

CONSERVATION NEWS
June-July 2023

General meetings:
21 June, 19 July, 1 pm,
Caloundra Power Boat Club

Executive meetings: TBA

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**Our thanks to Caloundra MP
Jason Hunt and staff for
their kind support in the
photocopying of
*Conservation News***



Celebrating Our 60th Year

From the April & May Meetings

At Cr Terry Landsberg's Division 2 meeting Claire gave our appreciative response to the release of the Shelly/Moffat Study findings and plans, and raised issues re the negative impact on migratory shorebirds of off-leash dogs on sandbanks. Claire will attend the Caloundra Chamber of Commerce President's Breakfast in June.

Sunshine Coast Council Draft Macropod Conservation Plan: Members were notified of the opportunity to respond to the Council's survey (including reporting sightings) by 5 June: In a comment separate to her submission on WPSQ's behalf (below), Elaine straightforwardly notes:

'The strategy for the survival of macropods is really quite simple. Instead of counting live and dead creatures, declare them Locally Significant under State Planning Policy 2016 and get some teeth into conditions on all development to preserve existing habitat and connectivity to green spaces.'

On behalf of the Branch, Elaine made the following response after discussion with Dr Elizabeth Brunton.

'*Wildlife* welcomes Council's plan to conserve macropods and comments are offered in a spirit of constructive criticism. In general the document is over-arching and lacks specific targets or measurable outcomes and a local context where existing populations are known to exist. The development and monitoring of locally specific targets would greatly facilitate public engagement.

The lack of up to date data underpinning the plan is a handicap and some data is probably about 5 years out of date in line with research undertaken by Dr Beth Brunton (USC). For instance, the methodology used to identify macropod hot spots actually refers to the number of people recording macropods rather than how many macropods. Roadkill estimates are thus likely to be a severe underestimate.

The focus on the Eastern Grey kangaroo, whilst it overlooks the other species of wallabies and pademelons also under threat, is justifiable in terms of their high visibility and the imminent threats from coastal development.

Desired Outcome 2 to support protection of macropods and their habitat through Council's planning processes is the key to macropod survival, but to wait to incorporate these into the new planning scheme is simply too late for some remaining coastal populations. Twin Waters West is a case in point where a viable population of

Advance Dates

World Environment Day events (visit <https://www.wed.org.au/program>)

11 June, 10 am to 1 pm
Shared World Environment Day event with Currimundi Catchment Care Group at Bancroft's Red Gum Environmental Reserve Bancroft's Redgum Reserve opposite Daintree Bvd, Little Mountain: Select 'Events' at <https://cg.currimundicatchment.org.au>

26 June, 11 am to 2 pm
State MP Jason Hunt's Environment and Energy Forum, Caloundra Power Boat Club, Golden Beach We'll have WPSQ information available.

16 July
Entries close for the WildHeART Student Art Prize, with the exhibition from 16 September to 1 October

August/September
Sunshine Coast Wildflower Festival
Members will again lead walks, including post-Wildlife Qld AGM:
Saturday 19 August: Ben Bennett Bushland Park, with an earlier activity for small children and parents;
Thursday 24 August: Isabel Jordan Bushland Reserve;
Saturday 2 September
Currimundi (Kathleen McArthur) Conservation Park.
Details and booking information will be

macropods is under immediate threat from a new development application.

The fact that the identified species of macropods are listed as *Of Least Concern* makes it difficult to impose conditions on development to protect them. The expansion of Aura to the south and west is dispersing existing populations of macropods and pushing them towards an uncertain future existence without appropriate protected habitat. As the plan identifies, the maintenance and establishment of permanent wildlife corridors is critical to survival. However this is unlikely to be achieved without a greater commitment.

Wildlife recommends further investigation of a mechanism under State Planning Policy 2016 to enable listing of the specified species of macropods as *Locally Significant* to offer additional measures of protection.

Desired Outcome 3 to reduce injury and mortality is better late than never but the pace of implementation is simply too slow to be effective. Road kills are a daily threat to the continued existence of our macropods and actions to implement all identified measures are top priority.

A comment must be made on 3.4.1 to promote macropods as valuable tourism attractions. Whilst it may appeal to some, the place for human-wildlife interaction is in a zoo. It has known deleterious effects on wildlife and should not be used as a justification to preserve macropod populations.'

The Turtle and Shorebird Season summary for Council's BushCare volunteers was presented on 8 May. Dog off-leash areas impacting shorebird roosting areas was also raised by attendees, who look forward to a possible Council-run *Welcome to Shorebirds* event next season, extending to members of the public. It was a better-than-expected turtle season with overall high success in spite of multiple necessary re-locations.

Koala surveys in Caloundra reserves: Despite some hope that Koalas may be present in Ben Bennett Bushland Park and surrounding areas along Sugarbag Road, there were no identifications in a recent Council survey. However, numerous arboreal mammals, possibly including Squirrel gliders, were present. Sunshine Coast Council has applied for funding for further Koala habitat surveys and assessment.

Next WPSQ Branch planning session: There will be a follow-up to our recent session, with a likely date towards the end of the year.

From **Correspondence**, information noted from the Currimundi Catchment Care Group concerned the possible siting of a **desalination plant** at the Ring Tank at Meridan Plains to cater for population expansion. This earth tank was built in 1964 as storage for water piped from the Mooloolah River weir to service Caloundra.

available on Sunshine Coast Council's website. And look for the article in the Coast's free *Salt* magazine, from an interview with Jude, and our history of the Wildflower Festival, established by Kathleen McArthur.

9 September

We're hosting the State AGM at the Currimundi Recreation Centre then taking attendees on a walk in the Kathleen McArthur Conservation Park.

The AGMs are a great way to connect with other branches and their activities and issues across the southern parts of Queensland, as well as meet the wonderful hardworking folk from the branches and of course Head Office.

Bookings will be available soon on Eventbrite or via an emailed registration form.

Defining a public-relatable title for the **Regional Inter-Urban Break** was the topic raised by SCEC's Narelle McCarthy in an email to Sunshine Coast Council:

'The Sunshine Coast Environment Council, together with a number of community groups, has re-established an alliance to support and expand the campaign for the statutory protection of the full extent (as mapped by SCRC) of the Regional Inter-Urban Break (RIUB).

This work is an over-arching, complementary campaign tied to continued actions and advocacy to have Halls Creek removed altogether from the SEQ Regional Plan currently under review.'

Narelle is seeking to support Council's 'Glass House to Pumicestone Green Belt/Space (or a similar descriptor) to encourage greater and broader awareness and engagement in this critical issue' before the local alliance starts campaigning.

Response

Claire has written to Council supporting their original condition for developers of multi-storey units at Buddina, which provides for light mitigation features in the units to preserve turtle-friendly habitat on the beach:

MCU18/0190.04

2 & 6 Talinga St, 84 & 85 Pacific Blvd, & 61 & 63 Iluka Ave

'We oppose the Material Change of Use application above that requests to remove Approval conditions 70(a), (b) and (c) and request that Council reject this application for the following reasons, but not limited to:

1. The State Planning Policy (SPP) model code for Sea Turtle Sensitive Habitat Areas has been enacted and in correspondence to our organisation dated 24 August 2022, it was stated by Shanagh Jacobs, A/Group Executive, Customer and Planning Services, Sunshine Coast Council "In the interim, although the current Sunshine Coast Planning Scheme 2014 does not incorporate the model code provisions and new State Planning Policy turtle mapping, Council's Development Services branch gives consideration to the model code when assessing development applications and often conditions development approvals above the standards in this guideline. This higher standard is intended to be maintained and reflected in the New Sunshine Coast Planning Scheme."
2. Light pollution poses a serious threat to sea turtles in particular.
3. The whole of the Sunshine Coast coastline is mapped at sensitive habitat. The main species nesting on Sunshine Coast beaches are the Loggerhead turtle and, less frequently, the Green turtle. The conservation status of the Loggerhead turtle, *Caretta caretta* is:
 - Nature Conservation Act 1992: Endangered
 - Environment Protection & Biodiversity Conservation Act 1999: Endangered
 - IUCN Red List of Threatened Species: Endangered
4. Whilst all Sunshine Coast beaches have the potential for turtle nests, there are physical conditions which favour some nesting beaches. Specifically, short crescent shape beaches defined by rocky headlands. On the Sunshine Coast, Buddina and Shelly beaches typically record more nests than any other beaches.

Faunawatch Outings

Second Wednesday of the Month Walks, 8 am at Maroochy Regional Bushland Botanic Gardens: 14 June, 12 July, 9 August

Fourth Monday of the Month walks, 8 am:

Monday 26 June, 8 am Fairview Walk, Wetland Section, at the end of Porter's Lane, North Maleny. The Sunshine Coast Council has done a great job in creating 'Fairview Walk' so it is time to go back and look at the western end and the wetlands to see what is using the site.

Meeting point: End of Porter's Lane, 600 m past Barung Landcare native Nursery.

Monday 24 July, 8 am Currimundi (Kathleen McArthur) Conservation Park

Named in honour of one of Wildlife Qld's founders, and our Branch founder, this park protects wallum heathland, woodland and dune plant communities that once covered areas of the Sunshine Coast, and forms a refuge for its fauna.

Meeting point: Park on the corner of Coongarra Esplanade and Bareki Street, Wurtulla

No outing in August due to the Wildflower Festival

5. Removal of these approval conditions will increase the severity of known impacts (artificial light at night) on the endangered Loggerhead turtle & their nesting habitat at Buddina.

6. Removal of these approval conditions removes compliance criteria protecting an endangered species, introduces uncertainty and inconsistencies for developers and goes against your planning advice as detailed to us in your letter dated 24 August 2022 that higher standards will be maintained.'

Claire also raised the SCC Biosphere status and Climate Declaration as drivers for good planning.

Updates

Shelly Beach to Moffat Beach Study

The outcomes of this protracted Study were presented to participating interest groups on 19, 21 and 22 April, and the reports and other documentation are available at:

<https://haveyoursay.sunshinecoast.qld.gov.au/shelly-beach-moffat-beach-coastal-study>

The major outcome, with a focus on successful turtle nesting, is a 40-metre-transect trial across the Shelly Beach dune. Cottontrees and their root systems will be removed in a narrow, seaward strip and replaced with foredune plantings (Spinifex, Beach bean, etc) and fenced to allow establishment over 20 or so months. Fencing will then be removed and turtles will be free to nest. There will be no changes to other existing vegetation on the dunes.

Ben Bennett Bushland Park/Caloundra Transport Corridor Upgrade (CTCU)

A recent Caloundra Residents Association meeting featured Active Transport Engineer Prue Oswin as guest speaker. A member of the Stakeholder Interest Group (SIG) for the joint TMR/SCRC CTCU) project, Prue provided an update on the project following the third SIG meeting, and gathered community opinion to feed into future SIG meetings as the project progresses through options assessment and detailed design. Sunshine Coast Council has advised that from 5 June until late June 2023 geotechnical (soil and rock) and environmental (flora and fauna) investigations in various locations will be part of the design process. Areas include Ben Bennett Bushland Park between Nicklin Way and Arthur Street, Bicentennial Park between Bowman Road and Omrah Avenue, Emergency Services access between Industrial Avenue and Nicklin Way and roads including West Terrace, Omrah Avenue, Oval Avenue, Gosling Street, Third Avenue, Nicklin Way and Industrial Avenue.

Point Cartwright

The Sunshine Coast Council draft masterplan for Pt Cartwright Reserve and La Balsa Park has been prepared, and while **public comment is now available until 2 July** at

<https://haveyoursay.sunshinecoast.qld.gov.au/point-cartwright-la-balsa-park-master-plan>

it is unclear if a conservation zoning for Pt Cartwright will be achieved.

Monday 25 September, 8 am

Cahill's Scrub, Peachester
This 18-ha bushland reserve has a great mix of species. Hopefully we will get another look at a Regent Bowerbird in the sun.

Meeting point: The end of Harold Place at Peachester

23 October, 8 am
Kawana Forest, Meridan Plains

This walk is part of the Climate Watch trail. We will start in Kurrajong Park before walking into Kawana Forest. With the open grasslands to the west, big eucalypts and the wallum section it should bring a good mix of species.

Meeting Point: Meet at the picnic shed in Kurrajong Park, with parking along and next to Kurrajong Crescent, Meridan Plains

27 November, 8 am
South River Park, East, South River Drive, Mooloolah Valley

After another two years of re-growth it will be interesting to see how the area is progressing.

Meeting point: By the playground on South River Drive, Mooloolah

Quentin's presentation on *Point Cartwright Reserve – A Case for Conservation* at the May meeting provided an 'overview of the nationally significant ecology, the rich Indigenous cultural heritage and the European history of the reserve – making a case for conservation. Also outlined were 'the policy and management paradigm that has led to the sustained decline in these human and natural values'. **The presentation will be available on the Wildlife Qld website and will be notified to members.**

Maleny Wood Expo

Thank you to members who kindly helped on the stall and put up with the chill in the wonderful green shade on the south bank of the Obi Obi. There was a steady stream of visitors to the adjacent environmental plant and bushcare stalls, including Council's Land for Wildlife and SCEC, and opportunities to engage about our history and present activities. The new bookmarks were a great starting point for conversations, as were Kathleen's sets of wildflower cards, and of course Jo's exquisite felted and stitched artworks in frames, which made up the raffle.

The Square would have been a success had the internet been working across the Expo site, so cash prevailed. Thank you to Elaine for her well-received short talk in the program of environmental speakers, covering 60 years of WPSQ including the background to conservation and development in her book *Piece by piece*.



Jenny and Robyn at the Wood Expo stall

Recovery of the Richmond Birdwing Butterfly workshop, presented by Matt Cecil of Wildlife Qld's RBW Butterfly Conservation Network, was fully attended by Council's BushCare volunteers and WPSQ branch members on Saturday 3 June.

The Network has operated since the 1990s with funding by WQ, working with the State DES, LandCare and other bodies in re-establishing the *Pararistolochia praevenosa* vine, required to support the butterfly's immature stage. The coastal rainforests of the Big Scrub, from the Northern Rivers to

Vale Des Ritchie OAM

Older WPSQ members will remember with fondness and respect the good-natured and hard-working Des, who throughout the 1980s, 90s and into the 2000s individually and at SCEC promoted environmental studies in schools, and educated the public in the value of the natural world. His presidency of the Woodford Folk Festival was the catalyst for the planting of 100,000 trees on the Festival site.

'His dedication and passion have motivated and changed the lives of many. Des is one of those people whose personal and community actions reflect the true meaning of sustainability – that we humans must live within, protect and enhance the bounty that nature has provided us with, for if we don't, we are robbing from future generations.'

(Sunshine Coast Environment Council)

Maryborough, were fragmented from the 1870s to the 1920s and have diminished to isolated patches subsequently. Regenerated corridors on the Sunshine Coast were well-established by the early 2000s and connections continue to be made with a minimum 3-km requirement for host vine plantings.

The butterflies produce three generations in a season from August to May, the females laying around 70 eggs, one per leaf, and after five moults the caterpillar eats a square metre of leaf before becoming a butterfly. Loss of genetic diversity is a major concern in isolated communities, so get planting if you have the right garden conditions!

The RBB Vine requires a damp soil, part shade, proximity to a slender smooth-barked supporting tree and should be staked and tied on a sisal string into the tree canopy. Mulching and frequent watering and the addition of native plant fertiliser, dolomite and seasol will favour success. *Don't* tease out the roots or damage the top tendril when planting.

Here are Wildlife Qld links to the program and factsheets:

<https://wildlife.org.au/our-work/conservation-programs/rbcn/>

RBCN: Richmond birdwing butterfly factsheets & guides

- [RBCN Recommended Nurseries Where you can Purchase Birdwing Vines](#) (updated Feb 2023)
- [How you can Help Save the Richmond Birdwing Butterfly](#) (2021)
- [Richmond Birdwing Butterfly](#) (2017)
- [Richmond Butterfly Vine and Mountain Aristolochia](#) (2017)
- [Cultivate and Care for Birdwing Butterfly Vines](#) (2016)

Matt requested GPS locations of vines to be sent to him at WQ Head Office. Our thanks to Jude for connecting Matt and the Network to Council's Environmental team.

WildHeART Student Art Prize 2023

The exhibition dates are 16 September to 1 October with entries closing on 16 July. It is still possible to personally contribute any amount of money to augment the branch allocation of \$250, so please contact Jude. Details are here: <https://botanic-garden.sunshinecoast.qld.gov.au/see-and-do/wild-heart-student-art-prize>

The State of Our Species Forum at MRBBG on 4 May

presented interesting talks from the Mycological Society, Forest Heart Nursery (on bio-threats including Bunya die-back and Myrtle Rust), and Dr Beth Brunton (on the human impacts on wildlife, with a focus on Eastern grey kangaroos in urban environments). At this Friends of Maroochy Gardens event, part of the Backyards to Biosphere series, we promoted WPSQ and Faunawatch with the new bookmarks, also selling *Piece by piece* and Kathleen's wildflower cards. It was also an opportunity to meet the new Healthy Land and Water Coordinator, Gabriela, invite her to our May meeting, and

60 Years

The link to *When the mind opens the flowers bloom: Kathleen McArthur (1915-2000) – Queensland wildflower artist, author, environmental educator and conservation advocate: a selection of paintings, writings and photographs* on the Wildlife Qld website will be sent out to members in June/July on completion of the technical task, with thanks to Paul Smith and Head Office staff Amanda Little. Thank you also to Myra for graphic design.

brief her on our connections with the Aura Advisory Stewardship Group.

Botanist Ann Moran attended the forum, and passed on the link to her detailed online entries on local plant profiles: <https://pollinatorlink.org/pollinator-link-plant-profiles/>

Faunawatch

Paul is continuing full Land for Wildlife surveys, with more to follow in mid-June. Recent sightings include Rose Robins and Little Lorikeets. Rob has four surveys to complete after his return from the UK in early June, after some locations were allocated late or changed by Sunshine Coast Council staff. Paul summarised the history and current activities of Faunawatch for Gabriela (HL&W), with input from Jill, Ken (TAPP) and others. He also explained how the locations of the Aura site surveys have changed with the expansion of the development. The Blackbutt Forest Park was discussed, and changes to Local Laws relating to Dog Off-leash areas are to be included in the agenda of the next SCC Ordinary meeting. (Pt. Cartwright is not included as it will be separately considered under the new Master Plan). Paul and others will investigate.

Faunawatch walks:

April's walk at Mt Emu north of Coolum followed a loop along the bottom of the western slope through the *E. Bancroftii* forest and back along the boundary with housing. Showers didn't diminish spirits but the birds largely stayed home, with a reduced tally of around 45 for the morning. **The walk at Koala Park at Rosemount in May** was again quiet, however a Square-tailed kite was recorded. See **Side column** for upcoming Faunawatch walks.

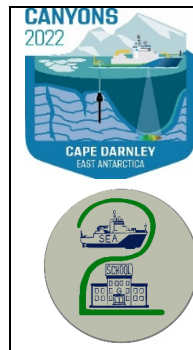
Sunshine Coast University Student Bursary Presentations

It was wonderful to share the passion of the two recipients of WPSQ's bursaries, Sonnie Flores (below, left) and Romney Edwards-Francis, and learn about their respective investigations into the habits of the Red-tailed tropicbird, and Crocodile vocalisations.



UniSC must be pleased with the high number of women achieving great things in their areas of study.

Antarctic Bottom Water



Antarctic Bottom Water production in the past: records from marine sediment

CANYONS Voyage on the RV *Investigator*

Joline Lalime

Sea2School Volunteer Education Coordinator

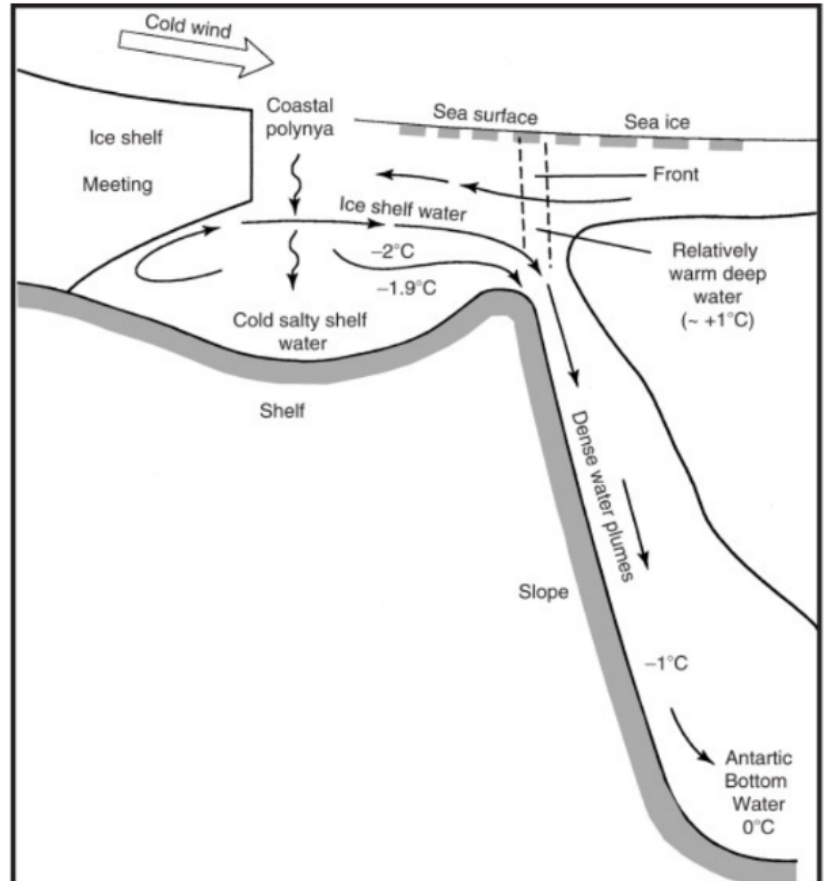
On 25 January 2023, the Research Vessel (RV) *Investigator* set sail for Antarctic waters with a team of 21 scientists, led by the Chief Investigator Alix Post from Geoscience Australia. They were off to investigate some very special Antarctic ocean water (Antarctic Bottom Water – AABW) and very special Antarctic mud (subsurface sediment core samples). Women in STEM (Science, Technology, Engineering and Maths) were well represented, making up 70% of the team. It was a collaborative research project with scientists from Geoscience Australia, CSIRO (Commonwealth Scientific and Industrial Research Organisation), the University of Tasmania, the University of Queensland, the University of Canberra, the Australian National University and the University of Tokyo. So, what is AABW and why is it important that a team of researchers travels from Australia to investigate it?



Figure 1: Me (centre) with Dr Helen Bostock (University of Qld) and Chief Investigator Dr Alix Post (Geoscience Australia). The ship is around 40 m high and 90 m long.

Referring to Figure 2 (below), katabatic winds blow off the Antarctic coastline, moving sea ice away from the coast, resulting in a polynya, an area of open water surrounded by sea ice. Katabatic winds are extremely fast winds carrying high-density air from higher elevation down a slope. The polynya allows for the formation of new sea ice, which draws

fresh water from the ocean. In turn, this leaves highly concentrated, extremely dense salty water below the newly formed sea ice, which sinks to the seabed on the continental shelf. This dense, salty water continues to slide off the continental shelf via canyons to the deepest part of the ocean. This is a continual process during the southern-hemisphere winter and the sinking, sliding, dense, salty water forms the deepest ocean layer – Antarctic Bottom Water.



There are several locations around Antarctica where ABBW is formed, with the area off Cape Darnley being relatively recently discovered and least researched. Off the Cape it is theorised that the sinking layer slides down through the Wild and Daly canyons, and scientists are curious to understand how ABBW is formed there as this region is different to other regions where ABBW is formed. Furthermore, the importance of ABBW is that it feeds into the ocean-wide phenomenon referred to as **thermohaline circulation** (temperature and salt regulated) (Figure 3), which is extremely important in keeping oceans healthy. Thermohaline circulation serves to distribute, among other things, oxygen and nutrients throughout the oceans. Ocean circulation in turn has a significant impact on Earth's climate. How does this relate to Australia? Looking again at the thermohaline circulation figure it can be clearly seen that these currents are important to ocean health around the world, including those adjacent to, and surrounding Australia. Productivity of these oceans is

reliant on a healthy thermohaline circulation which in turn is reliant on the feed-in of AABW.

Figure 2: Formation of AABW (Gordon, 2001)

Figure 3: Thermohaline circulation on a Spilhaus projection of the Earth (Meredith, 2019)

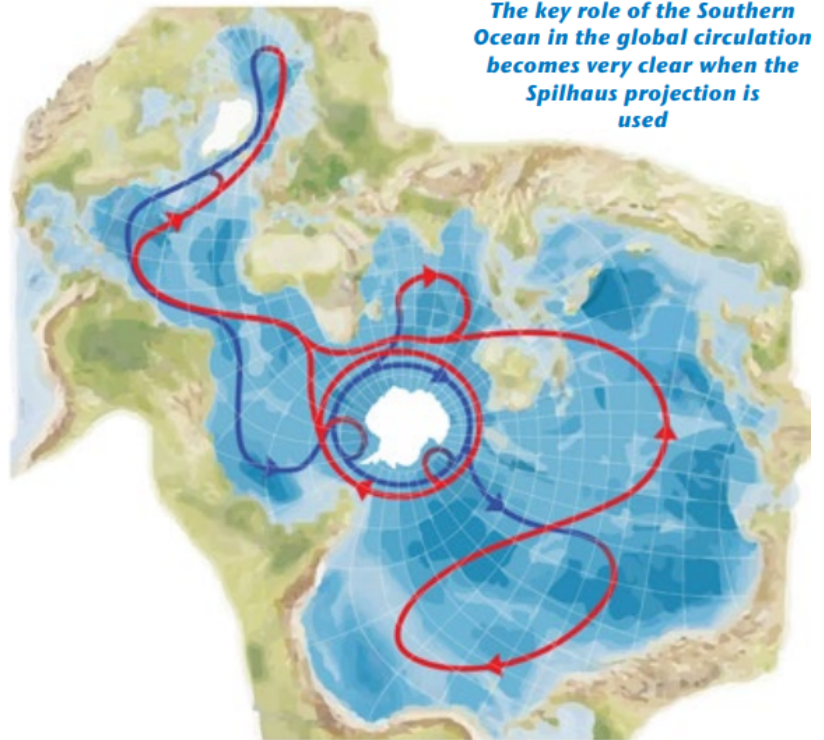


Figure 4: CTD Niskin Rosette (photo: J. Lalime)



Figure 5: Kasten core sample (photo: J. Lalime)

One of the most interesting pieces of equipment on the ship was the CTD (Conductivity, Temperature, Depth) Niskin rosette (Figure 4). This consisted of 36 Niskin bottles (specially designed to withstand the pressures of thousands of metres depth) and sensors to detect the salinity (conductivity), temperature and depth, set on a circular steel frame. The scientists determined how many bottles were to

**Weeds never sleep:
weeding opportunities in
2023**

Join a BushCare group near you, including the new **Roving groups** being set up by Council to cover – in the Caloundra area – Sharyn Bonney, Ben Bennett, Jill Chamberlain reserves and more. Check out the Council's BushCare website.

Here are some monthly sessions closest to southern-based residents, most commencing at 8 am, with weeding and planting for a couple of hours followed by a welcome morning tea and chat:

Currimundi (Kathleen McArthur) Conservation Reserve: 1st Wednesday (run by National Parks & Wildlife)

Watson Environment Park (Shelly Beach): 1st Friday (Thursday if Friday is a public holiday)

Golden Beach Foreshore: 2nd Thursday

Tooway Lake: 2nd Friday

Shelly Beach Foreshore: last Saturday.

Enquiries to
sunshine@wildlife.org.au

be triggered to shut at various depths depending on the type of samples and amount of water needed for each type of sample. All bottles were open at both ends for the descent. At the deepest testing position the first bottles were triggered and closed thus containing samples of water from that depth. The rosette was then raised to the next depth, and so on until all the bottles were full, providing data on the water column at each depth. As the equipment could be deployed to a maximum of 5000 metres, this process took several hours. On this expedition samples were taken to almost 3000 metres.

Throughout the expedition the RV *Investigator* was using multi-beam sonar to map the ocean bathymetry and subsurface layering. Information from this mapping was used by the scientists to determine possible coring sites. A sediment core is a type of sample that captures the sediment (stratigraphic) layers while preserving the sequence in which they were deposited (younger sediments are at the top and older sediments are at the bottom). The scientists would then track back to the area and deploy a Kasten corer (Figure 5) as a test sample of four metres of sediment. A Kasten corer is a 150-mm square steel corer that uses gravity to spear into the ocean floor from approximately 20 m height (after being lowered gradually into the ocean to the required depth). The scientists opened the corer on the ship and took hundreds of samples, and based on preliminary data, made a decision whether or not to deploy a 20-metre piston corer in the same location. The piston corer was also slowly lowered into the ocean to the depth required, then a piston shoved the 20-metre-long round corer into the sediment. The scientists were successful in retrieving an 18-metre sample which was later opened back at the University of Tasmania. Layers in these cores went back hundreds of thousands to millions of years ago and scientists are using the various data gathered (shifts in the seabed; type of sediment; fossilised microscopic animals – diatoms and foraminifera; isotopes and trace metals) to piece together the climate history of the Antarctic region. This information will then contribute to theories of what may occur as Earth's climate changes and potentially warms in the coming centuries.

My role during the expedition was Education Coordinator, with the primary responsibility being information dissemination to school students. Initially the goal was to hold ship-to-shore outreach sessions with Queensland school students using WebEx during the three-week research window in the Antarctic waters off Cape Darnley. This expanded to include over 1600 Primary, High School and University students from five countries (Australia, New Zealand, Germany, USA and Sri Lanka). I educated students on, amongst other things, adaptations, types and populations of organisms that live in Antarctic waters; weather conditions; AABW; thermohaline circulation; various equipment used on the ship; safety, navigation and running of the ship and life on the ship. It was an awesome experience.

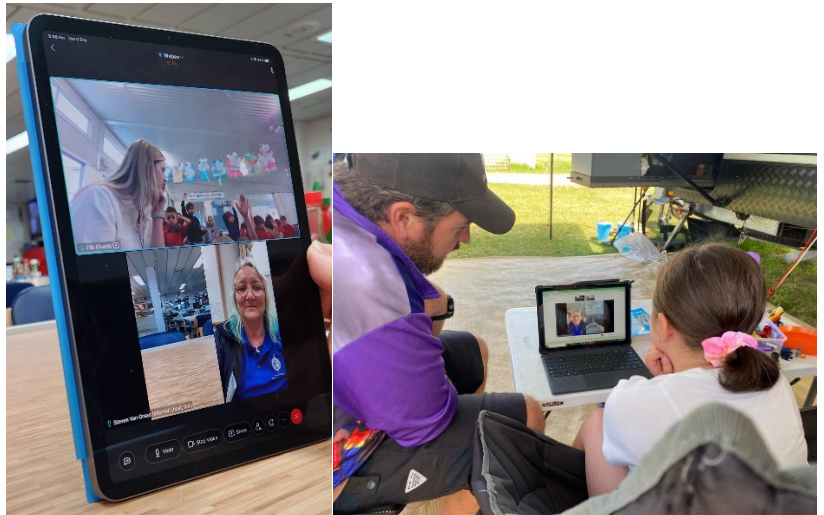


Figure 6: Ship-to-shore Outreach around the world.
(photos by. J. Lalime & provided by the Brady family)



Figure 7: One of the many icebergs. (Photos by J. Lalime)

Figure 8. Light-mantled Sooty Albatross.
(*Phoebetria palpebrata*)

On the ABC news (Monday 5 June): RV *Investigator* is heading south again with CSIRO and other scientists to undertake ocean nutrient testing.

We were privileged to see some amazing icebergs, with the one in the photo being approximately 1.8 nautical miles (3.3 km) long. The Light-mantled Sooty Albatross has an estimated 4-m wingspan.

References:

- Gordon, A.L. 2001. Formation of Antarctic Bottom Water. *Encyclopedia of Ocean Sciences* 2nd Ed. p. 415-421
- Meredith, M. 2019. The global importance of the Southern Ocean and the key role of its freshwater cycle. *Ocean Challenge*. 23(2) p: 29-34