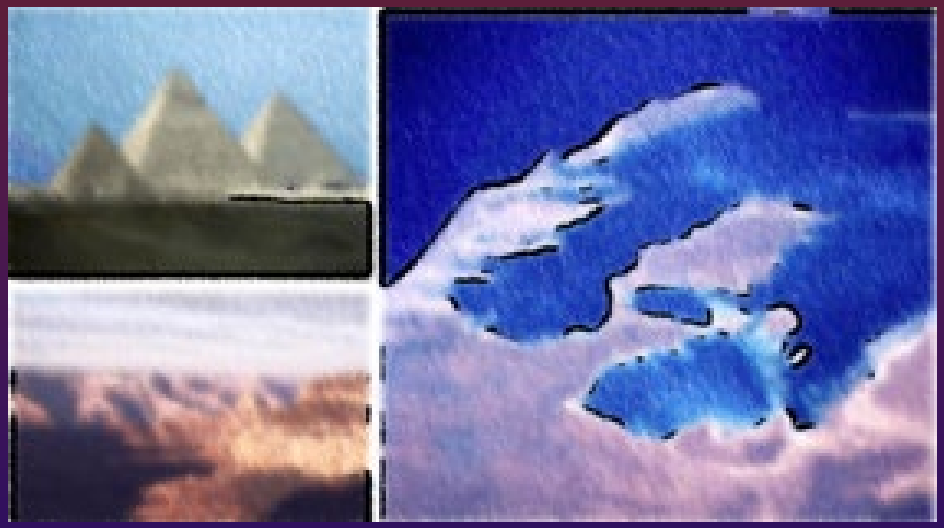
# Shark Bay

## World Heritage Values

**World Heritage Areas are regarded as GLOBALLY OUTSTANDING - they are the most important natural and cultural treasures the earth has to offer**

144 natural sites around the globe have been given World Heritage status.  Shark Bay is one of only 16 places that satisfy all four of the criteria for World Heritage listing



This means Shark Bay is on par with some of the world's most famous natural treasures, including the Grand Canyon, Yellowstone, the Great Barrier Reef, and the Galapagos Islands, all of which also meet all 4 of the criteria.

- **The Shark Bay World Heritage Area occupies 22,000 km² of land and sea. It has over 1,500 km of coastline.**

- **Its area includes most of the Shark Bay District and one third of the Carnarvon District.**

- **It is also the traditional home of the the Malgana, Yingkarta and Nhanda peoples.**

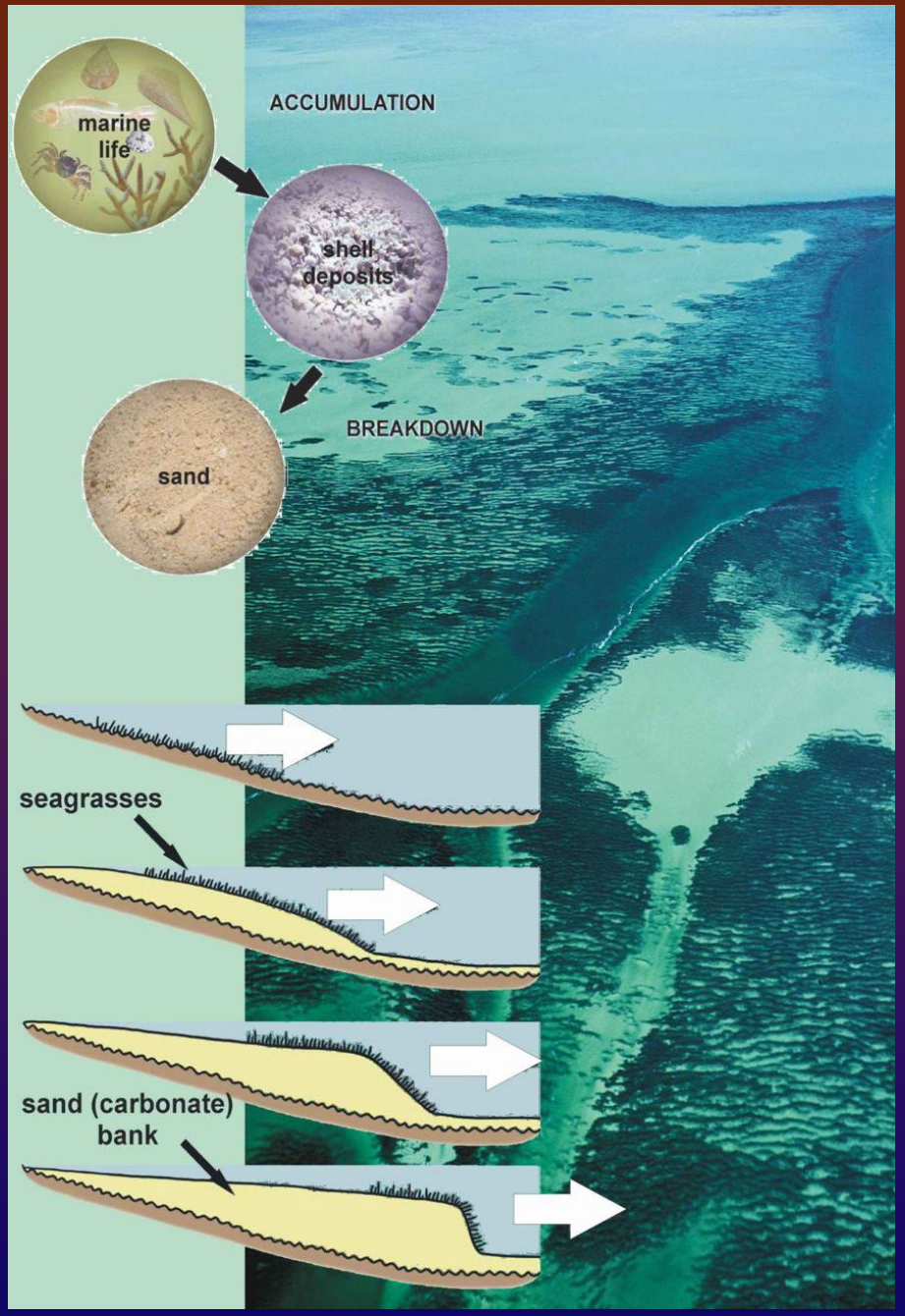
# 4 Key Reasons for Shark Bay's World Heritage Status

# Shaping of the Seabed by Seagrass

- an outstanding example of an ongoing geological process.

- **Over thousands of years, sediments and broken-down shells and skeletons of marine life have been trapped by seagrasses in Shark Bay's shallow waters.**

- **These sediments and skeletons have accumulated to form vast expanses of seagrass banks.**

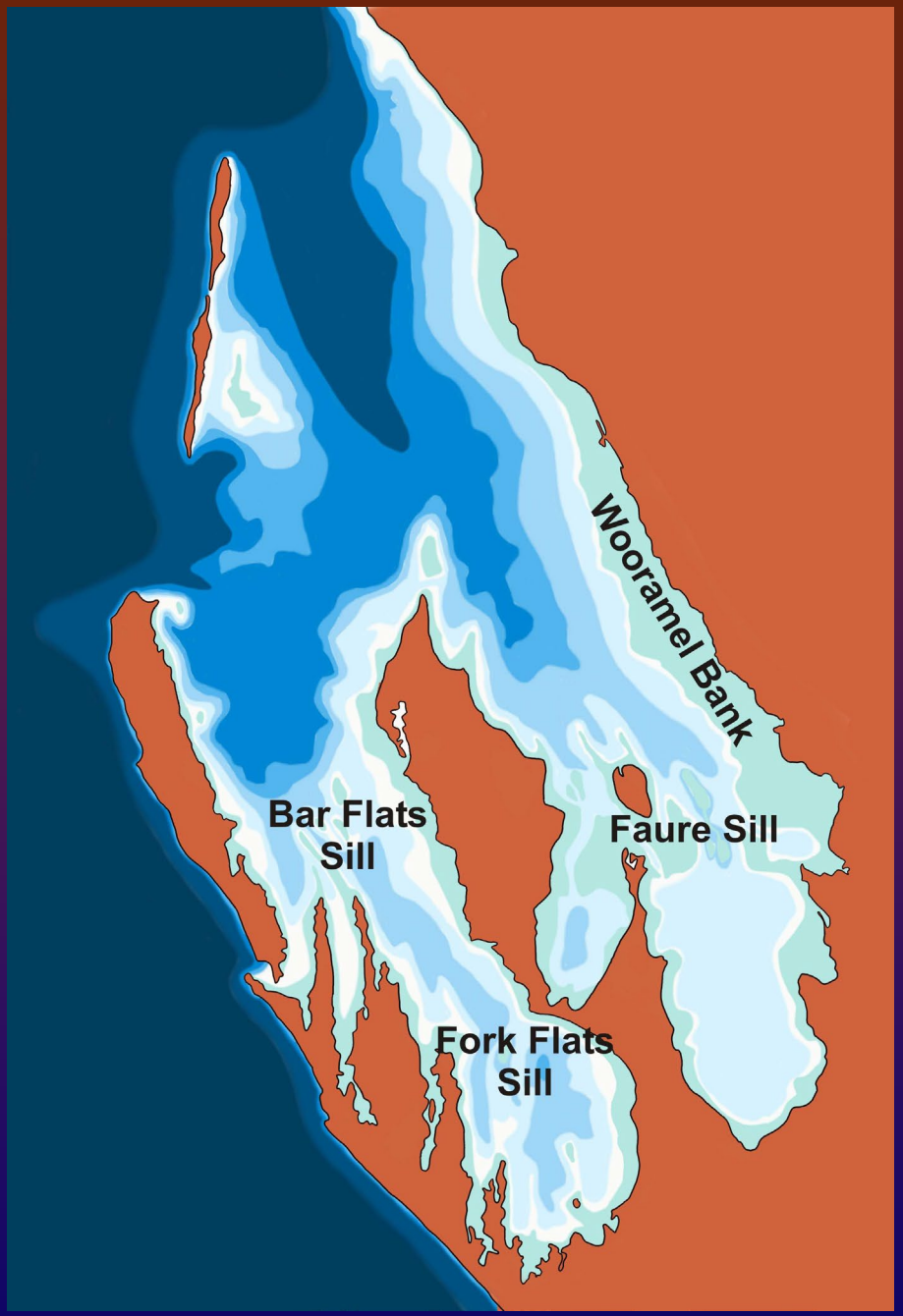


- **The most impressive of these are the *Wooramel Bank*, which runs the length of the Bay's eastern coast, and the 5000 year old *Faure Sill*, which spans the northern boundary of Hamelin Pool.**

- **The Wooramel Bank is the largest seagrass bank in the world.**

- **It has created an enormous amount of habitat for mangroves, young fish, shellfish and crustaceans.**

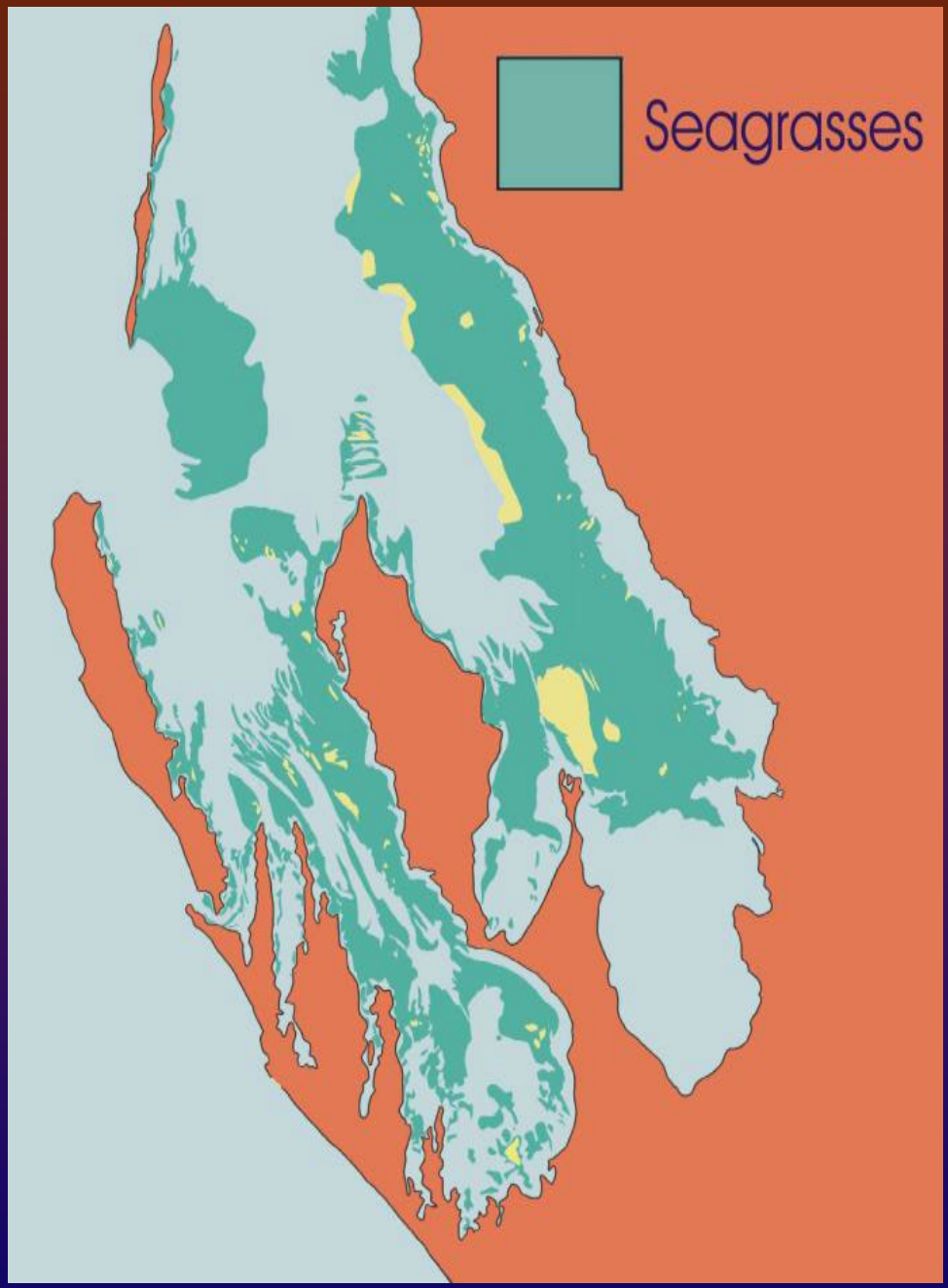
- **It is also used world-wide as a standard reference on carbonate banks.**



- **Altogether, Shark Bay contains 4000 km² of seagrass, covering an expanse the size of the Perth metropolitan area.**

- **These are the largest seagrass banks in the world.**

- **They have profoundly changed the geology, chemistry and biology of Shark Bay's marine environment.**



## ➢Some Physical Effects of Seagrasses

- ➢ stabilise bottom sediments
- ➢ encourage binding and building-up of bottom sediments.
- ➢ act as baffles to slow currents and calm waves.
- ➢ allow suspended particles to fall to the bottom – improves water quality
- ➢ reduces erosion and protects shorelines.

# Some Biological Effects of Seagrasses

- Seagrasses are important nurseries for young fish (bream, mullet, whiting), juvenile prawns, blue swimmer crabs and other marine life.

- Without them, Shark Bay would be like a desert and many of Shark Bay's commercial and recreational fisheries would not exist.

- **Seagrasses are the most important part of the Shark Bay food chain –provide the nutrients that feed everything else in the Bay.**

- **A single hectare of seagrass bed produces 20 tonnes of leaf material per year.**

- **Altogether, Shark Bay seagrasses produce 8,000,000 tonnes of leaf material every year.**

- **Shark Bay seagrasses are food for one of the largest and most important Dugong populations in the world.**
- **Shark Bay is home to 1/8$^{th}$ of the world's Dugong population**
- **Dugongs feed almost exclusively on seagrass**

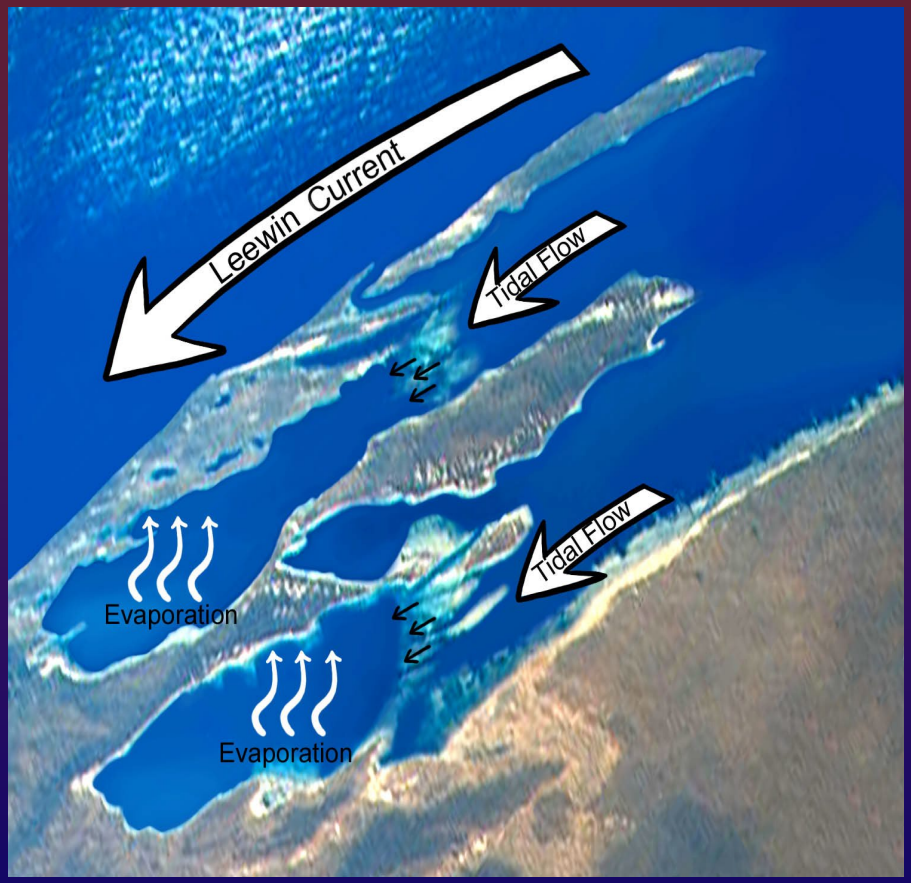


# Hypersaline Marine Waters

- a rare and superlative natural phenomena.

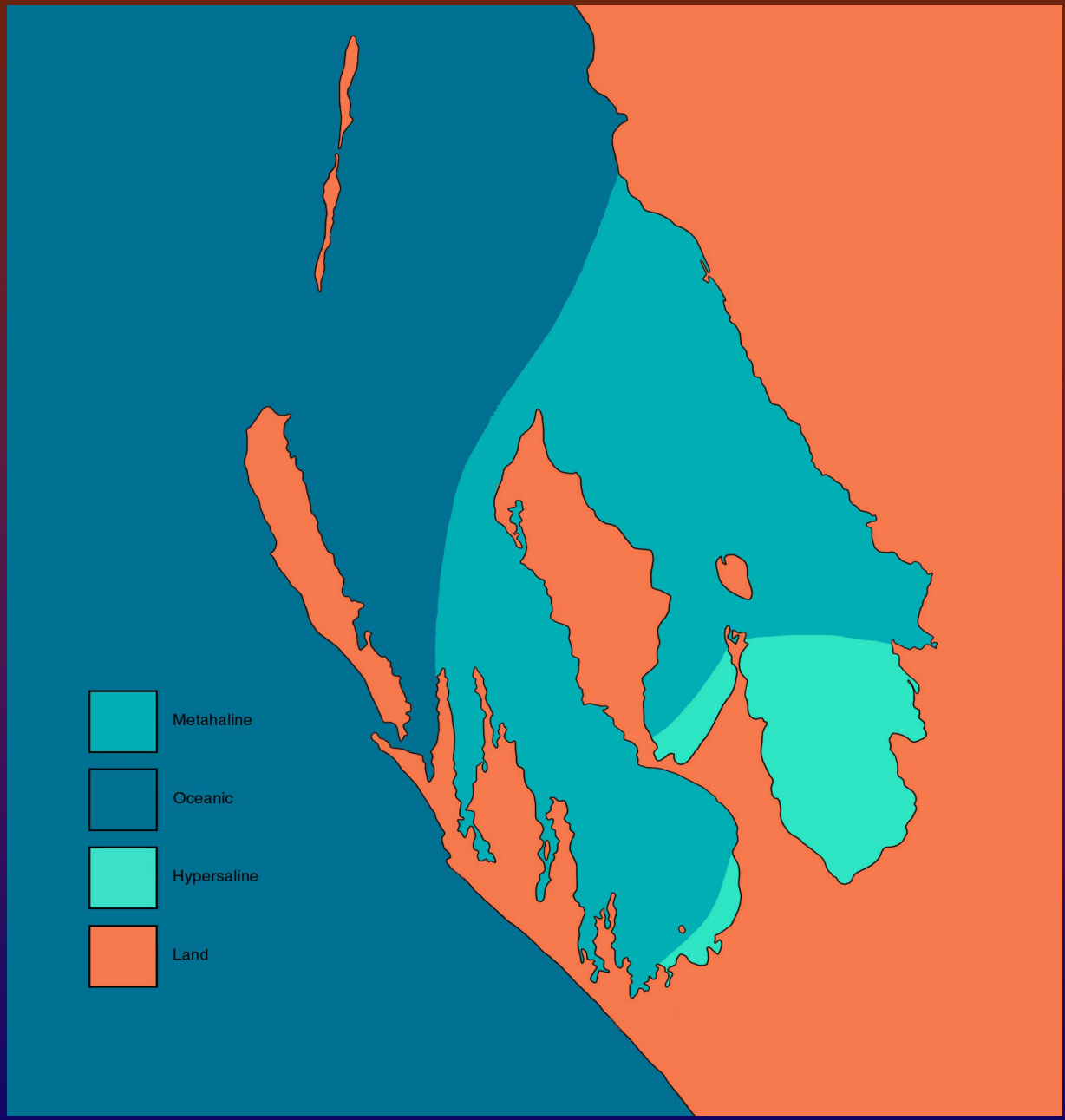
- **In Shark Bay's hot dry climate, evaporation rates are very high. Because of this, seawater in shallow bays - such as L'Haridon Bight and Hamelin Pool - becomes very concentrated, or "hypersaline".**

- **Seagrass banks help maintain the hypersalinity of these waters by restricting tidal flows into and out of the shallow bays. This ensures the open ocean does not dilute Shark Bay's hypersaline waters.**



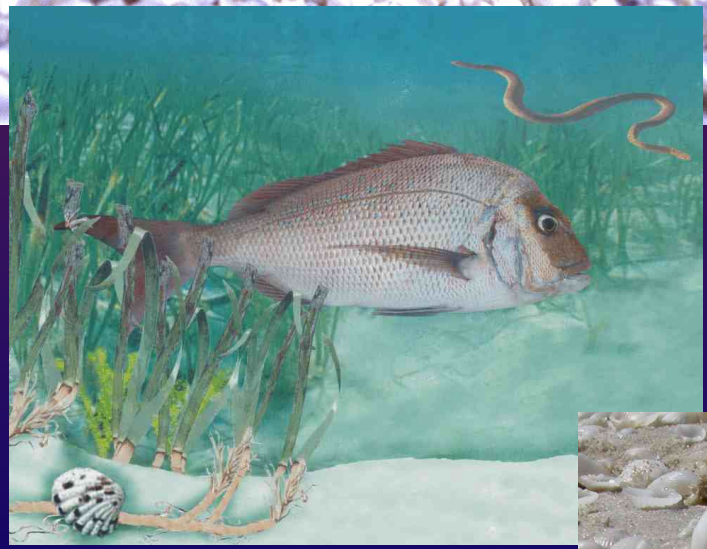
- **Shark Bay has one of the few hypersaline marine environments in the world.**

- **Most marine life cannot survive high salt concentrations, so hypersaline waters are relatively predator-free.**



- **Because there are so few predators, salt-tolerant species, such as the tiny cockleshell *Fragum erugatum*, flourish in great numbers, creating unusual phenomena such as Shell Beach.**

Kevin Crane



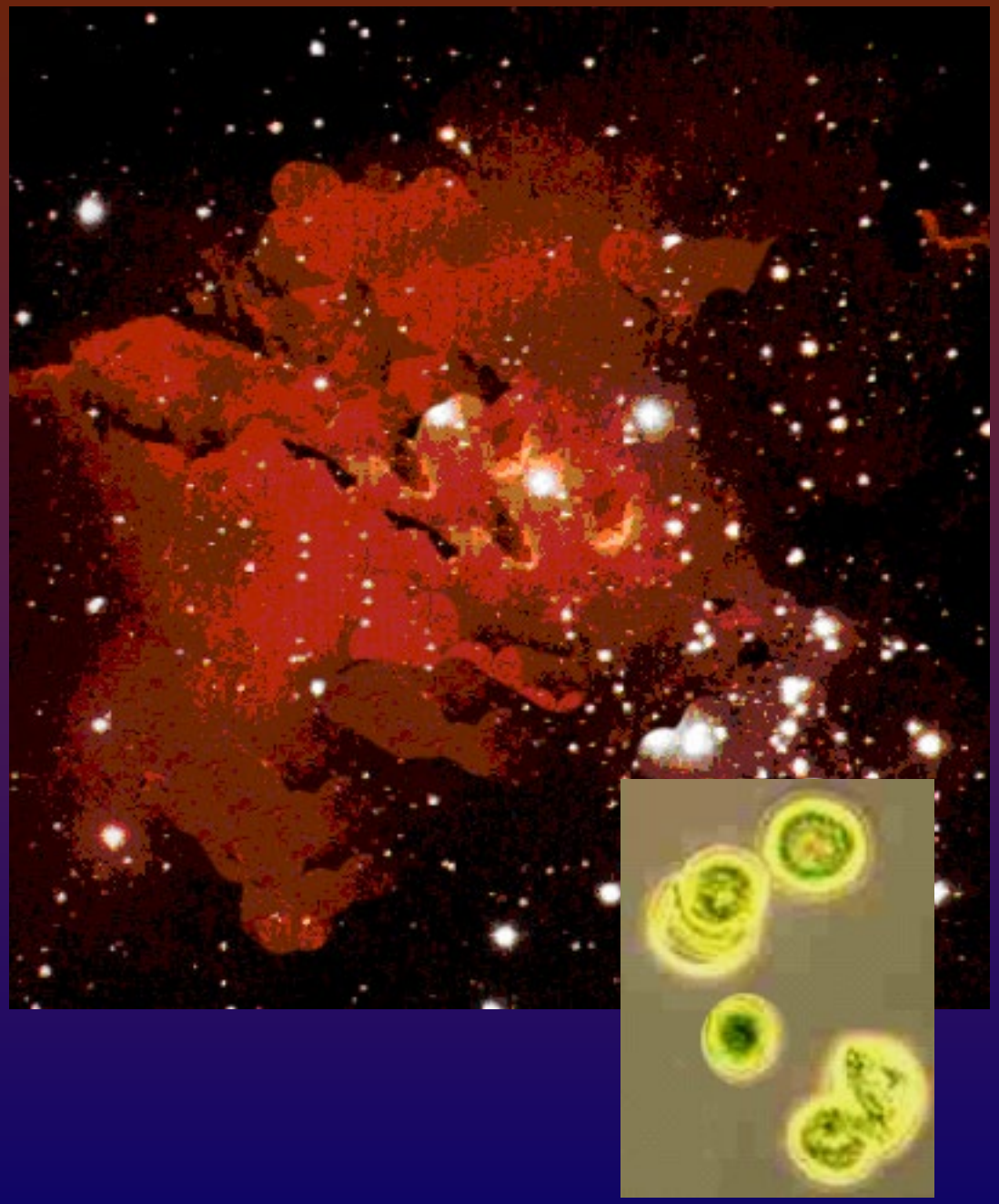
- **Some species are changing genetically to adapt to Shark Bay's high salt, including Pink Snapper and clams.**


# Stromatolites of Hamelin Pool

- an outstanding example of a major stage in the earth's evolutionary history.

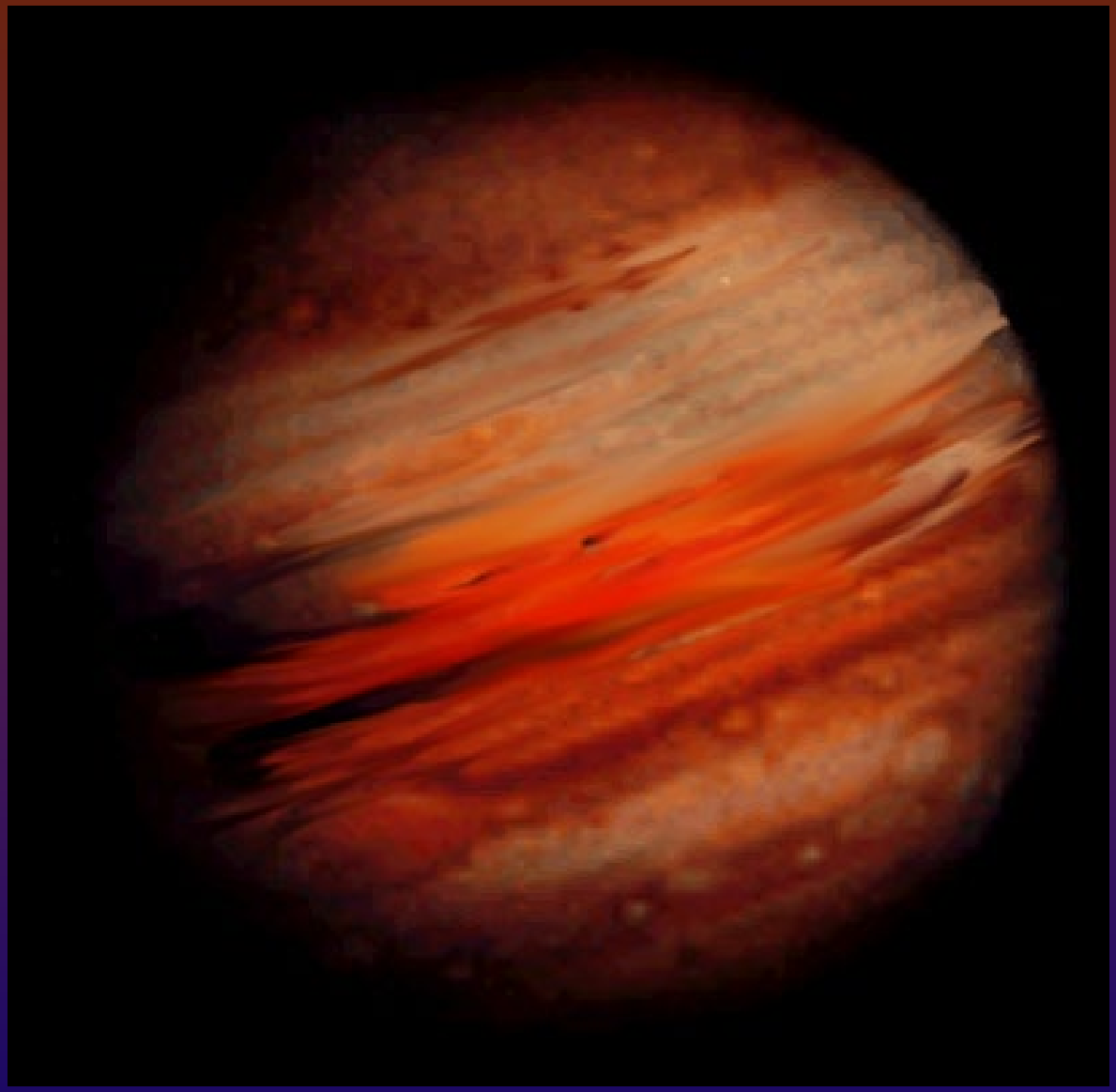
- **4,600 million years ago the earth and the solar system formed out of coalescing stardust and hydrogen gases. The average temperature of the earth's surface in these early days was well over 1600°C, the melting point for iron.**

- **1,000 million years later, some 3,500 million years ago, and not long after the first solid rock formed on the earth's cooling surface, life made its first appearance.**



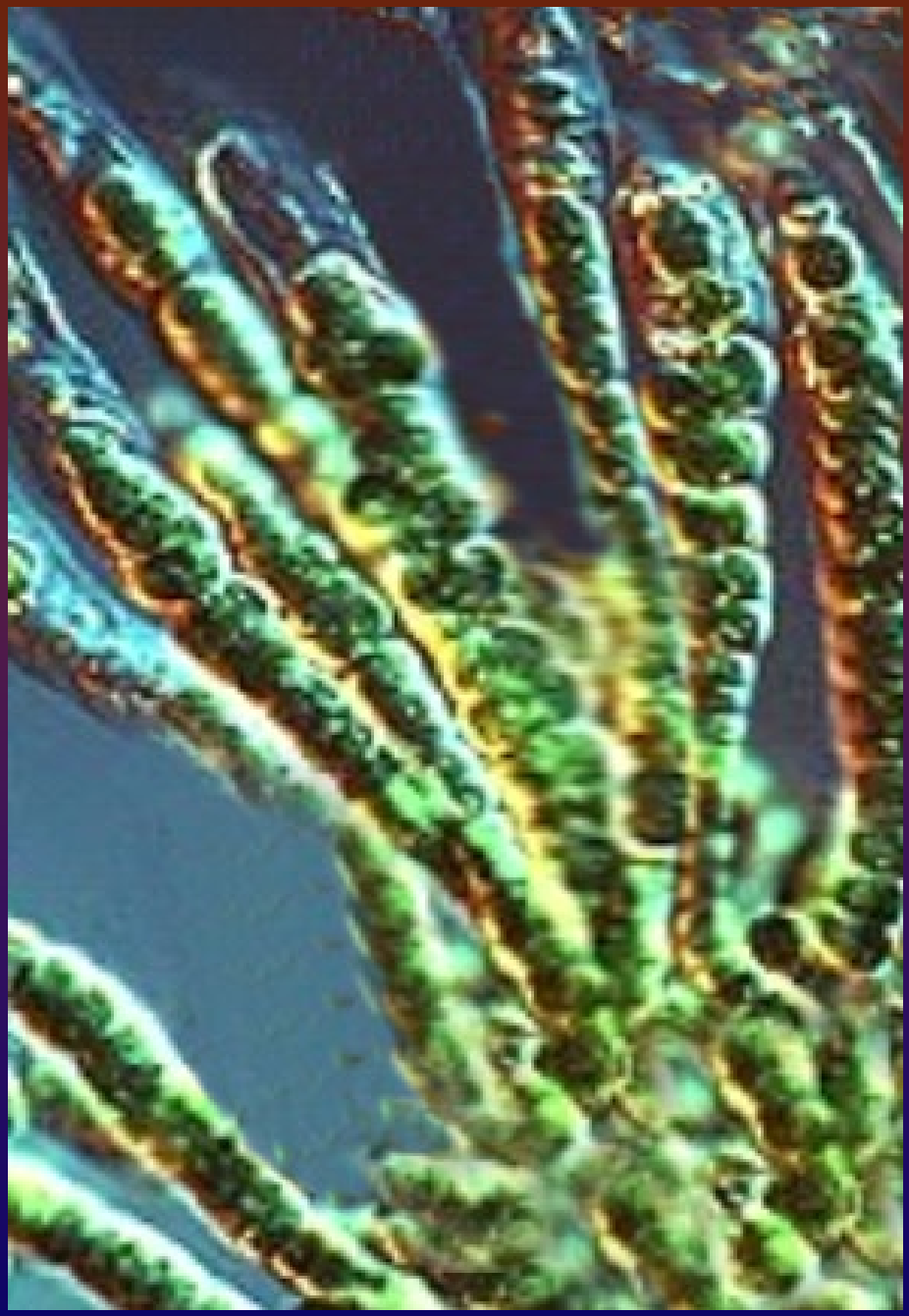
- At this time, the earth’s atmosphere largely consisted of gases spewed out from the earth's interior by volcanoes.

- Such gases would have included water, carbon monoxide, carbon dioxide, and hydrochloric acid (no oxygen!)– a lethal cocktail for most life on earth today.



- These first life forms were extremely primitive microscopic organisms called cyanobacteria.

- With time, cyanobacteria began to flourish in the earth's primordial oceans, floating free or bonding together with the help of mucous and filaments to form giant, sticky, colonies.

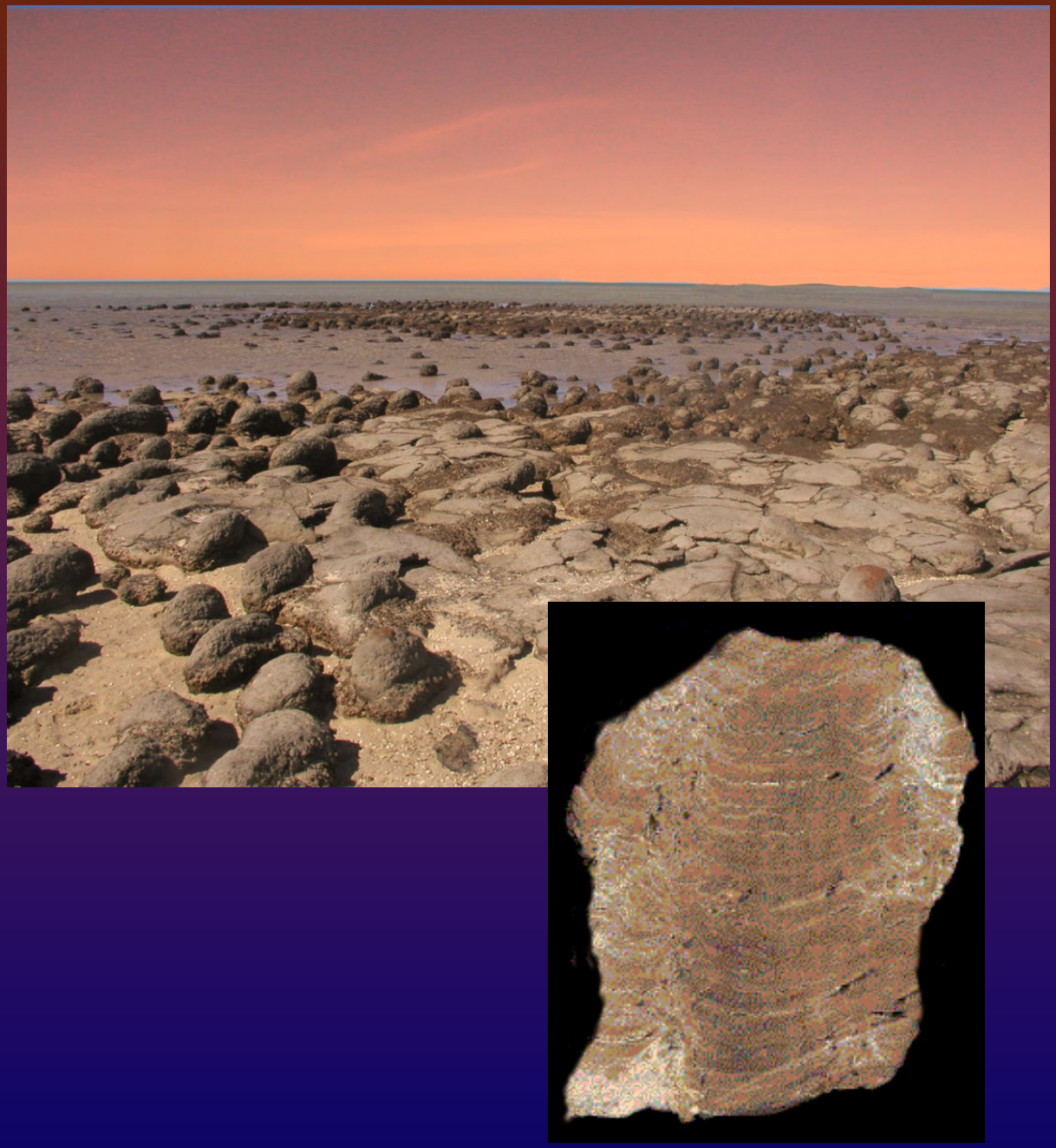


- **These colonies trapped sediments (such as sand and silt), forming extensive mats - called microbial mats, or solid rock-like structures - called stromatolites.**

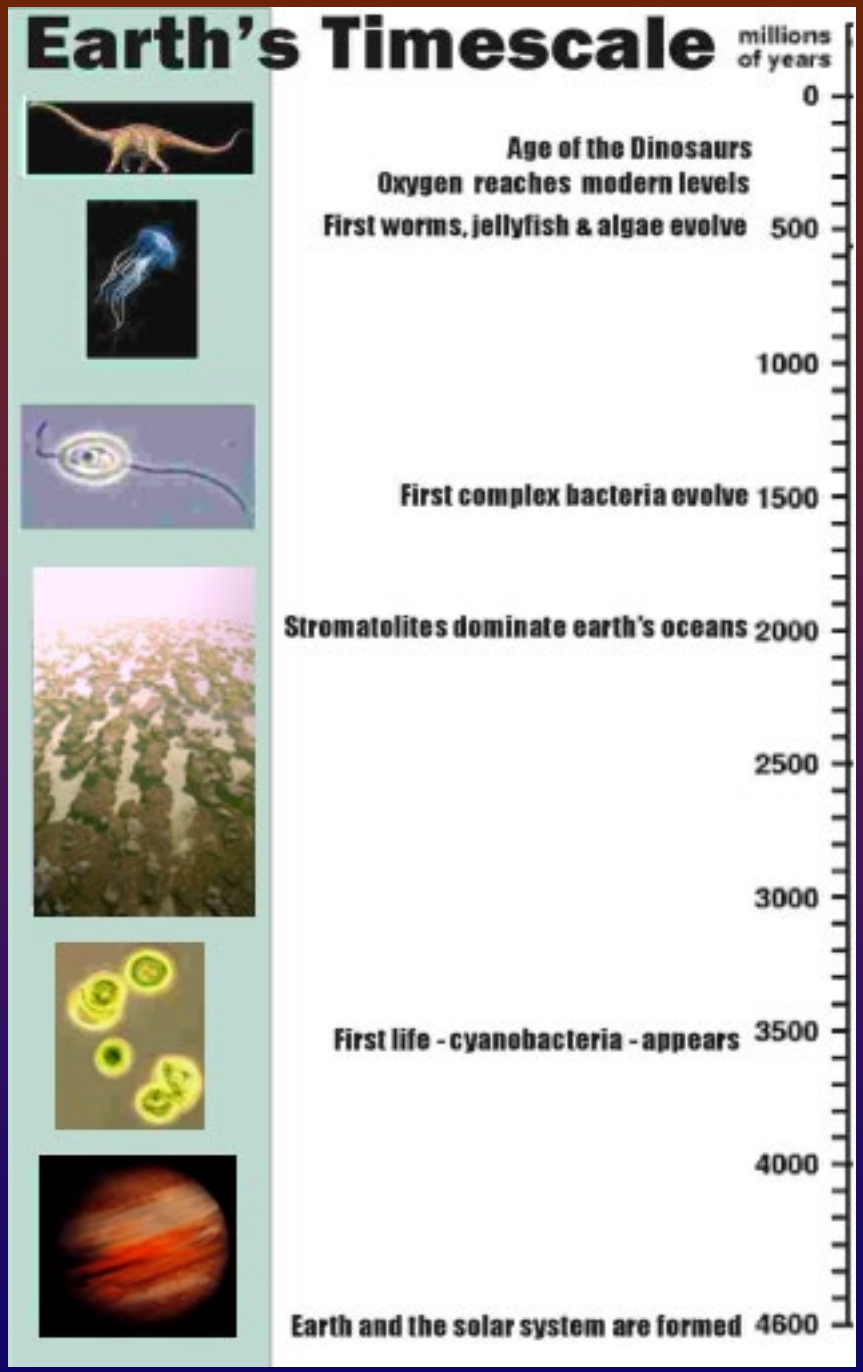
- **Some scientists believe that these trapped sediments helped protect the cyanobacteria against ultraviolet radiation.**

- **In places, the ancient stromatolites formed giant reefs that rivalled even the Great Barrier Reef in size.**

- **The fossil record shows us that some of these reefs were as thick as 4500 meters!**



- More complex life forms such as jellyfish, worms and algae didn't appear on earth until 500 million years ago.
- Their arrival signalled the coming of an explosive evolution of complex, oxygen-dependent life forms.
- This ended the 2,500 million year reign of cyanobacteria on earth (a reign ten times longer than that of the dinosaur- 250 million years - and a thousand times longer than our own - a scant 2.5 million years).

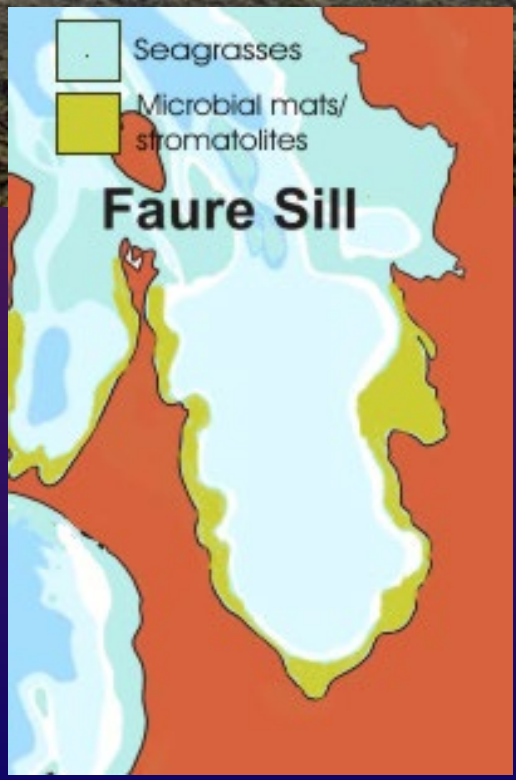


- **Today, stromatolites very rarely form. This is because modern cyanobacteria are grazed by fish, snails and other animals, and must also compete with plants and algae for places to live.**

- **However in Hamelin Pool, salt concentrations are so high that most plants and grazing animals cannot survive.**

- **As a result, a wide diversity of cyanobacteria now flourish in Hamelin Pool, forming extensive mats and stromatolites, much as they did billions of years ago.**

- **Microbial mats also grow outside of Hamelin Pool on tidal flats in Lharidon Bight, Freycinet Harbour, and along the Carnarvon Coast.**

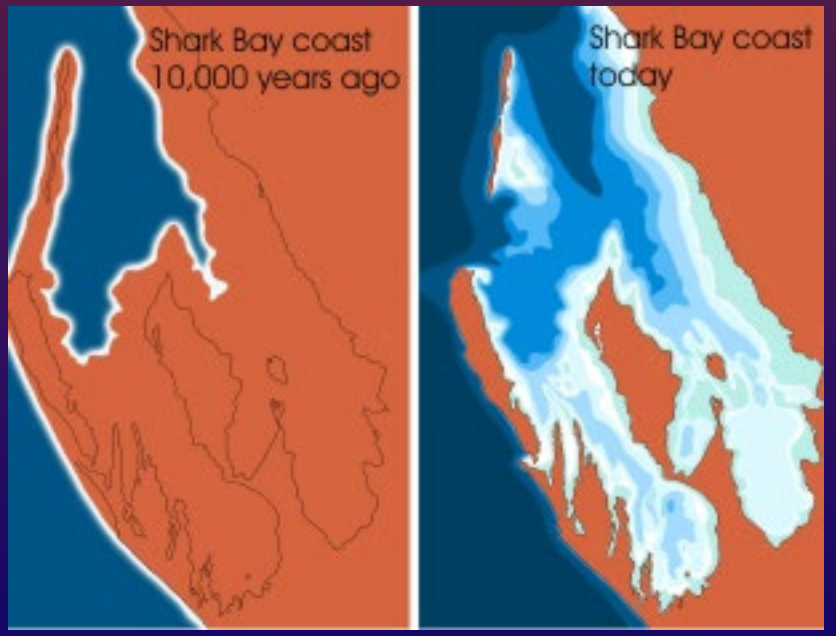



# Bernier and Dorre Islands

- important habitats where threatened animal species still survive.

- **Cat and fox-free Bernier and Dorre Islands are home to five of the world's most endangered mammals.**


- **These islands - and the animals that inhabit them - were separated from the mainland by rising sea levels, after the last ice age about 7000 years ago.**

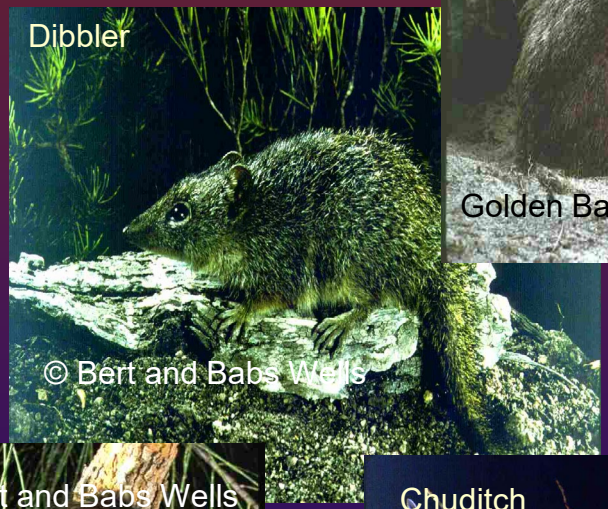


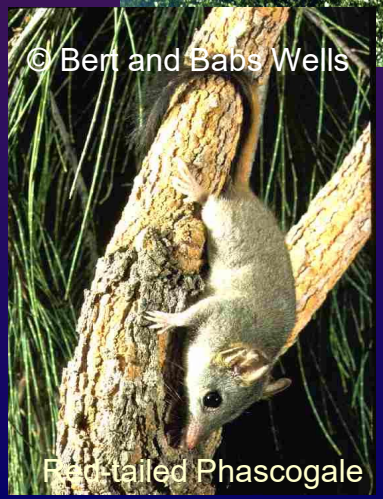
- **Before Europeans arrived some 200 years ago, many more mammal species were found across Australia than are found today.**

- **Sadly, these animals fell prey to the cats and foxes brought over by the Europeans, and many are now either extinct or critically endangered.**

*Critically endangered species once found in Shark Bay*






- **Four of these once wide-spread animals: the Rufous Hare-wallaby (or Mala), the Banded Hare-wallaby, Shark Bay Mouse and the Western Barred Bandicoot - remained safe on Bernier & Dorre islands.**



- **Meanwhile cats and foxes destroyed their cousins on the mainland.**

- **Now Shark Bay's cat and fox-free islands are the only places left in the world where these three endangered species are found in the wild.**


- **The Boodie, or (Burrowing Bettong) is another endangered species found on the islands.**

- **This species were once common on the mainland.**

- **Now the only other place in the world the Boodie is found is on Barrow Island in the Pilbara.**

- **A number of ambitious conservation projects across Australia are working to save these animals from extinction.**

- **They are doing this by controlling feral cats, foxes and goats, and reintroducing endangered species to different parts Australia.**

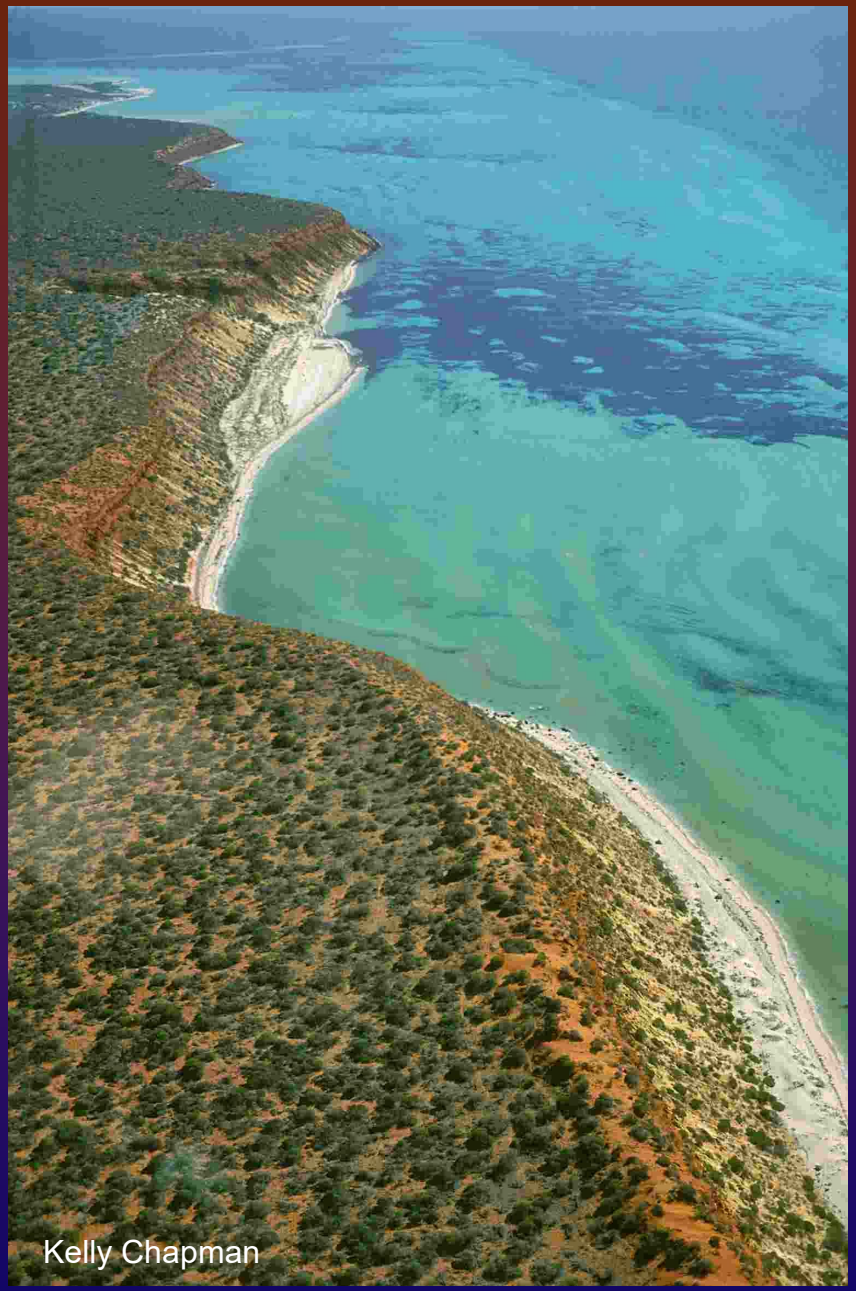
Three projects are working to reintroduce these species to mainland Shark Bay:

- Project Eden on Peron Peninsula
- Useless Loop's Community Biosphere Project on Heirisson Prong, and
- Australian Wildlife Conservancy's Faure Island Project

# More Reasons

## for Shark Bay's World Heritage Status

- ✓ An eighth of the world's total Dugong population
- ✓ Exceptional coastal scenery at Zuytdorp Cliffs, Dirk Hartog Island, Peron Peninsula and other sites
- ✓ Peron Peninsula's unusual birridas
- ✓ diverse and abundant marine life
- ✓ Spectacular spring wildflower displays
- ✓ Australia's most important Loggerhead Turtle nesting areas
- ✓ The meeting place of three climatic zones and tropical and temperate species  many endemic plants, birds and reptiles
- ✓ Gigantic shrubs of the Tree Heath
- ✓ Salt-adapted and genetically unique pink snapper and venerid clams.

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