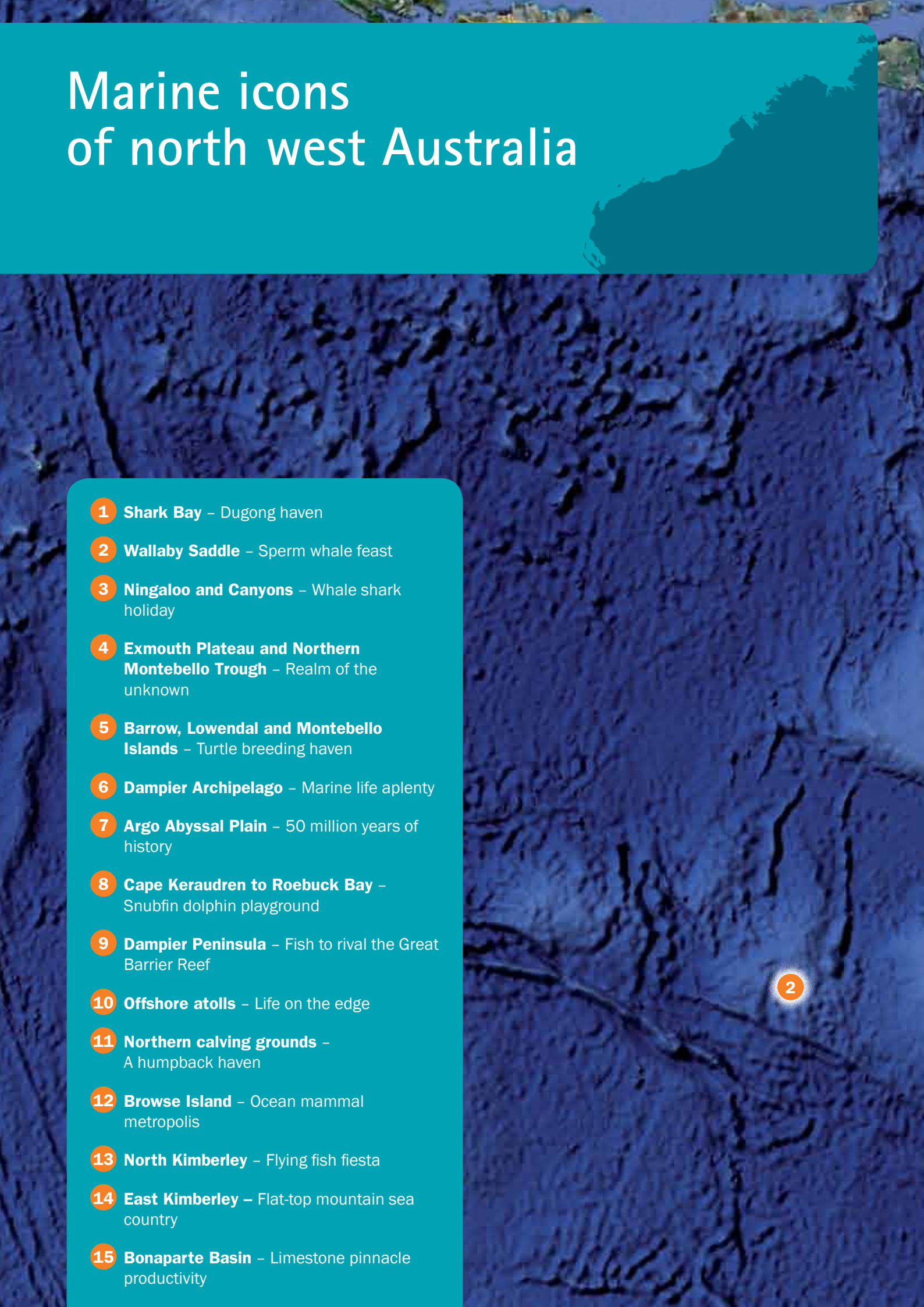
Wild blue yonder

Fifteen underwater places for protection in Australia's spectacular north west

Marine icons of north west Australia



1. **Shark Bay** – Dugong haven
2. **Wallaby Saddle** – Sperm whale feast
3. **Ningaloo and Canyons** – Whale shark holiday
4. **Exmouth Plateau and Northern Montebello Trough** – Realm of the unknown
5. **Barrow, Lowendal and Montebello Islands** – Turtle breeding haven
6. **Dampier Archipelago** – Marine life aplenty
7. **Argo Abyssal Plain** – 50 million years of history
8. **Cape Keraudren to Roebuck Bay** – Snubfin dolphin playground
9. **Dampier Peninsula** – Fish to rival the Great Barrier Reef
10. **Offshore atolls** – Life on the edge
11. **Northern calving grounds** – A humpback haven
12. **Browse Island** – Ocean mammal metropolis
13. **North Kimberley** – Flying fish fiesta
14. **East Kimberley –** Flat-top mountain sea country
15. **Bonaparte Basin** – Limestone pinnacle productivity

2

Australians love the sea and all the goodness it brings – fresh air, healthy food and all sorts of outdoor fun and leisure.

Successive Commonwealth governments over the past 20 years have committed to the creation of a network of marine sanctuaries around Australia. This network of marine sanctuaries will meet the needs of our unique marine life as well as our international obligations to marine conservation. With more sea than land under our government's care, it's an important responsibility.

The opportunity exists now to deliver on this long-standing commitment. The Marine Bioregional Planning Process can deliver a world class network of large marine sanctuaries to protect the spectacular north west from oil and gas, fishing and trawling impacts – securing its future for generations to come. Wild Blue Yonder has been prepared by an alliance of 13 conservation groups to highlight the extraordinary underwater values of this remote and spectacular region, and to encourage their protection.

Our precious north west

A multitude of marine habitats

Imagine a place far from where most Australians live, that is relatively untouched, filled with extraordinary creatures, where islands are too numerous to name and where new scientific discoveries are not beyond the imagination. This is the reality of Australia's north west.

Swept away

Our north west seas are shaped by their unusual currents – the two signature currents of the north west flow southwards, or 'against the norm'. The northern current, the Indonesian 'throughflow', brings water rich in marine life from the Pacific to the Indian Ocean and helps create huge tides that mould both the environment and its wildlife. Running south from the north west Cape, the Leeuwin current is the longest continuous coastal current in the world. Currents are the major marine transport system for most of our marine life that have a floating stage after hatching from eggs.

Ruled by tides

The north west boasts huge surface tides of up to 14 metres. Deep below the surface of the sea, still larger waves form, up to 75 metres high – creating a dynamic, changing environment that moves water around quickly and connects deepsea fish communities to mud loving birds.

Boom and bust

Normally low in nutrients, north west coastal seas can experience a boom in life when flushed with sudden bursts of rich sediments. Nutrients feed microorganisms such as plankton, which in turn are food for larger creatures like fish, sharks, dolphins and whales. The effects of these nutrient booms can hang around for months, creating a tropical feeding frenzy up the food chain.

A haven for rare species

The north west is home to many nationally protected species in danger of becoming extinct. These include the spectacular whale shark – the world's largest fish – and 17 species of seahorse and pipefish. Other protected species include 21 species of dolphins and whales, as well as 80 seabird species that visit the area. One third of all types of seasnakes in our oceans, 20% of the world's sharks, and six of the seven turtle species in the world are found in our north west waters.

The north west shelf has one of the largest breeding populations of hawksbill turtles in the world, as well as significant rookeries for green, loggerhead and flatback turtles. The Kimberley coast is the nursery for the largest humpback whale population in the world and Shark Bay is home to the largest remaining population of dugong in the world.

Ancient coral reefs

Formed 210 million years ago in the late Triassic Period, the reefs of the north west are four times older than the Great Barrier Reef. Unlike the Great Barrier Reef, they include different types of reef – based on

coralline algae in the north and hard corals in the south.

A global refuge for corals

Coral reefs are known as the rainforests of the sea – they provide homes to 25% of the world's marine life. Yet coral reefs and their communities are threatened worldwide, with two thirds predicted to collapse within the lifetime of our grandchildren.

The Indo-Pacific area north of Australia is known as the Coral Triangle. It features three quarters of the world's coral reef marine life and is the centre of global marine diversity for corals, fish and crustaceans (crabs, prawns and lobsters).

The oceanic shelf atolls in the north west are evolutionary stepping stones linking Western Australia and Indonesia, and may be the key to the global survival of coral reefs as ocean warming forces tropical species from the coral triangle to move south. Along with the corals will come the hundreds of thousands of species that are dependent on these coral reefs.

A network of marine sanctuaries in our northern waters will give tropical marine species the best chance to migrate south and survive the warming of our oceans.

At present less than 1% of the north west region is protected from extraction by the oil and gas industry, fishing and trawling.

Left: Dugong. Photo Scott Whiting

Above: Tropical north west island. Photo Scott Whiting

Below: Islands of the Kimberley. Photo Glenn Walker

North west sea country and Indigenous Traditional Owners

A culture rich and diverse

The north west is traditional saltwater country for at least 37 distinct Indigenous language groups living in and around coastal towns and settlements from Shark Bay to the Northern Territory border.

Their unique spiritual, economic and customary connections to the coasts and sea country are an invaluable store of knowledge, adding to everyone's understanding of the lands and seas of this area.

The various Traditional Owners have occupied the areas throughout the north west for varying times, but we know that their connection to the marine environment, its species, the ocean currents and movements has evolved over 50,000 years – from a time when the tide level was around 100 metres lower than it is today. Significant 'Dreaming tracks' or Songlines are found across this region and they sustain the culture and identity of many groups.

Many Traditional Owners engage in the protection and management of their sea country through Indigenous conservation initiatives. The application of the collective knowledge of the Traditional Owners will be crucial to the ongoing protection and management of north west sea country.

The Commonwealth's approach to the protection of the north west bioregion must embrace the rights, interests and sea country connections of the Indigenous Traditional Owners. Engagement with Traditional Owners should be well-resourced, take a 'ground up' approach to planning, and recognise customary ownership and management of sea country.

Padjarimanu – calling the currents

"The Yinigudura West Thalanyji peoples' history will always be at the lighthouse site commonly known as Vlamingh Head on North West Cape near Exmouth. But from the dreamtime until this day, it is known as Padjarimanu, a special place which calls the currents into the Gulf and is the home of the snake Kiljaru who still lives in waters in the bay off Padjarimanu. The peoples of this region and the traditional owners of the lands, seas and islands along the Western Australian coast should be properly recognised and engaged with to ensure that our country and its waters are properly respected and protected."

– John Dale. Traditional Owner, Exmouth 2011

The plans should include Marine Indigenous Protected Areas, co-managed sanctuary zones and marine resource use agreements.

Above: John Dale. Photo North West Cape Exmouth Aboriginal Corporation

Below: 'Ningaloo Dreaming' by Benson Dickerson, 2010. Image kindly provided by owners, Nahrel Dallywater and Gordon Houston. Note: image artwork has been digitally altered

Science supports sanctuaries

The evidence tells us marine sanctuaries work

Marine sanctuaries (called Marine National Parks by the Federal Government) fully protect both marine life and their homes from extractive industries like mining and fishing. A network of marine sanctuaries around Australia would ensure that our special places and unique marine life are preserved for all Australians to enjoy in the future. Across the world, research provides compelling arguments for the benefits of marine sanctuaries.

Marine sanctuaries protect our marine life. The main reason we need marine sanctuaries is to restore and protect biodiversity. There is evidence from all over the world that marine sanctuaries have powerful, positive impacts. For example, a global analysis of coral reefs in sanctuaries showed that reefs in protected areas maintained their coral cover while coral cover declined on unprotected reefs.

Marine sanctuaries allow fished populations to recover. In addition to being essential to protect biodiversity, marine sanctuaries can be a very useful complement to fisheries management. Marine scientists have shown that fish and shark densities have doubled across the Great Barrier Reef's network of marine reserves since they were established in 2004.

Marine sanctuaries can support fished populations outside. Marine sanctuaries become an engine room for fish production, generating many more offspring. A wide range of habitats and fisheries outside marine sanctuaries have benefited from the overflow of juveniles, eggs and larvae from within sanctuaries.

Marine sanctuaries build resilience to climate change. Leading Australian scientists tell us that marine sanctuaries support healthy ecosystems that are more resilient to climate change. On the Great Barrier Reef, corals in marine sanctuaries recovered from coral bleaching faster than corals outside marine sanctuaries.

Marine sanctuaries are economically valuable. Experience shows that protecting habitat and wildlife is much less costly that trying to rebuild and restore them, if indeed recovery is possible. Marine sanctuaries provide security for a range of industries like tourism (the Great Barrier Reef – with 33% in sanctuary zones – is worth over $5 billion annually). In areas that aren't fully protected, sanctuaries also act as an 'insurance policy' against over-exploitation, helping damaged areas and over-exploited species recover faster.

Marine sanctuaries improve ecosystem services. Internationally, many countries are valuing their natural wealth and the ecosystem services the environment provides – such as the protection mangroves give to coastal land in big storms.

Above: Scientists collecting data on coral reefs. Photo Eric Matson

Scientists support marine sanctuaries

Over the past decade, the scientific evidence for the benefits of marine sanctuaries has grown globally at a time when the health of our oceans has sharply declined. Marine scientists support the establishment of large networks of fully-protected marine sanctuaries as a vital step for the protection and recovery of our ocean life. Australia's two major marine science organisations – the Australian Marine Science Association and the Australian Coral Reef Society – have written strong statements urging the Australian Government to establish a network of marine sanctuaries throughout Australian waters.

Seabed destruction

Drilling for oil and gas and trawling damages our seafloor communities

Seabed destruction by the oil and gas industry

The two largest oil and gas sources in Australia are found in the north west – the Carnarvon and Browse basins. Located in the south of the region, the Carnarvon Basin has been exploited by the oil and gas industry for several decades and the region has a large amount of oil and gas industrial infrastructure, refineries and facilities – with many more in the pipeline. To the north, development of the Browse Basin is in its early stages, however, there are plans to industrialise the unspoiled Kimberley coastline. Each development fragments the area, and makes it unsafe for the marine life that calls it home.

The oil and gas industry causes negative impacts to our seas in many ways:

Infrastructure

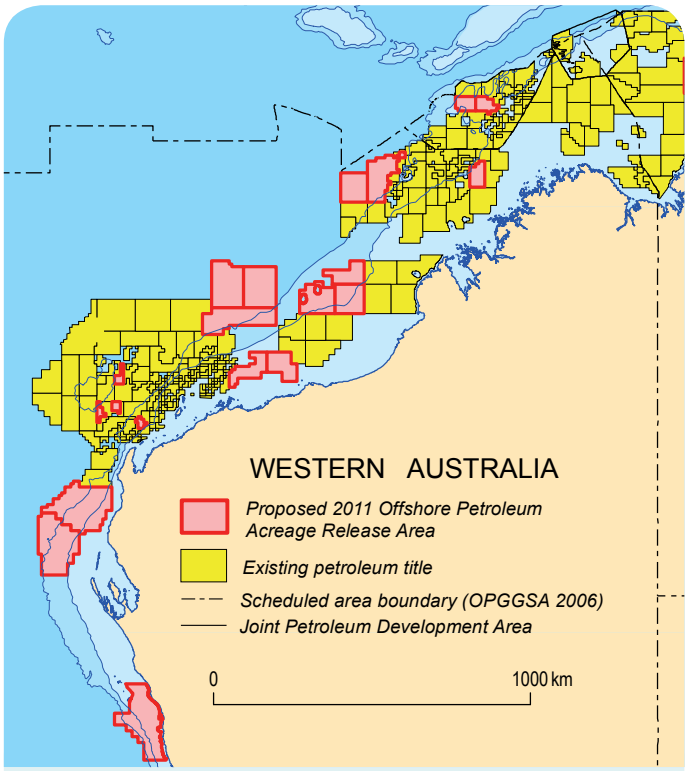
Ports, breakwaters, rigs, dredging and seabed pipes and wells destroy habitat and create barriers for migratory animals. These developments remove critical feeding and breeding areas of many marine species, including protected whales, turtles, dolphins and dugong.

Water pollution

Oil and gas products (from drilling, fuel and accidental spills) as well as hydraulic chemicals (used in drilling and piping) and desalination waste water are discharged into the sea. These are toxic for many species and can have a long-lasting impact on the marine environment.

Noise pollution

Many underwater species need sound to survive. The largest animal on Earth, the blue whale, communicates through song; and tiny tropical larval fish use the dawn chorus from coral reefs to navigate to their chosen home. Seismic testing, construction, shipping and dredging all create huge amounts of underwater noise pollution. Sound travels faster under the sea and low frequency noise in particular can travel huge distances. Many examples world-wide have documented the impacts of industrial noise on whale behaviour, including immediately leaving areas or strandings.



Seafloor grab: New leases for oil drilling

Oil and gas leases cover 59% of the north west bioregion. In addition, multiple, large gas pipelines run hundreds of kilometres across the seafloor from wells to onshore refineries. The most recent release of oil and gas acreage in 2011 of around 180,000 square kilometres, in full knowledge of the marine bioregional planning process, was a blatant effort by the resources sector to lock in oil and gas industry access around iconic areas such as Ningaloo, Shark Bay and the Rowley Shoals. These areas are too large to be realistically developed for many, many years.

Light pollution

LNG facilities operate 24/7, with thousands of operating lights and bursts of gas flares glowing bright in the night sky. These lights can disorient wildlife, especially turtle hatchlings and birds. Birds may be attracted into the gas flares and die, while hatchlings can fail to find their way to water as they leave their nests and face certain death by predators or dehydration.

Above: Montara oil spill, 2009. Photo Liana Joseph

Air pollution

The gas industry routinely releases a cocktail of toxic pollutants, such as carcinogenic toluene and Volatile Organic Compounds, as well as ozone and dust. The effects from this pollution can spread over enormous areas. The industry is not carbon friendly either – emitting a huge amount of greenhouse gases in the course of processing the resource. Greenhouse gas emissions contribute to global warming and the acidification of our oceans.

Ship strike

Ship strikes are a major cause of whale deaths in the world's oceans. Yet, in Western Australia, vessels are not required to report whale strikes. Research has found that humpback whales, snubfin dolphins, dugong and turtles are susceptible to ship strikes and may be injured or killed in the collision.

Seabed destruction by bottom trawling

Each year, thousands of kilometres of seafloor across northern Australia are trawled to catch a range of prawns, fish and shellfish.

Trawlers catch prawns and other fish by dragging weighted nets across the seabed, but in doing so they can seriously damage seafloor habitats like sea grass meadows and sponge gardens.

Trawlers also accidentally catch (or 'by-catch') non-edible fish and other marine life that swim along, or attach to, the seafloor. By-catch is often thrown overboard as waste.

The need to reduce seafloor damage and further reduce by-catch impacts remain serious sustainability challenges for the trawling industry across the region.

Montara oil spill

Two years ago (21 August 2009), Australia's worst oil rig spill in history began off the Kimberley coast in the Timor Sea. The blowout of a well cap in the Montara oil field took five attempts to fix, and a fire destroyed the West Atlas rig. The spill lasted for 74 days and due to an extraordinarily poor environmental monitoring program by the company during and after the spill, we will never know just how much oil polluted the sea. Experts estimated Montara may have been spilling up to 2000 barrels of oil each day, and the slick was estimated to cover 6,000 square kilometres.

Thousands of marine animals would have been contaminated by the surface slick including all air-breathing marine life such as whales, turtles and sea snakes. The slick attracted seabirds and baitfish which mistook the oil for food. Past oil spills confirm that oil stays in the marine environment for decades.

Underwater treasures

Fifteen special places for protection in the north west

The north west stretch of our broad continent, far from where most Australians live, features some of the most pristine tropical seas found anywhere in the world. Extending from Kalbarri, south of Shark Bay, to the Western Australian/Northern Territory border, this region covers over one million square kilometres of Commonwealth waters – an area 15 times the size of Tasmania.

Fifteen of the best in the north west

Fifteen icons capture the essence of the wild north west; fifteen underwater treasures that deserve the best protection we can give. These places include important deepsea features like canyons, saddles, troughs and pinnacles, as well as various islands, shoals and banks. From the well-studied Scott Reef to the depths of the unknown Wallaby Saddle, journey northward with us, icon by icon, to discover the best of the north west. And on the way discover a multitude of marine habitats, from sub-tropical to tropical waters, that provide homes for an incredible diversity of species.

Below: Blue-spotted fantail stingray. Photo Andy Murch/ OceanwideImages.com

Time to mend our ways

"Humans learned early in the Pleistocene how to work together to kill off other species. Causing the disappearance of coral reefs from the face of the earth is a new first – the 'extinction' of an entire ecosystem. This dismal achievement will be accomplished by mid-century unless we change substantially and very soon. And we will be well on the path to a gravely diminished future for ourselves. There are many ways we can change our behavior, including by ensuring that all networks of MPAs on coral reefs are managed in ways that make them effective."

– Emeritus Professor Peter Sale is an internationally renowned marine ecologist of long standing. He has witnessed the degradation of coral reefs around the planet

Shark Bay

Dugong haven

The Shark Bay World Heritage Area is renowned for its marine fauna – but there are no sanctuaries for wildlife beyond this area.

Dolphins are abundant and humpback whales use the bay in their migration along the coast. Of global importance is the population of dugong – the largest in the world at around 10,000 animals. Shark Bay has the most diverse seagrass meadows in the world – perfect feeding grounds for these large, gentle mammals. Twelve seagrass species cover over 4,000 square kilometres of the bay, including the world's largest seagrass bank – the Wooramel Seagrass Bank.

In Hamelin Pool and L'haridon Bight in Shark Bay dwells the oldest form of life on earth. Stromatolites are rock-like structures formed by algae and bacteria trapping grains of sediment. Hamelin Pool contains the most diverse and abundant examples of these ancient lifeforms in existence.

Turtles nest on the islands in the region. Dirk Hartog Island is the most important nesting site for loggerhead turtles in Western Australia.

Green turtles also nest there.

Further offshore, the seabed features include the only underwater valley in the north west, as well as the Zuytdorp shelf and slope, and part of the Carnarvon Terrace – cutting through the mud-and-sand-dominated sediments of the continental slope.

Above: Stromatolites. Photo Clay Bryce/marinethemes.com

Below: Dugong. Photo Gary Bell/OceanwideImages.com

Wallaby Saddle

Sperm whale feast

2

Why do sperm whales gather around the depths of the Wallaby Saddle to the west of Shark Bay? It's thought they are there to feed on the abundant squid. And why are squid so abundant? Because of a unique seafloor feature, the Wallaby Saddle.

The Wallaby Saddle sits between the Wallaby Plateau to the west and the continental slope on the east. Rising up from the deep ocean to its north and south, the Wallaby Saddle causes an upward movement of deeper, cooler waters. The nutrients in these waters create ideal conditions for life to flourish. The microorganisms and plants found there in turn attract huge numbers of small surface-water fish and the animals that eat them – sharks and other large predators such as tuna.

Right: Squid. Photo Tim Nicol

Below: Sperm whales. Photo Lin Sutherland/OceanwideImages.com

Calamari Connoisseurs

Squid is the favorite food of sperm whales. The north west is a hotspot for cephalopods, with around 80 species of octopus, squids and cuttlefish – five of them found nowhere else in the world. It seems like they would be spoiled for choice, but these giants will only eat two species of squid.

Ningaloo and Canyons

Whale shark holiday

3

Ningaloo Reef is the longest fringing coral reef in Australia. The outstanding features of Ningaloo Reef have recently received global recognition through World Heritage listing by the United Nations.

Ningaloo Reef lies in a 'transition zone', meaning it supports both tropical and temperate marine plants and animals. More than 250 corals provide homes for over 460 coral reef fishes. Ningaloo is one of the healthiest coral reefs in the world, at a time when scientists estimate that most coral reefs are in decline, some steeply. Protecting the areas off Ningaloo is crucial to giving it and its myriad species the best chance of survival.

Every year, tourists from around the world flock to Ningaloo. They come to see whales, dolphins and turtles. But Ningaloo is most famous for the annual arrival of whale sharks – the largest fish in the sea. Ningaloo Reef is one of the most accessible places in the world where these gentle giants appear in large numbers with such predictable regularity.

Whale sharks come to Ningaloo Reef for its abundant food. Next to the Ningaloo and Muiron Islands reef systems lie the Cloates and Cape Range canyons. These canyon systems are the only large multiple channel canyons in Australia's tropical waters and are believed to be essential to Ningaloo's productivity.

The upwelling zones are sites where marine species gather. Some fish, such as sweetlip emperor, are known to live on the tops of these canyons. The soft-bottom habitat of these canyons is also likely to support important communities.

Coral reef biodiversity: a hidden wonder

Recent research on biodiversity at Ningaloo Reef has uncovered new species and new connections between globally diverse marine communities. In just three weeks, a survey at Ningaloo doubled the number of a particular group of little crabs. Called cryptochirids, these crabs burrow and live inside live corals. Another group of small prawn-like creatures (marine isopods) were thought to occur only in Japan and Antarctica – until two species were recently discovered at Ningaloo. Discoveries like this revolutionise our understanding of the way the marine environment fits together. Who knows what is still waiting to be discovered in our little-studied north west waters?

Above: Gammaridean isopods. Photo David Fleetham/marinethemes.com

Below: Whale shark. Photo Darren Jew

Exmouth Plateau and Northern Montebello Trough

4

Realm of the unknown

At 50,000 square kilometres, nearly three quarters the size of Tasmania, Exmouth Plateau is a vast underwater landscape – rough, undulating and dotted with pinnacles. Rising up to 500 metres in depth, Exmouth Plateau plunges down to some of the deepest parts of the north west at around 5,170 metres.

The effect of the plateau is to bring oxygen and nutrient-rich waters closer to the surface, supporting several marine ecosystems.

Plateau communities

Exmouth Plateau provides huge offshore habitats for communities of creatures adapted to depths of around 1000 metres. Science has yet to fully comprehend everything this extraordinary habitat has to offer.

We do know that deep water marine communities of the sea-floor are likely to include filter feeders and patches of sea cucumbers, brittle stars, starfish, sea-urchins, boring worms and soft coral sea-pens. Closer to the surface, large groups of baitfish attract larger surface dwelling species such as billfish, tuna, sharks and dolphins. The plateau is linked to Ningaloo Reef and canyons by migratory species, such as whale sharks, whales, dolphins and turtles, which are found at both locations.

Montebello Trough

On the eastern side of the Exmouth Plateau, the Montebello Trough represents more than 90% of the area of troughs in the north west. Satellite imagery shows the increased concentration of life throughout the trough, supporting rich communities of fish and other marine life. This area of continental slope has one of the most diverse habitats in Australia, with over 508 fish species – nearly 80 of them found nowhere else on Earth!

The trough also provides crucial southern bluefin tuna spawning grounds and an important feeding site for sperm whales.

Above: Deepsea fish communities of Montebello Islands. Photo Claire Wellington

Below: Great hammerhead shark. Photo Gary Bell/OceanwideImages.com

Barrow, Lowendal and Montebello Islands

Turtle breeding haven

Migratory whales, dolphins and dugong are common in the waters off Montebello, Lowendal and Barrow Islands, which are resting areas for humpback whales.

Green, hawksbill and flatback turtles regularly nest on the islands in the area. Barrow Island provides critical nesting habitat for green and flatback turtles (and the occasional loggerhead turtle). The Montebello Islands and surrounding waters have been identified as critical nesting habitat for both flatback and hawksbill turtles. The shoals surrounding these islands are foraging grounds for green and hawksbill turtles, and west of Barrow Island green turtles gather in summer to mate. Young flatback turtles are thought to spend their first years in waters around Barrow Island.

These islands support significant colonies of wedge-tailed shearwaters and bridled terns. The Montebello Islands support the biggest breeding population of roseate terns in Western Australia. Ospreys, white-bellied sea-eagles, eastern reef egrets, Caspian terns and lesser crested terns also breed in this area. Barrow, Lowendal and Montebello islands are internationally important sites for six species of migratory shorebirds, supporting significant proportions of the East Asian-Australasian Flyway population of these species.

Right: Osprey. Photo Eric Matson

Below: Green turtle. Photo Jenita Enevoldsen

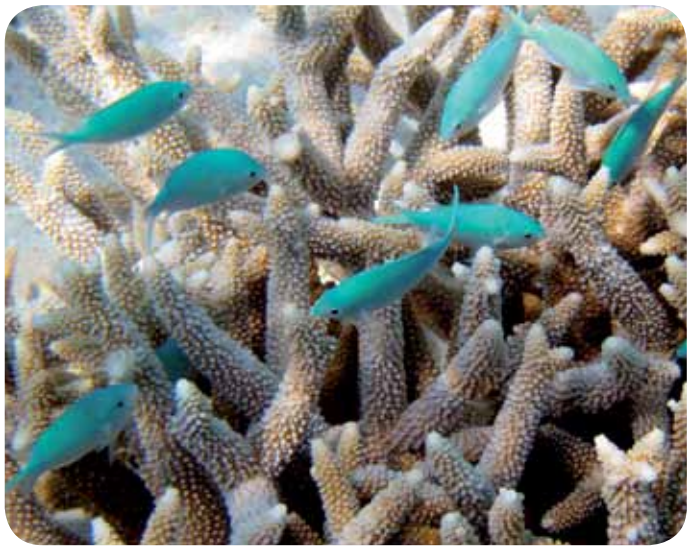
Dampier Archipelago

Marine life aplenty

The Dampier Archipelago supports a high diversity of marine species, including significant populations of a number of protected species that are likely to move through and feed here. With nutrient-rich waters, these areas are likely to be gathering sites for many marine species like whales and dolphins. The shallower waters of the Dampier Archipelago contain an extensive array of small barrier and fringing reefs, thought to be the richest area of marine biodiversity in Western Australia.

The Dampier Archipelago provides critical nesting habitat for flatback and green turtles, as well as supporting the most significant hawksbill turtle rookery in Western Australia.

Approximately 35 kilometres north of the Dampier Archipelago lie the Glomar Shoals. With water depths of between 26-70 metres, the Glomar Shoals have a distinctive coarse sediment consisting of shells, coral rubble and coarse carbonate sand. Cod, emperor, snapper and bream are fished commercially in large numbers, suggesting this location has nutrient rich waters supporting an usually high amount of marine life.



Above: Corals and fish. Photo James Watson and Liana Joseph

Below: Hawksbill turtle. Photo Nils Aukan/WWF

The Argo Abyssal Plain

7

50 million years of history

The Argo Abyssal Plain and canyons are carved into the continental slope rising up to the Rowley Terrace and Scott Plateau. The Scott Plateau occurs in water depths of 2,000-3,000 metres and is fringed by numerous spurs and valleys. It is separated from the Rowley Terrace by canyons that are believed to be up to 50 million years old.

While the Argo Abyssal Plain is thought to support sparse groups of rock-bound filter-feeders, the canyons on the slope between Argo Abyssal Plain and Scott Plateau are major havens for marine life. Fish gather there, attracting predatory fish, sharks, dolphins and whales. Southern bluefin tuna spawn in this area. Whaling records from the 19th century indicate that historically, Scott Plateau was a sperm whale gathering area and may be a breeding ground for sperm and beaked whales.

Right: Dolphins. Photo Eric Matson

Below: Schooling anchovies. Photo Gary Bell/OceanwideImages.com

Cape Keraudren to Roebuck Bay

Snubfin dolphin playground

These waters are influenced by windborne dust, which brings nutrients from the land into the water. Green, hawksbill, loggerhead and olive ridley turtles are all known to inhabit this area. Green turtles nest at Roebuck Bay and nearby beaches, and vulnerable flatback turtles regularly nest at scattered locations along Eighty Mile Beach.

The newly identified snubfin dolphin is an inshore species. With it are other dolphins including shallow feeding bottlenose and Indo-Pacific humpback dolphins and the deep water forager, the false killer whale.

Migratory shorebirds travelling the East Asian-Australasian Flyway use two internationally significant feeding and roosting onshore habitats: Roebuck Bay and Eighty Mile Beach. These locations regularly support over 500,000 birds at a time with over 850,000 birds using the area annually. Further offshore, seabirds feed in areas associated with the southward movements of the Baleine Bank upwelling.

Below: Snubfin dolphin. Photo Deborah Thiele

Seagrass

Found in oceans around the world, seagrass is an underwater flowering plant vital to the health of marine ecosystems. About 75% of seagrass becomes food for bacteria, fundamental to the entire marine food chain. The other 25% of seagrass is eaten directly by animals such as dugong, green turtles, fish, snails and crustaceans. Seagrass meadows are the primary food source for dugong and species of sea turtles. Seagrass habitats are critical for biodiversity, with about 40 times more animals living in seagrass meadows than on bare sand, including worms, sponges, shrimp, starfish, crabs, sea urchins and many other wonderful creatures.

Dampier Peninsula

Fish to rival the Great Barrier Reef

The waters off the Dampier Peninsula stretch 300 kilometres north from Broome to Cape Leveque. These waters support large numbers of baitfish, that in turn attract groups of seabirds and other marine life, such as predatory fishes. In the only fish study done off the Dampier Peninsula, at James Price Point, the diversity and abundance of fish populations was much higher than equivalent latitudes at the Great Barrier Reef.

Taking advantage of this abundance of food, seabirds breed on the nearby Lacepede Islands – home to the largest brown booby colonies in Western Australia. Other seabirds also breed in the area, including lesser frigatebirds, bridled terns, roseate terns and common noddies. Extensive seagrass meadows attract turtles, including flatbacks, and dugong to these waters to feed. The largest green turtle nesting habitat in Western Australia is located on the nearby Lacepede Islands.

The north west is one of three Australian hotspots for sponge biodiversity, particularly at Quondong Point. Large numbers of humpback whales, as well as other cetaceans such as false killer whales, pygmy blue whales and dolphins, have also been recorded in the waters around Quondong Point.

Right: Tasselled wobbegong shark. Photo Andy Murch/ OceanwideImages.com

Below: Juvenile chinaman fish. Photo Eric Matson

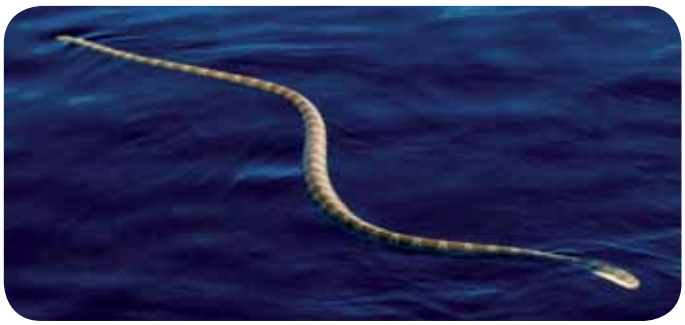
Offshore atolls

Life on the edge

There are three groups of spectacular shelf-edge Indian Ocean atolls off north west Australia: the Rowley Shoals, the Scott Reef group and Ashmore and Cartier Islands.

Hundreds of kilometres apart, these offshore reefs serve as stepping stones connecting the diverse biological reef communities of Indonesia to the coastal reefs here in Western Australia – reefs off the Pilbara, Ningaloo and coral reefs further south.

These atolls are epicentres for life, attracting migratory whales, including sperm, blue and small toothed whales, and dolphins; as well as other surface dwelling species like tuna, billfish and sharks. Each group of atolls has its own distinct features, including its unique communities of sponges.



All three atoll groups provide vital resting and feeding areas for migratory shorebirds.

Rowley Shoals

The Rowley Shoals are a collection of three atoll reefs: Mermaid, Clerke, Imperieuse, and a little known fourth

shoal that is unmapped. This place is breathtaking. Diving the Rowley Shoals is a life-changing experience. Few places on the planet are so wild. Huge fish cascade and wheel through coral canyons on the tides. Sharks, tuna and sailfish hunt on the sheer walls of the reef. The Rowley Shoals are what coral atolls should be. The reefs are noted for their high species diversity: 184 species of corals, 264 species of molluscs, 82 species of starfish and sea urchins, and 389 species of finfish. Sharks include grey reef and silvertip whaler sharks. Little terns, red-tailed and white-tailed tropicbirds breed at the Rowley Shoals.

Scott Reef

The Scott Reef group includes Seringapatam Reef, which boasts fish, molluscs and echinoderms found nowhere else in Western Australia. Scott and Seringapatam reef are both important areas for seasnakes. Scott Reef has 720 species of fish and 300 corals. Scott and Seringapatam reef have distinctly different sponges despite their proximity to each other. Also, Scott Reef supports a small but genetically distinct breeding population of green turtles and is an important foraging area for seabirds including roseate terns, lesser frigatebirds, brown boobies and wedge-tailed shearwaters.

How do deep corals survive low light levels?

Corals use tiny algae, called zooanthellae, to capture light and convert it to food using photo-synthesis. Typically, corals need 1% of the light available at the surface of the ocean in order to survive. As light decreases with depth, some deep corals maximise light exposure for their zooanthellae by growing in a flatter shape, while others supplement their food source by catching plankton with their tentacles.

Ashmore Reef and Cartier Islands

Ashmore and Cartier reefs are internationally famous as the ‘seasnake city’ due to their unusually high diversity and density of seasnake inhabitants. Unfortunately over the past 20 years there has been a serious, and unexplained, decline in seasnakes at Ashmore Reef.

Large seagrass meadows in waters surrounding Ashmore Reef support a small and potentially genetically distinct dugong population. Around 11,000 marine turtles feed in the area each year, including a genetically distinct green turtle population that breeds on Ashmore and Cartier reefs, as well as hawksbill and loggerhead turtles. These reefs are essential breeding habitats for some of the most important seabird colonies in the north west, including bridled terns, common noddies, brown boobies, eastern reef egrets, frigatebirds, tropicbirds, red-footed boobies, roseate terns, crested terns and lesser crested terns.

Ashmore and Cartier reefs are the northern-most reefs in the region that are dominated by hard corals. Coral reefs further north are based on coralline algae.

Top left: Seasnake. Photo Glenn Walker

Bottom left: Corals. Photo Eric Matson

Top: Brown boobies. Photo James Watson and Liana Joseph

Above: Red-tailed tropicbird. Photo James Watson and Liana Joseph

Northern calving grounds

11

A humpback haven

Every winter the shallow warm seas from south of Broome to the Bonaparte Archipelago in the north become a nursery for the largest population of humpback whales in the world. As the population recovers and grows, the area where humpbacks give birth is also growing. The calves are suckled in the warm, tropical waters for several months before commencing the long journey down to their summer feeding grounds in the Antarctic. The area is also home to blue whales, pygmy killer whales, pilot whales, Indo-Pacific humpback dolphins and bottlenose dolphins as well as the newly described Australian snubfin dolphin.

Montgomery Reef is a unique marine geological feature of the north west. With 400-500 square kilometres of coral and algal reefs and terraces, palaeontologists believe it is built on ancient limestone and contains fossil stromatolites possibly up to 1.8 billion years old.

Adele Island is one of the most important offshore seabird nesting sites for brown boobies, red-footed boobies, masked boobies, lesser frigatebirds and lesser crested terns.

Exmouth Gulf plays an important role in the southern migration of humpbacks. It is an important resting and suckling area for calves, where they can gain the weight and energy needed to continue their long migration to Antarctic waters.

Below: Humpback whales. Photo Gary Bell/OceanwideImages.com

Humpback history

In the 1800s and 1900s, humpback whales were hunted extensively throughout the oceans of the world and their population reduced to the brink of extinction.

Australia ceased killing humpbacks in 1963 and they were protected worldwide in 1965. By this time, however, Australian humpback whale populations were reduced by an estimated 95% and the Kimberley population had been decimated to around 500 individuals.

Luckily, Australian humpback whale populations are recovering, although there is still a way to go. Current estimates of the Kimberley population are between 33,000 and 35,000, making it globally the largest humpback whale population.

Humpbacks are renowned for their songs and aerobatic displays, making them popular with whale watchers.

Browse Island

Ocean mammal metropolis

A photographer's paradise

"In a personal and professional sense, the Kimberley's outer reefs and shoals are of tremendous importance to me. As a photographer of wildlife and marine life, there is never a shortage of subject matter. The outer reefs and shoals are teeming with zooplankton which support large schools of baitfish, providing vital food for the magnificent seabirds that breed on Adele Island and the Lacepede Islands and the world's largest single population of humpback whales, making this a wildlife photographer's paradise."

– Annabelle Sandes, wildlife photographer

The waters around Browse Island support the highest biodiversity of cetacean species in Western Australia, including large pods of oceanic dolphins, pygmy killer whales, false killer whales, melon-headed whales, minke whales and pilot whales.

Blue whales on their way to Indonesia stop over to feed on abundant tropical krill associated with the localised upwellings around Browse Island – during July on their northern migration and again during October-November as part of their southern migration.

Browse Island is a major rookery for green turtles, and flatback turtles also nest there.

Left: Booby chick, Adele Island. Photo Annabelle Sandes

Below: Blue whale. Photo Mark Carwardine/OceanwideImages.com

North Kimberley

Flying fish fiesta

The North Kimberley extends to the northern-most pristine part of the Kimberley and east into Bonaparte Gulf, including the western part of Londonderry Rise, a large elongated plateau that extends offshore from Cape Londonderry.

Closer to the coast, the Kimberley rivers wash nutrients into the sea. Despite their light being blocked out by this sediment, Kimberley corals thrive – unlike most corals that require clear tropical oceans to survive. Kimberley coral reefs are so extensive that they rival the Red Sea in their size. Kimberley fringing reefs are diverse too, with early studies on inter-tidal corals already showing more species than Ningaloo Reef.

Kimberley coral reefs support many fish species, including tropical reef fish and small surface dwelling fish, as well as larger species such as trevally, coral trout, gropers, emperors, snappers, dolphinfish, marlin and sailfish. Flying fish gather around these reefs making spectacular displays that attract hungry seabirds.

Left: Flying fish. Photo David Fleetham/Oceanwideimages.com

Below: Kimberley corals. Photo Eric Matson

A first for science: Kimberley corals

The first Australian corals collected for science came from the Kimberley. During a British hydrographic survey of the Kimberley waters aboard the Mermaid and Bathurst in 1818 to 1822, Phillip Parker King collected coral specimens from reefs at the Midway Islands. In 1927, King published a list of 20 coral species and it is believed that these specimens still exist in the Natural History Museum in London.

East Kimberley

Flat-top mountain sea country

The north west has 70% of the carbonate banks found in Australian waters, occurring predominantly in the Joseph Bonaparte Gulf. These banks and shoals rise up like mountains from depths of hundreds of metres to depths of tens of metres, with each bank less than 10 square kilometres in area. Standing much shallower than surrounding waters, these banks consist of a hard layer with flat tops and steep sides, forming ecosystems that differ vastly from their surrounds.

The carbonate banks support bottom dwelling communities, including coral, feeding on the suspended nutrients swirling around these features. Each bank is separated from the next by narrow channels. The banks and channels support a high diversity of animals including reef fish, sponges, soft and stony corals, gorgonians (sea fans), bryozoans (moss animals), ascidians (sea squirts) and other rock-clinging filter feeders. The banks and channels are known to be important foraging areas for loggerhead turtles and the north-west Kimberley breeding population of flatback turtles, and the wider area includes important feeding sites for olive ridley turtles.

This area also contains the majority of the tidal sandwaves/sandbanks of the north west, as well as the Londonderry Rise, a large elongated plateau that extends offshore from Cape Londonderry.

Right: Sacoglossans on Halimeda. Photo Bill Rudman/Sea Slug Forum

Green thieves

In the green algae ecosystems in the north of the bioregion live species of thieves. Slug-like shells, sacoglossans, have developed an organ that allows them to pierce Halimeda (calcareous green algae) and steal photosynthesising chloroplasts. These stolen chloroplasts will make sugars from sunlight for the slug for up to six weeks. The slug also steals defensive chemicals from the algae which it adds to the carbon to make its own defence system – a mucous skin excretion to deter predators.

Below: Yellowtail fusilier fish. Photo Getty Images

Bonaparte Basin

Limestone pinnacle productivity

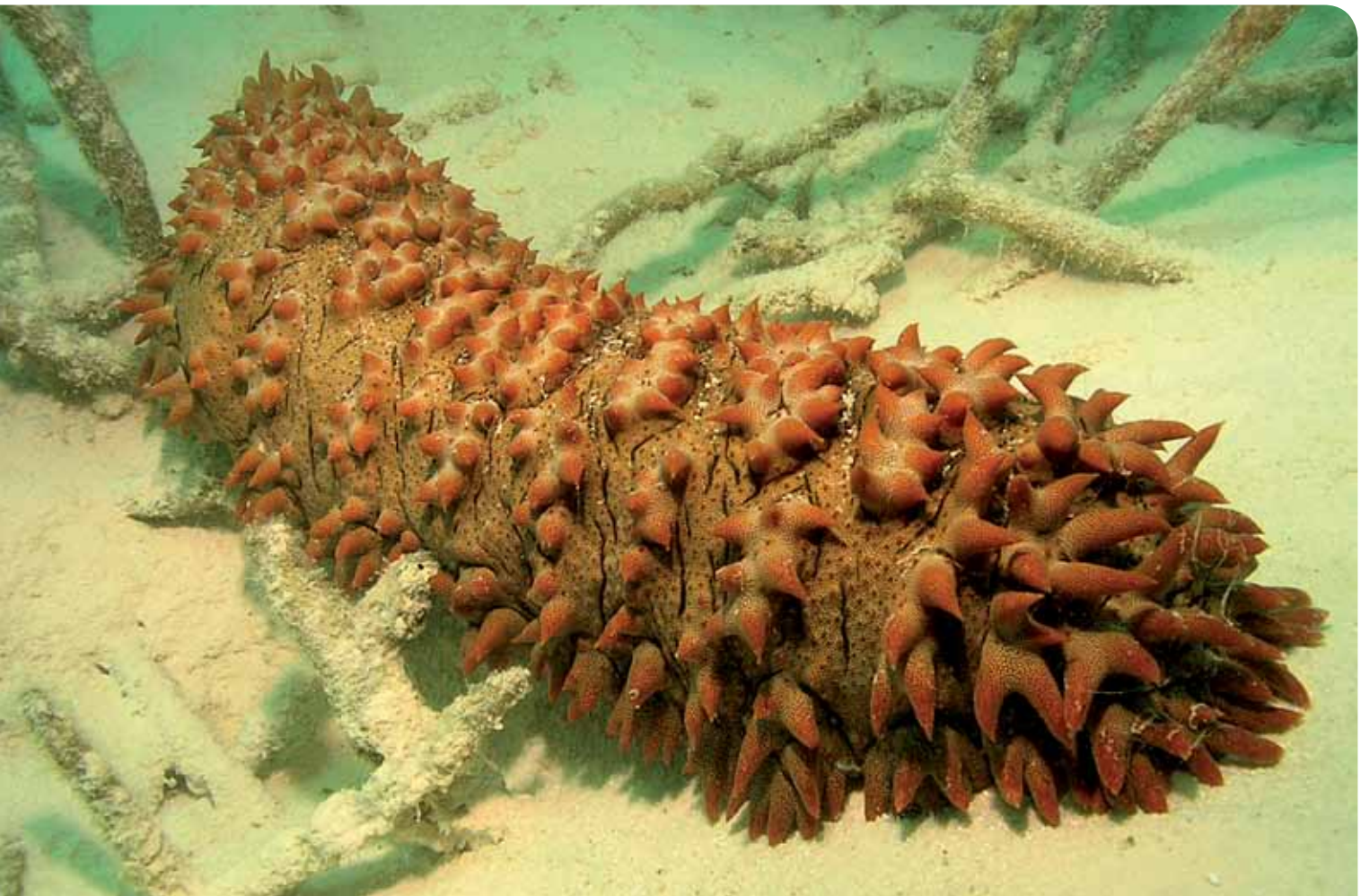
The Bonaparte Basin, a 45,000 square kilometre geomorphic basin, is a unique feature of the north west. Although relatively flat and shallow at depths of around 90 metres, it is punctuated by underwater banks and numerous pinnacles – 60% of pinnacles in the north west occur here.

The limestone pinnacles rise up to 50 metres high, are 50–100 kilometres long, and are distinctly different in shape and character to pinnacles elsewhere in the north west. They are believed to support a high diversity of marine species.

The movement of water around these features is likely to mix nutrients and sediments in the shallow waters where light can penetrate – facilitating growth of hard and soft corals and sponges and attracting fish such as snappers, emperors and gropers. The pinnacles are also thought to be important feeding sites, particularly for olive ridley turtles as well as green, loggerhead and flatback turtles.

Above: Olive ridley turtle. Photo Solvin Zankl WWF

Below: Sea cucumber. Photo: Eric Matson



What you can do

Help us get marine sanctuaries on the map for the north west.

As you have discovered, the north west is rich in special places and endangered marine life that needs protection.

Act now – help us tell the Australian Government you want real protection for our tropical sea life. Visit www.saveourtropicalsealife.org.au and show your support for protecting our wild blue yonder.

Let the Federal Environment Minister know you want all 15 underwater icons of Australia's north west fully protected.

Right: Montgomery Reef. Photo: Jenita Enevoldsen

Below: World Turtle Day 2011. Photo Jenita Enevoldsen

THE WILDERNESS SOCIETY

Australian Marine Conservation Society

THE PEW ENVIRONMENT GROUP

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protecting nature | living sustainably | creating a climate for change

Wildlife Preservation Society of Qld

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