Northern Australia Environmental Resources Hub

National Environmental Science Programme

Distribution maps of freshwater crocodiles and their nests at Danggu (Geikie Gorge) National Park

Report

by Ruchira Somaweera, Bruce Greatwich, Paul B. Yeoh and Bruce L. Webber

CSIRO

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

This report should be cited as: Somaweera R, Greatwich B, Yeoh PB & Webber BL. 2020. *Distribution maps of freshwater crocodiles and their nests at Danggu (Geikie Gorge) National Park*. CSIRO, Perth.

Cover photographs

Front cover: Australian freshwater crocodile (*Crocodylus johnstoni*) on a sandy bank at Fitzroy River at Danggu (Geikie Gorge) National Park (photo: Ruchira Somaweera, CSIRO).

Back cover: Approaching a crocodile on the bank during a night-time spotlighting survey at Danggu (photo: David Woods, DBCA).

This report is available for download from the Northern Australia Environmental Resources (NAER) Hub website at nespnorthern.edu.au

The Hub is supported through funding from the Australian Government's National Environmental Science Program (NESP). The NESP NAER Hub is hosted by Charles Darwin University.

ISBN 978-1-925800-68-5

October, 2020

Printed by Uniprint

Contents

List of figures

Acronyms

DBCA.....Western Australia Department of Biodiversity, Conservation and Attractions

Acknowledgements

We thank David Woods, Tracy Sonneman, Jasmyn Cook, Ruth McPhail, Penelope Purdie, the park rangers of the DBCA, Bunuba Men's Ranger team, and volunteers for their support with field surveys and logistics.

1. Introduction

A spotlighting-based monitoring program for freshwater crocodiles at Danggu (Geikie Gorge) National Park (Figure 1) was designed by Ruchira Somaweera (then at University of Sydney) for the Western Australia Department of Biodiversity, Conservation and Attractions (DBCA) and Bunuba Rangers in 2011. The primary objective of the surveys was to establish a baseline for crocodile numbers at Danggu, accounting for seasonal and annual variations in numbers, so that the impact of cane toads and other environmental changes could be evaluated systematically. Since 2014, DBCA has been conducting 2–3 annual surveys at the park coinciding with the nesting and hatching seasons of crocodiles.

This report provides distribution maps of crocodiles and their nests recorded during the surveys during the lifespan of the NESP project's field component (mid 2016 to mid 2019).

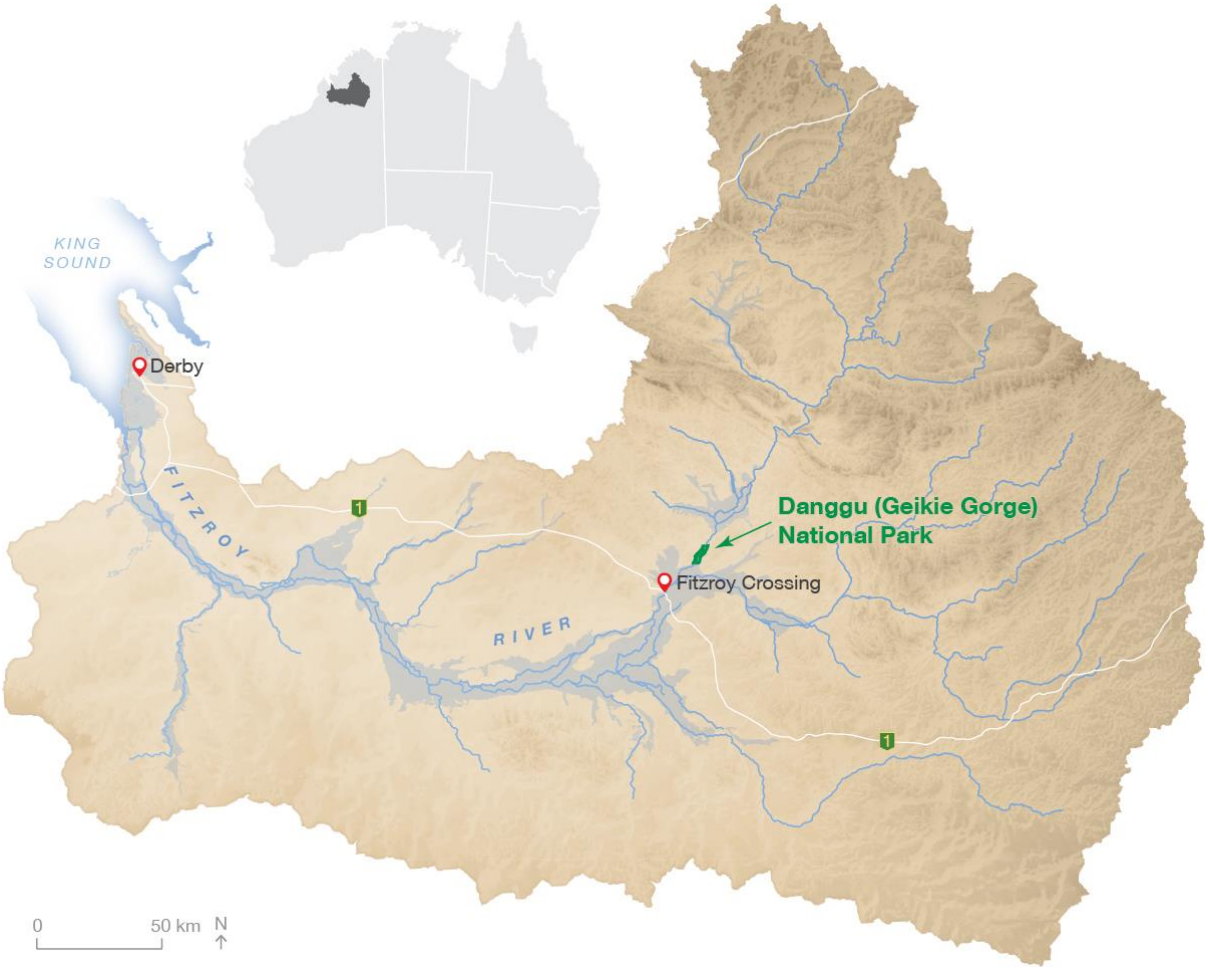

Figure 1. Location of Danggu (Geikie Gorge) National Park.

2. Methodology

Spotlighting: Night-time (1800–2300h) spotlighting was conducted one night each during nesting season (mid July to early September), and then hatching season (mid-November to late December). The banks were scanned using hand-held spotlights from a boat with a 30 HP outboard engine traveling at c. 8 knots speed, c. 20 m distance from the shoreline at night. Once a crocodile was sighted, we reduced speed (to idle) as we approached to visually estimate its size. A GPS location for each crocodile was recorded. A few animals were caught to obtain genetic samples and images of the head for other components of the broader study. Crocodiles with total length >150 cm were categorised as mature adults, based on published data (Webb et al. 1983). Individuals that escaped by diving before a size estimation could be obtained were reported as 'eye shines'.

Figure 2. Approaching a crocodile on the bank during a night-time spotlighting survey at Danggu. Photo David Woods, DBCA.

Figure 3. A crocodile caught during the night-time survey at Danggu being inspected by DBCA and Bunuba rangers. Photo David Woods, DBCA.

Locating nests. During the nesting season, the riverbank was inspected for signs of nesting including diggings, significant slide marks (indicating repeated visits to a location) and disturbed substrate during daytime. Locations of females digging on the banks during night-time spotlight surveys were noted and excavated by hand the next day to confirm nesting. Probing with a thin metal rod to look for nests (Webb et al. 1983) was also conducted on some sandy banks. During the hatching season, banks were checked for eggshells and dug-out nests to locate nests that were either missed during the nesting-season survey or laid after the survey.

3. Results

Results of the spotlighting and nesting surveys were analysed for a long-term study by DBCA. The scope of this report is to only provide distribution maps of the crocodiles and nests encountered between mid-2016 and mid-2019 (Figure 4 – Figure 14). Hatchlings form and stay together in crèches for up to a month in locations with shelter (usually abundant aquatic vegetation) closer to the nesting sites. Such crèches are shown as clumps of dots in the maps.

Supplementary information provided as digital files contains the data used for the maps.

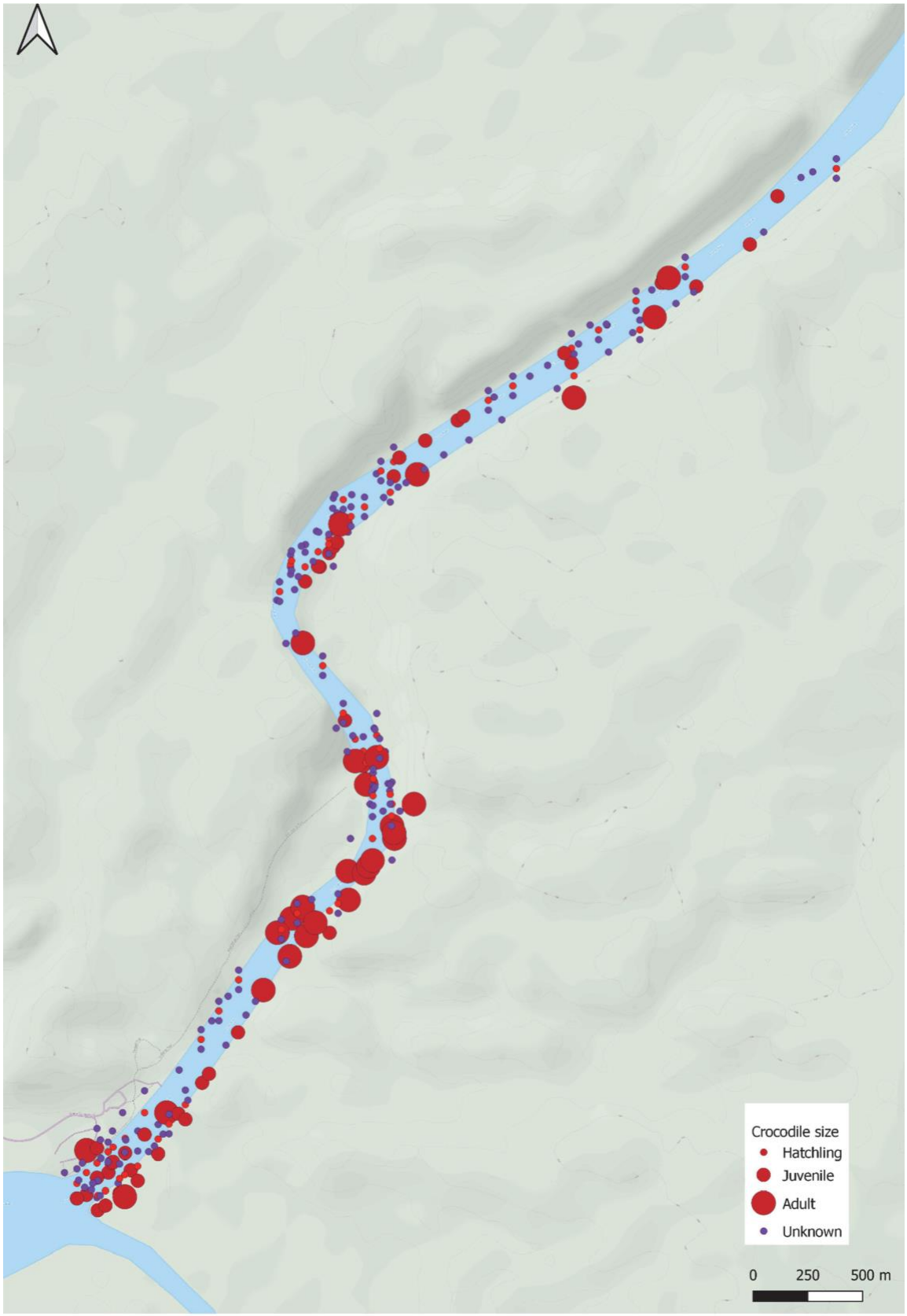

Figure 4. Distribution of crocodiles of all sizes during nesting season (August) of 2016 at Danggu.

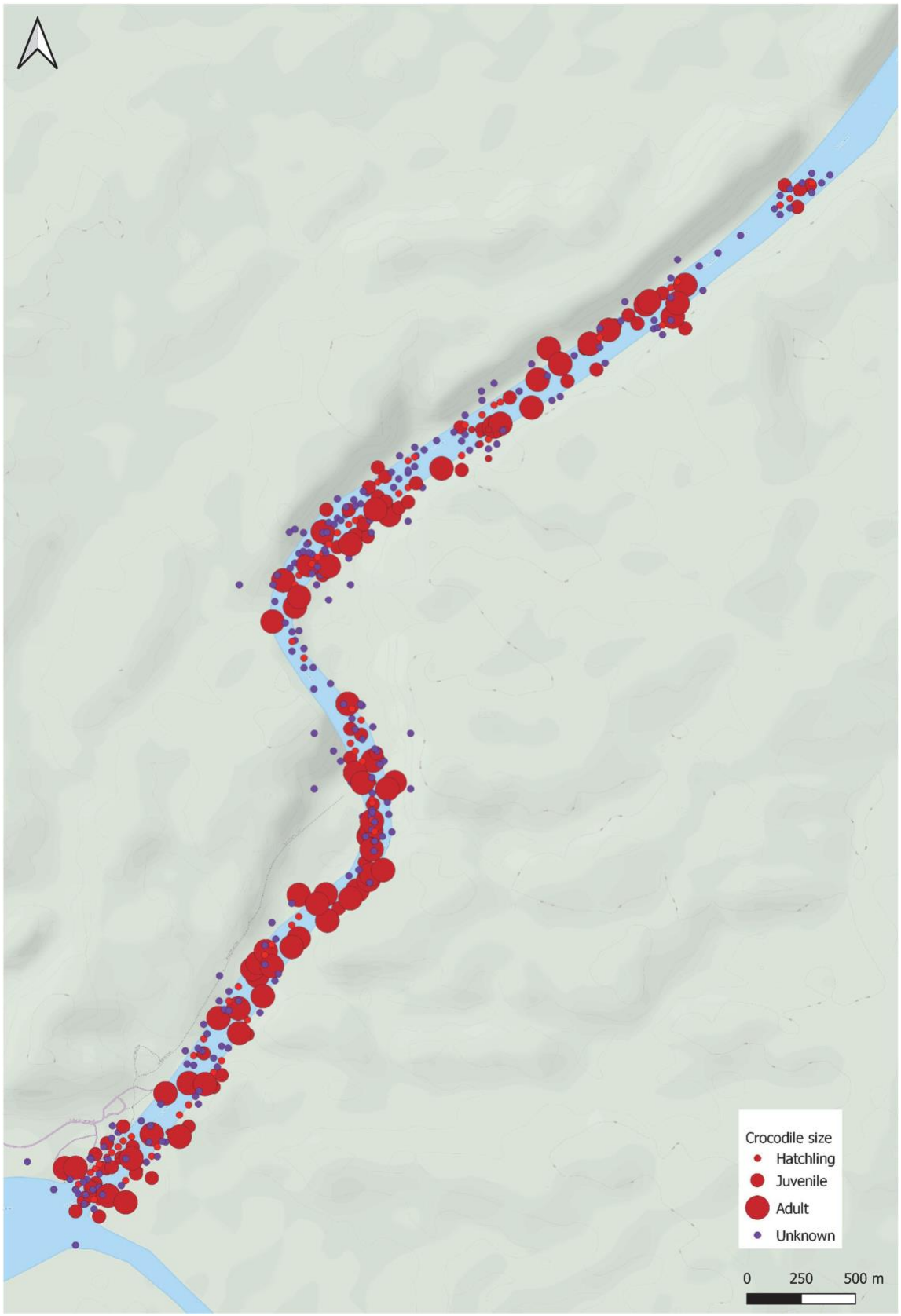

Figure 5. Distribution of crocodiles of all sizes during hatchling season (November) of 2016 at Danggu.

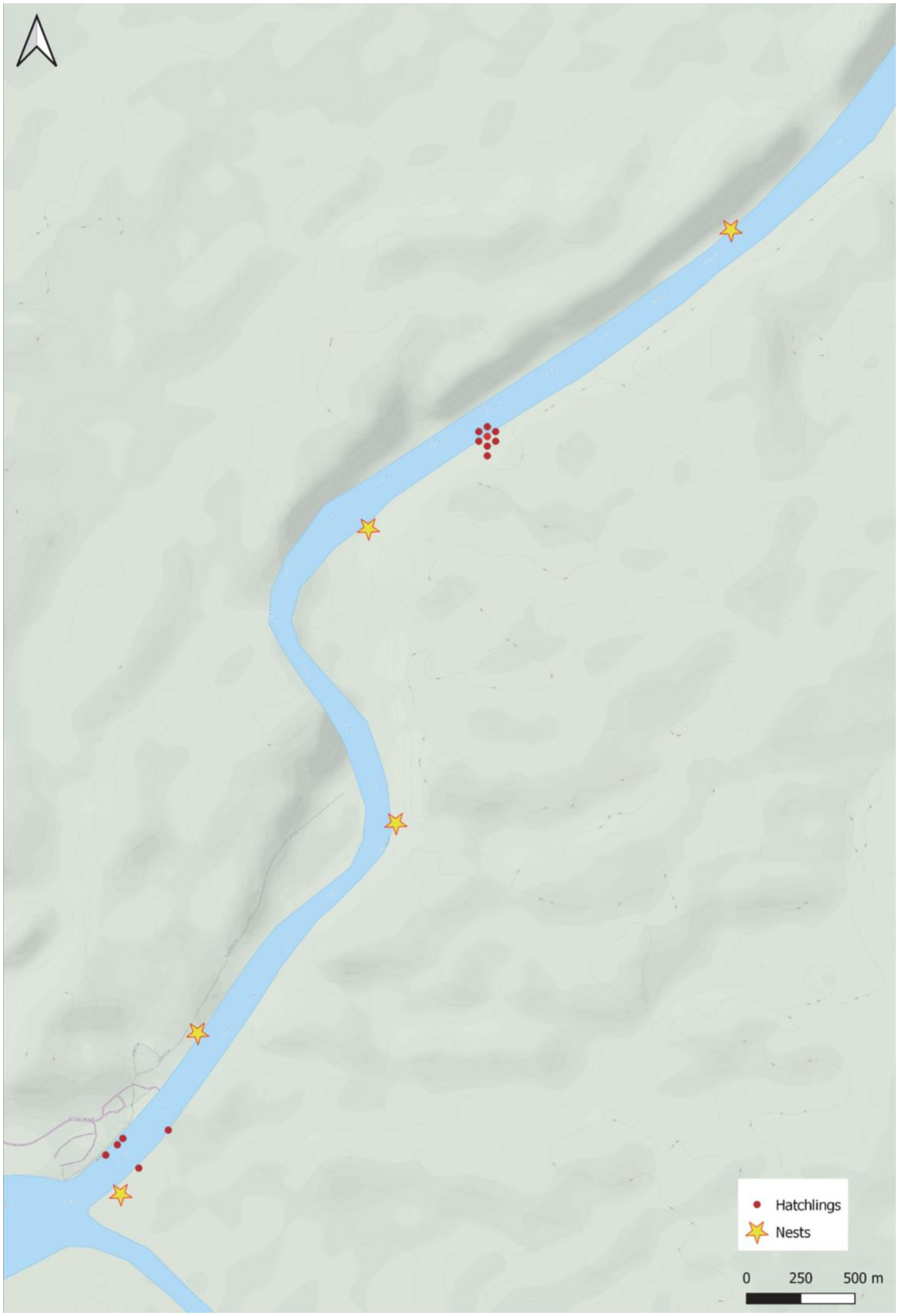

Figure 6. Distribution of hatchlings and crocodile nests in November 2016 at Danggu.

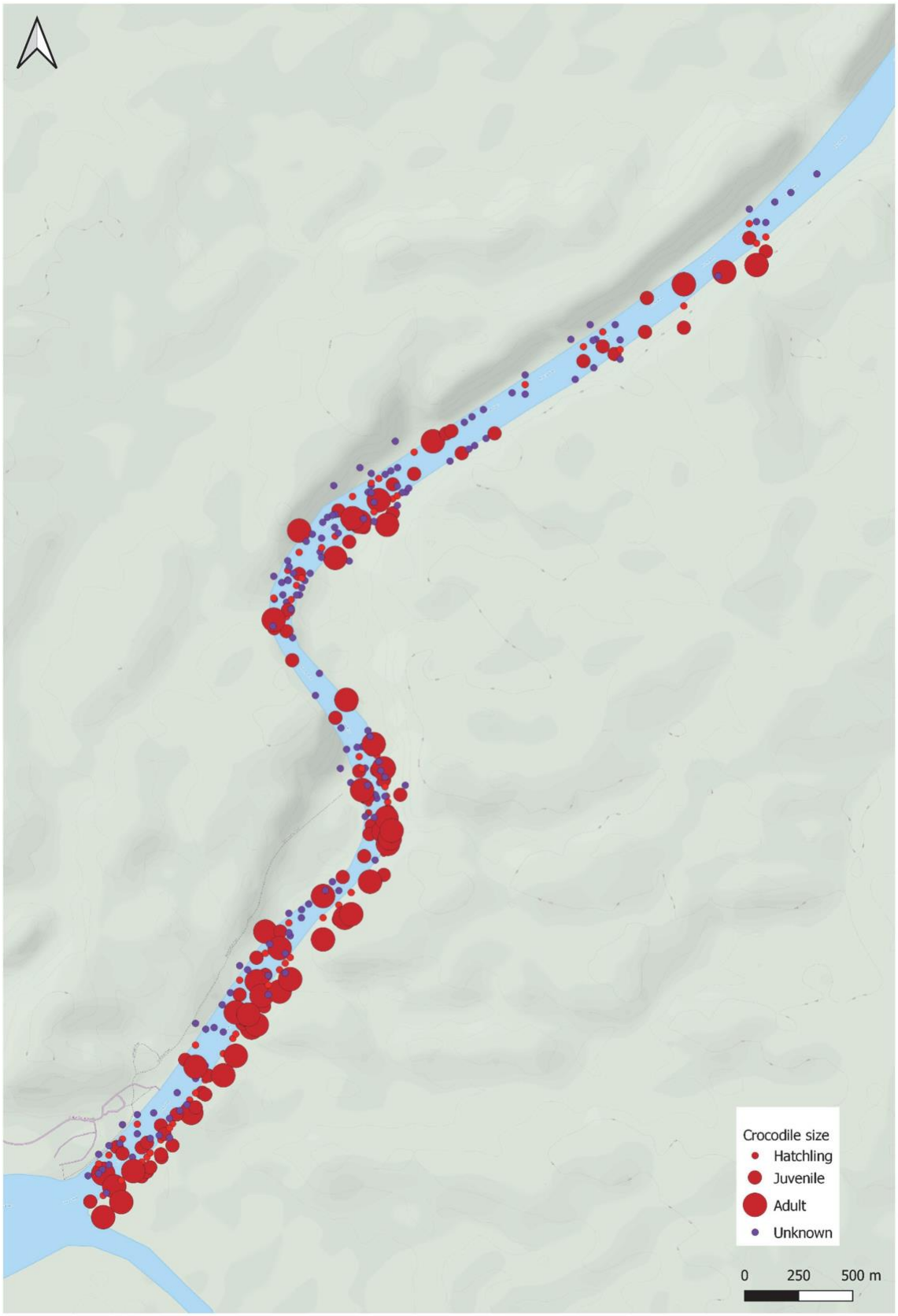

Figure 7. Distribution of crocodiles of all sizes during nesting season (July) of 2017 at Danggu.

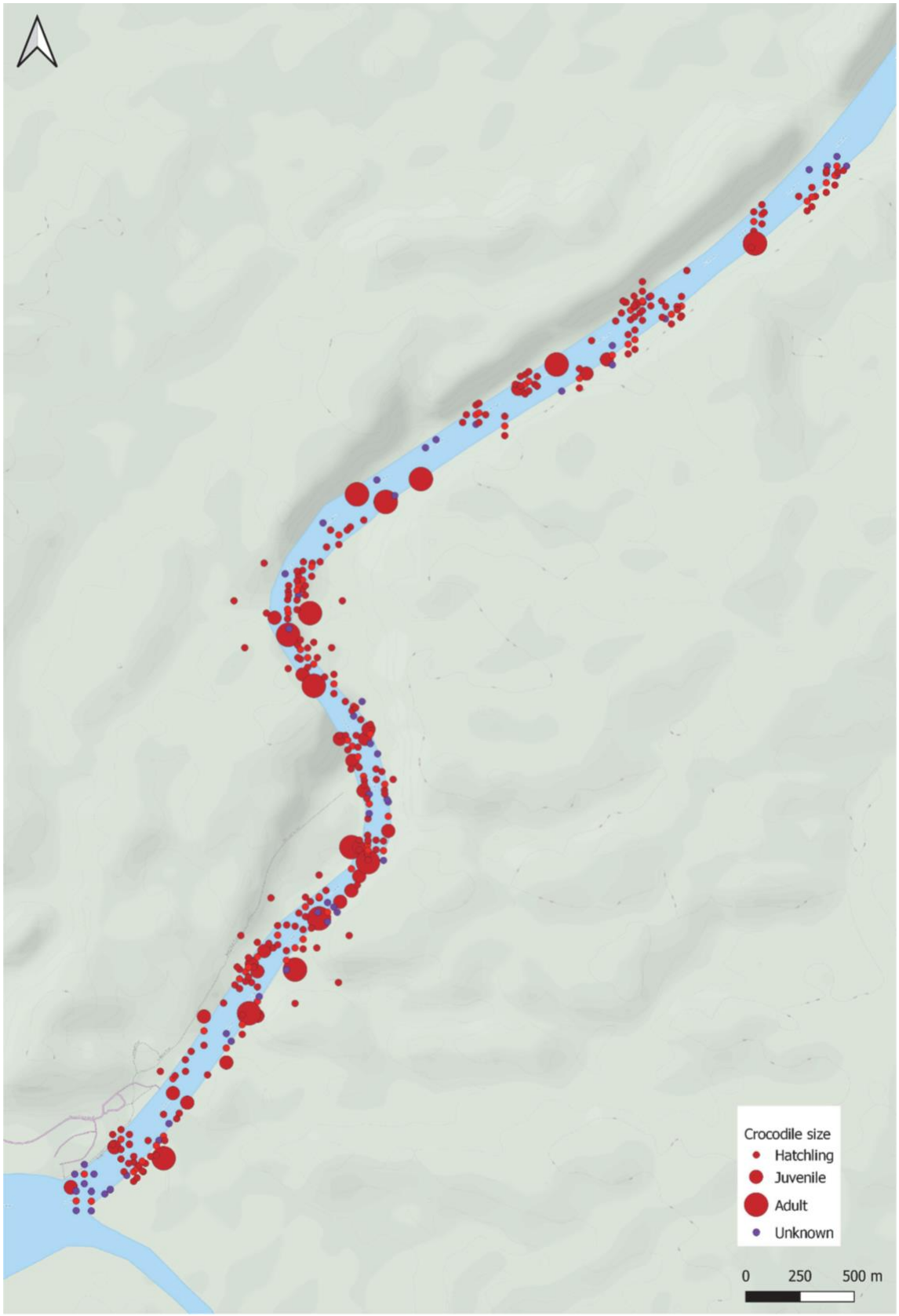

Figure 8. Distribution of crocodiles of all sizes during hatching season (December) of 2017 at Danggu.

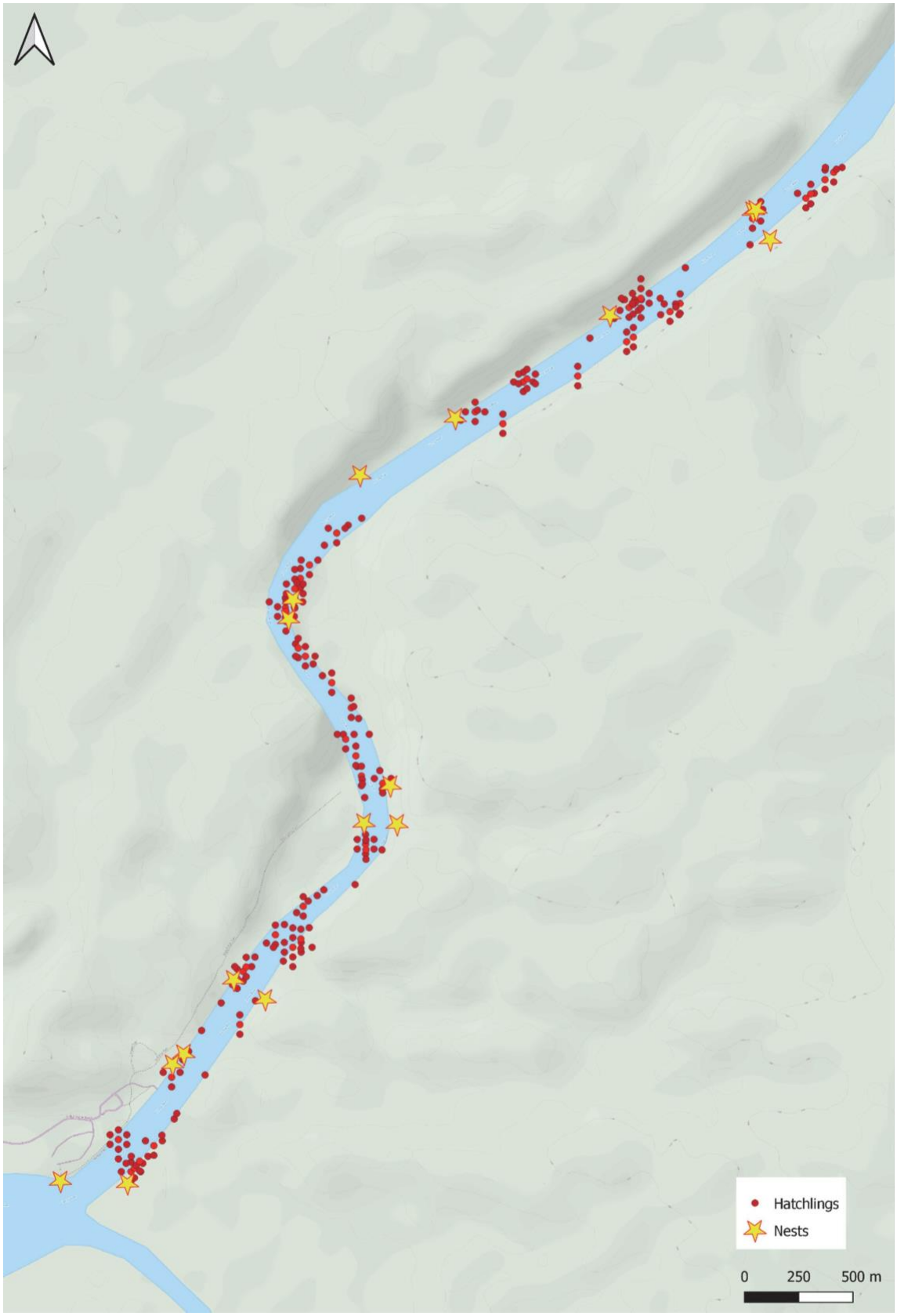

Figure 9. Distribution of hatchlings and crocodile nests in December 2017 at Danggu.

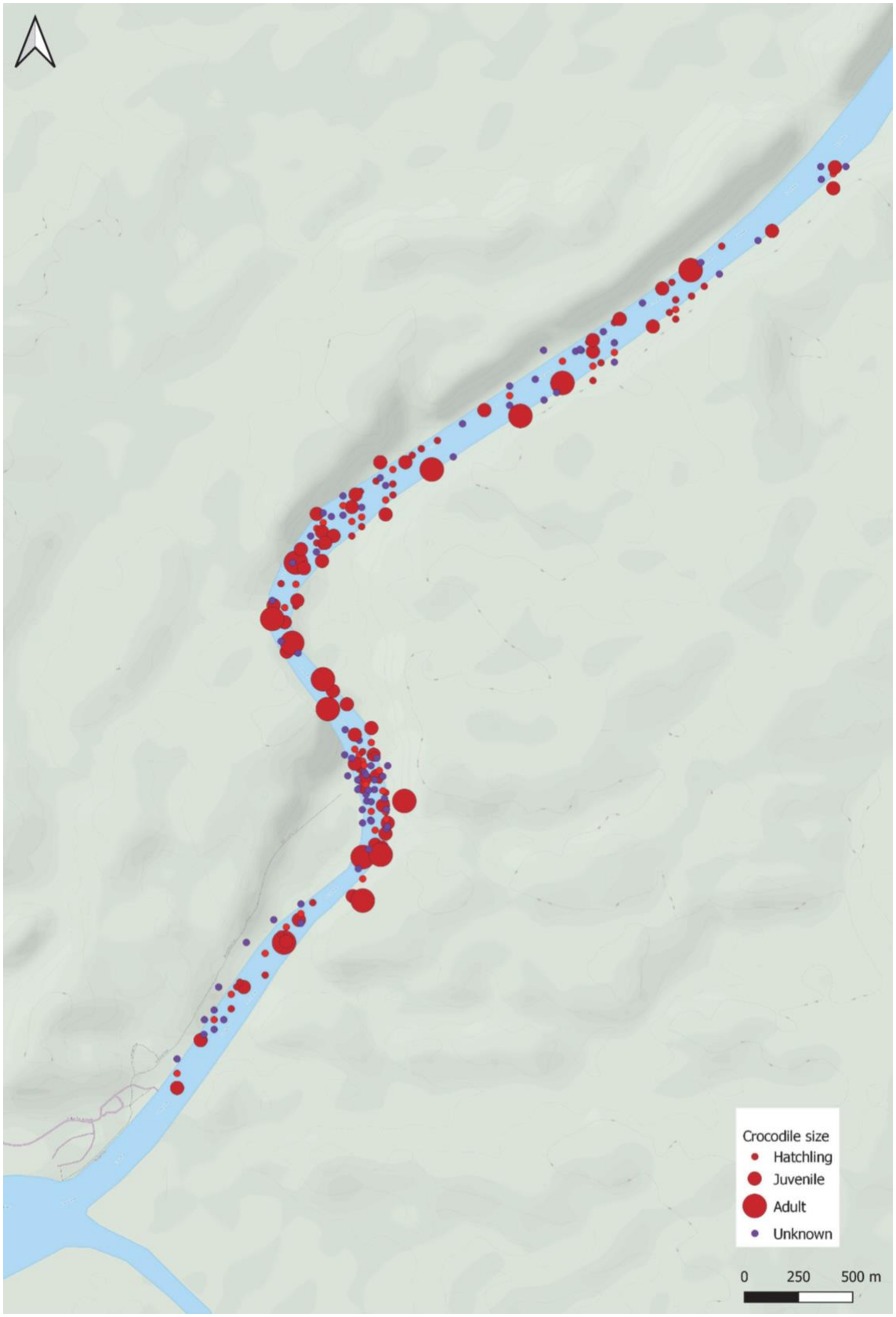

Figure 10. Distribution of crocodiles of all sizes during nesting season (July) of 2018 at Danggu.

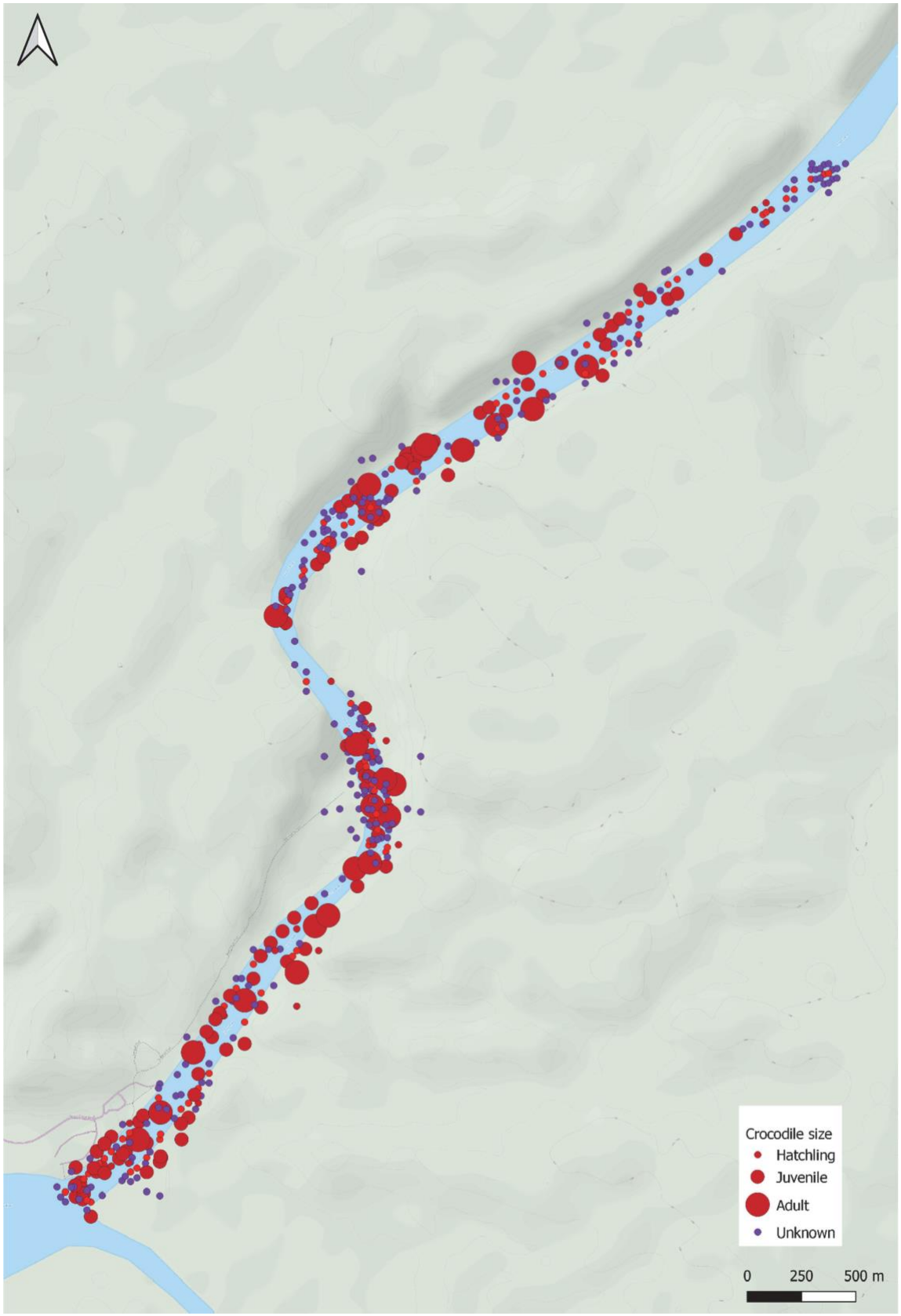

Figure 11. Distribution of crocodiles of all sizes during hatching season (November) of 2018 at Danggu.

Figure 12. Distribution of hatchlings and crocodile nests in November 2018 at Danggu.

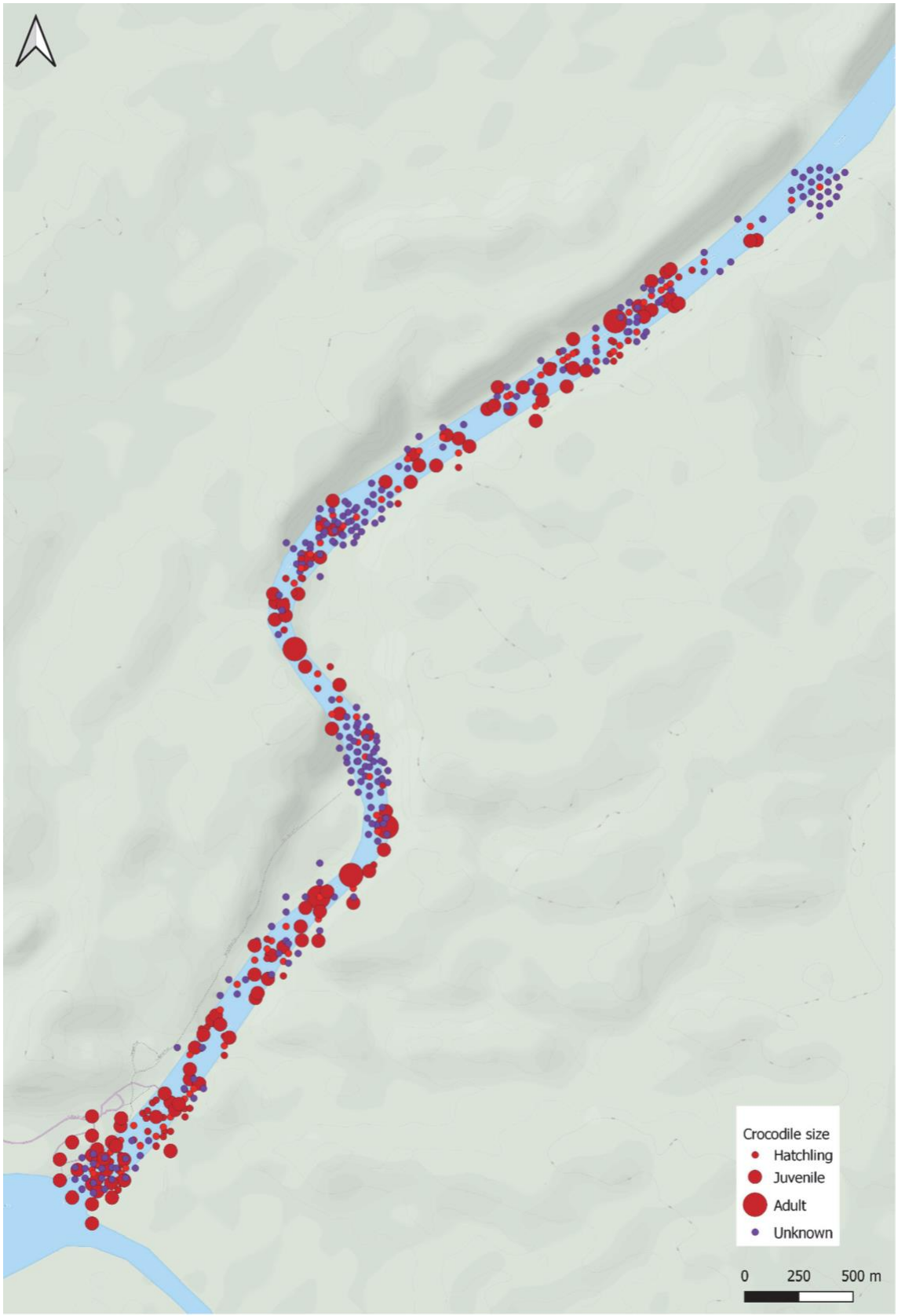

Figure 13. Distribution of crocodiles of all sizes during nesting season (August) of 2019 at Danggu.

Figure 14. Distribution of crocodile nests in August 2019 at Danggu.

4. Supplementary files

1. ESRI shapefile ‘Geikie Gorge_crocodiles_nests’ (digital format)
2. ESRI shapefile ‘Geikie Gorge_crocodiles_spotlighting’ (digital format)

References

Webb G.J.W, Buckworth R. & Manolis C.S. (1983) *Crocodyhs johnstoni* in the McKinlay River, N.T. VI. Nesting Biology. *Australian Wildlife Research* 10, 607-637.

Northern Australia Environmental Resources Hub

National Environmental Science Programme

www.nespnorthern.edu.au

This project is supported through funding from the Australian Government's National Environmental Science Program.

CSIRO

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**