從世界看東沙環礁
海洋生物的孕育場
Dongsha Atoll — the Nursery of Marine Life

今年新成立的東沙環礁國家公園，是我國第一座以保育海洋生態資源為首要目標的國家公園，主要保育與復育位於南海北部海域的東沙環礁，為我國第七座國家公園。由於總面積廣達35萬多公頃，比現有6座國家公園總和面積還大，為台灣唯一發育完整的大型環礁地景。

東沙環礁古稱「月牙島」，係由潟湖及珊瑚礁台所組成，直徑約25公里及面積達500平方公里，具有完整珊瑚礁景觀生態資源，其豐富的生物多樣性成為南海及台灣海洋資源的關鍵棲地。在長約46公里及寬約2公里的環狀礁台區部分，會隨潮浪高低，時而露出水面；環礁內由水深16公尺以內的淺潟湖與灘洲所組成，環礁外25公尺深度的海底則有古沉船遺蹟、熱帶珊瑚和魚群、棘皮動物、甲殼動物、底棲藻類、礁斜陡坡等構成豐富海洋文史生態廊道。

Established early this year, Dongsha Marine National Park is the 7th national park in Taiwan and the first aimed at marine resources conservation to restore the Dongsha Atoll in South China Sea. With an area of 350,000 hectares that is larger than the total of all six other national parks, it has a fully developed large atoll landscape most unique in Taiwan.

Previously named “Crescent Island”, Dongsha Atoll consists of lagoons and reef platforms and has a diameter 25km in length and 500km^2 in area. It has a complete coral reef landscape rich in eco-resources and biodiversity that make it a key habitat for the marine resources in both South China Sea and Taiwan. The 46-km-long and 2-km-wide ring-shaped reef platform merges and submerges in the sea with the tide. The inner part of the atoll is a lagoon no deeper than 16m and shoals, while the outer part is the 25-m-deep sea with ancient ship wreckages in the bottom plus abundant coral reef, tropical fish, echinoderm, crustacean and benthic algae.

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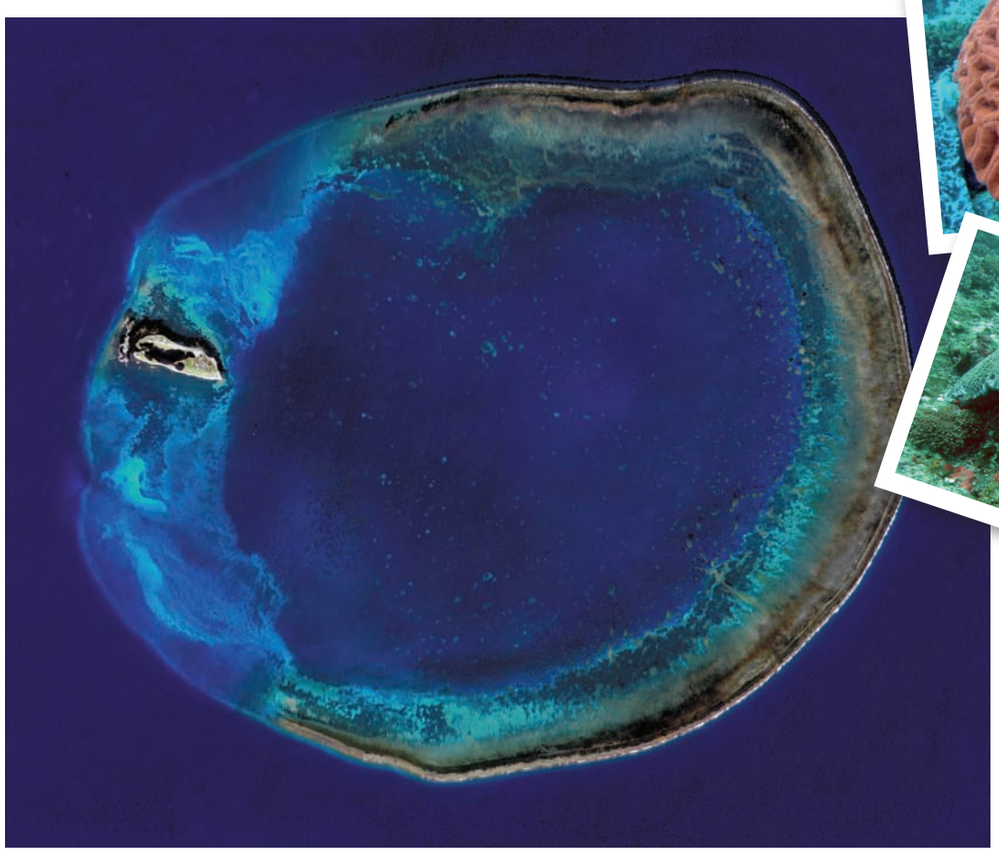
1 東沙貝殼沙灘（營建署提供）
Shell sandy beach of Dongsha (provided by CPAMI)

2 東沙環礁衛星影像圖（營建署提供）
Satellite image of Dongsha Atoll (provided by CPAMI)

3 聯合瓣葉珊瑚（海管處提供，戴昌鳳攝）
Lobophyllia hemprichii (by Chang-feng Dai, provided by MNP)

4 越南菊珊瑚（海管處提供，戴昌鳳攝）
Favia vietnamensis (by Chang-feng Dai, provided by MNP)



分期計畫性復育生態

今年初成立的東沙環礁國家公園，為配合國家財政狀況，園區建設計畫分為二期發展，在第一期1至5年的開創階段規劃中，先針對資源普查、生態調查和基礎建設環境影響分析，以及東沙島整體規劃優先進行，並強調復育與監測環境保育的重要性。其重點工作主要有設立國家公園管理處和服務中心，以及國際海洋研究站；廢棄物和污水的處理與利用；東沙海洋天然災害安全防護與應變計畫；環礁生態保護和監測設施；替代能源之規劃與試驗；東沙島建物節能與省水的規劃與試驗；安全設施及對外交通設備改善；規劃和改善原有東沙島車道及步道；自然和人文資源調查研究，規劃長期監測系統及建置資料庫，海洋科學研究設備設置等資源經營管理所需計畫。

The Phased Project for Ecological Recovery

The development project of Dongsha Marine National Park consists of 2 phases. The first is a 1 to 5 years' initial planning, including surveys on resources and ecology, analysis of the environmental influence from infrastructure and the overall planning that focusing on the importance of restoration and monitoring the environment. Its major tasks are: establishing the park headquarters, a service center and an international marine research station; waste processing and utilization; planning and testing for the alternative power resources; planning and testing for energy-saving and water-saving buildings on the island; improving the security facility and transportation; improving the existing roads and trails; research on natural and cultural resources; planning for a long-term monitoring system and database; planning for marine scientific research equipment and resource management.

其實在過去2年籌備成立國家公園期間，東沙環礁國家公園籌備處已經在2004年起委託中華民國珊瑚礁學會、中華民國國家公園學會、財團法人海洋台灣文教基金會，分別執行「東沙海域生態資源基礎調查研究」、「東沙國家公園陸域生物資源調查」、「東沙海域古沉船遺蹟之調查研究」等研究計畫。

在「東沙國家公園海域生物資源調查」中，主要調查環礁內外海域的魚類、珊瑚、無脊椎動物、藻類、水質檢測分析以及建立資料庫，目前共記錄到魚類531種、珊瑚類250種、軟體動物167種、棘皮動物27種、甲殼類動物31種和大型藻類148種，並提出外環礁區的海洋生物種類多於島邊、內環礁區的差異分布觀察現象。

「東沙國家公園陸域生物資源調查」則是針對東沙島陸域生態進行系統化調查，目前發現了維管束植物51科110屬126種、鳥類32科98種、陸域兩生爬行動物2種、陸棲哺乳動物3種、蜘蛛目8科11種、昆蟲至少73科125種。受委託之研究單位也提出針對島上動植物的管理建議，如應減少對原生植被分布區域的開發，小規模逐步移除外來的銀合歡防風林，並改植原生植種替代；禁止野放貓犬，避免成為野生動物殺手；保護潟湖內沙洲與潟湖口外灘地，以提供水鳥適當的棲地；保留環島沙岸環境，避免人為建物在附近產生光線或噪音的干擾，以利海龜上岸產卵。

In fact during the 2 years' preparation for the establishment of the park that starting from 2004, the headquarters already commissioned to Taiwanese Coral Reef Society, National Park Association and Foundation of Ocean Taiwan with research projects like Basic Survey on Marine Eco-Resources of Dongsha, Survery on Bio-Resources on land in Dongsha National Park and Survey on Ancient Ship Wreckages in Dongsha Sea Area, etc.

The purpose of Basic Survey on Marine Eco-Resources of Dongsha is to record the species of fish, coral, invertebrate and algae, make water analysis and establish a database. The present records include 531 fish species, 250 coral species, 167 mollusk species, 27 echinoderm species, 31 crustacean species and 148 large algae. The distribution difference that marine species of the outer atoll are more than those of the rime and inner atoll is also observed and noted in the survey.

Survey on Bio-Resources on land in Dongsha National Park makes a systematic survey on the ecology on land, and discovers 126 species of vascular plants from 110 genus of 51 families, 98 species of birds from 32 families, 2 species of amphibians and reptiles, 11 species of Order Araneae from 8 families, and at least 125 species of insects from 73 families. The research institute also offers management suggestions on reducing the development of primeval vegetation area, gradual replacing ecotic plants, banning stray cats and dogs, protecting the water fouls' habitat surrounding the lagoon, reserving the sand coast for the sea turtles coming ashore to lay eggs.

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1 魔鬼簑鮨，俗稱獅子魚（海管處提供，鄭明修攝）
Pterois volitans (by Ming-shiou Jeng, provided by MNP)

2 腎形真葉珊瑚（海管處提供，陳正平攝）
Euphyllia ancora (by Jeng-ping Chen, provided by MNP)

3 粒皮瘤海星（海管處提供，鄭明修攝）
Choriaster granulatus (by Ming-shiou Jeng, provided by MNP)

4 卷曲汽泡珊瑚（海管處提供，戴昌鳳攝）
Plerogyra sinuosa (by Chang-feng Dai, provided by MNP)

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1 東沙外環礁監測珊瑚覆蓋率調查（海管處提供，戴昌鳳攝）
A survey for the coverage rate of living coral in Dongsha outer atoll (by Chang-feng Dai, provided by MNP)

2 東沙外環礁海域的沉船（海管處提供，鄭明修攝）
The ancient ship wreckages in Dongsha outer atoll (by Ming-shiou Jeng, provided by MNP)

著手調查古沉船遺跡

由於東沙島位於古代「海上絲綢之路」的航線附近，夏季颱風頻繁、冬季風力強勁，導致海面浪流洶湧。因此，從古至今在不同時代的各類船舶都可能擱淺沉沒於此一海域，值得針對海洋考古及文史保存做更進一步的探勘研究。未來若能積極促成國際合作，將使東沙成為國際海洋考古的重鎮。

為此，東沙環礁國家公園管理處在「東沙海域古沉船遺蹟之調查研究」中，進行現地潛水勘查，發現在東沙環礁西側，亦即東沙島南北航道附近屬珊瑚碎屑和貝殼砂質之底質，較有可能保存完好的船隻遺骸和文物，建議未來可列為第一階段續勘重點區域。此外，東沙環礁結構特殊，其邊坡並非想像中的陡起陡落，而是具有類似火山周邊流落岩漿的潮溝，地質研究上具有深度研究意涵，值得未來列入研究。

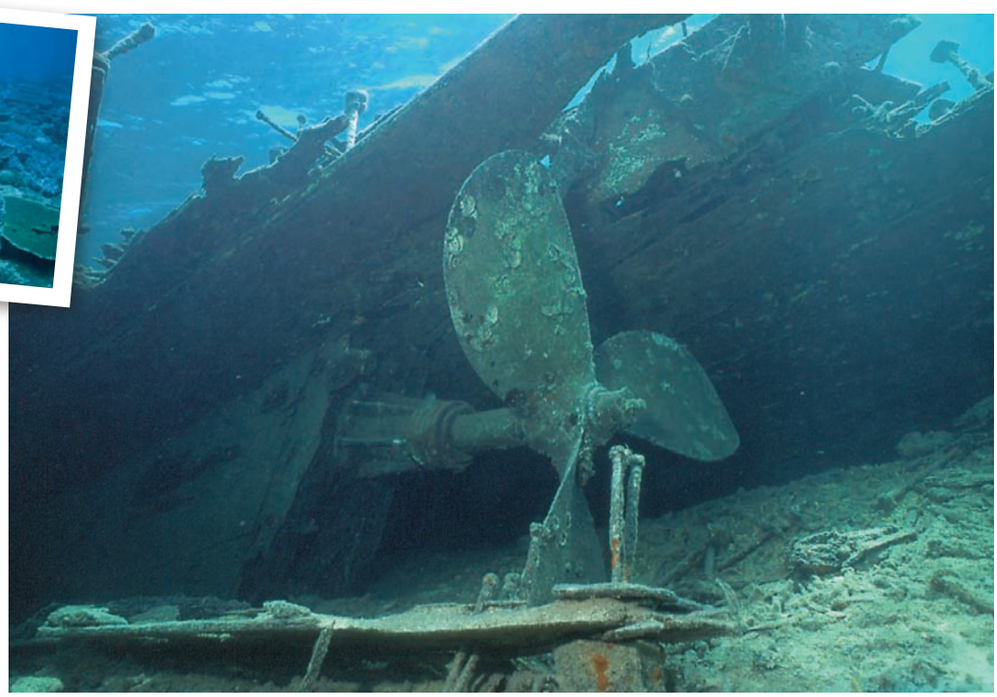
目前，東沙環礁國家公園致力於推廣海洋保育的概念，除了將結合政府、保育團體及專家學者等一同監測研究到的各項海洋資源成果，透過環境教育的模式，宣導大眾建立正確的海洋保育觀念，未來也將積極參與世界性研究工作和海洋保護活動，期待能與世界海洋保育成功接軌。

Inspection of the Ancient Ship Wreckages

Dongsha is situated close to the traffic of ancient “silk road on the sea” where typhoons frequent in summer and hard wind blows in winter. Ships of different years have been brought down by the boiling sea and reef, and now they become precious targets for archeological research. Dongsha may become an important site of marine archeology through promoting international cooperation.

In Survey on Ancient Ship Wreckages in Dongsha Sea Area, it is found that the ship wreckages might be buried in the coral grains and seashell sands on the west side of the atoll close to the north-south traffic route and thus makes the region a priority for following inspection. Also, the side slope of the atoll resembles a trench formed by flowing lava of the volcano, which is worthy of further geological research.

For the present, Dongsha Marine National Park is dedicated to promoting marine conservation by joining the government, conservation groups and experts to examine the research results, and advocate the correct concept to the public via environmental education. In the future the park will actively participate in international researches and marine protection programs, and get connected to the global marine conservation.



Close-up
生物特寫

白斑蹇魚 *Antennarius pictus*


蔡永春 攝 / by Yung-chuen Tsai

科別　蹇魚科
學名　*Antennarius pictus*
英文俗名　Fishing frog, Shaggy angler, Hispid forgfish
中文俗名　五腳虎

Family Name　Antennariidae
Popular Name　Fishing frog, Shaggy angler, Hispid forgfish

白斑蹇魚主要分布在印度洋至太平洋的礁區、近海沿岸，屬於淺海珊湖礁區底棲魚類，而在台灣則較常出現於澎湖、東沙。其長相頗為怪異，體表粗糙，體側扁呈卵圓形，腹部膨大，尾柄明顯；下頜突出，且其上下頜、鋤骨及腭骨均具齒。較為特別的是牠們具有與鮟鱇一樣的吻觸手（由第一背鰭特化而成），藉由揮動吻觸手前端餌料狀的衍生物，來誘捕其他小魚。此外，胸鰭也進化成為像手臂，可以用來支撐在海底爬行。

Antennarius pictus is a benthic fish, mostly found near the coastal and reef areas from Indian Ocean to Pacific Ocean, and around Penhu and Dongsha in Taiwan. This odd-looking fish has an oval-shaped flat body with rough skin, swollen in the belly and a conspicuous caudal peduncle. Its lower jaw protrudes out, and its upper and lower jaws, the vomer bone and maxilla bone are all teethed. It has specified illicium (evolved from the first back fin) like those of ***Lophiomus setigerus*** with a bait-like tip to catch small fish. Its thorax fin also evolved into arms to support the body when crawling.

長硨磲蛤 *Tridacna maxima*

科別　硨磲蛤科
學名　*Tridacna maxima*
中文俗名　硨磲貝

Family Name　Tridacnidae
Popular Name　Giant clam shell

需要潔淨熱帶海水才能存活的長硨磲蛤，殼緣有波浪型的皺褶，因其外套膜與共生藻行光合作用，致使外套膜呈現出豐富多變的色彩。人們利用長硨磲蛤的歷史非常久遠，早在太平洋的南島文化史前遺址中，發現史前人類將牠磨製成頸飾；其巨大的閉殼肌，則被人類製作成干貝食用，導致長硨磲蛤大量銳減，目前國際已在1983年將其列為世界稀有海洋生物。根據調查，東沙環礁外礁的珊瑚礁上偶爾可見長硨磲蛤、鱗硨磲蛤。

Living only in clean tropical sea, ***Tridacna maxima*** has wrinkled scallops. Its envelope can photosynthesize with the symbiotic algae, and therefore displays various colors. The use of ***Tridacna maxima*** for neck jewelry began long ago in the prehistoric civilization by the Austronesian people. Its large adductor muscle is a major source of scallops, a favorite for seafood, resulting in the drastic drop of ***Tridacna maxima*** population and adding it to the list of UN's rare marine life in 1983. Surveys show that ***Tridacna maxima*** and ***Tridacna squamosa*** are found occasionally near the coral reef of outer Dongsha Atoll.