AUSTRALIAN Wildlife

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$10 (non-members)

Celebrating a new century of wildlife preservation in Australia

Journal of the Wildlife Preservation Society of Australia Limited
(Founded 1909)

Threatened Wildlife Photographic Competition

Hairy correa (*Correa aemula*). Image: John Muchan - 2020 entrant.

Nowa Nowa grevillea (*Grevillea celata*). Image: Stanislaw Wawrzyczek - 2019 entrant.

Long-flowered nancy (*Wurmbea Tubulosa*). Image: Jennifer Smith - 2018 entrant.

Australian Wildlife Society
Conserving Australia's Wildlife since 1909

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Threatened Wildlife Photographic Competition

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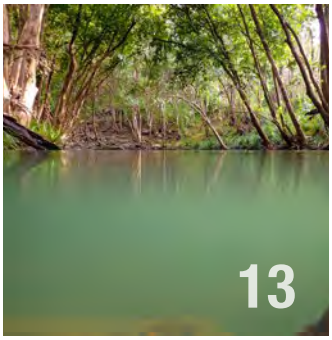


Regulars

Megan Fabian
Editor, Australian Wildlife

ON THE COVER:

Front Cover:
Silver princess (*Eucalyptus caesia*) is endemic to the south-west of Western Australia. Eucalyptus caesia subspecies magna grows to a height of fifteen metres with silvery drooping branches and larger blue-grey/mid-green leaves, buds, and fruit. Its large stunning flowers appear in autumn and winter and vary from pink to red, although white-flowered plants have been reported. These flowers attract nectar-feeding birds, making them an excellent choice for your garden. Image: Megan Fabian.

Back Cover:
Above Left: Grevillea loopy lou (*Grevillea hybrid*) is a small, fast-growing shrub with large flowers that change from yellow, pink, and red. Like most grevilleas, loopy lou is a bird attracting species and ideal for screening and hedging. Image: Megan Fabian.

Above Right: Caley's grevillea (*Grevillea caleyi*) is a shrub endemic to Australia and grows only in the northern suburbs of Sydney. Caley's grevillea is critically endangered and under threat from habitat loss, invasion of weeds, and rubbish dumping. Image: Dr Tony Auld.

Bottom Left: Pink pokers (*Grevillea petrophiloides*) is a tall, erect shrub native to Western Australia that produces bright pink flowers that grow eight centimetres long during winter and spring. The shrub attracts insects and nectar-eating birds such as hummingbirds. Image: Megan Fabian.

Bottom Right: The coloured spider-orchid (*Caladenia colorata*), endemic to South Australia and Victoria, is a ground orchid with a single hairy leaf and creamy-green flower with blood-red or purple-brown markings. Commonly found growing in sand or sandy soils, the flowering period of the orchid extends through August and September. The coloured spider-orchid is listed as Endangered and is under threat from various grazing animals, invasive weeds, and illegal collection of plants. Image: Noushka Reiter.

Connectivity of Common Dolphins

Across the Australasian Metapopulation

Andrea Barceló, Luciano Beheregaray, and Luciana Möller

Australia and New Zealand share a vast ocean where many marine species interact, from phytoplankton to top predators such as dolphins, seals, and sharks. The common dolphin (*Delphinus delphis*) is a magnificent charismatic species widely distributed and abundant in the region. Common dolphins can be found along the continental shelf of southern and eastern Australia. In New Zealand, they mainly concentrate around the north island. Although they can migrate thousands of kilometres in large groups of hundreds of individuals, in some populations, they associate in smaller groups of a few to dozen individuals and remain in relatively small areas.

Common dolphins are known to follow the distribution of their prey. Dolphins feed mainly upon schooling fish such as mackerel, sardines, and anchovies. However, these prey species are also targeted by fisheries in the Australasian region, which has led to entanglements and mortalities of common dolphins in several fisheries regions. Compared to other coastal dolphin species or even some shark species, we know little about how many dolphin populations there are, where they are located, how populations are connected, and how they are adapted to their environment.

A PhD research based at Flinders University, in collaboration with several Australian and New Zealand institutes (listed below), has recently assessed the population structure and connectivity between Australasian common dolphins. The partnership allowed the analyses of over five hundred dolphin samples, collected between 2000 and 2017, and for the first time, used thousands of deoxyribonucleic acid (DNA) markers to clarify the connectivity of the species between Australia and New Zealand. Furthermore, the researchers identified and generated information that can be used to obtain successful conservation and management outcomes.

The Power of Genomics to Elucidate Population Connectivity

Conservation genetics, or genomics when referring to genome-wide data, plays a significant role in characterising genetic diversity and informing the management of endangered species. The same principle can be applied to species or populations currently at-risk from human activities and rapid environmental changes.

After a monumental field effort to collect samples over most of the distribution of common dolphins

Above: A common dolphin (*Delphinus delphis*) in southern Australia. Image: Kirsten Bilgmann.

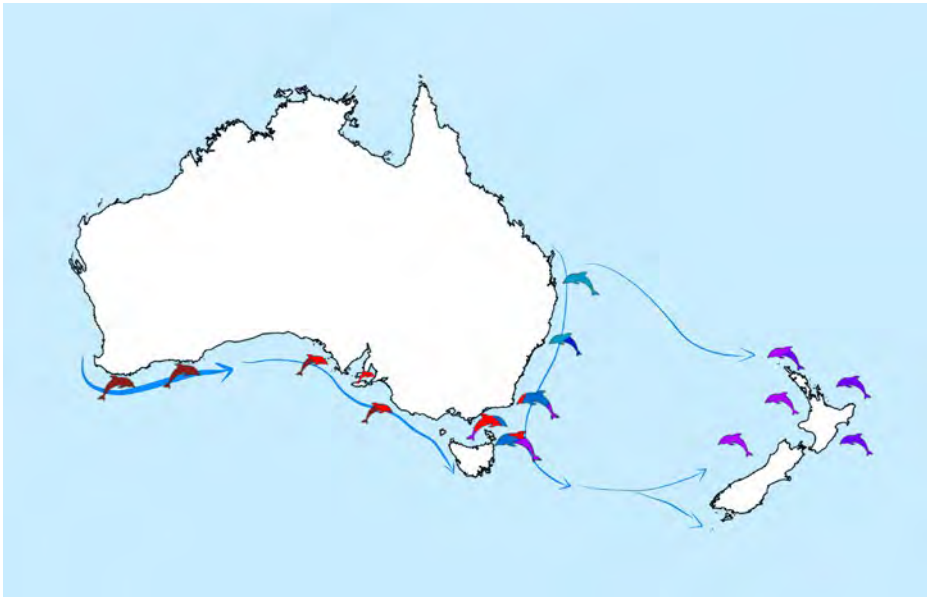
in Australasia, the study found that common dolphins are structured as a large, hierarchical metapopulation with various levels of connectivity between them. The metapopulation is subdivided into three main populations. The populations are represented by temperate eastern Australia and southern Australia, with low levels of connectivity between them, and New Zealand and Tasmania combined, the latter with moderate connectivity to the eastern Australian population.

Differences in levels of connectivity appear to be dependent on the scale of movement of different populations, which seem to be affected by different oceanographic processes occurring on the continental shelves of both the Pacific and Indian Oceans. For example, some common dolphins from southern Australia appear to seasonally move following the formation of upwellings and locally enhanced biological productivity, leading to wide-ranging populations and higher connectivity. In contrast, areas previously known to act as biogeographic boundaries, such as the 'Bassian Isthmus', separate many marine species between southern and eastern Australia and appear to reduce connectivity between common dolphins of the two ocean basins. Common dolphins from around Tasmania are particularly interesting, with individuals from eastern Tasmania exhibiting greater levels of connectivity to dolphins across the Tasman Sea in New Zealand, while others are more related to eastern Australian common dolphins.

Another interesting finding relates to common dolphins inhabiting the Gulf of St Vincent in South Australia. This subpopulation has low levels of connectivity to others outside the Gulf, suggesting that it may represent a resident population with potential gene adaptations to the environment it inhabits.

Management of Common Dolphin Populations

The common dolphin is currently an abundant species in Australia and New Zealand; thus, they are not generally considered a priority species for conservation. However, management of their populations is required given the species' protected status and by-catch levels in several fisheries. The distribution of the three main dolphin populations and their boundaries should be considered when managing dolphin and fisheries interactions. The need for continuing connectivity between demographically dependent subpopulations found within ocean



A simplified graphical representation of the study's findings shows that the metapopulation is subdivided into three main populations.

A common dolphin (*Delphinus delphis*) in the Gulf of St Vincent in Australia. Image: William Pyke.

Common dolphins (*Delphinus delphis*) in Australia are known to vary in colour between localities or populations. Image: Cetacean Behaviour, Ecological and Evolutionary Lab research team.

A pod of common dolphins (*Delphinus delphis*) in the Gulf of St Vincent in Australia. Image: William Pyke.

basins is vital. Given the findings, new collaborative efforts across state and international jurisdictions need to be made to ensure that management of the species in Australasia leads to the long-term persistence of its populations.

Conservation genomics is a developing field. The study provides an initial step towards understanding the adaptive resilience of local and regional populations of a small cetacean to naturally- and anthropogenically-driven environmental change. For more information on common dolphin genomics research, visit the Molecular and Ecology Research Lab website at www.molecularecology.flinders.edu.au/publications/

Collaborating institutions: the Cetacean Behaviour, Ecological and Evolutionary Lab (CEBEL) and the Molecular Ecology Lab from Flinders University, the Cetacean Ecology Research Group from Massey University, the National Institute of Water and Atmospheric Research of New Zealand, University of Auckland, Ministry of Primary Industries in New Zealand, Tasmanian Museum, and the Department of Primary Industries, Parks, Water and Environment of Tasmania.

An ariel view of a pod of common dolphins (*Delphinus delphis*) in Australia. Image: Cetacean Behaviour, Ecological and Evolutionary Lab research team.

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Membership Hotline: Mob: 0424 287 297

Note: All cheques to be made out to the Australian Wildlife Society

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Magazine: Receive the quarterly issue of Australian Wildlife via email or post to keep up-to-date with the collective work promoted nationally.

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AWS Portal: Access the Members' Resource Centre - your destination for resources and materials on various wildlife-related topics.

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Right to Vote: You have the right to vote on important matters at Society general meetings (financial members only).

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