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Team Turtle CQ: FBA's Community Marine Turtle Monitoring Program

2019-20 Summary Report
September 2020

The following report was produced by Fitzroy Basin Association (FBA) with the assistance of Karl French, through funding received for Team Turtle CQ – proudly supported by the Queensland Government – Queensland Citizen Science Grants, and the Great Barrier Reef Foundation.

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Acknowledgement

The success of Team Turtle CQ (TTCQ) is due to the many hours of volunteer effort contributed by community members of the Capricorn and Curtis Coasts area – this report is dedicated to you.

Karl French, marine scientist, supplied the summarised data and recommendations to inform this report.

FBA staff members have contributed to the project by supporting volunteers and reviewing data.

Fitzroy Basin Association acknowledges the traditional custodians of the land and sea of the Capricorn and Curtis Coasts area, the Darumbal, Woppaburra, and Bailai, Gurang, Gooreng Gooreng and Taribelang Bunda People, and pay our respects to their Elders past, present and emerging.

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The Team Turtle CQ project is supported by Fitzroy Basin Association through funding from the Australian Government's Reef Trust, the Great Barrier Reef Foundation and the Queensland Government, Department of Environment and Science.

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Introduction

The Fitzroy region is home to six of the world's seven marine turtle species. Three of these species – Flatback Turtle (*Nattator depressus*), Green Turtle (*Chelonia mydas*) and Loggerhead Turtle (*Caretta caretta*) – nest on our region's beaches. All marine turtle species found in Australian waters are threatened with extinction, being listed as either vulnerable or endangered under both Queensland and Australian legislation. Monitoring of marine turtle activity has occurred along the Queensland coast for decades, however a 2014 gap analysis carried out by FBA identified that the Fitzroy region provided a significant opportunity to add valuable information to this dataset: in particular, in the form of a community marine turtle monitoring program.

In 2015, an initial three-year program was established to train a network of community volunteers in turtle monitoring, under the Australian Government's Nest to Ocean Turtle Protection Program. Data collected by volunteers was submitted to the Queensland Turtle Conservation Program (QTCP), managed by the Department of Environment and Science. Volunteers were trained in turtle monitoring techniques by qualified experts, with some attending the QTCP at Mon Repos during the summer nesting season. In 2018/19, the program trialled the use of a mobile phone app, BioCollect, to record data in real time; this data was then quality-checked before being sent to the QTCP.

This report summarises the results of the 2019-20 Team Turtle CQ (TTCQ) program. Funding for this year's work was provided by the Department of Environment and Science (citizen science grants) and the Great Barrier Reef Foundation. Project deliverables included volunteer training in turtle monitoring and use of the BioCollect app, nest protection activities including monitoring and predator control, and reporting to funders on the project's achievements.

Photo: TTCQ volunteers monitor a marine turtle (credit: FBA)

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Results

This section will present the results of the TTCQ program for 2019-20. Results will be aligned to the three main activity types: volunteer training and community engagement, turtle monitoring, and nest protection.

Volunteer Training and Community Engagement

Two TTCQ workshops were held at the start of the nesting season, one each on the Capricorn and Curtis Coasts, aimed at upskilling local volunteers and ensuring compliance with the Queensland Government's Queensland Turtle Conservation Program (QTCP) protocols. Practical training focused on locating nests, identifying tracks and possible threats to nesting success. A classroom session then focused on general turtle biology, species identification, threat mitigation options, and use of the BioCollect app to record relevant data, including date, time, location, species, identified threats, and photographs of the track and nest site (if present). The latter allows verification of the species and nesting success through track identification. Volunteers were also encouraged to report 'nil results' of turtle presence through the app, as this helps form a regional picture of turtle activity at any given point in time.

A subsequent training session was held later in the season on the Capricorn and Curtis Coasts, focusing on best practice in observing and reporting hatchlings, fox predation, and further training in the BioCollect app. As not everyone was comfortable in using the app, alternative options for submitting data included email and through FBA's website. Training was also delivered to program facilitators at Stanage Bay, during a site visit in December 2019. Stanage Bay beach was previously identified as having significant numbers of nesting turtles, which provided a valuable opportunity for volunteers to increase their practical skills in recognising successful nests; measuring, tagging and recording a nesting female; adding data to the BioCollect app; and recognising turtle hatchling tracks. FBA staff were able to engage a new landholder during this trip, which has added significant data to the program.

The following table summarises the results of volunteer training during 2019-20 nesting season. A total of 71 attendees were recorded at training events (Table 1), with some attending multiple events (e.g. nesting, hatchling and facilitator training).

Table 1. Volunteers attending TTCQ 2019-20 training events

Location	Total	Youth	New
Curtis Coast Nesting Training	9	Nil	5
Capricorn Coast Nesting Training	27	1	10
Curtis Coast Hatchling Training	12	2	2
Capricorn Coast Hatchling Training	21	2	7
Stanage Bay Facilitator Training	2	Nil	2
TOTAL	**74**	**5**	**24**

In addition to volunteer training, this program aims to increase general community education and involvement in turtle conservation. Curtis Island Ferry Services continues to support the program by displaying educational signage on the barge to and from Curtis and Facing Islands, alerting passengers about nesting turtles. FBA staff continue to maintain positive relationships with Gladstone Ports Corporation, Livingstone Shire Council and

Gladstone Regional Council; this assists in facilitating turtle nesting signage on local beaches across the region, encouraging responsible four-wheel driving, reduction of light impacts on nesting turtles and hatchlings, minimising disturbance to nesting turtles, and contact details for reporting turtle sightings. Councils have also been actively supporting the program by placing signage on Facing Island, increasing monitoring and enforcement of local laws relating to illegal four-wheel driving on beaches, and supporting fox detection activities. FBA continues to raise awareness of turtle conservation in the local community through media opportunities and social media campaigns.

Turtle Monitoring

A total of 36 active volunteers participated in turtle monitoring and nest protection activities during the 2019-20 season. Monitoring is conducted by volunteers regularly walking beaches within the Fitzroy region to capture relevant data such as turtle tracks (or lack thereof), nesting attempts and successes, hatchling numbers, and predation effects. Data is reported by volunteers through the BioCollect app (preferred), emailed, or submitted through FBA's website. Validated data is then provided to the QTCP database, held by the Queensland Department of Environment and Science. Data is collected under authority permits granted by the Queensland Government.

Volunteer engagement and turtle records continue to be strongest on the Capricorn Coast, probably due to the greater proximity to urban centres, larger number of prospective nesting beaches for turtles, and the large nesting aggregation of Flatback Turtles around Peak Island (approximately eight kilometres east of Keppel Sands). By comparison, the Curtis Coast has fewer available beaches, larger expanses of unsuitable nesting habitat (e.g. mangroves, mudflats), increased maritime activity in and around Gladstone Harbour, and no large nesting aggregations inshore. Map 1 (following page) shows the distribution of monitoring activities in 2019-20. This year saw the greatest coverage in volunteer survey effort in the region to date.

TTCQ participants recorded a total of 231 nests and 1126 successfully emerged hatchlings in the 2019-20 season. This data is more than double that collected during the previous season, highlighting the passion and interest of volunteers in turtle conservation in central Queensland. Table 2 (page 8) shows the 'per beach' records of turtle activity in 2019-20; Table 3 (page 9) the survey effort of volunteers, per beach in the Fitzroy region; and Table 4 (page 10) presents summary data on volunteer survey effort and turtle monitoring activities since 2015.

A selected number of hatched nests were opportunistically excavated on Facing Island (six nests) and the Capricorn Coast (25 nests) to determine the hatchling success rate. Egg shells were exhumed and counted, noting unhatched and undeveloped embryos. This information is compared with data from index beaches monitored by the QTCP (Table 5, page 11). Hatching success rates were roughly comparable with those of the index beaches, however it is noted that the sample size of the TTCQ nests is small compared to those monitored by the QTCP, and exposed nests that might be subject to increased heat stress or tidal inundation were not sampled.

Map 1. Distribution of turtle monitoring activities in 2019-20

Team Turtle CQ Monitoring Activities 2019-20

Australian Government | Reef Trust | Great Barrier Reef Foundation | Queensland Government | FITZROY BASIN ASSOCIATION

1:1,100,000
(at original A4 size)

0 10 20 30 40 50
Kilometres

Spatial Reference: GDA2020

The Team Turtle CQ project is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation; it is proudly supported by the Queensland Government - Queensland Citizen Science Grants; and supported by Fitzroy Basin Association Inc.

Map Produced by: Pete Smith
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Table 2. Turtle activity 2019-20, per beach surveyed. NR = not reported

Locality & Beach Name	No. of Tracks	No. of Nests	Predated Nests	Notes
Stanage Bay – Alligator Bay Beach	85	69	NR	No observed predators. 32 nests low on beach
Stanage Bay – Langham Beach	NR (37)	37	NR	
Shoalwater Peninsula – Port Clinton	NR (1)	1	NR	
Byfield – Three Rivers Beach	Nil	Nil	NR	
Byfield – Five Rocks Beach	2 Green, 2 Flatback	3	NR	
Byfield – Nine Mile Beach	2	2	NR	
Cap Coast – Farnborough Beach North	2 Green, 4 Flatback	4	NR	
Cap Coast – Farnborough Beach South	1	1	NR	
Cap Coast – Barlow's Hill to Yeppoon Beach	1	1	NR	
Cap Coast – Lammermoor Beach	2	2	Nil	
Cap Coast – Kemp Beach	1	1	1 (fox)	
Cap Coast – Mulambin Beach	Nil	Nil	NR	
Cap Coast – Haven Beach (Ritamada/Tanby)	7	6	3 (fox)	
Cap Coast – Fisherman's Beach, Emu Pk	10	8	2 (fox)	
Cap Coast – Main/Shelley's Beach, Emu Pk	2	2	Nil	
Cap Coast – Zilzie Beach	7	6	3 (fox) 1 lost	
Cap Coast – Long Beach, Joskeleigh, Fitzroy R	1	Nil	NR	
Keppel Islands – Great Keppel, Long Beach	2	2	NR	
Keppel Islands – Nth Keppel, Considine Beach	6	6	NR	
Curtis Coast – Boyne Island, Lilley's Beach	Nil	Nil	NR	
Curtis Coast – Tannum Sands, Canoe Point	1 Green	1	Nest lost	Inundated, high water
Curtis Coast – Wild Cattle Island North	1	1	NR	
Curtis Coast – Wild Cattle Island South	1	Nil	NR	
Facing Island – Oaks Beach to North Pt	Nil	Nil	NR	
Facing Island – Ocean Beach	18	15	NR	1 PEX
Facing Island – East Pt (Lighthouse) Beach	21	16	NR	
Facing Island – Settlement Bay East	4	4	NR	
Facing Island – Settlement Bay West	60	47	1 (goanna/dog)	2 PEX
Curtis Island – Stone Huts Beach	Nil	Nil	NR	
Curtis Island – Joey Lees Beach	Nil	Nil	NR	

Table 3. Volunteer survey effort by month, 2019-20, as entered in the BioCollect app.
Note: CC = Capricorn Coast, KI = Keppel Islands, CsC = Curtis Coast,

Locality & Beach Name	Times surveyed per month, 2019-20						Notes
	S	O	N	D	J	F	
Byfield – Three Rivers Beach		1	1	1			4WDs, rubbish, wild dogs
Byfield – Five Rocks Beach		1	1	1			4WDs, rubbish, wild dogs
Byfield – Nine Mile Beach		1	1	1			4WDs, rubbish, wild dogs
CC – Farnborough Beach North			2	2			4WDs, turtle reported 1/12 – no evidence observed, strong wind may have obscured tracks
CC – Farnborough Beach South - Barlow's Hill			1	4	3	3	Data reported weekly from regular/daily walks on this section
CC – Yeppoon Main Beach							No data
CC – Lammermoor Beach							Only nesting data recorded
CC – Kemp Beach		1			4	1	
CC – Mulambin Beach		1	5	1	3		4WDs noted. 4WD tracks would obscure any turtle tracks
CC – Haven Beach (Ritamada/Tanby)							No data
CC – Fisherman's Beach, Emu Pk			1				
CC – Main/Shelley's Beach, Emu Pk	1	2	2	1			Goanna, fox, lights, fires reported. Quadbike use
CC – Zilzie Beach, Zilzie		1					
CC – Musken's Beach, Zilzie		1					Turtle reported – no evidence observed
CC – Long Beach, Joskeleigh, Fitzroy R			2				Deceased green turtle tag# K56163
KI – Great Keppel, Putney Beach					1		
KI – Great Keppel, Fisherman's Beach					1		
KI – North Keppel, Considine Beach			1	1			
CsC – Boyne Island, Lilley's Beach	1	1	2	3	2		Illegal 4WD use on dunes, rubbish and camping outside designated areas.
CsC – Tannum Sands, Canoe Point				2			
CsC – Tannum Sands, Main Beach		1		2			Lights
CsC – Wild Cattle Island North		1	3	2	2		Lights, fox in December
CsC – Wild Cattle Island South	1	1 3	1 4	5	1 1	5	Lights, fox, goanna
Facing Island – Oaks Beach to North Pt				1			No observed nesting up to this date, no tracks obs.
Curtis Island – Joey Lees Beach		1					No observed nesting up to this date, large tides.
Curtis Island – Stone Huts Beach		1					No observed nesting up to this date, large tides.

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Table 4. Summary of survey effort and monitoring activities since 2015. Note: NR = Not Recorded

Year	Location	No. of beaches surveyed	No. of volunteers	Tracks reported	Confirmed Nest	Emerged Clutches	Predation
2015-16	Capricorn Coast	3	4	10	5	2	1 (fox)
	Curtis Coast	2	3	5	3	1	1 (fox)
	Facing Island	1	0	39	16	2	15 (goanna)
	TOTAL	**6**	**7**	**54**	**24**	**5**	**17**
2016-17	Capricorn Coast	7	16	23	15	11	4 (fox)
	Byfield	1	1	4	NR	NR	NR
	Curtis Coast	4	3	20	6	NR	1 (fox)
	Facing Island	4	2	97	62	20	18 (goanna)
	Keppel Bay Is.	2	3	3	1	NR	NR
	TOTAL	**18**	**25**	**147**	**84**	**31**	**23**
2017-18	Capricorn Coast	6	9	30	12	11	3 (fox)
	Curtis Coast	3	1	6	1	NR	NR
	Facing Island	5	5	95	59	13	46
	Stanage Bay/ Byfield	1	1	25	3	3	3 (fox)
	TOTAL	**15**	**16**	**156**	**75**	**27**	**52**
2018-19	Capricorn Coast	8	10	13	10	8	1 (fox)
	Curtis Coast	2	2	1	0	NR	NR
	Stanage Bay/ Byfield	1	1	3+	3+	1	Dogs
	Keppel Bay Is.	1	1	1	1	NR	NR
	TOTAL	**12**	**14**	**18+**	**14+**	**9**	**1**
2019-20	Capricorn Coast	13	23	37	30	24	9 (fox)
	Curtis Coast	5	6	3	2	NR	NR
	Facing Island	5	3	103	82	6	1 (dog/ goanna)
	Stanage Bay incl. Langham/ Port Clinton	2	4	123	107	26	NR
	Byfield	3	3	6	5	NR	NR
	Keppel Bay Is.	4	4	8	8	NR	NR
	TOTAL	**32**	**43**	**280**	**234**	**56**	**10**

Table 5. Hatching success rates of turtle nests on Facing Island and the Capricorn Coast, compared with long-term averages from QTCP index beaches (Peak Island, Curtis Island, Woongarra Coast) (Limpus et al. 2006, Limpus 2007, Twaddle et al. 2014).

Locality	No. of Eggs	Percentage Hatching Success
Facing Island – 2019-20 average	53.83	81.36
Capricorn Coast – 2019-20 average	49.84	78.60
Peak Island average	52.60	76.80
Curtis Island average	54.68	64.96
Woongarra Coast (Bundaberg area) average	55.24	78.11

Nest Protection

Turtle eggs are vulnerable to predation by a range of native and introduced predators, including goannas, dingoes, wild dogs, pigs and foxes. Two main methods of increasing nesting success are through protecting nests directly by installing mesh barriers and conducting predator control (usually limited to feral animals); both methods were utilised in the 2019-20 season.

Predator exclusion

In some localities, a single predator is known to have destroyed almost 100 percent of turtle nests in a season. In past surveys, it has been noted that significant predation by goannas has been occurring on flatback turtle nests on Facing Island. To assist in mitigating this threat, installing protective mesh over nests was included in this program for 2019-20. Two weekend field trips were carried out in December 2019 to Facing Island, to locate recent nests where protective mesh could be installed. Hot, dry conditions and strong winds over both survey periods had removed all signs of recent turtle activity and made identification of successful nests near impossible. Sand moisture content was low, and many egg chambers collapsed before completion, with the nesting female abandoning the attempt. The resulting meandering by females amongst the dunes, whilst they searched for and tested nesting sites by partially digging body pits, made locating any successful nests even more difficult. Some nests were laid low on the beach, where moisture content was higher, however these nests were at risk from inundation during king tides and storm events and deemed not suitable for installing predator exclusion devices. Ultimately, three mesh predator exclusion devices were installed on the island on the limited number of nests able to be located, in suitable positions for nest protection.

It was also noted during these field trips that there was an absence of goanna tracks compared to previous seasons, however these had been replaced by wild dogs. It appears there has been a prey-shift at Facing Island, where wild dogs are now targeting turtle nests instead of the introduced whip-tail wallabies and other macropods. Future management actions to protect nests will need to include stronger mesh barriers to prevent canids (including foxes), as well as goannas.

Fox den fumigation

Foxes are recognised as significant local predators of turtle nests, with some exhibiting learned behaviour to locate and destroy multiple nests within a home range. This project sought to minimise fox predation on turtle nests in the Livingstone Shire and Gladstone Regional Council areas, by utilising a fox detection dog to locate active dens, that are then fumigated by a qualified contractor. This is a cost-effective method of fox control that avoids the need for poison baiting in public areas (e.g. along beaches) and is highly target specific. This makes it

a practical option for councils, where other methods of control such as trapping are potentially more difficult to gain approval for.

Den detection was carried out within parks and reserves from Corio Bay to Emu Park in the Livingstone Shire Council area (five days), and at Boyne Island within the Gladstone Regional Council area (six days) in September 2019. A total of 54 dens were located within the Livingstone Shire Council search area, including 12 active dens, four den attempts, 20 inactive dens and 18 abandoned dens. At Boyne Island, a total of 20 dens were located, including nine active dens, six den attempts, two inactive dens and three abandoned dens.

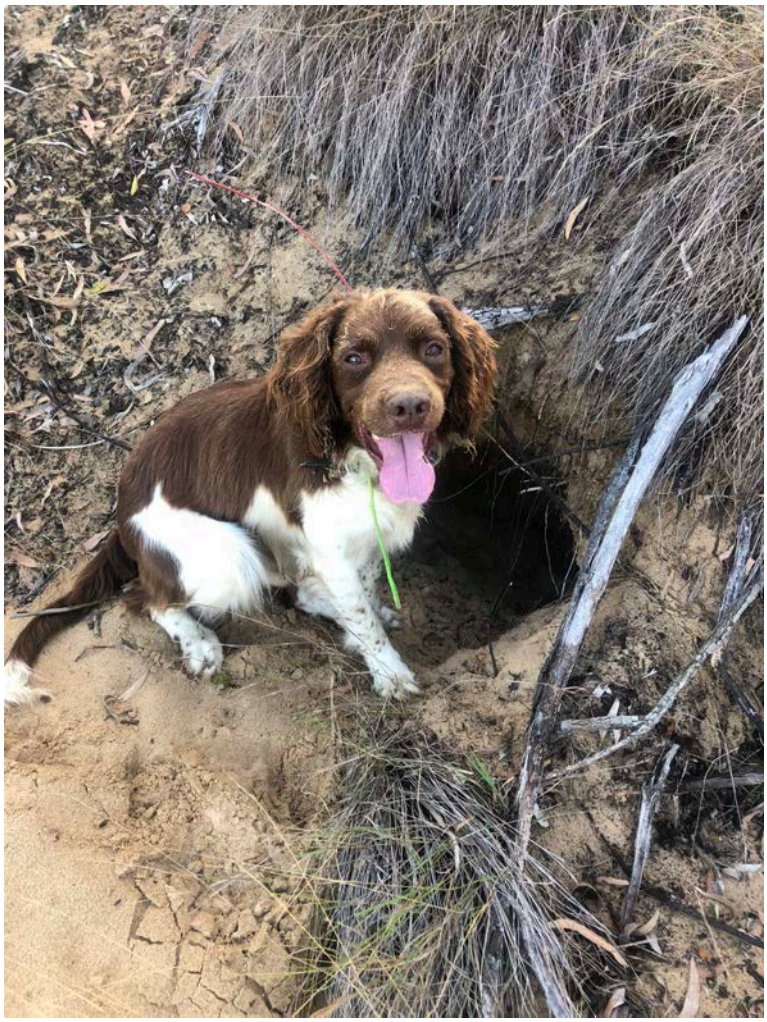

Photo: Fox detection dog Rocky successfully locating a fox den (credit: Tom Garrett)

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Recommendations

During the delivery of the 2019-20 TTCQ program, opportunities for improvement were identified by volunteers, coordinators and contractors; these are presented below.

1. **Increase data quality**: continue to focus on training volunteers, with an emphasis on collecting good quality, accurate and complete data (including reporting nil results). This is especially relevant for photos and details of turtle tracks, nests and location on the beach, to help enable species identification.

2. **Provide additional volunteer training and permitting for specialist activities**: some TTCQ volunteers have had the opportunity to participate in other turtle research and monitoring at Mon Repos, including nest protection, nesting success studies and relocation of nests deemed at risk of inundation. To help enable selected volunteers to take on these specialist activities within the central Queensland region by providing opportunities for further training and appropriate permitting.

3. **Recruit additional volunteers in targeted locations**: the TTCQ program has expanded significantly since its inception, however it is acknowledged that data gaps still exist in the region. If additional volunteers can be recruited from the Stanage Bay area south to Five Rocks Beach (likely for publicly accessible areas only), Facing Island and Curtis Island, this would fill major knowledge gaps in the region.

4. **Strengthen partnership opportunities**: continue relationships with regional stakeholders such as Gladstone Ports Corporation, Gidarjil Land and Sea Rangers, Gladstone Regional Council and Livingstone Shire Council, to improve various aspects of the TTCQ program. This includes turtle monitoring (Gladstone Ports Corporation, Gidarjil), and community engagement and feral animal control (councils). Consult with key stakeholders post-monitoring season to discuss any issues that impacted on project success, and to identify opportunities for the coming turtle nesting season.

5. **Expand nest protection activities**: focusing on Facing Island, and where possible on other beaches identified as having predation issues, increase nest protection activities. Utilise heavier plastic mesh so that nests can be protected regardless of predator type (e.g. goanna, wild dog, fox). Continue discussions with Gladstone Ports Corporation and Gidarjil Land and Sea Rangers regarding nest protection. Consider training volunteers in nest protection (in addition to turtle monitoring) if fox predation continues to be significant along the Capricorn Coast.

6. **Investigate feasibility for wild dog eradication on Facing Island**: increasing predation by wild dogs on turtle nests has been reported since 2017. If current control effort is unsuccessful in supressing the population, it has been suggested by Dr Colin Limpus (QTCP coordinator) that eradication of wild dogs from the island is required due to the alternative of dog-proof nest protection activities being highly labour intensive. This option would require separate funding from the TTCQ program.

7. **Expand fox control program**: den fumigation is highly effective in controlling fox populations during the breeding season and has been conducted by Livingstone and Gladstone councils, however for the most comprehensive control, this should be paired with baiting and/or trapping, particularly to control males which are unlikely to be inside dens when control activities occur. Also consider working with Queensland Parks and Wildlife Service (QPWS) to expand fox control to Wild Cattle Island National

Park, where foxes were observed on beaches there this season. Other locations under QPWS management include parts of Curtis Island, and Byfield National Park.

8. **Reduce light pollution:** artificial lighting such as streetlights, residential and industrial lighting is a significant issue for marine turtle hatchlings, as it affects their ability to navigate towards the ocean upon leaving their nest. This exposes them to increased predation and other risks. TTCQ volunteers observed hatchlings travelling over 500 metres towards house lights on the Capricorn Coast this nesting season. Continue working with stakeholders including councils and the general public to encourage increased screening vegetation on nesting beaches, installation of low-glow or sensor lighting in public places along beach fronts, and public education for residents to reduce light pollution from private properties (e.g. by drawing blinds on ocean-facing windows and doors, and turning off unnecessary outdoor lighting).

9. **Assist TTCQ towards becoming a semi-autonomous turtle watch group:** TTCQ has significantly expanded its reach and capability since its inception in 2015. It is hoped that, with time, TTCQ will become a semi-autonomous, self-governing turtle watch group. Until this is realised, FBA will continue to provide support to volunteers and volunteer coordinators to enable community-driven marine turtle monitoring activities to be delivered in central Queensland.

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