



Ningaloo Turtle Program

Annual Report 2022-23



Department of **Biodiversity,
Conservation and Attractions**



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GLOSSARY

| | |
|---|--|
| Body pit | A depression dug in the sand by a turtle during a nesting attempt. |
| Egg chamber | A deep cylindrical hole which a turtle digs into the bottom of a primary body pit with her back flippers only. The eggs are deposited here. |
| Entire season | All NTP database season dates and subsections except 1080 baiting data. This includes the intensive peak period monitoring and the pre and post peak period monitoring data. |
| False crawl | An abandoned nesting attempt with no eggs being laid. |
| GPS unit | Global Positioning System unit: an electronic navigational device which obtains a position on the earth using satellite signals. |
| Pre and post peak | Monitoring on the weekends either side of the intensive peak monitoring period. |
| Intensive peak monitoring period | Four-week period centred around the 31 December, during which monitoring takes places every day. Note: the peak period was identified by Whiting (2016) as the 7 January but due to having volunteers adequately trained before Christmas, the peak period has been brought forward one week every year. |
| Nest | A nesting attempt which we suspect has resulted in eggs being deposited. |
| Nest damage | The nest has been dug up, eggs or fresh empty egg shells are around the nest or eggs are exposed. |
| Nesting success | The number of suspected nests laid as a percentage of total turtle tracks counted. |
| New nest | A suspected nest laid during the night before or the morning of monitoring, which has therefore not been previously recorded. |
| Old nest | A suspected nest laid during the current season (but not laid during the previous night) which has been predated on. |
| Primary body pit | A depression dug in the sand by a turtle during a nesting attempt with the aim of laying eggs into it. The egg chamber is located here in a successful nest, but a primary body pit can also be left exposed from a false crawl. |
| Rookery | A significant breeding area for a large number of turtles. |
| Secondary body pit | The last depression dug during a successful nesting attempt to cover the primary body pit and egg chamber with sand. |

| | |
|-----------------------------|---|
| Standardised season | A period which only includes the intensive peak monitoring period to make data comparisons possible between seasons that would otherwise have different monitoring timeframes. |
| Survey effort | Total number of times each subsection was monitored over a specified period of time. |
| Suspected nest | Nests suspected of containing eggs as a result of assessment using standard monitoring techniques. Eggs were not witnessed being deposited into an egg chamber within the structure, hence the 'nests' are referred to as "suspected nests." |
| Tracks | The imprint left in the sand by a turtle emerging from and returning to the water. |
| Turtle activity | Includes both turtle nests and false crawls. |
| Unidentified species | A turtle activity that cannot be attributed to a green, loggerhead or hawksbill turtle is classed as belonging to an unidentified species. This may occur due to the track being too short in length, obscured by wind or another track, or a volunteer being unsure. |
| Zoning | Hierarchical spatial classification system of divisions, sections & subsections used for monitoring nesting activity. |

LIST OF ABBREVIATIONS

| | |
|---------------------------|--|
| CCG | Cape Conservation Group Inc. |
| DBCA | Department of Biodiversity, Conservation and Attractions |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation Act 1999</i> |
| JTC | Jurabi Turtle Centre |
| NMP | Ningaloo Marine Park |
| NTP | Ningaloo Turtle Program |
| NW Cape | North West Cape |
| Parks and Wildlife | Parks and Wildlife Service, Department of Biodiversity, Conservation and Attractions |

SUMMARY

The Ningaloo Turtle Program (NTP) was established in 2002 as a collaboration between the Cape Conservation Group Inc., World Wildlife Fund Australia, Murdoch University and the Department of Biodiversity, Conservation and Attractions (DBCA), Exmouth District. During the 2022-23 season, Woodside Energy and its joint venture partner made a significant financial contribution to sponsoring NTP. The program is now run by DBCA, and the primary aim of the NTP is to support the conservation of marine turtles along the Ningaloo Coast.

The monitoring design was consistent with previous recent seasons. This included 4 weeks of daily monitoring of turtle activity (nests and false crawls) during the predicted peak period of nesting at both the North West Cape (NW Cape) and Cape Range divisions (referred to as the standardised season) and 3 weekends pre-peak and 3 weekends post-peak at the NW Cape sections only. Janes Bay (Ningaloo Division) and Gnarraloo Bay were not monitored in 2022-23.

1979 suspected nests and 3862 false crawls were recorded in the Ningaloo Region over the full 2022-23 season. In the NW Cape division, 91.2% of activities were from green turtles. The season was the 13th busiest out of 21 seasons for number of green turtle nests and 3rd busiest out of 21 seasons for both hawksbill and loggerhead nests in the NW Cape division. In the Cape Range division (Bungelup), 90.6% of activities were from loggerhead turtles.

Nesting activity has varied greatly across the years since the monitoring program commenced in 2002. Nesting activity of green turtles has varied relatively more than for loggerhead and hawksbill turtles. There have been two clear peaks in nesting by green turtles since NTP began, one in 2011-12 and the other in 2020-21. Interestingly, these seasons were both characterised by La Nina weather patterns.

In comparison to long-term averages, in 2022-23 for the NW Cape division there were fewer than average number of nests by green turtles, above average number of nests for loggerhead turtles and almost double the average number of nests for hawksbill turtles. For the Cape Range division, there were fewer nests on average for all three species, compared to long-term averages.

Nesting success was above average for all three species in the NW Cape division in 2022-23. In the Cape Range division, nesting success was below average for loggerhead turtles but above average for green and hawksbill turtles.

In the NW Cape division standardised season, an average of 4.1 new green turtle nests were recorded per subsection per day, which is below the long-term average of 5.7 nests per day (range from 1.1 to 18.1 since 2002). Nesting success for green turtles was 31.8% (average 27.1%). Loggerhead turtles laid an average of 0.46 nests per subsection per day which is higher than the long-term average of 0.36 (range 0.24 to 0.68 since 2002). The nesting success was 56.1% (long-term average of 41.7%). Hawksbill activity remained relatively low (compared to other species), with 0.25 nests on average per subsection per day, however this

was the third busiest season since NTP began. The long-term average is 0.15 nests per day and the range since 2002 is 0.06 to 0.38 nests per day. Nesting success for hawksbills was 50.3% (long-term average of 47.5%).

In the Cape Range division standardised season, an average of 3.3 loggerhead nests were recorded per subsection per day which is close to the long-term average of 3.8 nests per day (range 2.5 to 6.4 nests since 2003). Nesting success was 36.8% (average 42.1%). Green turtles laid an average of 0.2 nests per subsection per day (range of 0 to 1.18 with an average of 0.28), and nesting success was 37.2%, above the average of 31%. Hawksbill activity remained relatively small as expected, with 0.21 nests per subsection per day, lower than the average of 0.40 (range of 0.03 to 1.53 since 2003). Nesting success (66.7%) was above average (51.9%). Note the low number of nests for green and hawksbill turtles when interpreting nesting success.

The density of nesting varied throughout subsections. The highest density of green and hawksbill nests (nests per kilometre per day) was in the Five Mile to Five Mile North subsection in the NW Cape division. The Bungelup North to Bungelup South subsection (in the Cape Range division) had the highest density of loggerhead nests.

Ninety nests (all species combined) were assessed as being disturbed, which was 4.5% of the total recorded nests. Seventy nine were attributed to ghost crabs, one to tide, three to bird predation as the eggs were being laid and four to unknown causes. Three nest disturbances were attributed to introduced predators (dog) or dingo.

During 2022-23, volunteers rescued 15 stranded turtles, contributing to at least 360 recorded rescues since 2002. Four mortalities and two tagged turtles were also reported.

Fifty one volunteers contributed 3253 hours to the Ningaloo Turtle Program in 2022-23. Since commencement of the program, volunteers have contributed over 84,011 hours. These hours demonstrate the effort and essential value of the volunteers over the life of the program. The Communications Internship position contributed to an increased social media following on Facebook, Instagram and YouTube and produced excellent promotional material, photography, articles, website content and educational experiences for children.

1. INTRODUCTION

The Ningaloo Turtle Program (NTP) was established in 2002, as a collaboration between the predecessors of the Parks and Wildlife Service at the Department of Biodiversity, Conservation and Attractions Exmouth District (DBCA), Cape Conservation Group Inc. (CCG), Murdoch University and the World Wildlife Fund – Australia (WWF). The primary aim of the program is to support the conservation of marine turtles along the Ningaloo coast, within the Ningaloo Marine Park and Ningaloo Coast World Heritage Area. This is accomplished through the collection of information to support an understanding of key aspects of turtle conservation including nesting abundance, distribution, disturbance and the effectiveness of management actions. This understanding helps inform management and conservation by DBCA including reducing disturbance to nesting turtles, management of introduced predators and managing coastal access and visitation to support effective conservation of sea turtles on the Ningaloo Coast.

Ningaloo Marine Park has regionally and globally significant nesting for ‘endangered’ loggerhead and ‘vulnerable’ green and hawksbill turtles, as listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and *Biodiversity Conservation Act 2016* (State) (Commonwealth of Australia 2017). The loggerhead rookery in Cape Range National Park is regarded as the largest mainland rookery for the Western Australian loggerhead genetic stock (Rob et al 2019).

Volunteers are essential to the success of the program. Based in Exmouth, Western Australia, the NTP provides opportunities for volunteers from the local community, Western Australia, interstate and internationally to take part in turtle conservation. Participating volunteers gain training and practical experience with track monitoring, turtle rescues and other related activities.

Woodside Energy Ltd and its joint venture partner has been the main external sponsor of the program, contributing to the program’s operational costs since 2012. The funding has contributed to volunteer costs, website maintenance, community activities, monitoring equipment and education.

In 2008 the monitoring design for NTP was consolidated from 60 days after it was determined that long-term trends in turtle populations could be detected with an acceptable level of confidence when survey effort was reduced (Whiting, 2008). Monitoring in the NW Cape and Cape Range divisions now occurs daily over the 28 days of the peak nesting period. Three weekends of monitoring during each of the pre and post peak nesting periods also occurs at NW Cape division.

Trend analyses of the NTP data have been undertaken every three years to understand longer-term changes in patterns of nesting at Ningaloo. The most recent trend analysis in 2016 is available online at www.ningalooturtles.org.au. A more recent analysis incorporating data collected since 2016 is underway.

The goals and objectives listed below have been developed through a community-based steering committee (with DBCA and volunteer community representatives) and are updated as required.

NTP Overarching Goals

- Contribute to the understanding of turtle nesting and threats along the Ningaloo Coast to support informed evidence-based conservation and local on-ground management
- Continue to develop a rigorous, peer-reviewed and reliable scientific monitoring programme supported by trained volunteers
- Maintain the only long-term monitoring of green turtles for the Western Australian green turtle genetic stock
- Provide key information to inform the Australian Marine Turtle Recovery Plan
- Build a culture of awareness and stewardship for marine turtle conservation.

NTP Primary Objectives

- Work with traditional owners to enhance the promotion of cultural connections to turtles and share knowledge to build a broader understanding of turtle conservation
- Estimate the abundance, distribution and species of turtle nests on key sections of beach over specified time intervals
- Identify the relative significance of specific nesting beaches for each species
- Identify temporal changes in nesting season and spatial changes in nesting distribution for each species
- Identify long-term trends in nesting and populations
- Quantify predation and disturbance as part of NTP monitoring and through supporting external research
- Record observations of tagged turtles, strandings and mortalities
- Rescue stranded turtles when appropriate
- Support external research relevant to the goals of the program
- Encourage active community and wider involvement through education and the recruitment of volunteers in order to build interest, skills and knowledge to assist with turtle conservation.

2. METHODS

Activities of turtles are recorded by observing fresh tracks from the previous night to determine species and identify suspected nests¹. Volunteers use standard procedures to determine if the activity has resulted in a successful nest or a false crawl. Nest positions are recorded using GPS. Signs of predation at nests are also recorded, along with sightings of tagged turtles, the presence of introduced animals, mortalities of turtles and rescues.

For more detailed information on the current NTP monitoring methodologies please see Section 5.0 of the NTP Annual Report 2012-13 (Coote et al 2013), or the NTP Turtle Monitoring Field Guide Edition 7 (McKinna et al 2015), both of which are available at www.ningalooturtles.org.au.

In the 2018-19 season, the NTP changed from recording on paper data sheets to collecting data using the ODK Collect app, installed on Lenovo tablets (<https://getodk.org/>). This change was part of a state-wide initiative across DBCA to standardise and coordinate the collection of data among turtle monitoring programs throughout WA. The app enables the location to be automatically saved when recording a turtle activity and has the benefit of eliminating human error in transcribing GPS coordinates from a GPS to a data sheet. The data from the app are uploaded via WIFI to a centralised database in Perth. This was the fourth NTP season using tablets. To support the reliable collection of data and use of the ODK app, staff and volunteers were provided with either new or refresher training in the use of the tablets prior to the season commencing.

2.1 Monitoring zones & dates

Important nesting beaches were identified through past aerial and ground surveys during the development of the NTP. For the purpose of the program, the Ningaloo Region is divided into four divisions. A fifth division was added in 2018-19 (Gnarraloo), but not monitored in 2022-23. Divisions are further divided into sections and subsections. Subsections are on average 2-3kms long so that they are practical to survey on foot (with the exception of Janes Bay). The start and end points of subsections were determined by either natural barriers that separate beaches or positions of car parks to facilitate access by volunteers. Volunteers identify subsections with a GPS location and NTP totems located at the start and finish points.

¹ The term 'nest' is used in this report to indicate an activity that appeared to be a nest based on a consistent set of criteria. Nests however cannot be confirmed unless egg-laying is witnessed. Uncertainty can be expected as turtles can sometimes create the appearance of nests without depositing any eggs into them (Whiting pers. comm. 2012) or may deposit eggs without creating the appearance of a nest. Any uncertainty, however, was not considered to be a significant source of bias nor would likely affect the confidence in the interpretation of results.

North West Cape division

The NW Cape division includes the Lighthouse Bay, Hunters, Graveyards and Tantabiddi sections, which is further divided into 11 subsections (Appendix 2). In 2022-23, each subsection was monitored for 36, 37 or 38 days depending on the availability of volunteers for each of the subsections. The NW Cape division was monitored daily during the intensive peak period from the 16 December 2022 to 12 January 2023 (with the exception of 1 January) and before the peak period on the weekends of the 5 and 6, 19 and 20 November and 3 and 4 December 2022 and after the peak period on the weekends of the 28 and 29 January, 11 and 12 and 26 February 2023. Monitoring was cancelled on 25 February 2023 due to rainfall.

Cape Range division

The Cape Range division includes the Bungelup section (divided into three subsections) and the South Mandu section (Appendix 3). South Mandu was not monitored in 2022-23. Each subsection of the Cape Range division was monitored for 26 days during the intensive peak period from the 16 December 2022 to 12 January 2023 (with the exception of 1 Jan). Data from 26 December were not included in this report due to concerns over accuracy².

Bundera/Ningaloo division

The Bundera/Ningaloo division includes six sections each divided into subsections. DBCA staff opportunistically monitor these subsections during monthly baiting operations for management of introduced predators including foxes and cats, but for the purpose of this report the data have not been included.

Coral Bay division

The Coral Bay division includes two sections: Batemans Bay and The Lagoon, each divided into one or more subsections. This division has not been monitored by NTP since the 2008-09 season. DBCA staff opportunistically monitor these subsections during monthly baiting operations for management of introduced predators including foxes and cats, but for the purpose of this report the data have not been included.

Gnarraloo division

The Ningaloo Turtle Program was expanded in 2018-19 to include a minor loggerhead rookery in Gnarraloo Bay (Gnarraloo Bay section)³. This was previously monitored by the Gnarraloo Turtle Conservation Program from 2008-09 to 2017-18 (Hattingh *et al.* 2018). The NTP commenced monitoring in Gnarraloo Bay in 2018-19 using a sampling regime recommended by Whiting (2018) based on assessment of available data from previous surveys at Gnarraloo Bay. Turtle nesting was not monitored in Gnarraloo Bay in 2022-23.

² During daily monitoring, volunteers drag their foot through each track after they have recorded it, so that track is not counted the following day. On 25 Dec at Bungelup, the foot drags were not placed high enough above the tide and were therefore washed away, making determination of fresh vs old tracks harder on the 26th. Therefore, data were not used.

³ Gnarraloo Bay follows the traditional Baiyungu spelling of Ngarralu (double 'r'). Gnarraloo Station and the Gnarraloo Turtle Conservation Program use one 'r'.

3. RESULTS

3.1 Nesting Activity 2022/23

3.1.1 North West Cape division

There were 1685 suspected nests and 3376 false crawls in the NW Cape division during the full 2022-23 season (Table 1). Green turtles were the most active species (nests and false crawls) in the NW Cape division with 91.2% of total turtle activity, followed by loggerheads (5.1%), hawksbills (3.5%) and unidentified species (0.2%). No flatback turtle activity was recorded.

Table 1: Total activities (suspected nests and false crawls) recorded for each species within the NW Cape division, NTP 2022-23 full season.

| Activity | Turtle species | | | | |
|-----------------------|-----------------|---------------|---------------|--------------|----------------|
| | Green | Hawksbill | Loggerhead | Unidentified | Total |
| New nests | 1446 | 94 | 142 | 3 | 1685 |
| False crawls | 3170 | 84 | 114 | 8 | 3376 |
| Total activity | 4616 (91.2%) | 178 (3.5%) | 256 (5.1%) | 11 (0.2%) | 5061 (100%) |

Nesting success is defined as the number of suspected nests laid as a percentage of total turtle activities. On the NW Cape in 2022-23 (full season), green turtles had a nesting success of 31.3%, loggerheads 55.5% and hawksbills 52.8%. For a comparison with long-term averages, see section 3.2.1.

Green turtles were the most abundant species throughout all 11 subsections on the NW Cape (Figure 1). The most loggerhead nests were in the Mauritius to Jacobz South subsection and the most hawksbill nests were in the NW Carpark to Surf Beach subsection.

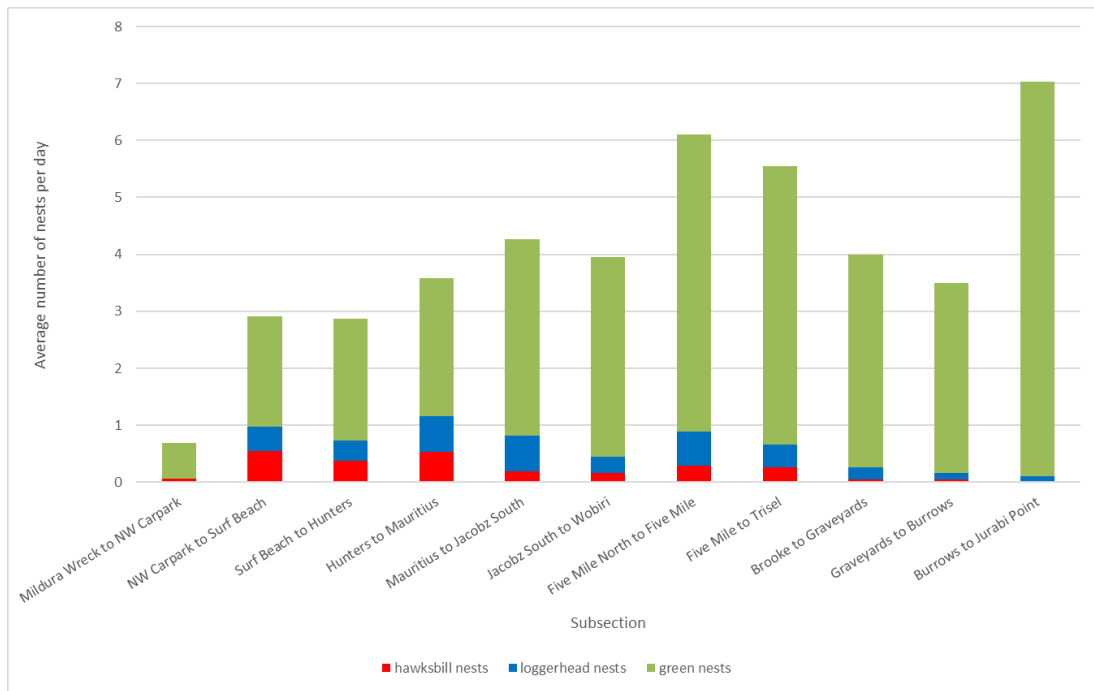


Figure 1: Average number of nests per day for each species for each subsection within the NW Cape division, NTP 2022-23 full season.

Nests per day, (as a measure of total nests) should be considered along with density of nests (nests per day per kilometre) to account for both survey effort and variations in subsection length, noting subsections varied in length from 800m to 3.5km (Appendix 2).

The most green turtle nests were in the Burrows to Jurabi Point subsection (average of 6.9 nests per day) while the densest nesting was in the Five Mile North to Five Mile subsection (6.5 nests per kilometre per day) (Figure 2). Both the least amount (0.64 nests per day) and the lower density (0.43 nests per kilometre per day) of green turtle nests was in the northern most subsection, Mildura Wreck to NW Carpark.

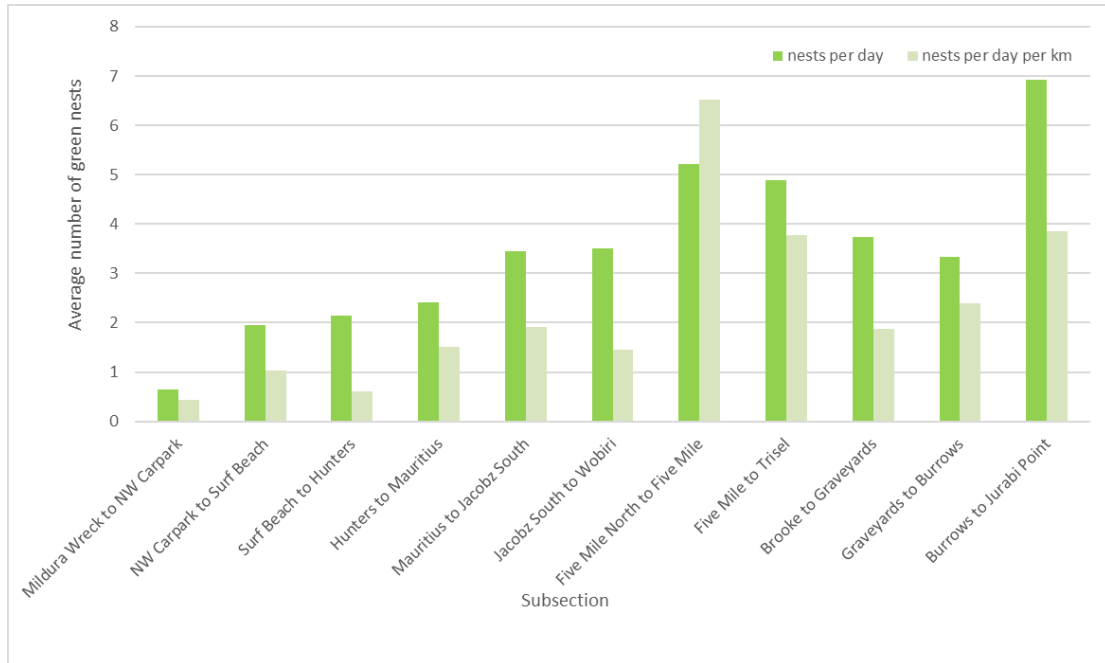


Figure 2: Average number of green turtle nests per day, and density of nests (estimated by nests per day per km) for each subsection within the NW Cape division, NTP 2022-23 full season.

Loggerhead nests were more abundant in the northern and mid subsections of NW Cape, with the most at Hunters to Mauritius and Mauritius to Jacobz South, an average of 0.63 nests per day (Figure 3). The densest loggerhead nesting was at Five Mile North to Five Mile, an average of 0.76 nests per kilometre per day. There were no loggerhead nests in the northern most subsection, Mildura Wreck to NW Carpark.

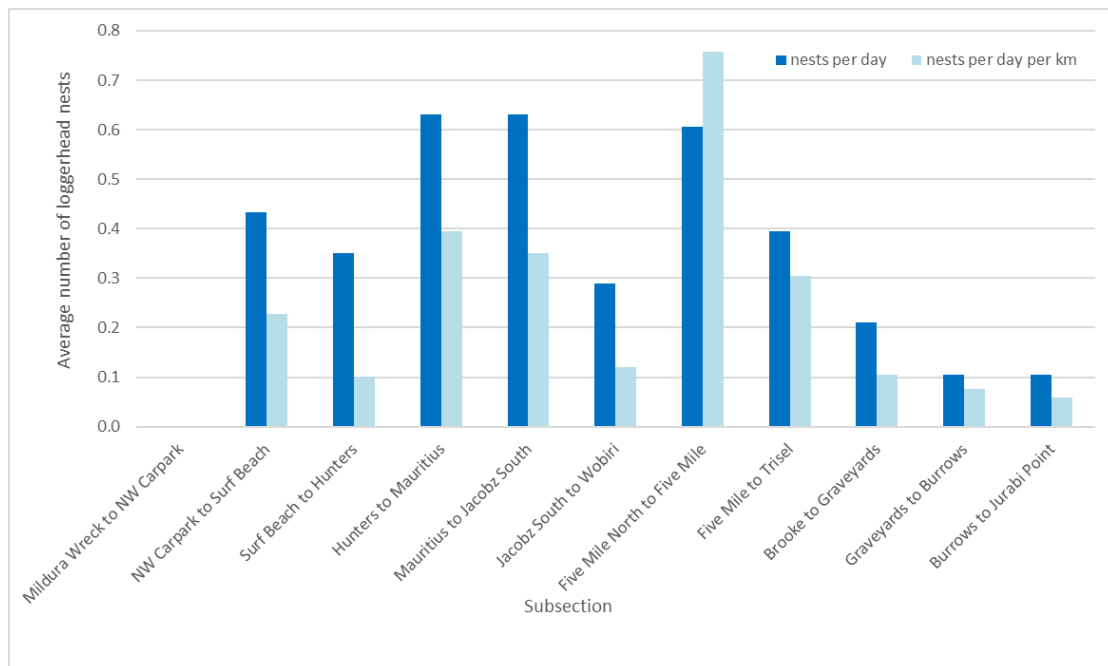


Figure 3: Average number of loggerhead turtle nests per day, and density of nests (estimated by nests per day per km) for each subsection within the NW Cape division, NTP 2022-23 full season.

The most hawksbill nesting was in the NW Carpark to Surf Beach subsection, an average of 0.54 nests per day (Figure 4). The densest nesting was at Five Mile North to Five Mile, an average of 0.36 nests per kilometre per day. There were no hawksbill nests at Burrows to Jurabi Point.

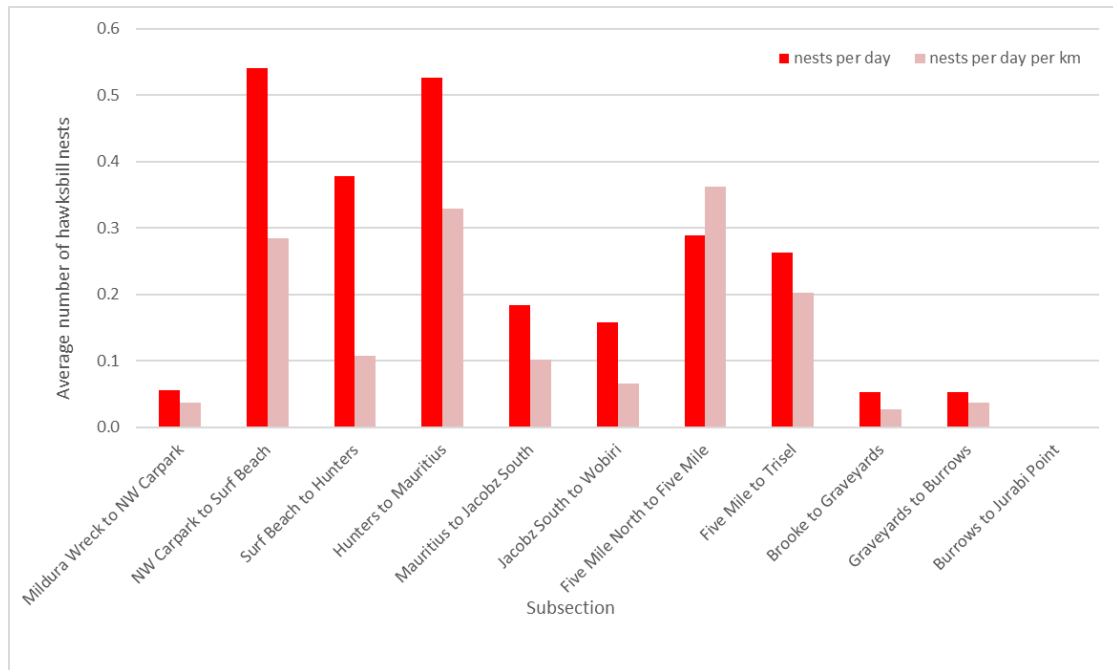


Figure 4: Average number of hawksbill turtle nests per day, and density of nests (estimated by nests per day per km) for each subsection within the NW Cape division, NTP 2022-23 full season.

For individual nest locations see maps in Appendix 4 - Appendix 7.

The numbers of nests recorded per day for each species varied during the season in the NW Cape division (Figure 5- green turtles, Figure 6- loggerhead turtles, Figure 7- hawksbill turtles). The peak timing for green turtles appeared to be during the period of mid - late December. The peak period for loggerheads was late December to mid-January. The period of peak nesting for hawksbills appears to be slightly earlier in the season, mid to late December.

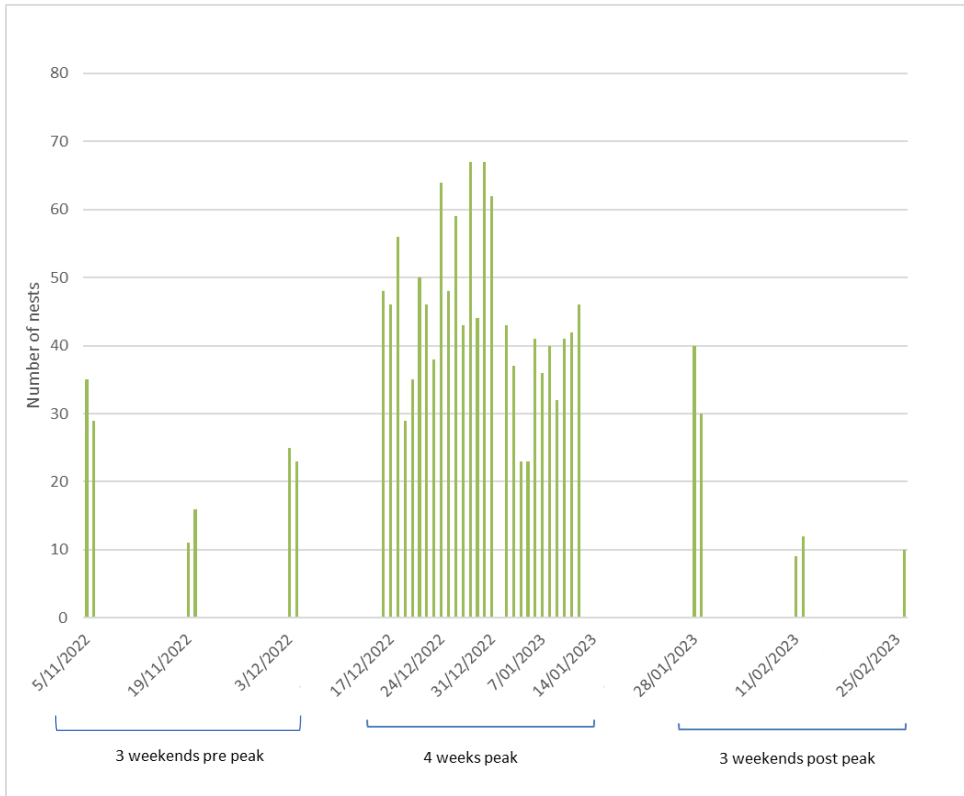


Figure 5: Number of green turtle nests recorded in the NW Cape division per day in the 2022-23 season. Note, no monitoring occurred on 1 January or 25 February

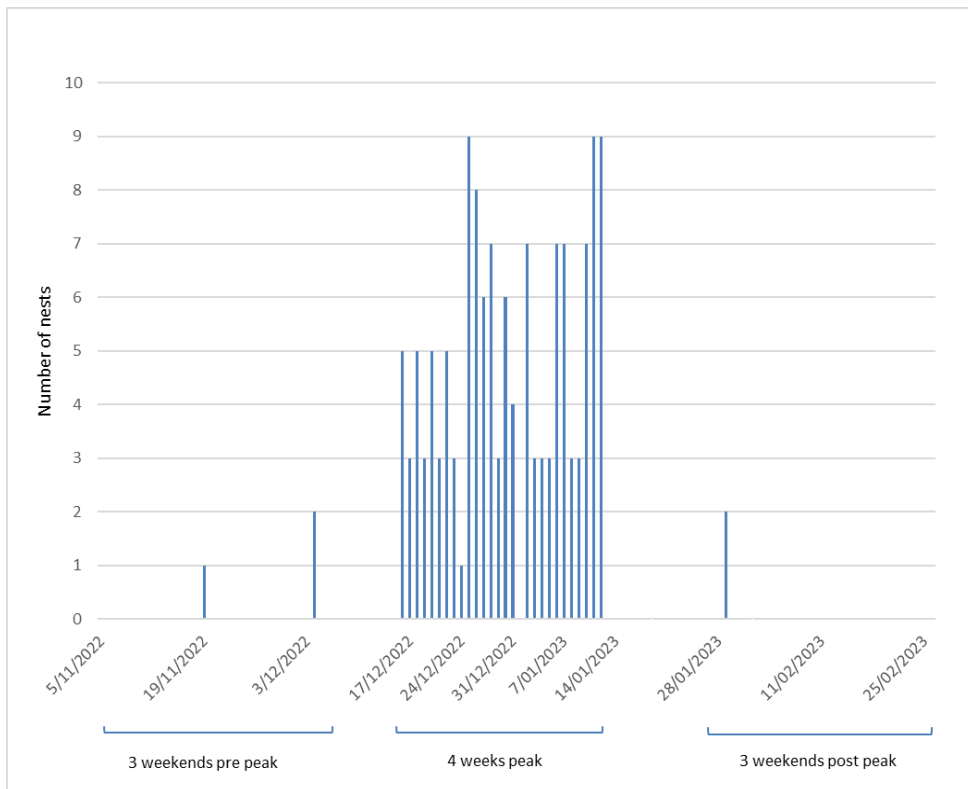


Figure 6: Number of loggerhead turtle nests recorded in the NW Cape division per day in the 2022-23 season. Note, no monitoring occurred on 1 January or 25 February.

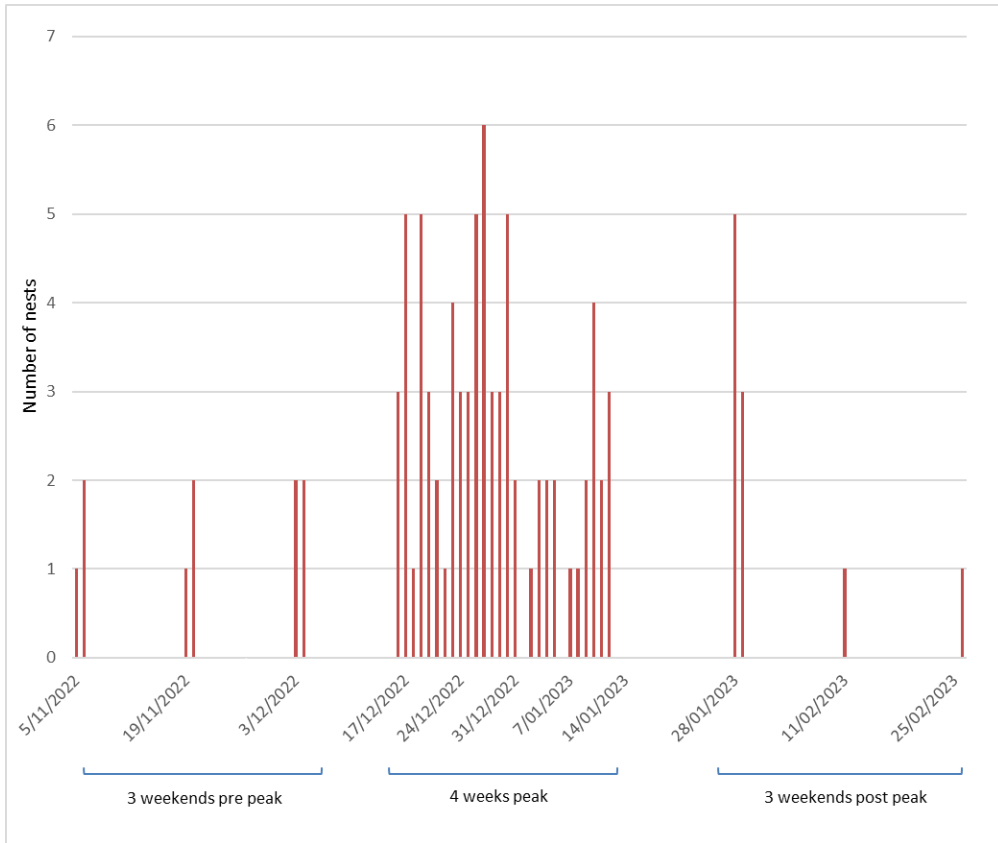


Figure 7: Number of hawksbill turtle nests recorded in the NW Cape division per day in the 2022-23 season. Note, no monitoring occurred on 1 January or 25 February.

3.1.2 Cape Range division (Bungelup section)

In the Bungelup section, 294 suspected nests and 486 false crawls were recorded during the 2022-2023 NTP season (Table 2). Loggerhead turtle activities were the most common (90.6%), followed by green (5.5%), hawksbill (3.1%), and unidentified turtle species (0.8%).

Table 2: Total activities (nests and false crawls) recorded for each species within the Bungelup section of Cape Range division, NTP 2022-23 full season.

| Activity | Turtle Species | | | | Total |
|-----------------------|----------------|--------------|----------------|--------------|---------------|
| | Green | Hawksbill | Loggerhead | Unidentified | |
| New nests | 16 | 16 | 260 | 2 | 294 |
| False crawls | 27 | 8 | 447 | 4 | 486 |
| Total activity | 43 (5.5%) | 24 (3.1%) | 707 (90.6%) | 6 (0.8%) | 780 (100%) |

Nesting success (the number of suspected nests laid as a percentage of total turtle activities) in the Bungelup section for loggerhead turtles was 36.8%, green turtles 37.2% and hawksbill turtles 66.7% (noting small numbers of both green and hawksbill activities). For comparison to long term averages, see section 3.2.2.

Nests from loggerhead turtles were the most abundant throughout all subsections within the Bungelup section (Figure 8), highlighting this area as primarily a loggerhead rookery.

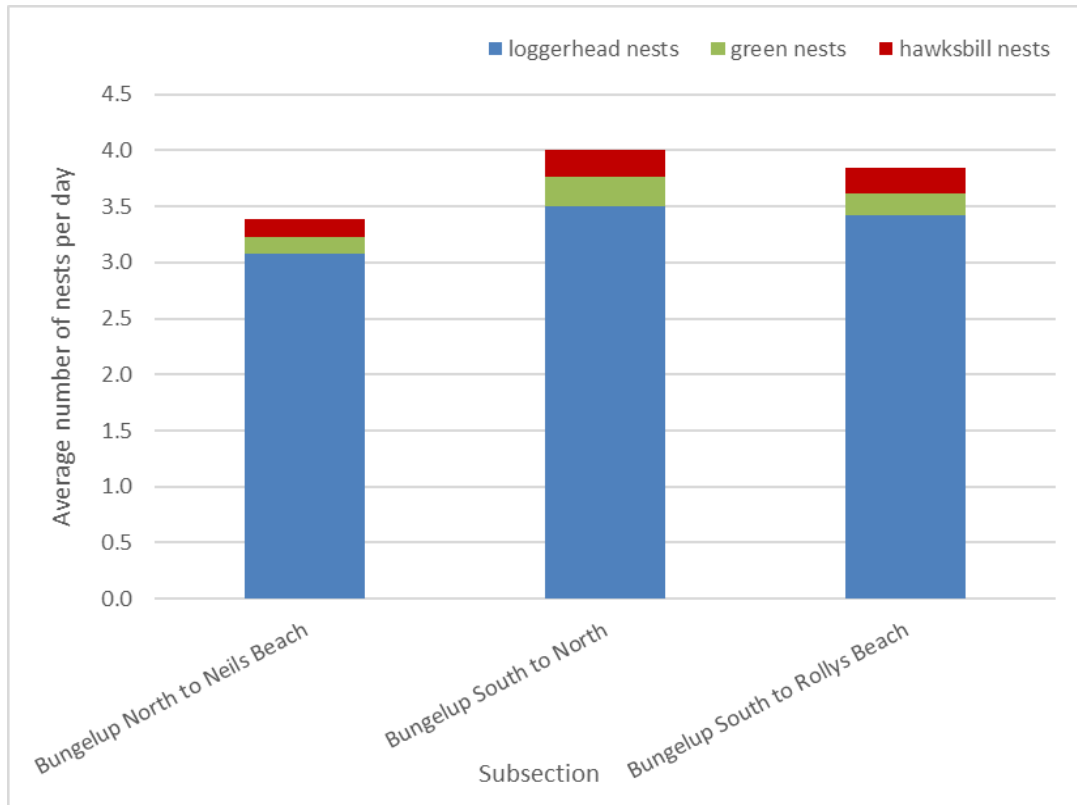


Figure 8: Average numbers of nests per day for each species for each subsection within the Cape Range division, NTP 2022-23 full season.

Nests per day, (as a measure of total nests) should be considered along with density of nests (nests per day per kilometre) to account for both survey effort and variations in subsection length, noting subsections varied in length from 1.05km to 2.55km (Appendix 3). Given the low number of green and hawksbill nests, only loggerhead nests are considered from here.

The average number of loggerhead nests per day were very similar across the three subsections of the Bungelup section (Figure 9). Bungelup South to North had the most number of nests per day on average (3.5). Bungelup South to Rolly’s Beach had similar average number of nests (3.4) but lower density (1.3 nests per km per day) compared to Bungelup South to North (3.3 nests per km per day). For individual nest locations see maps in Appendix 8.

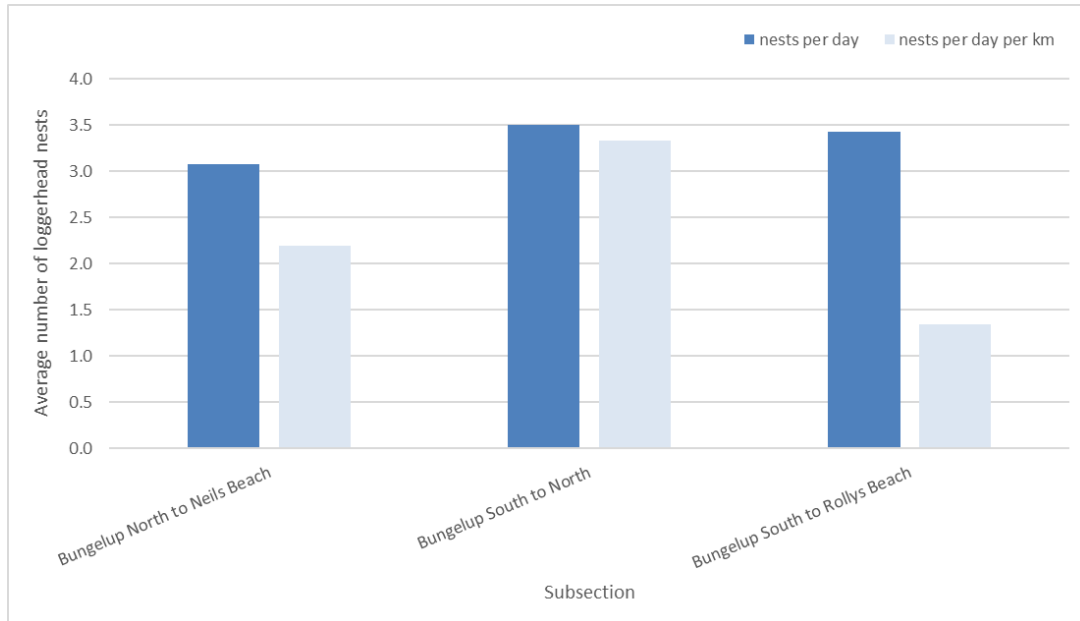


Figure 9: Average number of loggerhead turtle nests per day, and density of nests (estimated by nests per day per km) for each subsection within the Cape Range division, NTP 2022-23 full season.

Numbers of loggerhead nests each day varied through the season in the Bungelup section (Figure 10). There was a peak in nesting in late December, with a smaller peak in mid-January, which correlates with the inter-nesting interval of loggerhead turtles being approximately 14 days (Limpus, 2009).

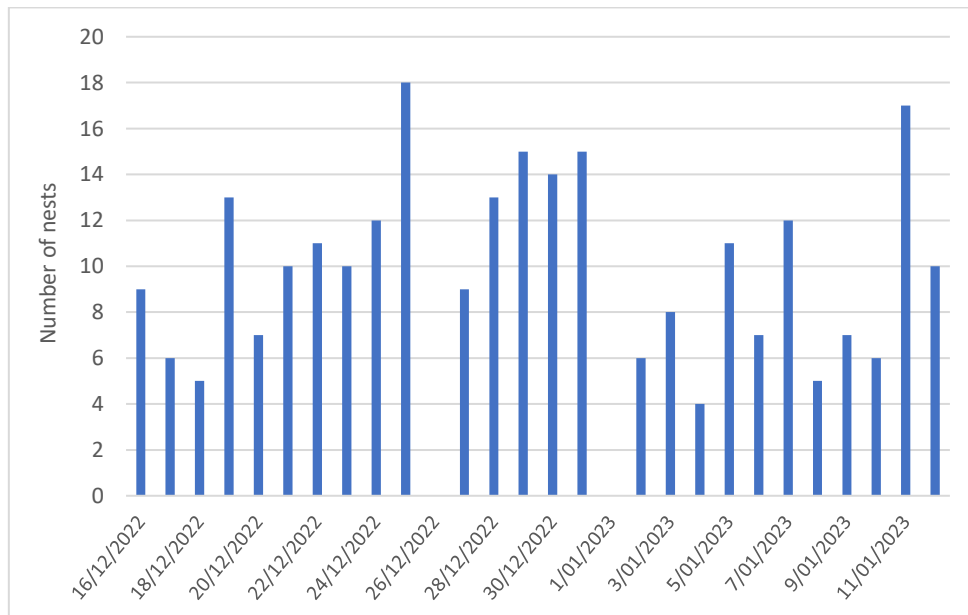


Figure 10: Number of loggerhead turtle nests recorded in the Bungelup section (Cape Range division) each day in the 2022-23 season. Note, no monitoring occurred on 26 December 2022 or 1 January 2023.

3.1.3 Comparison of NW Cape and Bungelup rookeries

The beaches of the NW Cape division are primarily green turtle nesting beaches, as shown in Figure 1, whereas the Bungelup section in the Cape Range division is primarily a loggerhead rookery (Figure 8). To understand the relative importance of each subsection within both rookeries, for each species, the average density of nests per kilometre per day was compared.

The highest density of green turtle nests was recorded at the Five Mile North to Five Mile subsection in the NW Cape division, with an average of 6.51 green turtle nests per kilometre per day (Figure 11) and the lowest density was recorded in the three Bungelup subsections. The highest density of hawksbill nesting (Figure 12) was also recorded at the Five Mile North to Five Mile subsection with an average of 0.36 hawksbill turtle nests per kilometre per day. No hawksbill nests were recorded at Burrows to Jurabi Point, with low densities in neighbouring subsections Brooke to Graveyards and Graveyards to Burrows. The highest density of loggerhead nests was recorded in the three Bungelup subsections (Figure 13), with at least four times the number of nests compared to the highest density NW Cape subsection.

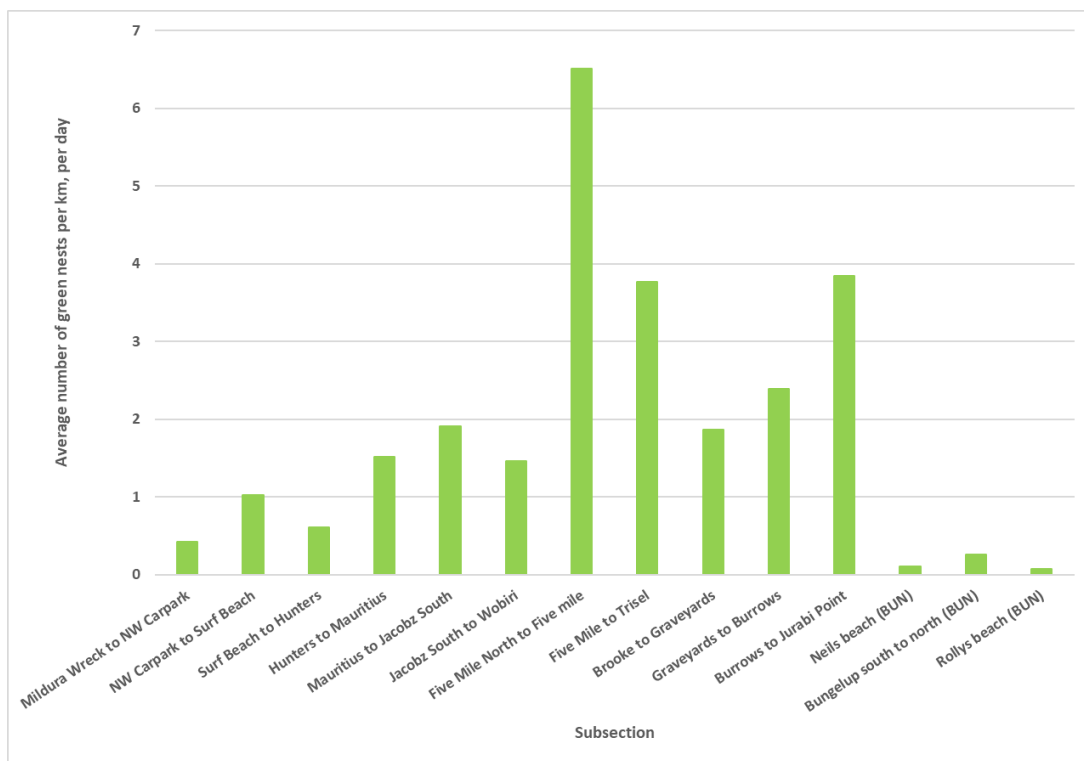


Figure 11: Green turtle nesting density (average number of nests per km per day) for each subsection within both the NW Cape and Cape Range (Bungelup section) divisions, NTP 2022-23 full season. Subsections within the Bungelup section are indicated with (BUN).

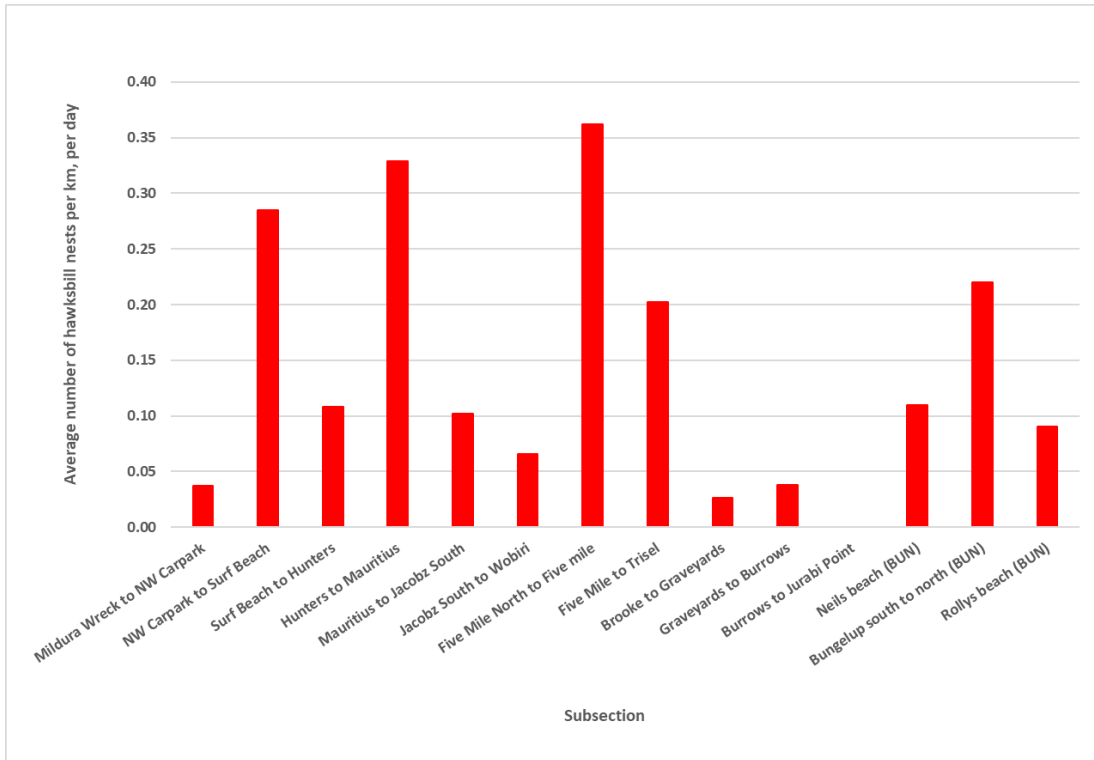


Figure 12: Hawksbill turtle nesting density (average number of nests per km per day) for each subsection within both the NW Cape and Cape Range (Bungelup section) divisions, NTP 2022-23 full season. Subsections within the Bungelup section are indicated with (BUN).

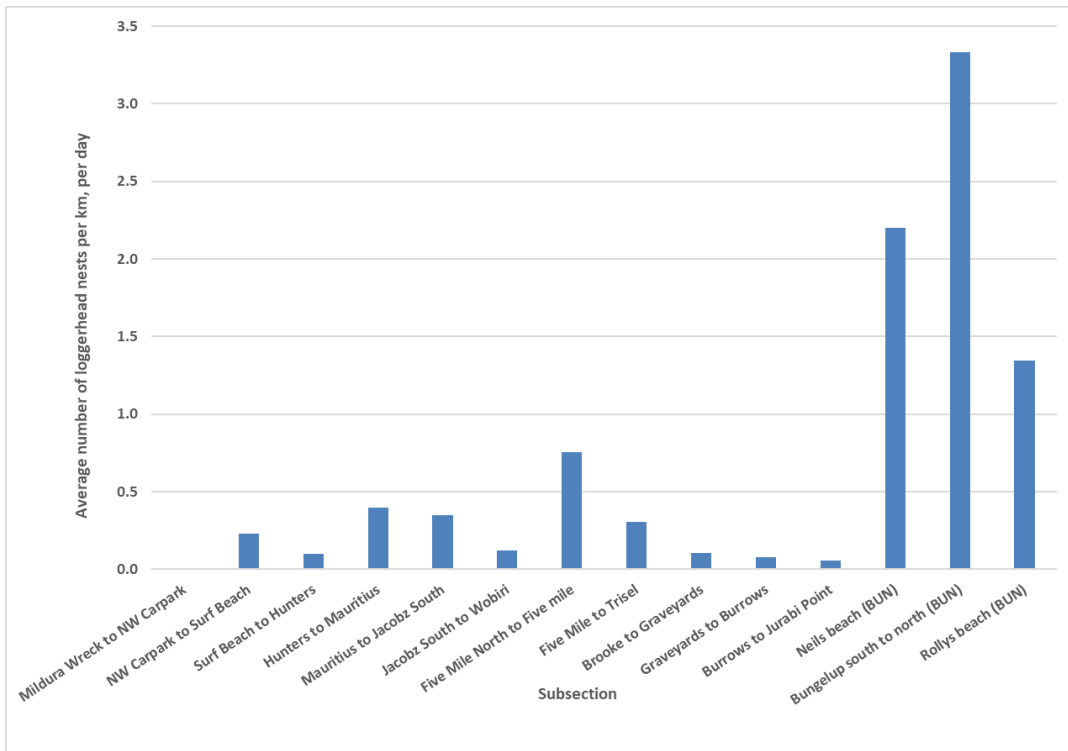


Figure 13: Loggerhead turtle nesting density (average number of nests per km per day) for each subsection within both the NW Cape and Cape Range (Bungelup section) divisions, NTP 2022-23 full season. Subsections within the Bungelup section are indicated with (BUN).

3.2 Long-term patterns of nesting

The NTP has recorded 69,136 suspected nests and 174,153 false crawls since commencement of the program in 2002 (full season data and all subsections, Appendix 1). Green turtles have consistently been the most abundant species in the North West Cape division with 95.2% of recorded turtle activities. Loggerhead turtles are the most abundant species in the Cape Range division (Bungelup) with 85.3% of activities.

Turtle activity for each season and subsection has been standardised using survey effort to compare activity among seasons. Survey effort is defined as the number of times each subsection was monitored. Not all subsections were monitored on the same days or for the same total number of days within or among seasons (Appendix 1). Long-term patterns for each division are compared separately due to NW Cape division being primarily a green turtle rookery, and Cape Range division a loggerhead rookery.

3.2.1 North West Cape

Green turtles

The number of green turtle nests has varied largely among years (range of 1.06 to 18.13 nests per subsection per day) with an average of 5.69. There have been two clear peaks (2011-12 and 2020-21) in activity since the beginning of NTP where activity has been approximately 2.5 to 11 times greater than other seasons (Figure 14). The average number of green turtle nests in the 2022-23 peak season were below average with 4.07 nests per subsection per day. 2022-2023 was 13th busiest out of 21 seasons.

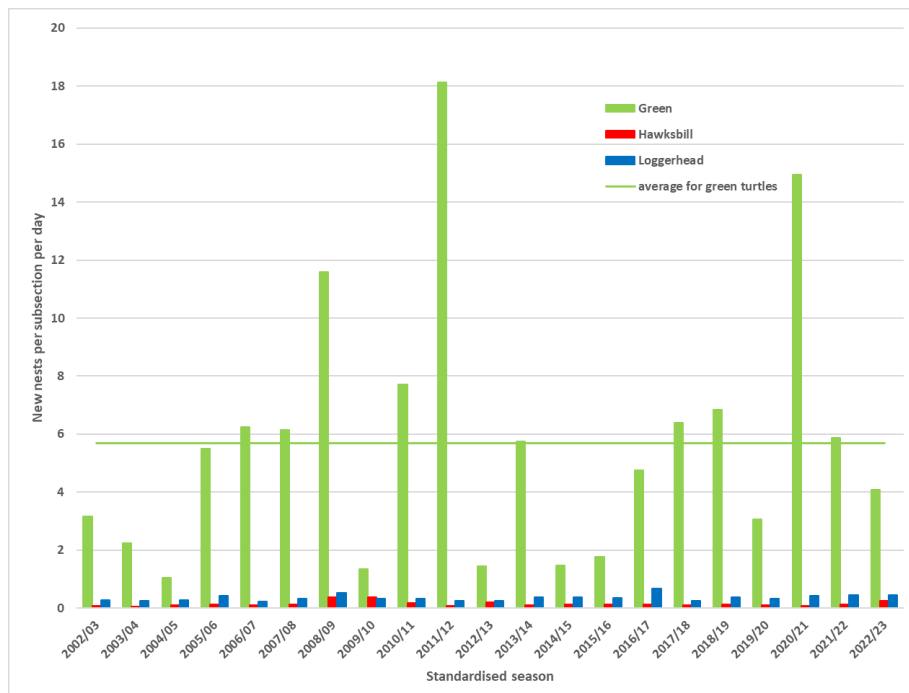


Figure 14: Number of new nests (each species, per subsection per day) for each season standardised by survey effort during the intensive peak monitoring period at NW Cape division, 2002-03 to 2022-23. See Figure 15 for more detailed information on hawksbill and loggerhead nests.

Loggerhead turtles

The standardised level of loggerhead turtle nesting along the NW Cape over the last 21 seasons has ranged from 0.24 to 0.68 nests per subsection per day during the peak monitoring period. With an average of 0.46 nests per subsection per day, the 2022-23 season was above the long-term average (0.36) and the third highest since the program began (Figure 15).

Hawksbill turtles

Hawksbill turtle nesting remains lower than green and loggerhead turtle nesting on the NW Cape coastline, ranging from 0.06 to 0.38 nests per subsection per day since 2002-03 (Figure 15). The standardised level of hawksbill turtle nesting during the 2022-23 peak season (0.25 nests per subsection per day) was above the long-term average (0.15), ranking the season third busiest since the NTP began.

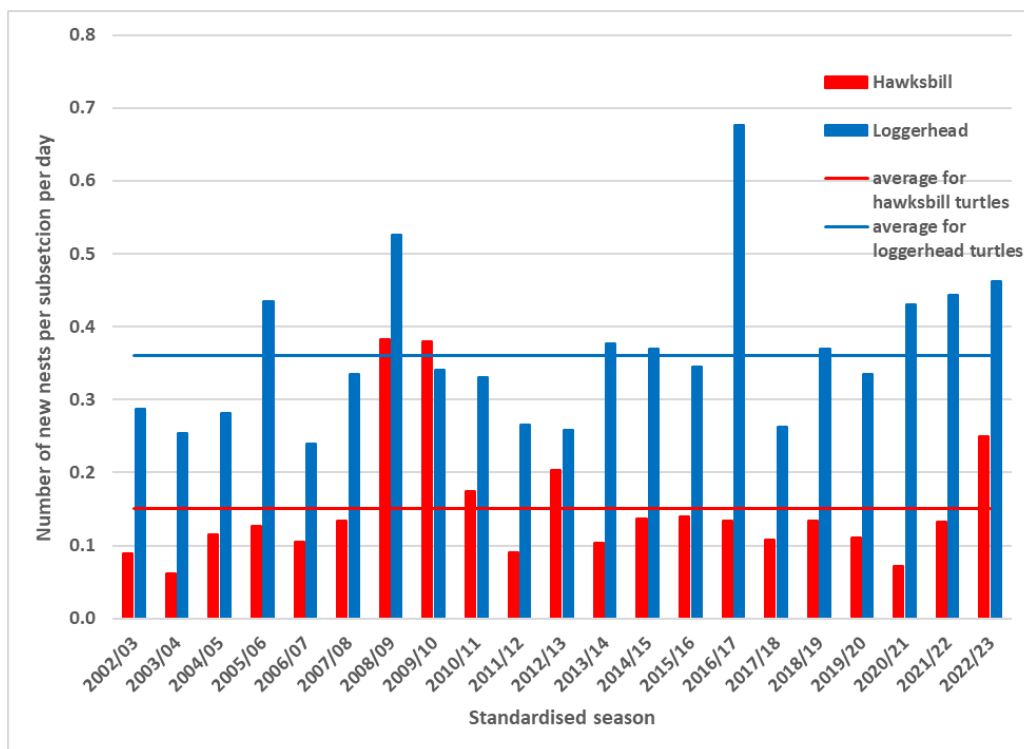


Figure 15: Number of new nests (per subsection per day) for hawksbill and loggerhead turtles for each season standardised by survey effort during the intensive peak monitoring period at NW Cape division, 2002-03 to 2022-23 (from Figure 14).

Nesting success

Patterns of nesting success of the three species have fluctuated in synchrony among seasons (Whiting 2016), as shown in long-term patterns of standardised seasons below (Figure 16). In general, when nesting success peaked for green turtles, it also peaked for loggerhead and hawksbill turtles. When nesting success declined for green turtles, it was also lower for loggerhead and hawksbill turtles. In the 2022-23 intensive peak season, nesting success for the NW Cape rookeries increased from the previous season for green and loggerhead turtles but declined slightly for hawksbill turtles. Nesting success was above the long-term average for all three species.

Nesting success for green turtles has generally been lower than for loggerhead and hawksbill turtles. Nesting success of 31.8% in the 2022-23 standardised season was above average (27.1%). It has ranged from 16.9 to 37.2% since 2002-03.

Nesting success for loggerhead turtles in the 2022-23 standardised season was the highest since the NTP began (56.2%). The long-term average is 41.7% with a minimum of 27.5% in 2002-03.

Hawksbill turtles have generally had the highest nesting success of the three species, ranging from 32.9% in 2006-07 to 61.2% in 2008-09. Nesting success of 50.3% in the 2022-23 season was above the average (47.5%).

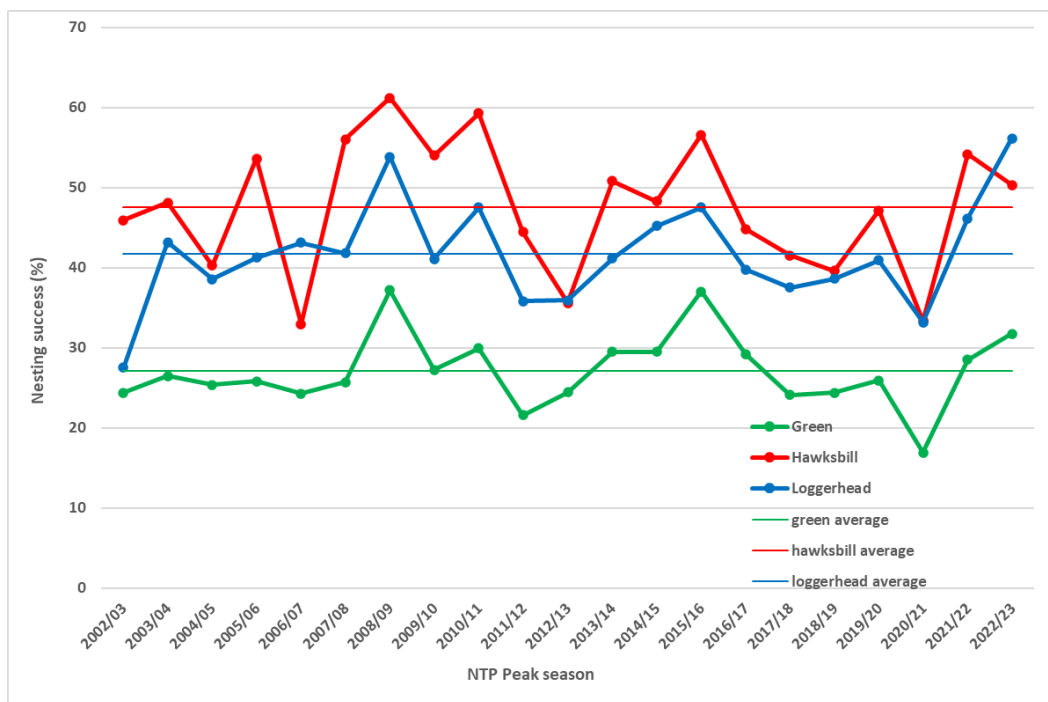


Figure 16: Nesting success (and long-term average) at NW Cape for all three species during the peak period of NTP seasons 2002-03 to 2022-23.

3.2.2 Cape Range

From 2003-04 to 2022-23 (20 seasons) during the intensive peak monitoring period, NTP has recorded 6282 nests and 9617 false crawls at Bungelup section (total activity 15,899). Levels of activity have been fairly consistent (and less variable compared to the NW Cape division (Figure 17)). There have been no seasons with an extreme low level of nesting.

Loggerhead turtles

The standardised level of loggerhead turtle nesting at Bungelup section over the last 20 seasons has ranged from 2.53 to 6.44 nests per subsection per day. With an average of 3.33

nests per subsection per day, the 2022-23 season was below the long-term average (3.79), placing the season 16th out of 20 (Figure 17).

Green turtles

The number of green turtle nests at Bungelup section has ranged from zero to 1.18 nests per subsection per day, with an average of 0.28. Green turtle nests in 2022-23 were slightly below average with 0.21 nests per subsection per day (Figure 17).

Hawksbill turtles

Hawksbill turtle nesting at Bungelup section ranged from 0.03 to 1.53 nests per subsection per day since 2002-03 (Figure 17). The standardised level of hawksbill turtle nesting during the 2022-23 season (0.21 nests per subsection per day) was below the long-term average (0.39).

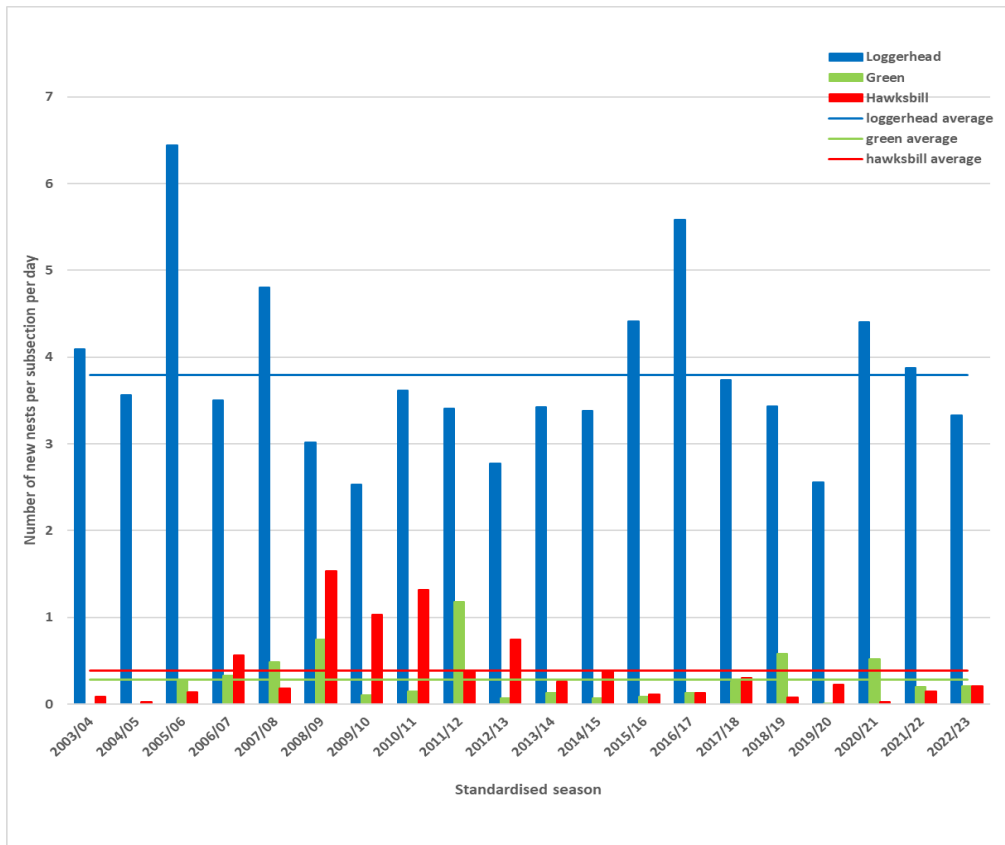


Figure 17: Average number of new nests (each species, per subsection per day) for each season standardised by survey effort during the intensive peak monitoring period at Bungelup section, 2003-04 to 2022-23.

Nesting success

Patterns of nesting success of the three species at the Bungelup section have not fluctuated in synchrony among seasons like they did in the NW Cape division. Long-term patterns of standardised seasons (Figure 18) show that when nesting success peaked for one species, it didn't generally correlate with a peak for the other species. However, in the 2022-23 season,

nesting success for all three species declined from the previous season. It was above the long-term average for hawksbill and green turtles, and below average for loggerheads.

During the 2022-23 season, nesting success for loggerhead turtles was 36.8% (long-term average of 42.1%). This is similar to the long-term average of nesting success for loggerheads of 41% in the NW Cape division. Nesting success for green turtles and hawksbill turtles should be interpreted with caution given the relatively small number of activities for these species in the Bungelup section. Green turtles (43 activities) had a nesting success of 37.2% (long-term average 31%). Hawksbill turtles (24 activities) had a nesting success of 66.7% (long-term average 51.9%).

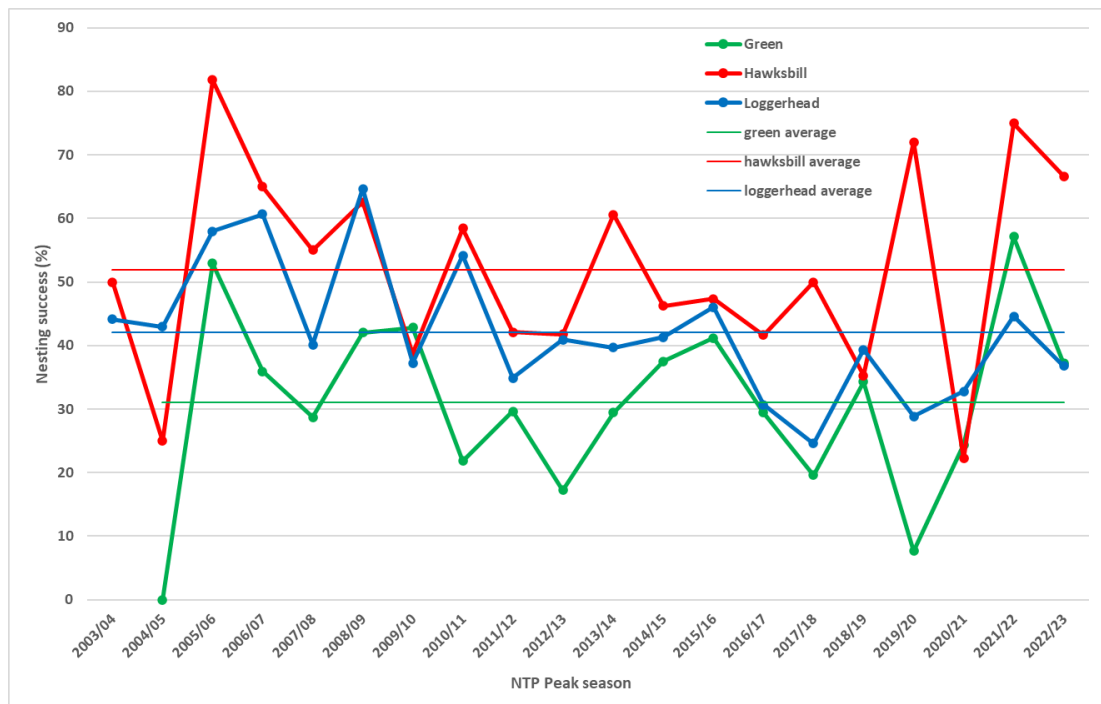


Figure 18: Nesting success (and long-term average) at Bungelup section for all three species during the peak period of NTP seasons 2003-04 to 2022-23.

3.3 Nest damage and predation

Ninety nests were recorded with damage in the 2022-23 full season in the NW Cape and Cape Range divisions (equating to 4.5% of total recorded nests)⁴. 66 of these nests were in the North West Cape division and 24 were within the Cape Range division. Ghost crabs caused the majority of damage (79 nests). Other causes were tide (1), birds taking eggs as a turtle was

⁴ Only new nests (i.e., on first day of incubation period) are methodically checked for signs of disturbance. Damage to old nests (i.e., after the first day of the incubation period until hatching) is only recorded opportunistically if it is encountered whilst monitoring new nests. Therefore, it is likely that incidences of damaged nests go undetected.

laying (3) and unknown causes (4). Three nests were damaged by either a dingo or an introduced predator (possibly a dog other than a dingo)⁵.

A reduction in predation of nests by introduced predators has been recorded in recent years coinciding with a rigorous introduced predator control program by DBCA’s Parks and Wildlife Service including aerial and ground baiting and trapping (Figure 19).

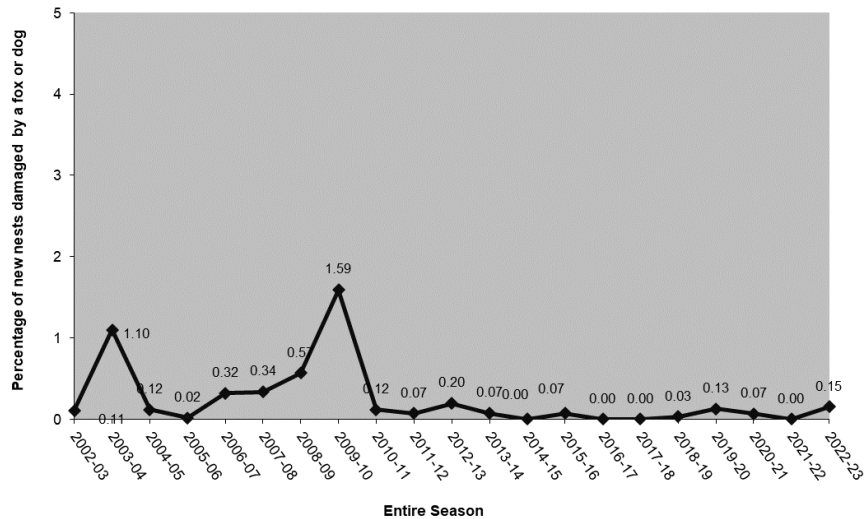


Figure 19: Percentage of new nests damaged by fox or dog per season, NW Cape and Cape Range divisions.

3.3.1 Presence of introduced species

Dogs⁵ and foxes are known to dig up turtle nests and eat the eggs. While feral cats can prey upon turtle hatchlings, they have not been observed nor are suspected to dig up nests (based on long-term opportunistic observations by experienced DBCA staff and supported by NTP nest predation data). NTP volunteers routinely record the presence of prints and tracks from introduced species and dingoes to help inform targeted management of introduced species.

In 2022-23, volunteers recorded the tracks of dogs in ten of the eleven subsections in NW Cape division and two of the three subsections in the Cape Range division. Dog tracks were observed in the NW Cape Division on 37 of the 38 monitoring days and 2 of the 27 monitoring days in the Cape Range division.

Cat tracks were observed in eight of the eleven subsections in the NW Cape division and all three subsections in the Cape Range division. Cat tracks were observed on 24 of the 38 days in the NW Cape division while in the Cape Range division they were seen nearly every day (25 of the 27 monitoring days).

No fox tracks were observed.

⁵The term 'dog' used throughout this report refers to wild dog, domestic dog or dingo as species cannot be differentiated from prints. A wild or domestic dog is considered an introduced species whereas a dingo is not.

3.4 Other observations and data

3.4.1 Turtle mortalities

Turtle mortalities have been recorded as part of NTP since 2007-08 (Figure 20). Four dead turtles were recorded by NTP volunteers during the 2022-23 season in the NW Cape and Cape Range divisions. Three of these were suspected to have washed up already deceased, and one died after becoming lost behind a large sand dune after nesting.

Turtle mortalities have fluctuated greatly over the seasons, with the most in 2011-12. This coincided with high level of turtle activity. Mortalities recorded by DBCA staff outside of the NTP season, or on beaches not monitored as part of NTP are not reported here.

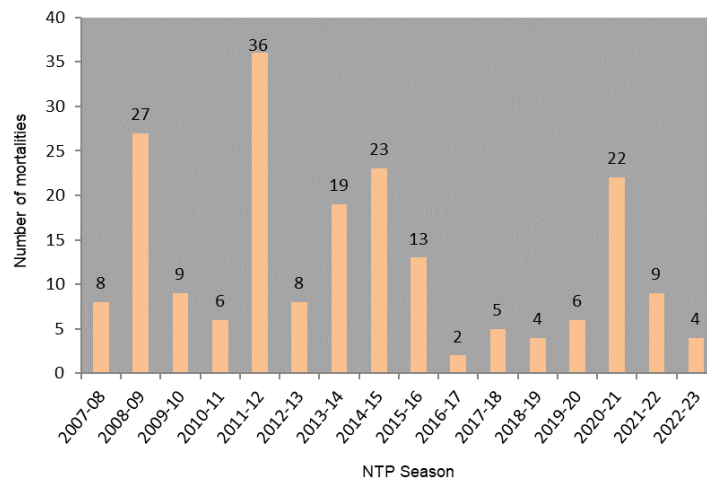


Figure 20: Turtle mortalities recorded during the NTP per season, from NW Cape and Cape Range divisions.

3.4.2 Rescues of stranded turtles

Fifteen turtles were rescued during the 2022-23 season by NTP volunteers and staff. All except one were in the NW Cape division. Eight of the turtles became lost or disorientated behind the sand dunes, five turtles were wedged or stuck in the rocks on the shoreline, and two were flipped onto their backs after falling off a small rocky cliff edge (Table 3).

Table 3: Date, species, location and predicament of turtles rescued during 2022-23 NTP season.

| Date | Species | Location / subsection | Predicament |
|------------|-----------|------------------------------|---|
| 17/11/2022 | green | Brooke to Graveyards | trapped in rocks |
| 17/11/2022 | green | Five Mile to Five Mile North | trapped in rocks |
| 19/11/2022 | green | Brooke to Graveyards | lost in dunes |
| 9/12/2022 | hawksbill | South Mandu (Cape Range) | lost in dunes |
| 17/12/2022 | green | Jacobz South to Wobiri | lost in dunes |
| 17/12/2022 | green | Jacobz South to Wobiri | lost in dunes |
| 20/12/2022 | green | Brooke to Graveyards | trapped in rocks |
| 30/12/2022 | green | South of Jurabi Point | lost in dunes |
| 31/12/2022 | green | Brooke to Graveyards | lost in dunes |
| 3/01/2023 | green | Five Mile to Trisel | flipped on back after falling off cliff |
| 6/01/2023 | green | NW Carpark to Surf Beach | lost in dunes |
| 9/01/2023 | green | NW Carpark to Surf Beach | lost in dunes |
| 10/01/2023 | green | Five Mile to Trisel | flipped on back after falling off cliff |
| 10/01/2023 | green | Brooke to Graveyards | trapped in rocks |
| 10/01/2023 | green | Hunters to Mauritius | trapped in rocks |

At least 360 stranded marine turtles, mainly of nesting age, have been rescued since the program began in 2002-03 (Figure 21). The number of turtles rescued has varied among seasons. Rescues outside of the NTP monitoring dates are not reported here. For example, while patrolling remote beaches, DBCA staff routinely “flip” stranded turtles that have been turned over by the waves on the shoreline.

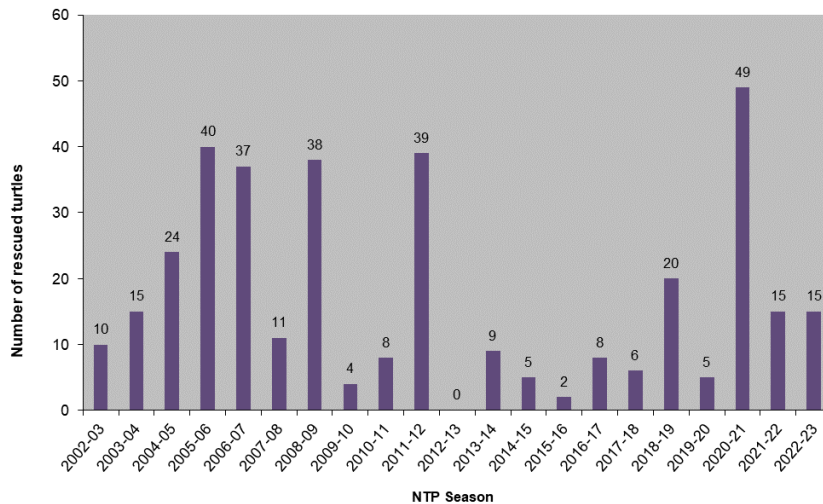


Figure 21: Turtles rescued during the NTP per season, from NW Cape and Cape Range divisions.

3.4.3 Re-sightings of flipper tagged turtles

Marking individual turtles in a population (using titanium tags applied to the trailing edge of the front flipper, close to the body) provides information useful in the management of marine

turtles including migration patterns, nesting and feeding site fidelity, growth rates and changes in nesting population numbers (Eckert *et al* 1999).

Turtles were tagged at the North West Cape from the 1988/89 season through to the 1999/2000 season as part of the WA Marine Turtle Program (Prince RIT 2000). Flipper-tagging of turtles is not currently a part of the NTP, however sporadically flipper tags have been deployed as part of associated research programs such as satellite tagging. Tagged turtles are resighted in most years.

Two flipper-tagged turtles were re-sighted during the 2022-23 season by NTP volunteers (Table 4). Both green turtles, they were tagged on the NW Cape in 1992.

Table 4: Re-sightings of tagged turtles during NTP 2022-23 season.

| Tag | Species | Gender | When tagged | Location tagged | CCL when tagged | Date resighted | Location resighted | CCL when resighted |
|-----------|---------|--------|-------------|-----------------|-----------------|----------------|--------------------|--------------------|
| WA17501 R | G | F | 11/01/1992 | Five mile | 1015 | 6/01/2023 | Five mile | n/a |
| WA18760 R | G | F | 7/12/1992 | Baudin | 935 | 10/01/2023 | Five mile | n/a |

3.4.4 Weather events

Beaches surveyed in the NTP are susceptible to seasonal weather events such as cyclones, storm surges and flooding. These can significantly affect turtle nests and available nesting habitat and the program's ability to monitor. During the 2022-23 season there were no significant weather events, however one day of post-peak monitoring in February was cancelled due to rainfall.

4. VOLUNTEER ENGAGEMENT AND COORDINATION

Fifty one volunteers contributed 3253 hours to the Ningaloo Turtle Program in 2022-23. Volunteers were coordinated, supervised and trained by DBCA staff and supported by volunteers from the local community.

Local Exmouth volunteers contributed 505 hours mainly through the pre-peak and post-peak monitoring weekends and external (visiting) volunteers contributed 2748 hours during the peak monitoring period.

Since commencement of the program in 2002, 84011 hours of time from volunteers have contributed to the program. Volunteer time was primarily turtle monitoring and also included data uploading, training, education, school visits, turtle rescues, and weekend monitoring coordination.

4.1 Media and communications

Since the 2015-16 NTP season, a dedicated Communications Internship volunteer position has been filled. This role focuses on expanding public education, engagement and promotion of the NTP. The focus in the 2022-23 season was promotion of the 20th anniversary of NTP through print media and photography, regular social media posts and website updates. The following outcomes were achieved:

- An educational school visit to Exmouth primary school for classes from kindergarten to year 4-5
- Turtle Watching Code of Conduct posters produced by children during the school visit displayed around town at supermarkets, notice boards, art gallery, visitor centres, op shop and others
- A school holiday activity held at Exmouth Public Library for local and visiting families (the first time this has been done). Library staff provided positive feedback and have asked NTP to continue this in future years
- Upgrades to the NTP website, making it more modern and functional
- A print article and photos in Landscape magazine
- Print articles and photos in the Sunday Times and West Australian newspapers
- Regular engaging Facebook and Instagram posts
- Trialling the short video format on YouTube (over 10,000 views).

By the end of the 2022-23 season, the NTP had 80.6% more reach⁶ on Facebook and 558.8% more reach on Instagram.

4.2 Educational activities

A key goal of the NTP is to build a culture of awareness and stewardship regarding marine turtle conservation at Ningaloo. In addition to the communications role discussed in 4.1, DBCA staff conduct routine beach education patrols throughout the nesting season. Patrols were mainly in the evenings throughout December to March, however some were during the day in the peak turtle mating aggregation time of September and October. The purpose of these patrols is to educate locals and visitors to the beaches on the most appropriate way to view nesting and hatching turtles to minimise disturbances. In 2022/23, NTP volunteers were given the opportunity to assist DBCA staff with these patrols, as needed, and most of the external volunteers and Team Leaders participated. Volunteers accompanied DBCA staff in the evenings to the beaches where most people were visiting with the intent to view turtles, and talked to locals and visitors, raising awareness of the Turtle Watching Code of Conduct.

Other educational activities by DBCA staff not reported here include Turtle Education Tours at the Jurabi Turtle Centre, school holiday activities and distribution of Code of Conduct posters and handouts to local businesses and accommodation providers.

⁶ In social media, 'reach' is the number of unique users who saw any content from your Page or about your Page.

5. ACKNOWLEDGEMENTS

The NTP is conducted on the traditional lands of the Baiyungu, West Coastal Thalanyji and Yinikurtura People. DBCA recognise their traditional custodial role and continued support for turtle conservation. *Bujurrba nhuna majunjarri nyinggulubarndi* – looking after turtles in Nyinggulu.

Thank you to the local NTP volunteers from the Exmouth community, the external volunteers recruited nationally and internationally and the team leaders (Jenny Bowman, Elle Ebbeck and Reagan Nicholas) and communications intern (Craig Duncan). The program would not be able to function without the significant contribution of time, effort, passion and enthusiasm the volunteers contribute.

A special thank you to Susie Bedford for continuing to return to Exmouth and the NTP each summer to help train new volunteers and provide guidance and support to the program.

Thank you to volunteers Kalpa Vekaria and Craig Duncan for their amazing work reviewing and updating the NTP website.

Thanks to the Cape Conservation Group Inc. for their support for the first twenty years of the program, and Roland Mau, Susie Bedford and David Waayers, for the development and implementation of the original 2001-2002 NTP pilot program.

Thank you to the DBCA Community Involvement Unit for the volunteer recognition funding which was used to appropriately thank our volunteers.

Thank you to Woodside Energy Ltd and their Joint Venture partner Mitsui for the ongoing contribution to funding the operational costs of the Ningaloo Turtle Program.

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Personal communications

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7. APPENDICES

Appendix 1: Survey effort and summaries of turtle activity

Survey effort* 2002/03 – 2022/23 entire season (all data and subsections)

| Full Season | 2002/03 | 2003-04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | TOTAL | |
|--------------------------------|-------------------|-------------------|------------------|-------------------|------------------|------------------|-----------------|------------------|------------------|-------------------|-------------------|-----------------|----------------|------------------|-------------------|------------------|-------------------|--------------------|----------------------|----------------------|----------------------|--------------|------|
| Survey Dates for entire season | 18/11/02-16/04/03 | 11/11/03-30/03/04 | 3/11/04-18/03/05 | 21/11/05-28/02/06 | 1/12/06-28/02/07 | 1/12/07-28/02/08 | 7/12/08-1/03/09 | 7/11/09-27/03/10 | 6/11/10-27/03/11 | 12/11/11-11/03/12 | 10/11/12-10/03/13 | 28/10/13-2/3/14 | 3/11/14-1/3/15 | 31/10/15-7/03/16 | 27/10/16-26/02/17 | 11/11/17-2/03/18 | 10/11/18-24/02/19 | 9/11/2019-23/02/20 | 7/11/2020-28/02/2021 | 6/11/2021-27/02/2022 | 5/11/2022-26/02/2023 | | |
| Survey Effort | | | | | | | | | | | | | | | | | | | | | | | |
| Division | Section | | | | | | | | | | | | | | | | | | | | | | |
| North West Cape | Graveyards | 165 | 375 | 374 | 368 | 341 | 336 | 234 | 160 | 153 | 144 | 162 | 172 | 185 | 193 | 174 | 171 | 154 | 154 | 156 | 156 | 152 | 4479 |
| | Hunters | 248 | 263 | 271 | 271 | 256 | 252 | 173 | 117 | 114 | 109 | 111 | 117 | 120 | 123 | 111 | 121 | 116 | 117 | 116 | 116 | 114 | 3356 |
| | Lighthouse Bay | 127 | 137 | 215 | 260 | 222 | 251 | 147 | 83 | 93 | 97 | 106 | 113 | 113 | 119 | 106 | 100 | 115 | 115 | 117 | 115 | 110 | 2861 |
| | Navy Pier | - | 86 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 86 |
| | Tantabiddi | 115 | 3 | - | 85 | 86 | 84 | 58 | 38 | 37 | 36 | 41 | 38 | 43 | 41 | 39 | 41 | 39 | 39 | 39 | 39 | 38 | 979 |
| Cape Range | Bloodwood | - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 |
| | Bungelup | 1 | 49 | 152 | 114 | 120 | 140 | 124 | 72 | 87 | 91 | 78 | 114 | 91 | 85 | 82 | 81 | 81 | 80 | 79 | 81 | 78 | 1880 |
| | Turquoise Bay | - | 16 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 16 |
| | Boat Harbour | - | - | 203 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 203 |
| Bundera/ Ningaloo | Carbaddaman | 7 | - | 204 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 211 |
| | Janes Bay | 13 | 24 | 12 | 29 | 22 | 4 | - | - | - | - | - | - | - | - | - | - | 51 | 51 | 48 | - | - | 254 |
| | Norwegian Bay | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 |
| Coral Bay | Whaleback Beach | - | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | 17 | 17 | 16 | - | - | 65 |
| | Batemans Bay | 103 | 100 | 117 | 51 | 76 | 47 | 34 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 528 |
| | Lagoon | 103 | 100 | 116 | 51 | 76 | 47 | 34 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 527 |
| | Turtle Beach | 56 | 100 | 66 | 49 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 271 |
| Gnaraloo | Gnaraloo Bay | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 17 | 17 | - | - | - | - | 34 |
| Total survey effort | 940 | 1265 | 1738 | 1278 | 1199 | 1161 | 804 | 470 | 484 | 477 | 498 | 554 | 552 | 561 | 512 | 514 | 590 | 590 | 571 | 507 | 492 | 15757 | |
| Number subsections monitored | 22 | 29 | 28 | 20 | 19 | 19 | 18 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 21 | 21 | 18 | 14 | 14 | | |

* Survey effort is defined as the number of times each subsection was monitored. These are totalled for each section.

Turtle activity 2002/03 – 2022/23 entire season (all data and subsections)

| Full Season | 2002/03 | 2003-/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | TOTAL or AVERAGE |
|---|-------------------|-------------------|------------------|-------------------|------------------|------------------|-----------------|--------------------|------------------|-------------------|-------------------|-------------------|------------------|--------------------|-----------------------|------------------|---------------------|------------------------|------------------------|------------------------|------------------------|------------------|
| Survey Dates for entire season | 18/11/02-16/04/03 | 11/11/03-30/03/04 | 3/11/04-18/03/05 | 21/11/05-28/02/06 | 1/12/06-28/02/07 | 1/12/07-28/02/08 | 7/12/08-1/03/09 | 7/11/09 - 27/03/10 | 6/11/10-27/03/11 | 12/11/11-11/03/12 | 10/11/12-10/03/13 | 28/10/13 - 2/3/14 | 3/11/14 - 1/3/15 | 31/10/15 - 7/03/16 | 27/10/16 - 26/02/2017 | 11/11/17-2/03/18 | 10/11/18-24/02/2019 | 9/11/2019 - 23/02/2020 | 7/11/2020 - 28/02/2021 | 6/11/2021 - 27/02/2022 | 5/11/2022 - 26/02/2023 | |
| Green nests | 1539 | 1552 | 788 | 4695 | 4349 | 5254 | 6297 | 571 | 2732 | 6594 | 585 | 2276 | 628 | 759 | 1856 | 2518 | 2733 | 1184 | 5212 | 2182 | 1462 | 55766 |
| Green false crawls | 5404 | 3086 | 2533 | 9948 | 14395 | 13156 | 12608 | 1451 | 6507 | 22865 | 1769 | 4960 | 1465 | 1357 | 4243 | 7306 | 8082 | 3216 | 23945 | 5420 | 3197 | 156913 |
| Green activity | 6943 | 4638 | 3321 | 14643 | 18744 | 18410 | 18905 | 2022 | 9239 | 29459 | 2354 | 7236 | 2093 | 2116 | 6099 | 9824 | 10815 | 4400 | 29157 | 7602 | 4659 | 212679 |
| Green activity adjusted by survey effort per day | 7.39 | 3.67 | 1.91 | 11.46 | 15.63 | 15.86 | 23.51 | 4.30 | 19.09 | 61.76 | 4.73 | 13.06 | 3.79 | 3.77 | 11.91 | 19.11 | 18.33 | 7.46 | 51.06 | 14.99 | 9.47 | 15.35 |
| Green nesting success % | 22.2% | 33.5% | 23.7% | 32.1% | 23.2% | 28.5% | 33.3% | 28.2% | 29.6% | 22.4% | 24.9% | 31.5% | 30.0% | 35.9% | 30.4% | 25.6% | 25.3% | 26.9% | 17.9% | 28.7% | 31.4% | 27.9% |
| Hawksbill nests | 48 | 81 | 100 | 108 | 157 | 156 | 336 | 202 | 189 | 65 | 125 | 69 | 91 | 75 | 67 | 70 | 63 | 74 | 28 | 62 | 110 | 2276 |
| Hawksbill false crawls | 49 | 60 | 139 | 71 | 153 | 145 | 207 | 202 | 132 | 84 | 192 | 51 | 108 | 65 | 89 | 99 | 104 | 60 | 64 | 52 | 92 | 2218 |
| Hawksbill activity | 97 | 141 | 239 | 179 | 310 | 301 | 543 | 404 | 321 | 149 | 317 | 120 | 199 | 140 | 156 | 169 | 167 | 134 | 92 | 114 | 202 | 4494 |
| Hawksbill activity adjusted by survey effort per day | 0.10 | 0.11 | 0.14 | 0.14 | 0.26 | 0.26 | 0.68 | 0.86 | 0.66 | 0.31 | 0.64 | 0.22 | 0.36 | 0.25 | 0.30 | 0.33 | 0.28 | 0.23 | 0.16 | 0.22 | 0.41 | 0.33 |
| Hawksbill nest success % | 49.5% | 57.4% | 41.8% | 60.3% | 50.6% | 51.8% | 61.9% | 50.0% | 58.9% | 43.6% | 39.4% | 57.5% | 45.7% | 53.6% | 42.9% | 41.4% | 37.7% | 55.2% | 30.4% | 54.4% | 54.5% | 49.5% |
| Loggerhead nests | 288 | 387 | 777 | 1068 | 540 | 795 | 580 | 288 | 405 | 382 | 304 | 430 | 436 | 519 | 696 | 392 | 481 | 379 | 540 | 456 | 402 | 10545 |
| Loggerhead false crawls | 429 | 359 | 1040 | 925 | 477 | 954 | 486 | 471 | 388 | 715 | 466 | 595 | 580 | 583 | 1395 | 1086 | 730 | 725 | 1065 | 554 | 561 | 14584 |
| Loggerhead activity | 717 | 746 | 1817 | 1993 | 1017 | 1749 | 1066 | 759 | 793 | 1097 | 770 | 1025 | 1016 | 1102 | 2091 | 1478 | 1211 | 1104 | 1605 | 1010 | 963 | 25129 |
| Loggerhead activity adjusted by survey effort per day | 0.76 | 0.59 | 1.05 | 1.56 | 0.85 | 1.51 | 1.33 | 1.61 | 1.64 | 2.30 | 1.55 | 1.85 | 1.84 | 1.96 | 4.08 | 2.88 | 2.05 | 1.87 | 2.81 | 1.99 | 1.96 | 1.81 |
| Loggerhead nesting success | 40.2% | 51.9% | 42.8% | 53.6% | 53.1% | 45.5% | 54.4% | 37.9% | 51.1% | 34.8% | 39.5% | 42.0% | 42.9% | 47.1% | 33.3% | 26.5% | 39.7% | 34.3% | 33.6% | 45.1% | 41.7% | 42.4% |
| Unidentified nests | 29 | 123 | 59 | 42 | 33 | 61 | 38 | 8 | 18 | 7 | 7 | 20 | 19 | 4 | 7 | 6 | 12 | 8 | 28 | 15 | 5 | 549 |
| Unidentified false crawls | 44 | 20 | 82 | 45 | 19 | 29 | 12 | 8 | 9 | 4 | 12 | 17 | 14 | 3 | 3 | 7 | 17 | 14 | 56 | 11 | 12 | 438 |
| Unidentified activity | 73 | 143 | 141 | 87 | 52 | 90 | 50 | 16 | 27 | 11 | 19 | 37 | 33 | 7 | 10 | 13 | 29 | 22 | 84 | 26 | 17 | 987 |
| Total all species nests | 1904 | 2143 | 1724 | 5913 | 5079 | 6266 | 7251 | 1069 | 3344 | 7048 | 1021 | 2795 | 1174 | 1357 | 2626 | 2986 | 3289 | 1645 | 5808 | 2715 | 1979 | 69136 |
| Total new nests (all three species) adjusted by survey effort per day | 2.03 | 1.69 | 0.99 | 4.63 | 4.40 | 5.40 | 9.02 | 2.27 | 6.91 | 14.78 | 2.05 | 5.05 | 2.13 | 2.42 | 5.13 | 5.81 | 5.57 | 2.79 | 10.17 | 5.36 | 4.02 | 4.89 |
| Total all species false crawls | 5926 | 3525 | 3794 | 10989 | 15044 | 14284 | 13313 | 2132 | 7036 | 23668 | 2439 | 5623 | 2167 | 2008 | 5730 | 8498 | 8933 | 4015 | 25130 | 6037 | 3862 | 174153 |
| Total activity | 7830 | 5668 | 5518 | 16902 | 20123 | 20550 | 20564 | 3201 | 10380 | 30716 | 3460 | 8418 | 3341 | 3365 | 8356 | 11484 | 12222 | 5660 | 30938 | 8752 | 5841 | 243289 |
| Total turtle activity adjusted by survey effort per day | 8.3 | 4.5 | 3.2 | 13.2 | 16.9 | 17.7 | 25.6 | 5.4 | 21.4 | 64.4 | 7.0 | 15.2 | 6.1 | 6.0 | 16.3 | 22.3 | 20.7 | 9.6 | 54.2 | 17.3 | 11.9 | 17.5 |

Survey effort* 2002/03 – 2022/23 standardised season

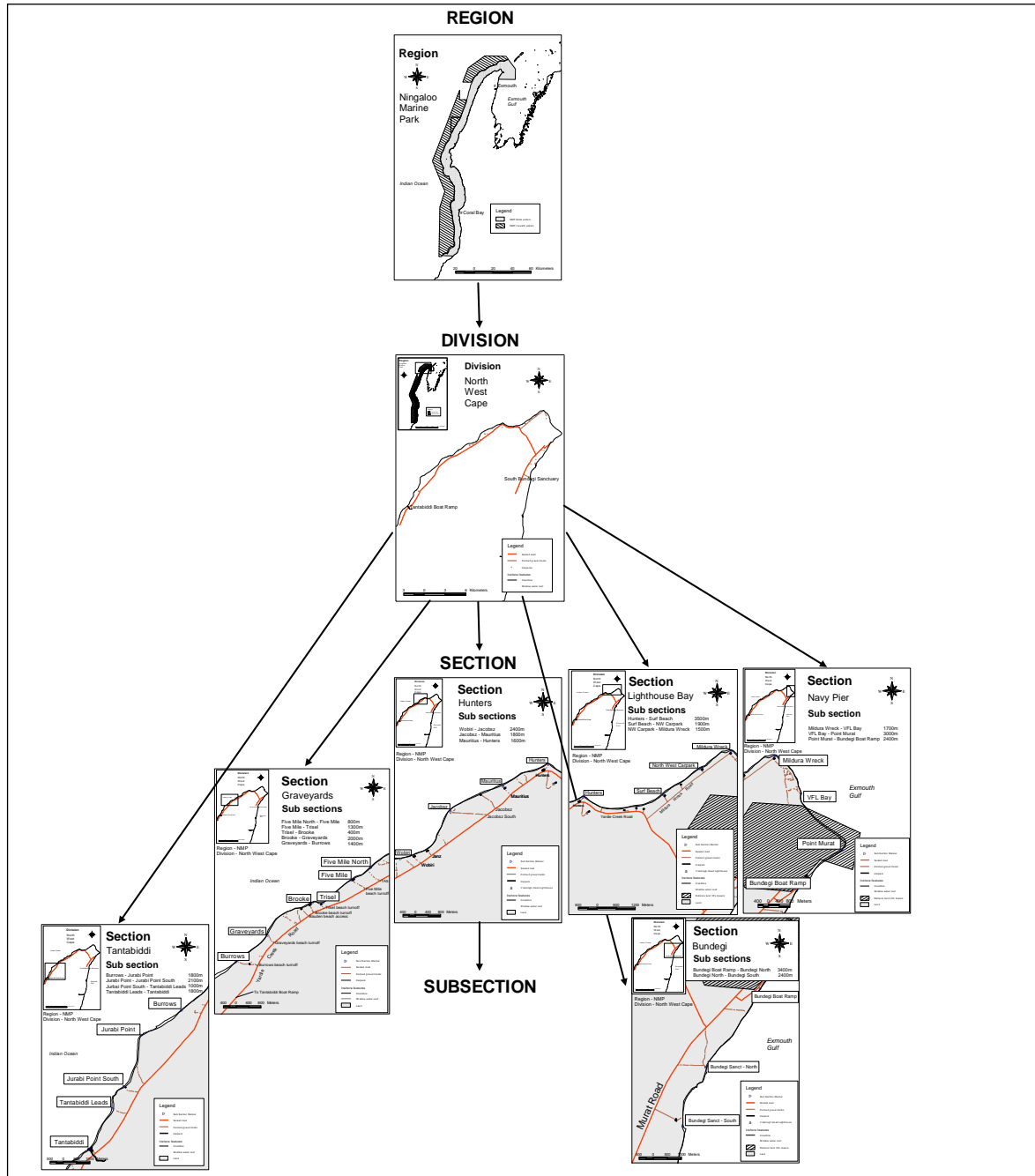
| Standardised season | | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | TOTAL |
|---|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------|
| Survey Dates intensive peak period monitoring dates | | 16/12/02-12/01/03 | 15/12/03-11/01/04 | 20/12/04-16/01/05 | 19/12/05-15/01/06 | 18/12/06-14/01/07 | 17/12/07-13/01/08 | 15/12/08-11/01/09 | 14/12/09-10/01/10 | 20/12/10-16/01/11 | 19/12/11-15/01/12 | 17/12/12-11/01/13 | 16/12/13-12/01/14 | 15/12/14-11/1/15 | 14/12/15-10/1/16 | 12/12/16-8/1/17 | 18/12/17-14/01/18 | 17/12/18-13/01/19 | 16/12/19-12/01/20 | 17/12/20-13/01/21 | 17/12/21-13/01/22 | 16/12/22-12/01/23 | |
| Survey Effort | | | | | | | | | | | | | | | | | | | | | | | |
| Division | Section | | | | | | | | | | | | | | | | | | | | | | |
| North West Cape | Graveyards | 57 | 100 | 112 | 107 | 100 | 100 | 96 | 70 | 108 | 112 | 104 | 108 | 112 | 112 | 107 | 108 | 108 | 107 | 107 | 108 | 108 | 2151 |
| | Hunters | 72 | 78 | 84 | 81 | 75 | 75 | 72 | 50 | 81 | 84 | 78 | 81 | 84 | 84 | 78 | 81 | 81 | 81 | 80 | 80 | 81 | 1641 |
| | Lighthouse Bay | 53 | 34 | 56 | 77 | 75 | 75 | 72 | 39 | 77 | 84 | 78 | 81 | 84 | 83 | 78 | 80 | 81 | 81 | 81 | 80 | 80 | 1529 |
| | Tantabiddi | 9 | - | - | 27 | 25 | 25 | 24 | 17 | 27 | 28 | 26 | 27 | 28 | 28 | 28 | 27 | 27 | 27 | 27 | 27 | 27 | 481 |
| Cape Range | Bungelup | 0 | 11 | 71 | 66 | 69 | 60 | 60 | 30 | 79 | 84 | 75 | 78 | 84 | 82 | 79 | 80 | 81 | 80 | 79 | 81 | 78 | 1407 |
| Total survey effort* | | 191 | 223 | 323 | 358 | 344 | 335 | 324 | 206 | 372 | 392 | 361 | 375 | 392 | 389 | 370 | 376 | 378 | 376 | 374 | 376 | 374 | 7209 |
| Number subsections monitored | | 11 | 12 | 12 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | |

* Survey effort is defined as the number of times each subsection was monitored. These are totalled for each section.

Turtle activity 2002/03 – 2022/23 standardised season

| Standardised season | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | TOTAL or AVERAGE |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|
| Survey Dates intensive peak period monitoring dates | 16/12/02-12/01/03 | 15/12/03-11/01/04 | 20/12/04-16/01/05 | 19/12/05-15/01/06 | 18/12/06-14/01/07 | 17/12/07-13/01/08 | 15/12/08-11/01/09 | 14/12/09-10/01/10 | 20/12/10-16/01/11 | 19/12/11-15/01/12 | 17/12/12-11/01/13 | 16/12/13-12/01/14 | 15/12/14-11/1/15 | 14/12/15-10/1/16 | 12/12/16-8/1/17 | 18/12/17-14/01/18 | 17/12/18-13/01/19 | 16/12/19-12/01/20 | 17/12/20-13/01/21 | 17/12/21-13/01/22 | 16/12/22-12/01/23 | |
| Green new nests | 587 | 475 | 266 | 1548 | 1650 | 1721 | 3103 | 239 | 2270 | 5683 | 422 | 1714 | 459 | 554 | 1449 | 1919 | 2082 | 896 | 4452 | 1747 | 1222 | 34458 |
| Green new nests adjusted by survey effort per day | 3.07 | 2.13 | 0.82 | 4.32 | 4.80 | 5.14 | 9.58 | 1.16 | 6.10 | 14.50 | 1.17 | 4.57 | 1.17 | 1.42 | 3.92 | 5.10 | 5.51 | 2.38 | 11.90 | 4.60 | 3.30 | 4.60 |
| Green false crawls | 1821 | 1328 | 785 | 4217 | 5138 | 4959 | 5226 | 634 | 5322 | 20501 | 1314 | 4098 | 1092 | 939 | 3495 | 6051 | 6397 | 2582 | 21843 | 4353 | 2618 | 104713 |
| Green activity | 2408 | 1803 | 1051 | 5765 | 6788 | 6680 | 8329 | 873 | 7592 | 26184 | 1736 | 5812 | 1551 | 1493 | 4944 | 7970 | 8479 | 3478 | 26295 | 6100 | 3840 | 139171 |
| Green activity adjusted by survey effort per day | 12.61 | 8.09 | 3.25 | 16.10 | 19.73 | 19.94 | 25.71 | 4.24 | 20.41 | 66.80 | 4.81 | 15.50 | 3.96 | 3.84 | 13.36 | 21.20 | 22.43 | 9.25 | 70.31 | 16.22 | 10.30 | 18.48 |
| Green nesting success % | 24.4% | 26.3% | 25.3% | 26.9% | 24.3% | 25.8% | 37.3% | 27.4% | 29.9% | 21.7% | 24.3% | 29.5% | 29.6% | 37.1% | 29.3% | 24.1% | 24.6% | 25.8% | 16.9% | 28.6% | 31.8% | 27.2% |
| Hawksbill new nests | 17 | 14 | 31 | 45 | 67 | 48 | 193 | 98 | 155 | 60 | 114 | 51 | 73 | 52 | 50 | 56 | 46 | 50 | 23 | 51 | 90 | 1384 |
| Hawksbill new nests adjusted by survey effort per day | 0.09 | 0.06 | 0.10 | 0.13 | 0.19 | 0.14 | 0.60 | 0.48 | 0.42 | 0.15 | 0.32 | 0.14 | 0.19 | 0.13 | 0.14 | 0.15 | 0.12 | 0.13 | 0.06 | 0.14 | 0.24 | 0.20 |
| Hawksbill false crawls | 20 | 14 | 49 | 33 | 80 | 38 | 119 | 106 | 109 | 79 | 183 | 43 | 81 | 43 | 63 | 69 | 72 | 42 | 49 | 37 | 81 | 1410 |
| Hawksbill activity | 37 | 28 | 80 | 78 | 147 | 86 | 312 | 204 | 264 | 139 | 297 | 94 | 154 | 95 | 113 | 125 | 118 | 92 | 72 | 88 | 171 | 2794 |
| Hawksbill activity adjusted by survey effort per day | 0.19 | 0.13 | 0.25 | 0.22 | 0.43 | 0.26 | 0.96 | 0.99 | 0.71 | 0.35 | 0.82 | 0.25 | 0.39 | 0.24 | 0.31 | 0.33 | 0.31 | 0.24 | 0.19 | 0.23 | 0.46 | 0.40 |
| Hawksbill nesting success | 45.9% | 50.0% | 38.8% | 57.7% | 45.6% | 55.8% | 61.9% | 48.0% | 58.7% | 43.2% | 38.4% | 54.3% | 47.4% | 54.7% | 44.2% | 44.8% | 39.0% | 54.3% | 31.9% | 58.0% | 52.6% | 48.8% |
| Loggerhead new nests | 52 | 78 | 324 | 544 | 306 | 380 | 320 | 136 | 383 | 368 | 282 | 379 | 398 | 462 | 668 | 375 | 388 | 307 | 475 | 445 | 397 | 7467 |
| Loggerhead new nests adjusted by survey effort per day | 0.27 | 0.35 | 1.00 | 1.52 | 0.89 | 1.13 | 0.99 | 0.66 | 1.03 | 0.94 | 0.78 | 1.01 | 1.02 | 1.19 | 1.81 | 1.00 | 1.03 | 0.82 | 1.27 | 1.18 | 1.06 | 1.00 |
| Loggerhead false crawls | 141 | 128 | 449 | 484 | 244 | 557 | 218 | 214 | 349 | 681 | 432 | 566 | 541 | 530 | 1350 | 1042 | 603 | 649 | 969 | 543 | 554 | 11244 |
| Loggerhead activity | 193 | 206 | 773 | 1028 | 550 | 937 | 538 | 350 | 732 | 1049 | 714 | 945 | 939 | 992 | 2018 | 1417 | 991 | 956 | 1444 | 988 | 951 | 18711 |
| Loggerhead activity adjusted by survey effort per day | 1.01 | 0.92 | 2.39 | 2.87 | 1.60 | 2.80 | 1.66 | 1.70 | 1.97 | 2.68 | 1.98 | 2.52 | 2.40 | 2.55 | 5.45 | 3.77 | 2.62 | 2.54 | 3.86 | 2.63 | 2.54 | 2.50 |
| Loggerhead nesting success | 26.9% | 37.9% | 41.9% | 52.9% | 55.6% | 40.6% | 59.5% | 38.9% | 52.3% | 35.1% | 39.5% | 40.1% | 42.4% | 46.6% | 33.1% | 26.5% | 39.2% | 32.1% | 32.9% | 45.0% | 41.7% | 41.0% |
| Unidentified new nests | 1 | 10 | 14 | 21 | 13 | 17 | 21 | 3 | 15 | 3 | 6 | 16 | 19 | 4 | 6 | 5 | 7 | 5 | 18 | 12 | 5 | 221 |
| Unidentified new nests adjusted by survey effort per day | 0.01 | 0.04 | 0.04 | 0.06 | 0.04 | 0.05 | 0.06 | 0.01 | 0.04 | 0.01 | 0.02 | 0.04 | 0.05 | 0.01 | 0.02 | 0.01 | 0.02 | 0.01 | 0.05 | 0.03 | 0.01 | 0.03 |
| Unidentified false crawls | 2 | 7 | 36 | 18 | 9 | 12 | 7 | 3 | 9 | 4 | 9 | 17 | 11 | 1 | 3 | 4 | 4 | 11 | 39 | 6 | 7 | 219 |
| Unidentified activity | 3 | 17 | 50 | 39 | 22 | 29 | 28 | 6 | 24 | 7 | 15 | 33 | 30 | 5 | 9 | 9 | 11 | 16 | 57 | 18 | 12 | 440 |
| Unidentified activity adjusted by survey effort per day | 0.02 | 0.08 | 0.15 | 0.11 | 0.06 | 0.09 | 0.09 | 0.03 | 0.06 | 0.02 | 0.04 | 0.09 | 0.08 | 0.01 | 0.02 | 0.02 | 0.03 | 0.04 | 0.15 | 0.05 | 0.03 | 0.06 |
| Flatback new nests | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 5 |
| Flatback false crawls | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 7 |
| Flatback activity | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 1 | 0 | 0 | 12 |
| Flatback activity adjusted by survey effort | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.001 |
| Flatback nesting success | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 100.0% | n/a | n/a | n/a | n/a | n/a | 33.3% | 50.0% | 0.0% | n/a | 0.0% | 45.8 |
| Total new nests (all species) | 657 | 577 | 635 | 2158 | 2036 | 2166 | 3637 | 476 | 2823 | 6114 | 826 | 2160 | 949 | 1072 | 2173 | 2355 | 2525 | 1259 | 4968 | 2255 | 1714 | 43535 |
| Total new nests (all species) adjusted by survey effort per day | 3.44 | 2.59 | 1.97 | 6.03 | 5.92 | 6.47 | 11.23 | 2.31 | 7.59 | 15.60 | 2.29 | 5.76 | 2.42 | 2.76 | 5.87 | 6.26 | 6.67 | 3.35 | 13.30 | 6.00 | 4.60 | 5.80 |
| Total false crawls (all species) | 1984 | 1477 | 1319 | 4752 | 5471 | 5566 | 5571 | 957 | 5789 | 21265 | 1938 | 4724 | 1725 | 1513 | 4911 | 7166 | 7080 | 3285 | 22901 | 4939 | 3260 | 117593 |
| Total activity | 2641 | 2054 | 1954 | 6910 | 7507 | 7732 | 9208 | 1433 | 8612 | 27379 | 2764 | 6884 | 2674 | 2585 | 7084 | 9521 | 9599 | 4542 | 27869 | 7194 | 4974 | 161128 |
| Total turtle activity adjusted by survey effort per day | 13.8 | 9.2 | 6.0 | 19.3 | 21.8 | 23.1 | 28.4 | 7.0 | 23.2 | 69.8 | 7.7 | 18.4 | 6.8 | 6.6 | 19.1 | 25.3 | 25.4 | 12.1 | 74.5 | 19.1 | 13.3 | 21.40 |

Appendix 2: Zoning and subsection details NW Cape division.

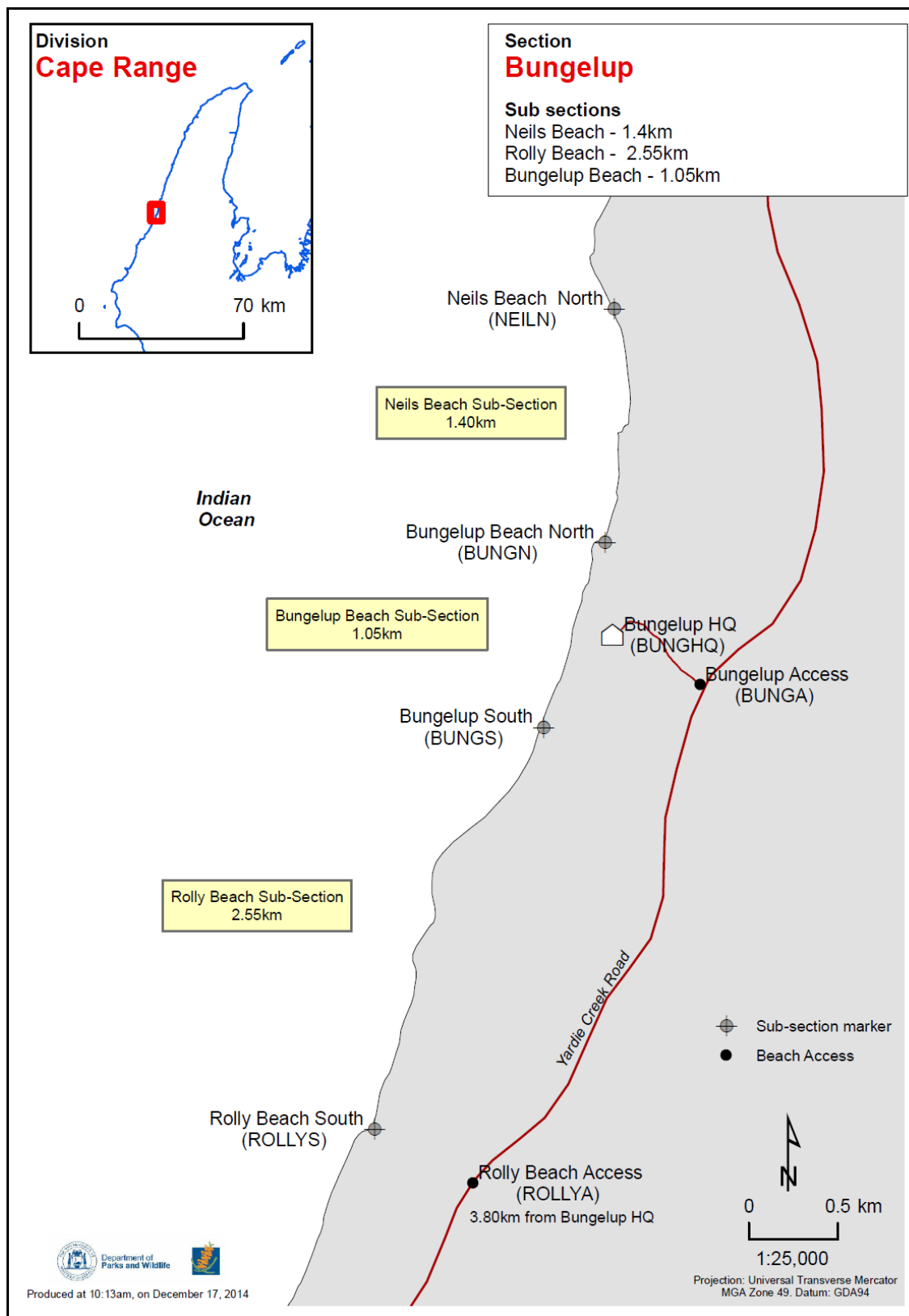


Note – the Bundegi section, including beaches south of the Bundegi boat ramp to the southern edge of the Bundegi sanctuary zone has never been included in NTP monitoring due to very low levels of nesting activity. The Navy Pier section incorporating the beaches from the Bundegi boat ramp north to the Mildura Wreck has not been monitored since 2003/04 for the same reason.

Location and distance of each subsection within NW Cape division.

| Subsection | Location of northern totem | Location of southern totem | Distance (m) |
|--|-----------------------------------|-----------------------------------|---------------------|
| Mildura Wreck - North West car park | 21.78568 S; 114.16518 E | 21.79174 S; 114.15402 E | 1500 |
| North West car park - Surf Beach | 21.79174 S; 114.15402 E | 21.81590 S; 114.13930 E | 1900 |
| Surf Beach - Hunters | 21.81590 S; 114.13930 E | 21.80287 S; 114.10873 E | 3500 |
| Hunters - Mauritius | 21.80287 S; 114.10873 E | 21.80938 S; 114.09532 E | 1600 |
| Mauritius - Jacobsz South | 21.80938 S; 114.09532 E | 21.81638 S; 114.07927 E | 1800 |
| Jacobsz South - Wobiri | 21.81638 S; 114.07927 E | 21.83038 S; 114.06505 E | 2400 |
| Five Mile North - Five Mile | 21.83485 S; 114.05431 E | 21.83928 S; 114.04766 E | 800 |
| Five Mile - Trisel | 21.83928 S; 114.04766 E | 21.84658 S; 114.03836 E | 1300 |
| Brooke - Graveyards | 21.84733 S; 114.03389 E | 21.85660 S; 114.02085 E | 2000 |
| Graveyards - Burrows | 21.85660 S; 114.02085 E | 21.86595 S; 114.01052 E | 1400 |
| Burrows - Jurabi Point | 21.86595 S; 114.01052 E | 21.87348 S; 113.99803 E | 1800 |

Appendix 3: Zoning and subsection details Cape Range division.



Location and distance of each subsection within Cape Range division.

| Subsection | Location of northern totem | Location of southern totem | Distance (m) |
|---|-----------------------------------|-----------------------------------|---------------------|
| Neils Beach North - Bungelup Beach North | 22.26489 S; 113.83277 E | 22.27674 S; 113.83231 E | 1400 |
| Bungelup North - Bungelup Beach South | 22.27674 S; 113.83231 E | 22.28613 S; 113.8292 E | 1050 |
| Bungelup Beach South - Rolly's Beach South | 22.28613 S; 113.8292 E | 22.30650 S; 113.82062 E | 2550 |

Appendix 4: Lighthouse Bay section - New nests (NTP 2022-23) Map 1 & 2

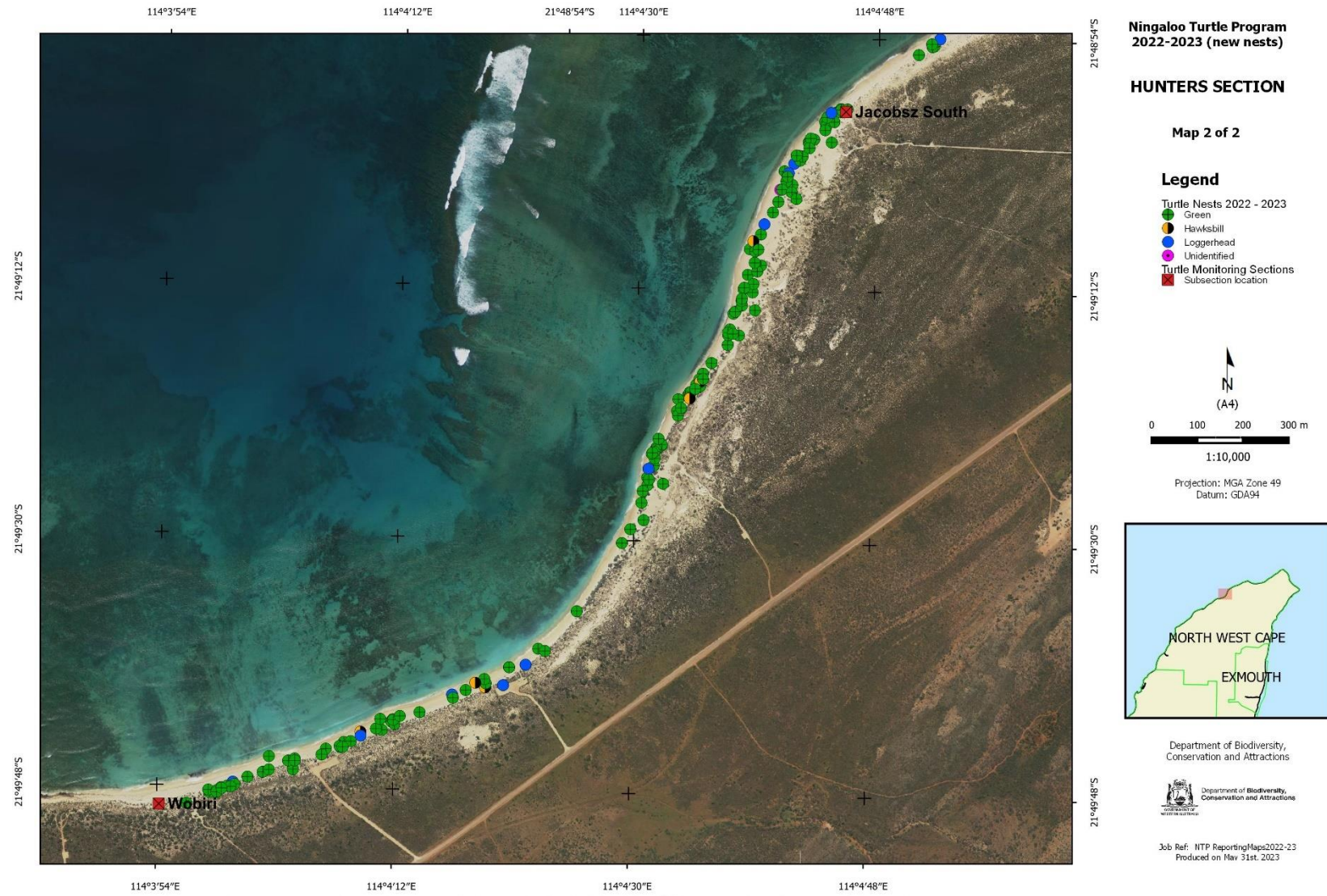




Appendix 5: Hunters section - New nests (NTP 2022-23) Map 1 & 2

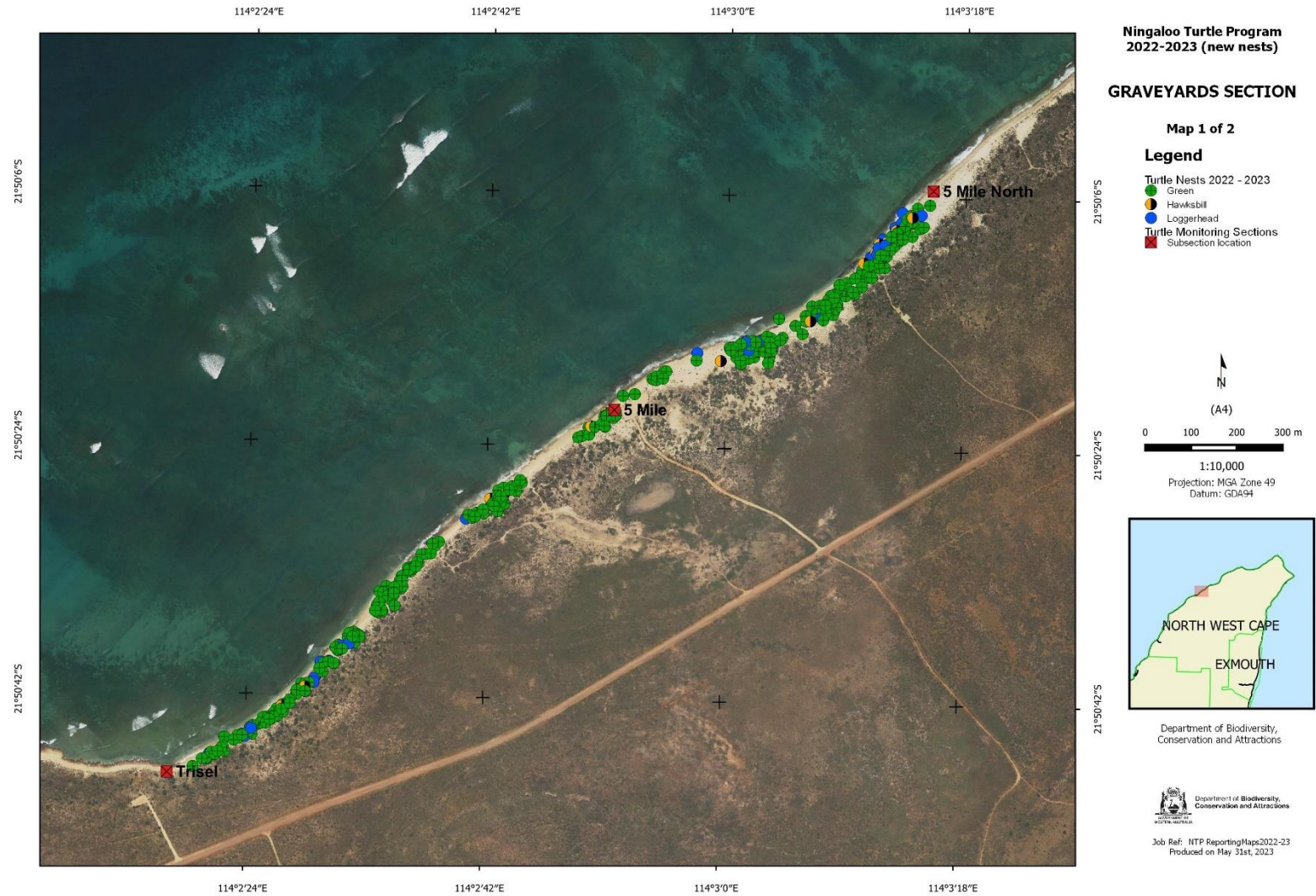


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Appendix 6: Graveyards section - New nests (NTP 2022-23) Map 1 & 2

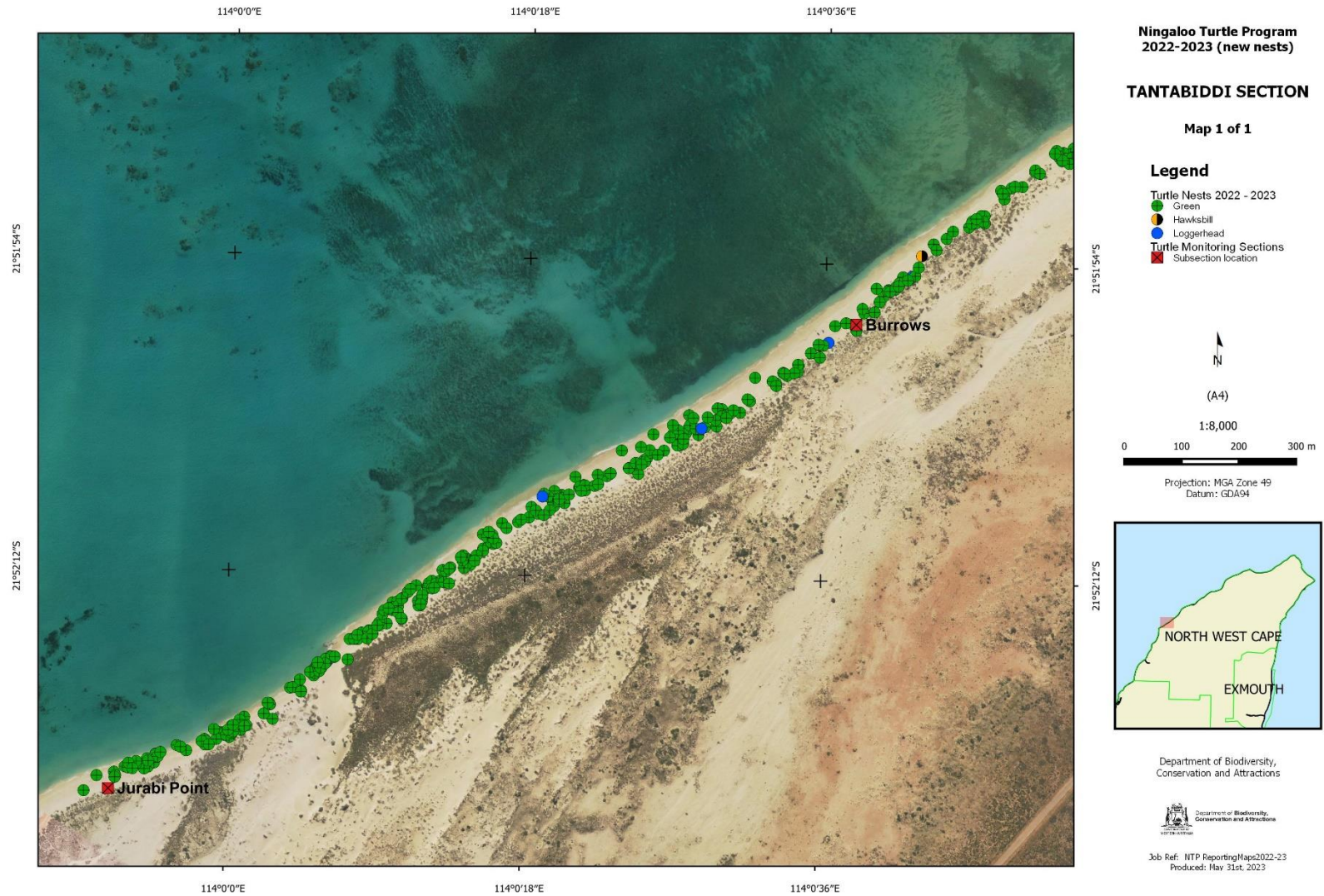


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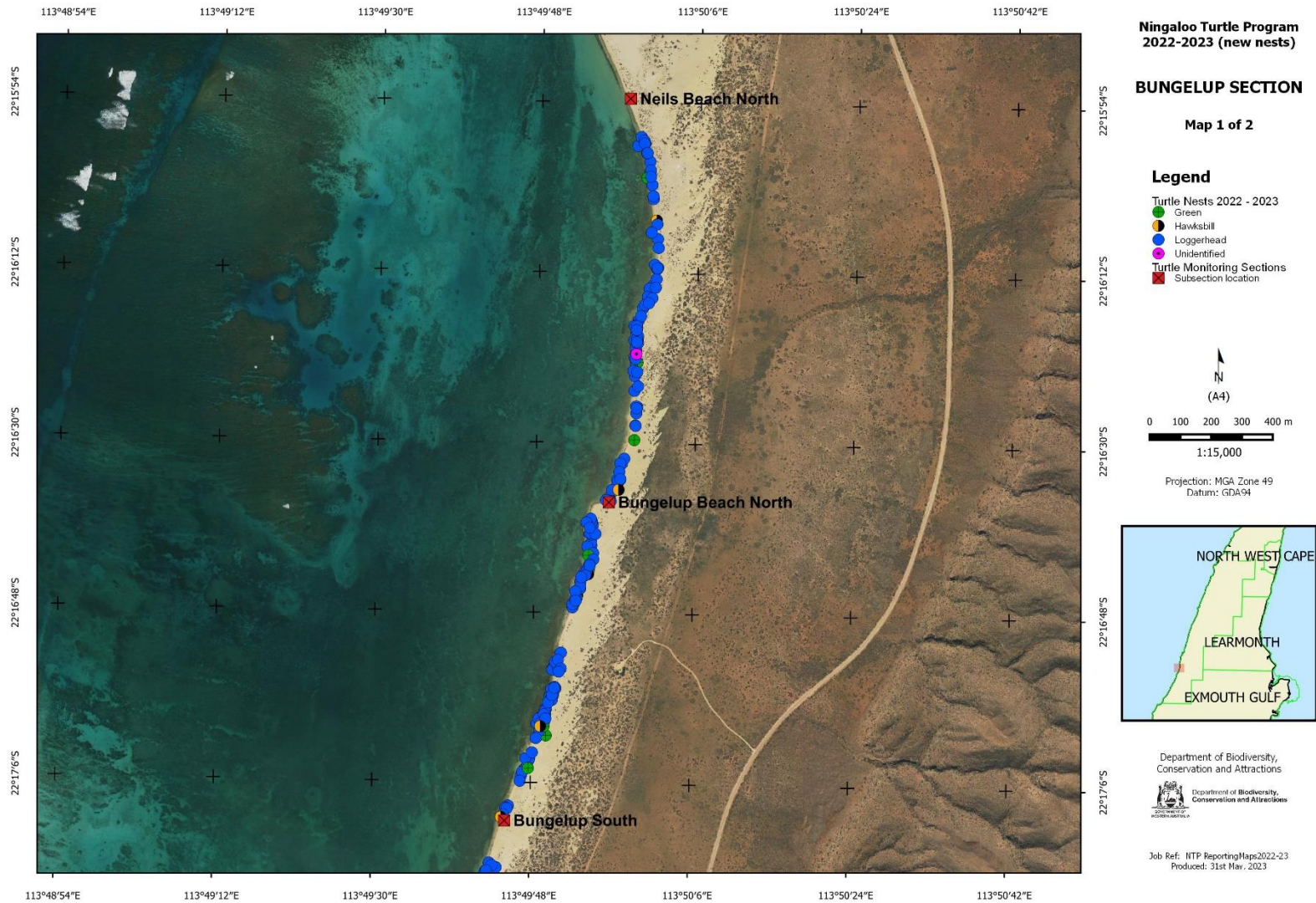
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Appendix 7: Tantabiddi section - New nests (NTP 2022-23) Map 1

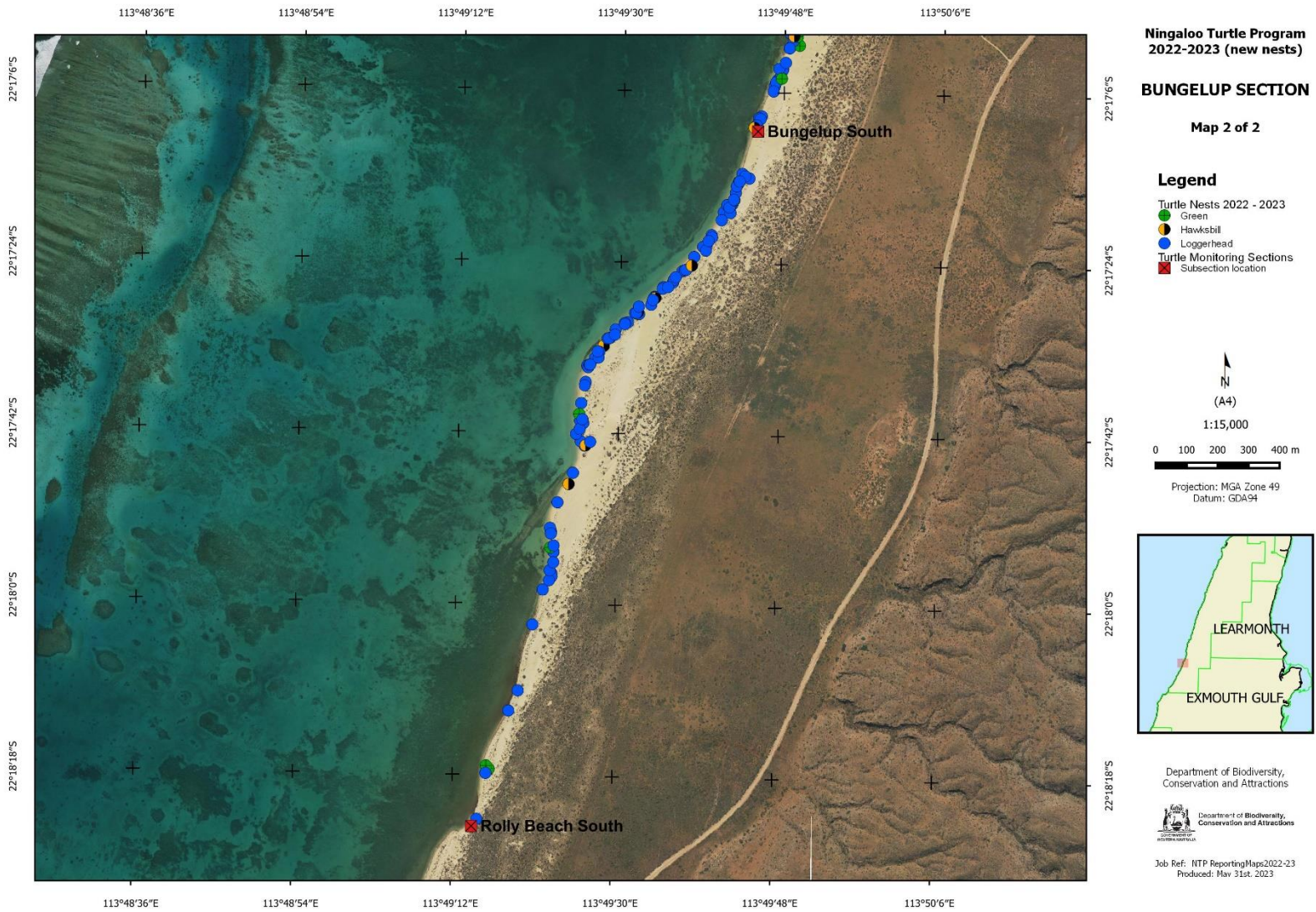


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Appendix 8: Bungelup section - New nests (NTP 2022-23) Map 1 & 2



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Appendix 9: 2022/23 NTP Infographic

Ningaloo TURTLE PROGRAM

Ningaloo Turtle Program 2022/23 Season

Ngarnurra nhuna nhugurarrima Baiyungu, West Coastal Thalanyji and Yinikurtura ganyarajarri thanardi ngarrari.

We acknowledge Baiyungu, West Coastal Thalanyji and Yinikurtura People as the original custodians of the land and water we manage.

The Ningaloo Turtle Program is run by the Department of Biodiversity, Conservation and Attractions, Parks and Wildlife Service.



Department of Biodiversity, Conservation and Attractions




Overarching goals of the program

- Contribute to the understanding of turtle nesting and threats along the Ningaloo Coast to support informed evidence-based conservation and management
- Continue to develop a rigorous, peer-reviewed and reliable scientific monitoring programme supported by trained volunteers
- Build a culture of awareness and stewardship for marine turtle conservation

Ningaloo Turtle Program is a track monitoring program

Volunteers are crucial, without them we wouldn't have a program.

Thank you



Woodside and its joint venture partner supported NTP in 2022/23



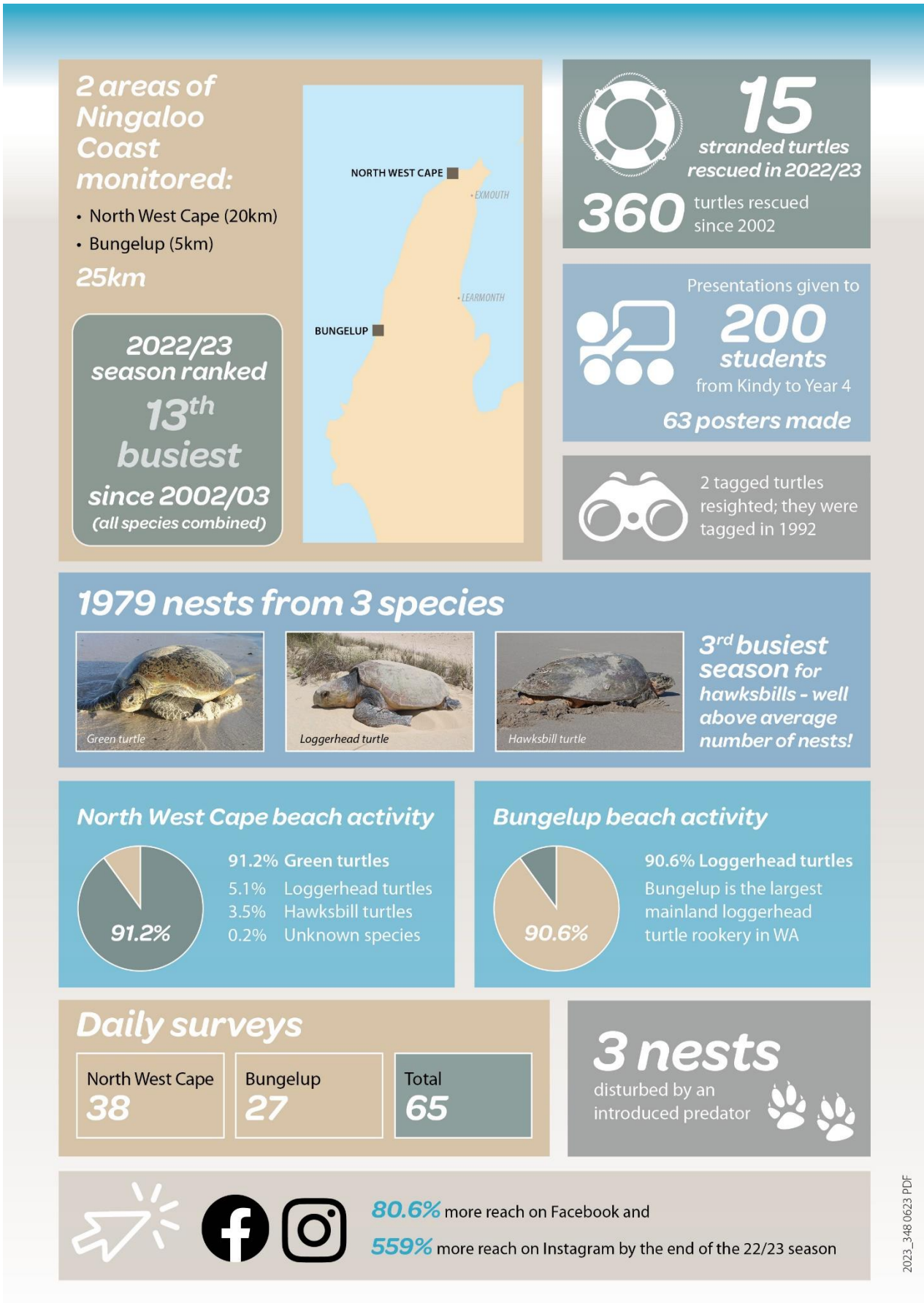
season 21 of the Ningaloo Turtle Program

3253 hours contributed by 51 volunteers in 2022/23

Volunteers came from Vic, Qld, WA, SA, ACT

35 from Exmouth

Over 84,010 hours since 2002/03!



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