Welcome to the quarterly newsletter from the North West Shoals to Shore Research Program (NWSSRP). Produced by the Australian Institute of Marine Science, this bulletin will provide updates on activities within the three-year program.

In this edition:
- Pearl oyster habitats
- Migratory pathway for green turtles
- Pygmy blue whale tagging
- Coral reef hydrodynamics at the Rowley Shoals

What’s happening?

**Pearl Oyster Habitat**

With all the field surveys for the Pearl Oyster Habitat project now complete, early observations are providing some insight as to what the results will be.

This theme of work aims to increase our understanding of seabed biodiversity on the North West Shelf with the Pearl Oyster Habitat project focussing on areas offshore from Eighty Mile Beach. (Continued on p2)

**Green Turtle Highway**

The coverage of the green turtle dataset we have compiled is well representative and has allowed us, for the first time, to map the distribution for this stock.

Although not all green turtle tracks have been included in the analysis yet (Muiron Island. data is yet to be obtained), so far we have identified a common migratory pathway near the coast where the movements of turtles overlap during their migration from the nesting site to foraging grounds. (Continued on p3)

Left: Common migratory pathways for green turtles on the North West Shelf

Above: Pearl oyster habitat on the North West Shelf
In July, Dr Michele Thums led a field trip to deploy the first satellite tag on a pygmy blue whale off Ningaloo for the Northwest Shoals to Shore Research Program.

Pygmy blue whales, up to 24 metres long, aggregate in the Perth Canyon for feeding and migrate along the WA coast to the Banda Sea in Timor for breeding in winter.

Previous tagging has occurred in the Perth Canyon but there is a paucity of data from the North West Shelf.

Michele and the team set out to attempt to tag at Ningaloo on the northern migration and are also planning to tag at Ashmore Reef on the southern migration in October.

The tags (called limpet tags) being used provide high spatial resolution location estimates, crucial for identifying important foraging areas along their migration, which is a key goal of this project.

The research was done in collaboration with the Centre for Whale Research on board the RV Whale Song.

The whales were located acoustically via the use of sonobuoys and also a spotter plane.
Green Turtle Highway (from page 1)

Threatened Species

The satellite tracking data from green and hawksbill turtles tagged by AIMS in late 2017 have been combined with multiple existing satellite tracking datasets from these species on the North West Shelf.

The final dataset comprises the tracks of 95 green turtles and 41 hawksbills, with coverage of all the main nesting beaches across the North West Shelf.

We are using this large dataset to quantify the at-sea distributions, to identify important areas associated with nesting, foraging and migration, and assess overlap with potential pressures.

A common migratory pathway has been identified near the coast where the movements of turtles overlap during their migration from the nesting site to foraging grounds. We have also established that green turtles across the stock do not seem to have a common feeding ground, with individual turtles using relatively discrete areas during foraging.

Results for the hawksbill turtles and also the results of our analysis of pressures will be in the next edition.

On the horizon

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**Marine Noise**

**Seabed Biodiversity**

**Threatened Species**

**Reef Monitoring**

October 2019

**Theme: Isolated Coral Reef Atolls**
Collect physical oceanographic data and predatory fish and shark data at Rowley Shoals.

**Theme: Threatened Species**
Attach satellite trackers to pygmy blue whales at Ashmore Reef during their southward bound migration.

**Theme: Seabed habitats and biodiversity**
Finalise sampling on the Ancient Coastline KEF.

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1 The data includes research results provided by the Department of Biodiversity Conservation and Attractions, Woodside, Inpex and Pendoley Environmental.
Mermaid Reef is one of three atolls of the Rowley Shoals located on the edge of the northwestern Australian continental shelf. It is regularly exposed to a combination of energetic wave and tide conditions, making it an ideal site to investigate how waves and tides interact in a non-linear way to influence the overall circulation of coral reef atolls.

Using the findings of a unique one-year experiment monitoring surface waves, currents and water levels at several locations spanning the reef flat, lagoon, and channel regions of the atoll, we want to quantify how both wave and tidal forcing drive the circulation and flushing of this reef system. Very few atolls around the world have demonstrated to be both wave and tide dominated.

The incorporation of numerical simulations integrating high-resolution LiDAR bathymetry and offshore forcing, by both water levels and incident wave conditions, will allow us to resolve the detailed hydrodynamics of the entire reef at very fine resolution (~30m), including the dominant flow pathways and connectivity patterns.

The combination of in situ observations and numerical simulations provide a key insight into the physical processes controlling the movement of water masses, which ultimately contribute to regulate many of the biological and chemical processes within reef systems.

Building Capacity in Research

Camille Grimaldi received the 2019 Diversity Journal Award for Coral Reef Research for her PhD work at the Australian Institute of Marine Science (AIMS) in collaboration with The University of Western Australia.

Camille’s research fits into the AIMS North West Shoals to Shore Research Program goal to better understand the isolated coral reef systems (e.g. Rowley Shoals, Scott Reef and Ashmore Reef) of the North West Shelf of Australia. Led by Dr James Gilmour, The Isolated Coral Reef Atolls project has been studying the ecological importance of the coral reefs and Camille’s PhD will provide a better understanding of the physical oceanography around and within those reefs.

Originally from France, where she did her undergraduate studies, Camille graduated from a joint MSc in Marine Environment and Resources at the University of Southampton (UK), Bordeaux (France) and Bilbao (Spain) with master’s research project at Scripps Institution of Oceanography (SIO; USA).

For more information on the full program, head to www.aims.gov.au/nw-shoals-to-shore