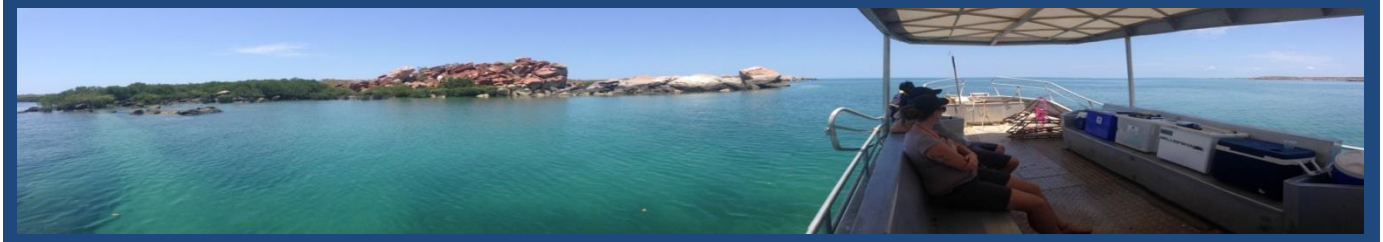
OCTOBER **KIMBERLEY MARINE** RESEARCH STATION ● CYGNET BAY 2015



Seeding at KMRS

With the beginning of the wet season soon approaching, the team here at Cygnet Bay is quickly declining, as both staff and tourists make their way south to avoid the oncoming heat. Thats not to say that operations have slowed at all, with activity in the hatchery still bustling. October is the month when first operations begins; the process that prepares the oysters for pearl production.

At this stage the oysters have now spent between 2-3 years maturing at sea, they are then brought into the hatchery and placed in large tanks filled with sea water, which helps to reduce stress. It is then our job as interns to gently pry open the shell, peg it (see *figures 1 and 3*), and position the oysters for first operations.

Our talented technician Garata then makes a small incision in the gonad where he inserts a nucleus and a small piece of mantle tissue, from a sacrificed oyster (see *figure 2*).

The oyster is then mounted in panels and taken back out to sea where they are attached to either floating or bottom lines. They will stay in this position for several years, allowing the oysters sufficient time to coat the nucleus with nacre to form the valuable pearl.

Figures 1-4, L-R: Maddi preparing to peg the oyster, Garata seeding the Oyster, Hayley pegging, Garata cutting the mantle tissue.

What's new with the interns

Figure 5. L-R: Tilly, Maddi, Hayley, Garata and Mat out on the cleaning boat

I'm Hayley, the latest intern at KMRS. As with many of the other interns, I have recently completed my degree in Marine and Environmental Science. I am enjoying the whole experience KMRS has to offer, from learning the commercial fishing/aquaculture side of the Pearl Oyster operations, to helping out the visiting researchers.

Hi I'm Maddi, I arrived a little unexpectedly a couple of weeks after Hayley. My boyfriend and I are travelling around Australia at the moment and stumbled upon Cygnet Bay Pearl Farm. I was extremely excited to have been offered the opportunity to join the team here as an intern. Hayley and I studied our Bachelor of science together at Murdoch University and are excited that we are now working in the field together.

Life at Cygnet Bay

One of the perks as an intern is being able to jump on board with some of the fantastic tours the Cygnet Bay Pearl Farm provides. Allowing us to experience the fascinating giant tides of the region, along with exploring some of the many islands of the Buccaneer Archipelago.

The Kimberley remains one of the last healthy refuges for a vast array of marine wildlife, which we have been lucky to encounter on a daily basis here at Cygnet Bay. This includes; dolphins, turtles, sharks, large schools of fish, crocs, shovel nose sharks and mud crabs.

Figures 6-8 L-R: Early morning tour of the pearl farm; some of the pearling crew with shell for the hatchery; turtle swimming next to the long lines-(photo credit Ben Leeson)

Research at KMRS

All the researchers that visited KMRS during our stay were working in collaboration with the Bardi Jawi Rangers, who share their wealth of knowledge and experience. The data they collect can be used towards developing a baseline study for this pristine region. This will help understand the ecological processes occurring and their resilience to possible future impacts.

October 4rd – 13th : A collaboration between AIMS, WAMSI, UWA & Bardi Jawi Rangers

"Juvenile Fish Recruitment Dynamics"

Figure 9. Milly preparing the BRUVS on Atalanta IV

The beginning of October we had the first group of researchers visit KMRS. There were two teams, one concentrating on coral recruitment, and the other focusing on fish recruitment dynamics. I was able to accompany the teams out on the water to their chosen study sites and observe their fieldwork methodology.

Martial Depczynski from AIMS and Camilla Piggott an AIMS and UWA PhD student, were investigating the spatial and temporal variability of fish recruitment processes between various habitats; seagrass, mangroves, coral and algae. This was conducted by deploying baited and unbaited RUVS (Remote Underwater Video Stations) onto the seafloor of the chosen habitats (see *figure 9.*), which identifies the abundance and diversity of juvenile fish. This type of research is highly important for the Kimberley region to assist in future fisheries management and help understand and protect essential nursery areas.

"Coral Communities"

Figure 10. Bardi Jawi Ranger on a fishing break

The coral team; James Gilmour and Kylie Cook are working on an ongoing project studying the spatial and temporal patterns of coral communities in the Kimberley region. Using a steel frame with terracotta plates as a structure for coral to colonise *(see figure 12),* they are able to observe when the different corals recruit. This research aims to understand the timing of reproduction by corals in the Kimberley and to compare the numbers recruiting to other reefs.

Both research teams were joined by the Bardi Jawi Rangers whose extensive knowledge of the surrounding islands helped to identify the biological hotspots that provide the most suitable study sites, (as well as the good fishing sites! - *see figure 10.*).

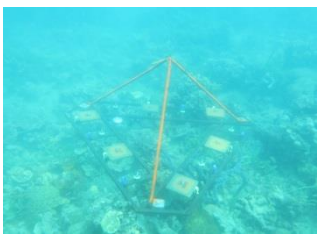


Figure 11 & 12, T-B: Acropora coral, Coral recruitment frame in-situ (photo credit: James Gilmour)

October 23rd- 2nd November: A collaboration between CSIRO, WAMSI, UWA & Bardi Jawi Rangers

"Kimberley Soft Sediment Habitats"

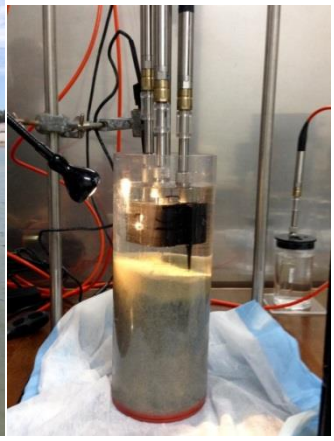


Figure 13 & 14, L-R: James and Jim deploying the benthic chamber, Sediment Core being sampled for O_2, H_2S and pH.

We welcomed the second group of scientists later that month; James McLaughlin and Jim Greenwood from CSIRO. The research they are conducting aims to assess the biogeochemical processes occurring in the soft sediments of the nearshore marine environment of Cygnet Bay, Jologo Beach at Ardyloon (One Arm Point), and Sunday Island. They measure a range of water quality parameters via deploying a benthic chamber *(seen in Figure 13)* to collect sea water samples for later analysis.

Sediment cores *(figure 14)* are also collected from low to high tide mark to assess benthic micro-algae community composition and biomass. This is obtained by measuring chlorophyll concentration, pigment content and the redox reactions occurring within the sediment. This data will then be used to determine the carbon and nutrient dynamics of the study areas.

Figure 15. Mat recording grazing data

Figure 17. Mel and Hayley on the way to the Jalan Reef sample site.

"Seagrass Productivity & Grazing"

Mat Vanderklift, Douglas Bearham, and Melanie Trapon from CSIRO, as well as Andrea Perez from UWA arrived a couple of days later. Their main objective was to examine aspects of the seagrass communities inhabiting the areas around Jalan Reef and Sunday Island. Deciphering when, where and what is grazing on the seagrass meadows is a vital tool in understanding the overarching seagrass ecosystem. To determine herbivore activities; mouth morphology *(see figure 16.)*, rate of consumption and stable isotope analysis of mangrove, seagrass and sargassum leaves were considered. Their results found that small fish, such as the common 'rabbitfish' and turtles, were the predominant grazers at these study sites. These findings are supplemented by gut content analysis of the herbivores and satellite data obtained from turtle tagging that was conducted on a previous trip to KMRS.

Figure 16. Fish bite mark on seagrass leaf!

The other aspects of seagrass ecology considered were; growth rate, above and below sediment biomass, seagrass reproduction and seasonal dynamics of sargassum.

Photo of the Month

Monkey Fish (Bardi name: Gaadiliny) ***Opistognathus reticulatus:***

Are found in coastal waters on rubble or soft sediments. They typically reside in burrows they construct by sucking up sand and expelling it elsewhere to create a hole. They then 'decorate' the opening of their burrow with coral rubble and shells. I was lucky enough this Monkey Fish enjoys posing for tourists at the One Arm Point Hatchery.

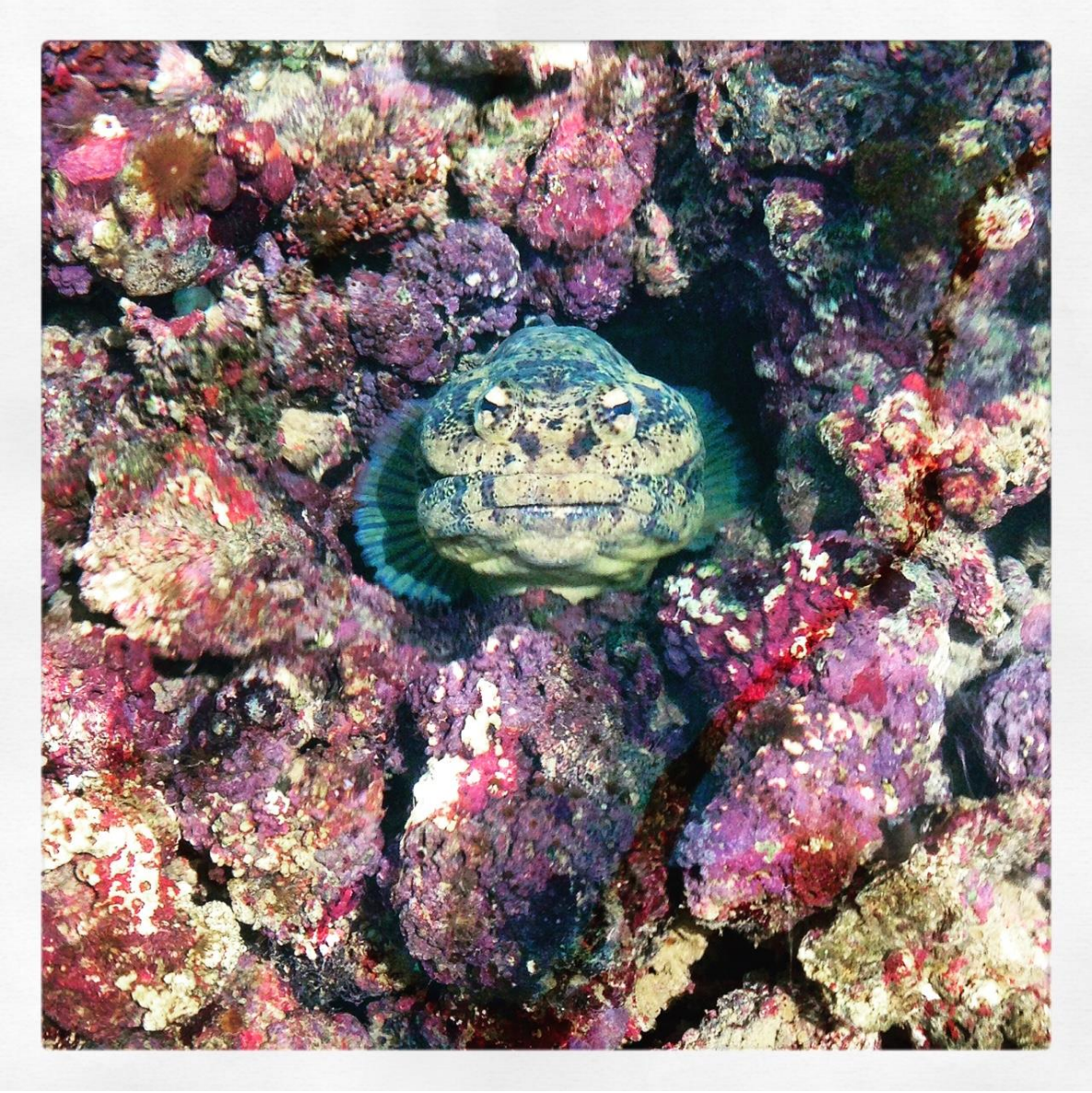


Photo credit: Hayley Woodland

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