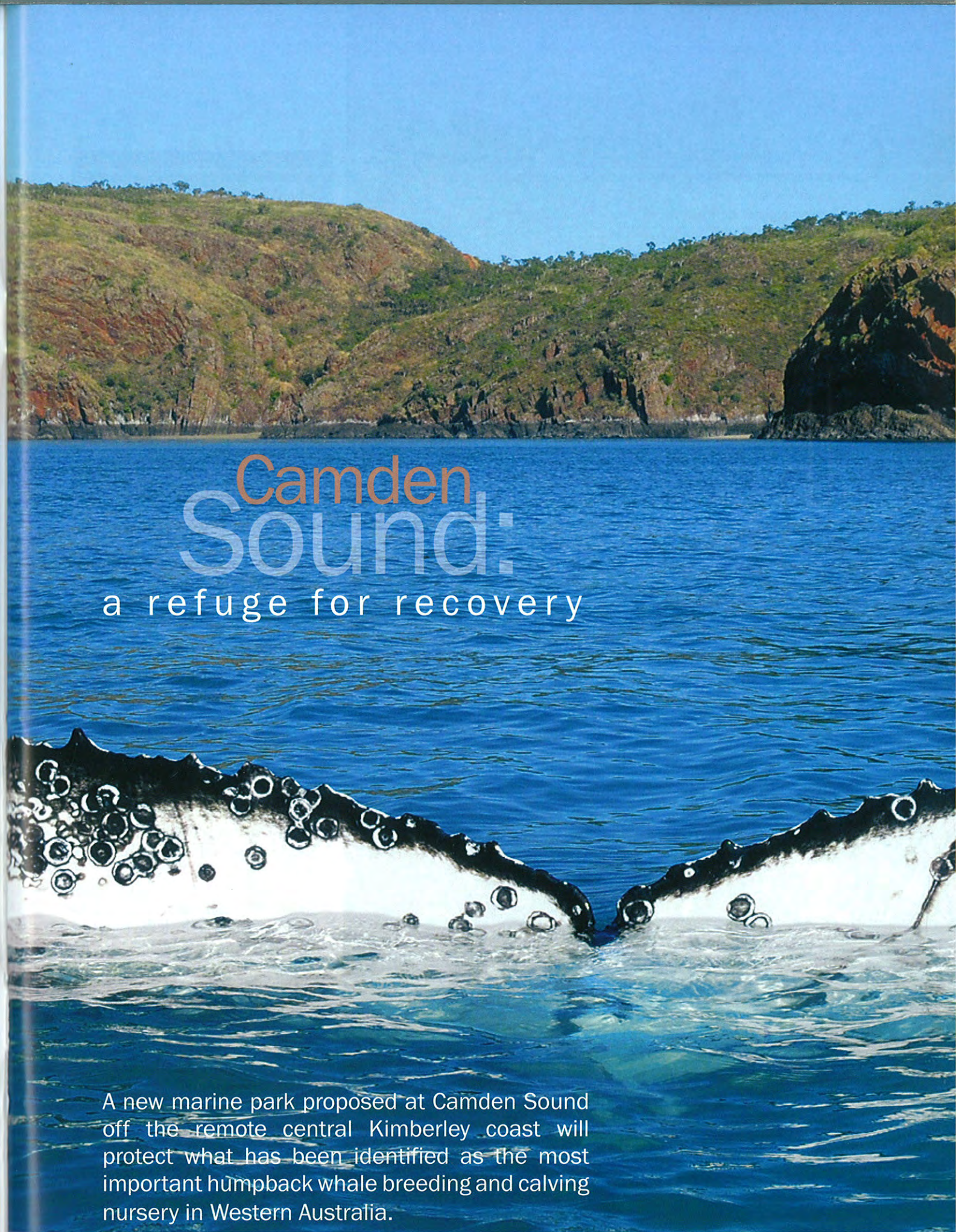

Camden Sound:

a refuge for recovery

A new marine park proposed at Camden Sound off the remote central Kimberley coast will protect what has been identified as the most important humpback whale breeding and calving nursery in Western Australia.

by Barb Green, Carolyn Thomson-Dans and Alena Kessell

Camden Sound is a marine embayment located within a remote and isolated part of the central Kimberley region approximately 400 kilometres north of Broome in Western Australia. The sound is encompassed by the Kimberley mainland to its east, Augustus Island (the largest island in the Kimberley) to its north, an elaborate arrangement of islands and reefs to its north-west and west, and a complex of shoals, rock platforms and soft sediments to its south.

Phillip Parker King named Camden Sound while charting the Kimberley coast in 1821. He named the sound after the first Marquess of Camden, John Jeffery Pratt, an English nobleman and politician who was a generous patron of the New South Wales colony in the early 1800s.

Humpback whale refuge

During the 1800s and 1900s humpback whales (*Megaptera novaeangliae*) were hunted extensively throughout the world's oceans, resulting in elimination of an estimated 95 per cent of the world population. In Australia, it is estimated that humpback whales were reduced to less than five per cent of pre-whaling abundance. As such, humpback whales are listed as threatened under the State's *Wildlife Conservation Act 1950*, the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* and the International Union for the Conservation of Nature's 'Red List' of threatened animals.

Camden Sound has long remained an unintended refuge for humpback whales in the remote north of WA. Whales using the area were protected from whaling vessels operating off WA by some of the most treacherous waters known to mariners. While the area was charted by Phillip Parker King in 1821, his charts did not become available until the mid 1800s. This limited the ability of whalers to navigate safely in the inner waters of the Kimberley resulting in them targeting other more accessible parts of the WA coast where humpback whales were common, such as the Exmouth Gulf.

Each year, humpback whales migrate along the WA coast from Antarctic feeding grounds to northern breeding grounds. Camden Sound continues to play a critical role in the recovery of the WA humpback whale population, which is now estimated to number between 22,000 and 25,000.

Camden Sound is a warm water nursery area for newborn humpback whales where water temperatures can reach 28°C during the calving season. Newborn calves are only four to five metres long at birth and are almost completely lacking in insulating blubber. Between June and November each year, humpback cows use Camden Sound to rest and nurse their young to quickly build up their calves' protective blubber layer. This layer of natural insulation ensures that the metabolic strain endured by the warm-blooded mammal is minimal during its first few critical weeks of life.

The complex shoreline and bathymetry of Camden Sound provides ample hiding places and enables cows to protect their calves from predators and even aggressive bull humpback whales intent on mating. The combination of warm water and complex shoreline makes Camden Sound an ideal calving and nursery area for the protected species.

Minke whales (*Balaenoptera acutorostrata*) and false killer whales (*Pseudorca crassidens*) have also been seen in Camden Sound, indicating that the area provides habitat for both baleen and toothed whales.

Previous page
Main A humpback whale in Camden Sound.
Photo – Micheline Jenner

Left A humpback whale 'spy hopping'—raising its head and eyes above the water to look around.
Photos – Hans and Judy Beste/Lochman Transparencies

Above Humpback whale.
Photo – Hans and Judy Beste/Lochman Transparencies

Above right Sea eagle.
Photo – Ann Storrie

Right Manta ray.
Photo – Geoff Taylor/Lochman Transparencies

More than just whales

The distribution of marine life in Camden Sound, and the Kimberley as a whole, is influenced by the Indonesian 'throughflow', a warm, nutrient-deficient, low-salinity current that originates in the Pacific Ocean. Cyclones and storms also have a major influence on the area. Tidal movement can exceed nine metres in amplitude, and rainwater run-off from rivers and gullies affects water clarity, nutrient levels, ecological function and bathymetry in the sound. The complexity of these influences is such that Camden Sound is likely to have unique features in comparison to other areas of the Kimberley coast.

Geologically, Camden Sound is a drowned valley of the western section of Macdonald Range. The surrounding islands are the only remaining emergent features of this ancient formation, with subtidal features presenting a complex arrangement of habitat throughout the area.

The 'valleys' of the Camden Sound seabed are dominated by mud sediment and rocky substrate. Mud sediment is the primary habitat of bottom-feeding species such as rays and crabs. Adult male humpback whales are known to cake themselves in the sticky mud of Camden Sound, possibly to assist in healing wounds sustained during mating battles. Rocky substrate is a dominant feature in the south of the sound, and consists of a submerged platform extending from the mainland.

Many coral inhabited reefs exist throughout Camden Sound, although they vary greatly in size and depth. A large reef platform between Jungulu and Augustus islands has similar characteristics to the Montgomery Island reef system located further south. This reef platform is likely to be influenced by hydrological and tidal processes unique to the adjacent Saint George Basin and Prince Regent River system. Although this reef platform is yet to be surveyed in detail, it is likely to be highly diverse and provide significant habitat and feeding value for reef-associating marine plants and animals.

A locally distinct fringing coral reef system occurs at the Champagny Island group at the western edge of Camden Sound. This fringing coral reef occurs across a variable depth range, and is located both on the seaward and landward sides of the island group. Marine biological surveys in the Kimberley have so far identified 280 species of coral across 55 genera,

and marine scientists are only just starting to discover what are thought to be globally significant coral reefs in the region. Camden Sound is expected to host a significant number of coral species, some of which may be new to science.

In the southern area of Camden Sound, and approximately 500 metres off Wilson Point, are the Slate Islands. In 2008, these islands were examined by the Australian Institute of Marine Science using underwater video. The research revealed that reefs in the area are dominated by a mix of seaweeds and reef-building corals along reef edges, and sponges and gorgonian and whip corals in the channels between the mainland and islands. This preliminary assessment indicates that many sponges in the area may also be new to science.

The shoreline of Camden Sound, including its islands and inlets, has fringing mangrove forests that are nursery areas for many marine and estuarine species including barramundi (*Lates calcarifer*), threadfin salmon (*Polydactylus macrochir* and *Eleutheronema tetradactylum*) and prawns. Mangrove-lined inlets are known feeding areas of the newly identified Australian snubfin dolphin (*Orcaella heinsohnii*), which is endemic to northern Australia, as well as for Indo-Pacific humpback (*Sousa chinensis*) and bottlenose (*Tursiops* sp.) dolphins. A study of inshore dolphins conducted by an independent dolphin researcher has shown that Deception Bay and the inlets of Augustus Island are particularly important to these species in the Camden Sound area.

Mangroves and their associated invertebrate-rich mudflats are important habitats for migratory

Top left Slate Islands near Wilson Point, in the heart of Camden Sound.
Photo – Ann Storrie

Centre left Black-necked stork.
Photo – Hans and Judy Beste/Lochman Transparencies

Left Intertidal mangroves.
Photo – Marie Lochman

Above Hammerhead shark.
Photo – Clay Bryce/Lochman Transparencies

Left Striated heron.
Photo – Hans and Judy Beste/Lochman Transparencies

shorebirds from the northern hemisphere, such as common sandpipers and whimbrels, which are protected by international agreements. Bird species that are mostly confined to the mangroves include mangrove grey fantails, broad-billed flycatchers, dusky gerygones, yellow white-eyes, red-headed honeyeaters and white-breasted whistlers. Striated herons, black-necked storks and brahminy kites nest in the dense mangrove foliage. Stilt rooted mangroves are also important roosting areas for black flying-foxes (*Pteropus alecto*) and other bat species.

Sharks and rays are common in Camden Sound including the largest of all rays, the manta ray (*Manta birostris*). A total of 94 shark species, representing approximately 19 per cent of the world's known shark species, have been recorded in northern Australia and a high proportion of these are likely to be found in the Camden Sound area. Species such as the hammerhead shark (*Sphyrna* spp.), pigeye shark (*Carcharhinus amboinensis*), sandbar shark (*Carcharhinus plumbeus*), tiger shark (*Galeocerdo cuvier*), blacktip sharks (*Carcharhinus* spp.) and lemon shark (*Negaprion acutidens*) are most likely common there.

Turtles, including loggerhead (*Caretta caretta*), flatback (*Natator depressus*), olive ridley (*Lepidochelys olivacea*) and leatherback (*Dermochelys coriacea*), are all believed to occur in Camden Sound among coral reefs and near mangroves. All four species are listed as threatened and the State's marine turtle populations are extremely important in a world context. Flatback turtles breed only in Australia and genetic research has shown that the small Australian population of olive ridley turtles is distinct from those of India and Malaysia in the Indian Ocean and from those of Mexico and Costa Rica in the Pacific Ocean. Thus, although the species is more abundant in some other parts of the world, Australia is the custodian of an endemic stock and WA retains some of the best populations of turtles in the world.

Saltwater crocodiles (*Crocodylus porosus*), once hunted to near extinction for their skin and as a food source, are abundant in the nearby Saint George Basin and Prince Regent River and are likely to be intermittent visitors to the muddy mangrove-lined shores and waters of Camden Sound to rest and ambush prey.

Dugongs (*Dugong dugon*) are believed to occur in low numbers in Camden Sound in areas where seagrass occurs. Studies have found that in areas where tidal change is great, dugong feeding activity is largely determined by tides and weather.

Above Humpback whales are important to tourism.
Photo – Geoff Taylor/Lochman Transparencies

Above right Barramundi.
Photo – Gunther Schmida/Lochman Transparencies

Cruising Camden Sound

The Kimberley coast expedition cruise industry consists of more than 30 vessels operating multi-day cruises along the coast between Broome and Wyndham. The industry has grown significantly during the past 10 years. Camden Sound is an important destination for the Kimberley expedition cruise industry, as it is a place where passengers on the cruise vessels are able to view hundreds of whales in their natural habitat at certain times of year.

Most Kimberley cruises visit Montgomery Islands reef before moving north to Camden Sound to anchor and land in Camden Harbour, where stone ruins, graves and a shipwreck site can still be seen—remnants of an ill-fated attempt to farm sheep there in 1864–65. The settlement at Camden Harbour was abandoned after only 10 months due to the harsh conditions experienced by settlers. Features offered by cruise companies include fishing for barramundi and oysters and an appreciation of colonial settlement and exploration sites, pearl farms and the outstanding scenic coastline. Most of the whale watching and recreational fishing in Camden Sound occurs as part of these cruises.

Traditional connections

All lands, including islands, adjacent to Camden Sound are Aboriginal reserves. The entire area is culturally significant to the Dambimangari people, with whales being strongly represented in their spiritual beliefs. While traditional owners no longer live on these lands year round, they maintain ongoing cultural and spiritual connections with their land and sea country.

In October 2009, the State Government, as part of its Kimberley Science and Conservation Strategy, announced its intention to establish a marine park to protect Western Australia's most significant nursery ground for the threatened humpback whale. The area also contains marine habitats representative of the Kimberley marine bioregion, which are not currently included in the State's marine park and reserve system. The proposed marine park in the Camden Sound area will promote greater public awareness of the scenic and near-pristine marine waters of the Kimberley, together with their high scientific and conservation value, which is already attracting growing numbers of visitors. Along with other outcomes of the Kimberley Science and Conservation Strategy, such a marine park will help to protect the region's natural and cultural values as the Kimberley fulfils its economic potential.

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