FROM LITTLE THINGS BIG THINGS GROW: LOCALISED SMALL-DRONE NESTING BEACH SURVEYS CAN SUPPORT A REGIONAL DATASET

Daniella Hanf[1], Joshua Abbott[1], Sean Webb-Martin[1], Regina Flugge[2], and James Gee[3]

[1]O2 Marine, Fremantle, Western Australia
[2]Leichhardt Industrials Pty Ltd, Subiaco, Western Australia
[3]Department of Biodiversity, Conservation and Attractions, Perth, Western Australia

Globally, the conservation status of sea turtles ranges from critically endangered to data deficient. Many populations utilise nesting habitats which are remote and difficult or expensive to access for the purposes of scientific investigation and population monitoring. As a result, they are understudied which hinders conservation and management decisions. We provide a case-study from north Western Australia (WA) that shows how localised monitoring programs can use small drones to contribute to a larger dataset. Six of the world's seven species of sea turtles occur in Australian waters and are protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* The north-west marine region of WA provides important nesting habitat for several species along a vast and remote coastline under various pressures from developments. The WA *Environmental Protection Act 1986* and WA *Biodiversity Conservation Act 2016* both aim to help achieve environmentally sustainable development while protecting environmental values, including biodiversity, across the State. The latter is implemented by the State Department of Biodiversity, Conservation and Attractions (DBCA) who are tasked with monitoring and managing threatened species and communities. The purpose of our study was to support an environmental impact assessment, by identifying the presence of nesting turtle species and determining the regional significance of the beaches at our site as nesting habitat. We used a DJI Phantom 4 remotely piloted aerial system (RPAS), or 'drone', which is relatively small, affordable, and easy to acquire. The use of RPAS in marine wildlife monitoring is rapidly growing, with benefits including reduced costs and health and safety risks due to less field time required and increased transparency and reproducibility due to permanent data storage for future verification and autonomous operations along pre-defined transects. As the use of RPAS in sea turtle studies remains novel, we consulted with DBCA scientists during the early stage of survey design. The outcome was to, where possible, mirror photographic data capture, processing and analysis methods used by a regional-scale study conducted by an occupied aircraft with mounted cameras. RPAS flights were planned and flown along transects using the freely available DJI GS Pro application. The pilot moved by small vessel or four-wheel drive vehicle to maintain visual line of sight with the RPAS. While a larger RPAS would allow data to be gathered from large stretches of inaccessible coastlines and offshore islands beyond visual line of sight, associated licensing and permitting times can be prohibitive. A trained and experienced observer identified flatback (*Natator depressus*) and green (*Chelonia mydas*) turtle track presence, distribution, density, and nesting outcome. We were able to directly compare our local data with results obtained for the region. By focussing surveys to a localised area, we were able to repeatedly survey beaches within a survey period and the turtle nesting season which increased capture probability. The methods proved reliable with the potential to be standardised for uptake by various groups including grass-roots NGOs, indigenous rangers, and environmental consultants to contribute to data for informed sea turtle population-level conservation and management.

NOAA Technical Memorandum NMFS-SEFSC-777
https://doi.org/10.25923/cv3r-ws82

PROCEEDINGS OF THE FORTIETH ANNUAL SYMPOSIUM ON SEA TURTLE BIOLOGY AND CONSERVATION

40th International Sea Turtle Symposium

25 to 28 March, 2022

Perth, Australia (virtual)

Compiled by:
Paul A. Whittock, Anton D. Tucker, and Lisa Belskis

U.S. DEPARTMENT OF COMMERCE
National Ocean and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Centre
75 Virginia Beach Drive
Miami, Florida 33149

March 2024