

## Lord Howe Island Marine Park News

### Reef Life Survey

*Reef Life Survey* (RLS) divers returned to the Lord Howe Island Marine Park (LHIMP) in March to continue long-term monitoring of biodiversity. With support from LHIMP staff and local dive company Dive Lord Howe, the volunteer divers undertook a massive survey effort completing 82 surveys across 32 long-term monitoring sites. During these surveys fish, invertebrates and benthic organisms (i.e. coral and algae) were recorded by SCUBA divers at each site using standardised methods.

Alongside an abundance of colourful and widespread Indo-Pacific species, highlights for the survey team included endemic species unique to the LHIMP and surrounding region such as McCulloch's anemonefish (*Amphiprion mccullochi*). The team also recorded some of the marine parks larger residents, including Galapagos whaler sharks (*Carcharhinus galapagensis*), black rockcod (*Epinephelus daemeli*), and yellow-tail kingfish (*Serolia lalandi*).



*Members of this year's RLS team ascending to the surface after completing underwater biodiversity surveys. Photo credit Antonia Cooper.*

These standardised surveys have been undertaken every 2 years since 2006, with trained RLS citizen scientists taking them on since 2009. Data from RLS surveys have made important contributions to our knowledge of environmental values in the LHIMP, including the distribution and abundances of endemic species and ecological baselines to compare change against. Being the longest continuous data set for the marine park, it is also crucial for monitoring reef health, recovery from impacts, and other emerging ecological trends.

Data from this year's surveys will play an important role in assessing impacts and recovery from the recent coral bleaching event as well as fluctuations in the natural boom-and-bust urchin species *Tripneustes australiae*. The importance of this data was on the minds of this year's survey team, who went above and beyond in their efforts both underwater and behind computer screens entering data. This data will feed into the National Reef Monitoring Network Database and key findings will also be communicated directly with LHIMP staff.

RLS is an outstanding Australian citizen science project, and their website is a fantastic resource to learn about their efforts and approach to citizen science: <https://reeflifesurvey.com>. The organisation has also launched an online interactive tool called Reef Life Explorer, to make information about global reef health more accessible: <https://reeflifesurvey.com/explorer>. Any residents interested in becoming RLS members are welcome to contact marine park staff for further information.

## Lord Howe Island Marine Park News

### Who pulled the plug out?

In early May, Lord Howe Island residents and visitors were surprised to see extreme low tides as the sea level fell below zero. This gave the appearance of someone pulling the plug out of the lagoon and left 35-40cm of coral high and dry.

Tides are caused by the gravity of the sun and moon pulling on the ocean and causing it to bulge. As the earth rotates relative to these bulges, they are experienced as high tides, with low tides in between. Tides can, therefore, be predicted years in advance based on the relative position of the earth, sun and moon.

However, the LHIMP experiences extreme variations to these predictions, known as tidal anomalies. One factor driving anomalies are intense circular currents known as ocean eddies which occur here. Eddies form as the southward flowing East Australian Current peels away from the coastline of mainland Australia, spinning offshore towards the island as vortices which can be hundreds of kilometres wide and persist for months.

Anticlockwise eddies of warm water draw the sea surface level upwards, creating positive tidal anomalies. In contrast, clockwise eddies of cooler water draw the sea surface downwards like a giant whirlpool, creating negative tidal anomalies. Other factors influence anomalies including air pressure (i.e. low pressure storm cells can cause positive tidal anomalies) and ocean swell, making them very difficult to predict.

Consequently, tidal anomalies often catch local residents and marine life by surprise. When they coincide with the lowest tides of the month, negative anomalies can result in sea levels falling below zero, as occurred from May 5 to 12 this year. This disrupts local boating when water is too shallow to navigate through the lagoon, including for the supply ship *Island Trader*.

It can also impact shallow reefs when the top layer of coral dries out and is repeatedly exposed to wind and sunlight. This last occurred in September 2022, and LHIMP staff monitored exposed corals, with the surface layer of many colonies dying but their bases remaining alive and regrowing to their previous height within 18 months. LHIMP staff also monitored the May 2024 event, during which water levels fell 22cm below zero, resulting in mortality of the top 15-20cm of shallow corals throughout the lagoon. LHIMP staff will continue to monitor the impacts and recovery of corals following both the summer bleaching event and this low tide exposure.

While extreme, these were not the lowest recorded tides in the LHIMP. Since 1994 Manly Hydraulics Laboratory (MHL) has maintained a water level gauge at Lord Howe Island wharf on behalf of the NSW Office of Environment and Heritage. Data from this gauge document anomalies as the 'residual' between predicted and recorded tidal level. The lowest recorded tides (28cm below zero) occurred in 2010.

You can view the near-real time tidal levels and residuals for Lord Howe Island at: <https://mhl.nsw.gov.au/Station-240402>. This link is also provided in the 2024 Tidal Predictions Booklet available at the LHIMP Office. A short-term forecast of tidal anomalies (also called sea level anomaly) around Lord Howe Island is also provided by the Bureau of Meteorology at: <http://www.bom.gov.au/oceanography/forecasts/idyoc300.shtml?region=LordHowe&forecast=SLACur>



*Coral in the LHIMP exposed to air during extreme low tide. Photo credit NSW DPI.*