Title: 'Ocean wanderer'

Description: An impressionistic version of stormy seas and a mollymawk

Photographer's name: Noelle Bennett

Where and when: Rarangi Beach. Marlborough, June 2021.

Sustainability: New Zealand is no stranger to storms, in fact some of the largest on the planet frequently brush past us in the Southern Ocean. And not to be outdone, significant tropical storms develop to our north and sometimes drop south and hit us. More than half of Aotearoa New Zealand juts out south directly into the "roaring forties" and its belt of strong westerly winds so we're in the perfect place to experience nature's fury.

So what is significant about being in the roaring forties? With no land other than Tasmania and the very southern portion of South America to get in their way and slow those winds down, it's no real surprise that New Zealand gets blasted. Also New Zealand is where mild air temperatures from the north meet cooler air from the south and that all creates - well, the recipe for a perfect storm (sorry)!

When a storm hits we often discuss travel conditions. Will flights be impacted? And what about the roads? Will they be flooded? Around my neck of the woods, the conversation always strays to how the seas will affect ferry travel across Cook Strait. It is not in the least bit unusual to get winds in excess of 55 knots (101 kph) and if those winds have any southerly element to them, the seas in the Strait build to give wave heights in excess of six, seven or even eight metres! The ferries stop running, the sea state becomes wild and confused. And yet the white-capped mollymawk has perfected flight in these conditions, wheeling effortlessly just above those wild waves on its long, narrow, stiffly held wings.

Mollymawks are part of a bigger group of 'Procellariiformes', the "tube nosed" seabirds, that include albatrosses, shearwaters and petrels. These long-distance travellers that adjust their wings in response to minute shifts in air pressure as wind fluxes over the waves – so they gain a lift and speed from minute updrafts caused by wind hitting

waves. Most people think of the sea as uniform, but in reality food is concentrated in patches (think oases in a wet desert) that may be far away from a mollymawk's nest. So there is a need to get to and from the feeding areas to feed the chick as quickly as possible. Their flight speed and gliding skill are spectacular, in part to minimise energetic costs and allow them to find high-quality foods from further away without letting their chicks starve. Albatrosses and shearwaters make the feeding trips more efficient by converting the food into 'proventricular oils' – the raw food is digested at the distant feeding zone and then converted into a high-energy oil which is secreted back into their 'stomach' for the 1000 km journey home to the chick. The proventricular oils save on bulk and weight for efficient and fast return to the nest and the chicks receive a super high-octane fuel for rapid growth.

The strength and direction of the winds is crucial for the efficiency of this whole system, so it's no surprise that the roaring forties are important for many seabirds. New Zealand is often said to be the "seabird capital of the world", and we can largely thank wind for this biodiversity.

So might these storms get worse with climate change? Well, research suggests that the winds are stronger now than at any time in the past 1,000 years, possibly because greenhouse gases are causing the winds to intensify. However, there may be just a hint of positive news for New Zealand. Researchers also believe the roaring forties have moved between two and five degrees closer to the South Pole. Large changes in wind force and direction are triggered by the "El Niño – La Niña" climate oscillation. Many sooty shearwater adults die and nests fail in upcoming El Niño conditions. It is not yet known if we will get more El Niños, or more intense ones, with climate change. So it's a case of watch this space.

Photographer's notes: Often when I'm taking a photograph, I don't want it to simply be a pictorial representation of what I see. What I really want is for it to convey a feeling or impression of the scene and that is what I wanted to produce here. I hope you, as the viewer, can feel the raw power of the sea as the mollymawk glides effortlessly over the waves.

Photo specs: This image is a composite that was produced from two images, one of which used intentional camera movement (ICM) as the technique to produce it in order to achieve the impressionistic feeling of the image. Technical specs: The main image (the sea and sky) was taken using a Panasonic DC-G9 camera and a Panasonic Lumix G-Vario 12-35mm f/2.8 lens. Exposure details - 0.77sec at f11 with an ISO of 100 and a focal length of 28mm (56mm full frame equivalent).

Digital specs: 7706 x 5777 pixels (44.52MP) @ 300dpi

Key words: wind, roaring forties, ocean, sea, coast, marine, mollymawk, white-capped mollymawk, storm, waves, climate change, drama, flight, clouds, sky, colour, ICM, impressionistic, Noelle Bennett, Ecosystems Photography, sustainability.

Price: $300 (incl. GST) for use of the digital image. Visit www.ecosystemsphotography/sales for details & to order, or to get a quote if you would like a high-quality print.

Donation: The price includes a $100 donation to a sustainability organisation or project of your choice, or otherwise for WWF-NZ.

We recommend that the donation goes to WWF-NZ because of their action to mitigate and adapt to climate change https://www.wwf.org.nz/what_we_do/climateaction/new_zealand_impacts/. They apply evidence-based environmental advocacy and support education and community-led action.

Image ref: NB#025 (please use this reference in all orders and correspondence).

Noelle Bennett
26 December 2021