. H., Tepman, Z., & Henderson, V., (2015). Yes–no answers versus check-all in self-administered modes. A systematic review and analyses *International Journal of Market Research*, 57 (2), 203-223.
- Chen P. N. (2017). Conservation Of The Southern River Terrapin *Batagur Affinis* (Reptilia: Testudines: Geoemydidae) In Malaysia: A Case Study Involving Local Community Participation. *Journal off Threatened Taxa*, 9(4), 10035–10046
- DWNP. 2010. Annual Report 2010. Kuala Lumpur.
- DWNP. 2012. Annual Report 2012. Kuala Lumpur.
- DWNP. 2014. Annual Report 2014. Kuala Lumpur.
- Gleick, P. H., Singh, A., & Shi, H. (2001). Threats To The World's Freshwater Resources. *Pacific Institute for Studies in Development, Environment, and Security*. 654 13th Street Oakland, California 94612 <http://www.pacinst.org><http://www.worldwater.org>.
- Shi-Ping Gong, Alex T. Chow, Jonathan J. Fong & Hai-Tao Shi. (2009). The chelonian trade in the largest pet market in China: scale, scope and impact on turtle conservation. *Fauna & Flora International, Oryx*, 43(2), 213-216.
- Hoffmann, M., Hilton-taylor, C., Angulo, A., Böhm, M., Brooks, T. M., Butchart, S. H. M., & Russell, A. (2010). The Impact of Conservation on the Status of the World 's Vertebrates. *Science*, 330(6010), 1503–1509. <http://doi.org/10.1126/science.1194442>
- Mathers, N., Fox, N., & Hunn, A., (2009). Surveys and Questionnaires. *National Institute For Health Research RDS for the East Midlands / Yorkshire & the Humber*, 2007.
- McDougall, B. R. (2009). Too many people : Earth's population problem Constantly increasing numbers Key points. *Population*, 2006–2010.
- Mohammad, N. (2011). Environmental Law and Policy Practices in Malaysia : An Empirical Study. *Australian Journal of Basic and Applied Sciences*, 5(9), 1248–1260.
- Moll. E. O., 2009. Batagur baska (Gray 1830). Northern river terrapin. *Chelonian Research Monographs*, 5, 037.1-037.10. <http://doi.org/10.3854/crm.5.037.baska.v1.2009>
- Moll, E. O., Platt, S. G., Eng, H. C., Horne, B. D., Platt, K., Praschag, P., van Dijk, P. P. (2015). Batagur affinis (Cantor 1847) – Southern River Terrapin, Tuntong. *Chelonian Research Monographs*, 1,2015, 090.1-17. <http://doi.org/10.3854/crm.5.090.affinis.v1.2015>
- Rancangan Tempatan Daerah Perak Tengah. 2015. *Draf 2030*.
- Turtle Conservation Coalition (2011). *Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles - 2011*. Lunenburg, MA: IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservation Fund, Turtle Survival Alliance, Turtle Conservancy, Chelonian Research Foundation, Conservation

- International, Wildlife Conservation Society, and San Diego Zoo Global, 54pp.
- Dijk, V. P. P., Brian L. Stuart., & Andras G. J. Rodhin. (2000). An overview of Asian turtle Trade. *Asian Turtle Trade: Proceedings of a Workshop on Conservation and Trade of Freshwater Turtles and Tortoises in Asia*. Chelonian Research Foundation. 164 pp.
- Vincenot, C. E., Collazo, A. M., Wallmo, K., and Koyama, L. (2015). Public awareness and perceptual factors in the conservation of elusive species: The case of the endangered Ryukyu flying fox. *Global Ecology and Conservation*, 3, 526–540. <http://doi.org/10.1016/j.gecco.2015.02.005>
- WWF-Malaysia. 2012. WWF-Malaysia Strategy 2012-2020, 1–102. www.panda.org