MINKE WHALE PROJECT RESEARCH NEWSLETTER // ISSUE #15 // 7 June 2023

MINKE WHALE PROJECT

Retrospect: A Look Back at 2020 – 2022

The Minke Whale Project research team is excited to continue our work in the 2023 Field Season – our 28th consecutive year! When COVID-19 was picking up in March 2020, we made the hard decision to stand down our new cohort of volunteers as part of our team relocated overseas and the borders were closing. While we were disappointed to have to slow our behind-the-scenes work, the safety and well-being of our volunteers was our top priority. We did, however, continue our fieldwork in the 2020 and 2021 Field Seasons, albeit at a reduced level. We were excited to take on a new cohort of volunteers in time for the 2022 Season and another in the lead up to 2023 (see page 2). We are very excited to continue our unique research collaboration with our partners in the dive tourism industry, studying the only known aggregation area in the world! We are also looking forward to engaging with guests and sharing our research with a wider audience. Dwarf minke whales are incredibly interesting, exquisitely beautiful and extraordinarily interactive and we are immensely grateful for the opportunity to continue our research and contribute to knowledge about these fascinating animals.

MEET THE 2023 MWP TEAM

The Minke Whale Project is excited to announce the appointment of Claire Barr as Project Operations and Data Coordinator through to the end of 2023.

IN THIS ISSUE

In this role, Claire assists in season coordination as well as managing our volunteer cohort and data tasks. Claire has been a MWP Volunteer and research assistant with our team since 2018, and we are thrilled to have her bring her experience and knowledge into this role.

In addition to Claire's appointment, we are also excited to welcome six new volunteers to the Minke Whale Project, joining the continuing team of Dr Alastair Birtles, Dr Naomi Gardiner, Dr Matt Curnock, and PhD candidate Suzanne Hillcoat. These individuals will play a vital role in our research efforts by assisting with data collection and analysis, as well as other important tasks such as photo-ID.

Our 1st (of five) Minke Whale Project Volunteer Training Workshops, November 2022. From left to right and back to front: Suzanne Hillcoat, Alastair Birtles, Claire Barr, Lauren Beattie, Caylee Lindsay, Clancy Box, Olivia Crawley, Naomi Gardiner, Tia Ngo Nguyen, Naema Gros Dubois, Hanna Shrubshall, Madi Lacy. Image ©MWP

We are grateful to have such a dedicated and talented team working to advance our understanding of dwarf minke whales in the Great Barrier Reef and look forward to making lots of progress in our research efforts in 2023.

2022 MINKE SEASON

Last year, the Minke Whale Project conducted its 27th field season in the northern Great Barrier Reef. Some highlights included:

- Over 22,000 images collected at sea
- 524 whales seen between May and August
- 186 encounters with whales, 81 in-water encounters
- 18 researchers in the field
- 194 researcher days at sea

UPCOMING RESEARCH

Unravelling the Mystery of Minke Calves

Claire Barr is embarking on a Masters project this year to study dwarf minke whale mother and calf pairs in the Great Barrier Reef, supervised by Alastair and Naomi. Only a few sightings are recorded every year, meaning very little is known about dwarf minke whale calves.

To address this knowledge gap, Claire will be investigating all sightings in the last 27 years of fieldwork by the Minke Whale Project. By analysing sighting information, imagery, breathing rate data, and length measurements, she hopes to gain insights into their calving locations, how mothers with calves use the GBR aggregation area, and what calf development looks like in the first few months of life.

Claire is hoping fervently (!) to make the first ever resight of a calf within the interacting population using our ever-growing Minke Whale Project Photo-ID Catalogue. This would provide valuable information on the potential social bonds within this population as well as calf biology and recruitment into the interacting population.

Overall, Claire's research has the potential to greatly expand our understanding of the ecology and behaviour of dwarf minke whale mothers and calves in the GBR. Her findings will be invaluable in informing conservation efforts for this species, as well as broadening our understanding of this little-known whale.

Using AI to identify individual minkes

In 2018 and 2019, with the help of highly experienced JCU IT specialists Dr Dmitry Konovalov and Kent Adams, we made substantial progress in developing an artificial neural network that can distinguish minke whales within our collected underwater imagery. The work continues this year, and we aim to be using it to identify individual

minke whales in the near future! To see our publications on this topic, see the 'MWP Research Outputs' section.

RECENT RESEARCH

Clancy Box: Abundance Patterns

Clancy Box completed her Honours in 2022 supervised by Alastair, Naomi and Dr Putu Lisa Mustika. She investigated patterns of relative minke whale abundance in the northern GBR and what factors might be influencing these patterns. She analysed the spatial and temporal variations in boat search effort within the 2017 and 2018 Field Seasons and found that the highest concentration of sightings per unit effort were around Ribbon Reefs #9/10, which is consistent with previous research conducted by the Minke Whale Project.

Clancy then investigated the influence of several factors on the number of whales in an encounter, including wind speed, depth, tidal variation, lunar phase, sea temperature, and vessel status (stationary or drifting). She found that the models created to test the influence of environmental variables on whale relative abundances accounted for 24.7% and 40.5% of the variance in the number of whales per encounter for 2017 and 2018, respectively. There were significant relationships between the number of whales per encounter and wind, tide, and depth in both years. Further investigation found that drift encounter size decreased with increased wind speed, and generally increased with drift distance.

Marissa Hutchings: Colour Patterns

Marissa Hutchings was a MWP volunteer in 2019 who then completed her Honours with the MWP in 2020, detailing dwarf minke whale colour pattern complexity and investigating its likely functional significance. She was supervised by Alastair and JCU A/Profs Mark Hamann and Scott Smithers. Building upon previous work, Marissa developed a system for categorising dwarf minke whale colour patterns then assessed the variation, asymmetry, association and temporal stability of colour pattern components in over 100 photo identified individuals. This revealed a high level of asymmetric colour pattern variation that did not change through time. White markings were found to be dominant and strongly associated on the right side of the body. She hypothesised that dwarf minke whale colour patterns had roles in predator concealment, intraspecific communication and foraging. Her work also investigated the possibility of sexual dichromatism in dwarf minke whale colour patterns, which would have been very useful for sexing individuals in the field and through photo-ID. Very sadly, she found there was no difference at all between male and female colour patterns!

Marissa presented this research at the 2022 Australian Marine Sciences Association Conference and has recently had a fully refereed paper published in the prestigious Marine Mammal Science (see 'Research Publications' section). She is now a PhD candidate at Flinders University in Adelaide, South Australia, investigating the phenotypic traits, allometry, spatiotemporal distribution and population dynamics of killer whales around Australia.

Lauren Missen: Genetics

JCU Masters student Laura Missen completed her project in 2020 using free-floating sloughed skin samples collected in 2017-2020. She was supervised by Alastair, Prof Kyall Zenger and Drs Lynne van Herwerden and Nikolaos Andreakis. Using this expanded dataset and higher quality DNA than in previous studies, Laura was able to confirm that our GBR dwarf minke whales are genetically distinct from other minke whale populations. As minke whales are considered of Least Concern by the IUCN, it is clear that taxonomic revision is required to substantiate that our dwarf minke whales are a distinct population, and should therefore be managed as a separate unit. Since these whales have been susceptible to past Japanese commercial whaling in the Southern Ocean, it is critical to monitor the GBR population, as the effects of whaling are still unknown. Since completing her Masters, Laura has moved to Perth to work at the University of Western Australia where she will be using eDNA to sequence the genomes of Australian marine animals. Hopefully these new techniques will help in being able to sequence the genome of dwarf minke whales in the future!

FIELD SEASON THROUGH A VOLUNTEERS EYES

Written by Hanna Shrubshall and Tia Ngo Nguyen

As a Minke Whale Project Volunteer, there is a lot that goes into the lead up to your first interaction with the elusive dwarf minke whale. From workshops learning about the Code of Conduct to the ins and outs of data management and taking accurate observations in the field. The anticipation builds up between Field Seasons as we eagerly sit

on the edge of our seats, inputting encounter summary data while envisioning ourselves face to face with such a magnificent species. Then the day comes when you are out in the field and you spot your first white glow of a minke underbelly or a dorsal fin popping up near the boat – it is go time, and it is absolutely exhilarating!

From that moment you get to put everything you have learned into action, recording invaluable information on this species such as *How far is the minke from the boat? In what direction? How many are there? What behaviours are they demonstrating? Is there a calf?* followed by sharing and reflecting upon this experience with the MWP team, the dive crew, and the passengers – it's an unforgettable experience. Being part of the MWP is more than just another volunteer gig, it's like joining a family.

MWP RESEARCH OUTPUTS

The last few years have seen multiple Minke Whale Project researchers publish their findings. Substantial work has been completed with artificial intelligence, resulting in an artificial neural network that can distinguish whales within imagery. PhD candidate Suzanne Hillcoat has also published part of her methodology, and most recently, we have published about the colour pattern complexity in dwarf minke whales, based on Marissa Hutchings 2020 Honours work. Ask your onboard MWP researcher if you want to see copies of our recent research:

Curnock, M., et al. (2019). Monitoring whales within the Reef 2050 Integrated Monitoring and Reporting Program: final report of the whales team in the megafauna expert group. Great Barrier Reef Marine Park Authority.

Hillcoat, S.K., et al. (2021). Developing protocols for in-water morphometric measurements of cetaceans using stereo-videogrammetry. Marine Mammal Science, 37(1), 45-63.

Hutchings, M.J., et al. (2023). Colour pattern complexity in dwarf minke whales (Balaenoptera acutorostrata) of the northern Great Barrier Reef of Australia. Marine Mammal Science, https://doi.org/10.1111/mms.13013

Konovalov, D.A., et al. (2020). Automatic Sorting of Dwarf Minke Whale Underwater Images. Information, 11(4), 200.

Konovalov, D.A., et al. (2018). Individual Minke Whale Recognition Using Deep Learning Convolutional Neural Networks. Journal of Geoscience and Environment Protection, 6, 25-36.

Ramirez-Flores, O., Birtles, A., Pazmino, D., Zenger, K. R., & Van-Herwerden, L. (2019). Dwarf minke whales from the South Pacific share a matrilineal lineage distinct from *Balaenoptera acutorostrata acutorostrata* and *B. a. scammoni*. Australian Mammalogy, 41(2), 231-240.

FUNDING UPDATE

Our lab operations throughout the year, the 2023 Field Season costs and Claire's p/t position are all being entirely funded from passenger donations. We are profoundly grateful for this outstanding support for our research.

A FINAL MESSAGE FROM ALASTAIR

I hope it isn't (my final one!) although I have been battling a few health issues since last Season, including a new hip in early April. However, lots of hard work and physio-directed exercise has me already walking, swimming and finning pretty well. I'm now Adjunct Professor of Marine Biology at JCU and still enjoying exploring the many "mysteries of the minkes" and very excited about meeting up with old friends (whales and people!) in what is my 28th Field Season and a >30 year involvement with the Minke Whale Project. As well as the pleasure of co-supervising Claire's research project (see p.1) with Naomi, we are just beginning an exciting new genetics project with Masters student Caylee Lindsay, supervised by Prof Zenger and Dr Andreakis. Apart from this, I have acquired a wonderful new role as Grandad over the last few years with five grandkids (all under four years) and one more due in October!

I'm really pleased that we have been able to train a new cohort of MWP Volunteers in 2023 to assist in our research and I very much look forward to mentoring them during the 2023 Season.

Contact Us

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